70-NET

UNINTERRUPTIBLE POWER SUPPLY SYSTEM

THREE-PHASE OUTPUT

50 - 60kVA

User Handbook

10H52163PBMC rev.2

GB

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ABOUT THIS PRODUCT

With this innovative Uninterruptible Power System CHLORIDE UPS SYSTEMS is able to offer a combination of maximum load safety and minimum running costs.
Now, your equipment will protected from all disturbances associated with the mains power supply; in fact, 70-NET ensures total protection from voltage peaks and troughs, variations in frequency, electrical disturbances and interruptions in mains supply.
70-NET is an intelligent, double conversion UPS - see Fig. 13 - in transformerless, three phase in/three phase out configuration. It is available at ratings of 50 and 60kVA; and may be connected in parallel up to a maximum of 8 units.
Numerous optional components are available, including: parallel kits, safety and disconnecting devices, system bypass switches, as well as software and communications solutions, that allow you to project and install elaborate systems which ensure total protection for you loads.

CONTINUOUS CONTROL OF YOUR LOAD SAFETY

Extensive research has demonstrated how the application of maintenance programmes can enhance UPS performance, improving reliability and prolonging service life.
For this reason CHLORIDE UPS SYSTEMS offers solutions which are specifically tailored to your needs: ranging from access to expert consultants via telephone to the availability of technical assistance 24 hours a day, 365 days a year.
In particular, for your complete peace of mind, you can choose LIFE.net, the advanced remote diagnostic system, which automatically transmits data on the operating condition of your UPS to our Customer Service Dept.
Wherever you are, whatever your business and however great or small your requirements, you can always count on the quality of Service provided by CHLORIDE UPS SYSTEMS .

PREFACE

This User's Manual contains information regarding the installation, operation and use of the Uninterruptible Power System (UPS).

It is advised that this User's Manual be consulted before installation of the equipment, which operation shall only be carried out by qualified personnel. Thereafter, it shall be kept and referred to whenever it is necessary to carry out work on the UPS.

1. SAFETY

1.1. INTENDED USE

This device serves as an uninterruptible power supply (UPS) for connected loads. The device is in compliance with all relevant safety regulations concerning information technology equipment, including electronic appliances for use in an office environment.
In certain configurations, battery packs are installed in the UPS devices. These may only be connected electrically to the corresponding UPS device.

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1.2. WARNING NOTICE

Danger
CHLORIDE considers the safety of personnel to be of paramount importance. For this reason it is essential that procedures relating to safety be studied before commencing work and properly adhered to thereafter.

- **The user or Operator** may only intervene in the operation of the UPS provided that the instructions laid out in Chapter 6. are strictly adhered to.
- **Installation** as described in Chapter 4. may only be carried out by **qualified technicians**.
- Even when all switches are off and isolators are open, hazardous voltages are present within the UPS; any operation that requires protection panels to be opened and/or removed may be carried out by authorized technical personnel only.

1.3. SAFETY NOTICES

Danger
Carefully read the following safety notices! Failure to observe the indications may endanger your life, your safety, the reliability of your device or the security of your data.

- Use only suitable packaging to transport the device (protect against jolts and shocks).
- If the equipment is moved from a cold environment to the operating room, moisture condensation may occur. Before commissioning the device, it must be completely dry. Therefore, an acclimatisation period of at least two hours is required.
- The equipment must be installed in accordance with the environmental conditions specified in para. 3.4 and Chapter 10.
- There is no button on the panel and no switch inside the UPS that isolates completely the device (UPS) from the mains. To do this, the power cables must be disconnected.
- **In case of interruption of the mains voltage, the external battery maintains the power supply of the user equipment.**
- Lay the cables in such a way that no one can stand on or trip over them. When connecting the device to the power supply, follow the instructions in chapter Chapter 4.. **It must be ensured that the live input source cannot accidentally become connected to the UPS during installation** - see para. 4.1 and Chapter 6..
- Ensure that no objects (e.g. pins, necklaces, paper clips, etc.) are left inside of the device.
- In emergencies (e.g. damaged case, controls or power cables, penetration of liquids or foreign matter) switch off the device, disconnect the power cables and contact the appropriate customer service representative.
- Do not connect equipment that may overload the UPS or demand DC-current (e.g. half-wave rectifiers).
- The sum of the leakage currents (protective conductor current) of the UPS and the connected devices may exceed 3.5 mA for all ratings. Earth connection is essential before connecting supply.
- Data transmission lines should not be connected or disconnected during a thunderstorm.

- Emergency Power Off (E.P.O.) input - X8 - is located behind the secondary access panel of the unit (see Fig. 5). When this connection is open, the logic circuit will immediately shut down the UPS output. In order that the wiring installation safety complies to the European Harmonized Document HD384-4-46 S1, an Emergency Switching Device (E.S.D.) shall be fitted downstream of the UPS.
- This device is not equipped with its own mains separation device. You are, therefore, required to provide a mains separation device at the installation site.
- The mains separation device for the mains supply must be provided with a warning plate on which the following is stated: "Switch off the UPS supply prior to working on this system!"

1.4. EMERGENCY MEASURES

In an emergency, immediately carry out the following steps:

- Open the external mains separation device.
- Switch off the load.
- Put out any fires with an extinguisher appropriate for the batteries being used.
- Never attempt to extinguish a fire with water since the batteries carry voltage.

1.5. DANGER AREAS

When the UPS is closed, parts which carry voltage must not be touched. After removing the cabinet panelling or terminal field covering, the connection terminals and rails, as well as exposed metal parts and other components carrying dangerous voltages are no longer protected against accidental contact!

Danger

The UPS contains capacitors which continue to store energy for a period of time after the device has been disconnected from the mains supply(ies) and battery. This voltage (> 400 V DC) is present at the battery terminals. For this reason, check that the UPS and the external mains separation device are switched off and the battery fuses removed. Before continuing work, measure the voltage at the battery terminals and at the mains input filter and wait until this has dropped to 0 V or wait at least 5 min. after disconnecting. Failure to do this can lead to severe electrical shock and even death.

1.6. LEAKAGE CURRENTS

Danger

The PE safety conductor shall be connected before any other cables.

1.7. RADIO FREQUENCY INTERFERENCE

Danger

70-NET is interference protected according to EN_50091-2 or EN_55022 class RS. To avoid interference, installation restrictions may apply or additional measures may be required.

1.8. BATTERIES - (EXTERNAL ONLY)

Battery maintenance must be carried out by authorised personnel.

- The batteries installed in the battery extension kits contain electrolytic substances. Under normal conditions the containers are dry, but a damaged battery may leak electrolyte which can be dangerous in contact with the skin and cause irritation to the eyes. Should this happen wash the affected part with copious amounts of water and seek immediate medical advice.
- Voltage is present on the battery contacts at all times.
- Even when discharged a battery has the capacity to supply a high short circuit current, which, in addition to causing damage to the battery itself and associated cables, may expose the operator to the risk of burns.
- Battery voltages can be hazardous. The voltage of a single cell is not dangerous, however a number of such blocks, connected in series, can produce dangerous voltages. During maintenance, disconnect the battery blocks so that not more than five batteries are connected in series.
- The batteries are sealed “hermetically”. Periods of storage or disuse may not exceed 6 months, at 20°C, without the batteries being recharged. If this period is exceeded it is essential that the battery be recharged, which requires that the UPS be switched on. Guarantee is void if these instructions are not followed. However, it is advised that recharging be carried out at least once every 4 months.
- Since new batteries often do not provide full capacity after an initial charge it may be necessary to carry out a number of discharge/recharge cycles before optimum performance is achieved.
- In order to protect the environment batteries must be disposed of in accordance with the regulations governing disposal of toxic and harmful waste.

1.9. RE-PACKAGING

To re-package, proceed as follows:

▶ Do not pack the equipment until at least six hours have elapsed since the last recharge.

▶ Place the equipment in bags made of a material sufficiently porous to allow it to breathe (e.g. 100μm polyethylene).

▶ Do not remove air from the packaging.

2. INTRODUCTION

This User's Manual contains information regarding the installation, operation and use of the Uninterruptible Power System (UPS) 70-NET .
It is advised that this document be consulted before installation of the equipment, whose operation shall only be carried out by qualified personnel.
Thereafter, it shall be kept and referred to whenever it is necessary to carry out work on the UPS.

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2.1. NOTES TO THE EC DECLARATION OF CONFORMITY

70-NET conforms to the following European directives:

73/23/EC
Directive of the council for adaptation of the legal regulations of the member states regarding electrical equipment for use within specific voltage limits, modified by directive 93/68/EC.

89/336/EC
Directive of the council for adaptation of the legal regulations of the member states regarding electromagnetic compatibility, modified by directive 91/263/EC, 92/31/EC and 93/68/EC.
Conformity is established through compliance with the following standards:

- EN 50091-1-1
- EN 50091-2

Additional information regarding adherence to these directives is included in the appendices NSR and EMC of the EU Declaration of Conformity. If needed, the EU Declaration of Conformity can be requested from CHLORIDE.

2.2. SYMBOLS AND PICTOGRAMS

The following symbols and pictograms are used in this handbook:

⚠ **Danger**
Indicates instructions which, if not observed, may result in danger to life, safety, the reliability of your device or data security.

Notice
Indicates additional information and tips.

▶ **Indicates a step that you must carry out.**

2.3. TERMS USED

Service bypass
The switch that allows continued supply to the load during maintenance work; also referred to as the maintenance bypass.

Electronic bypass
A thyristor switch which connects the load directly to mains in event of inverter overload; also referred to as a static switch or static bypass.

Qualified personnel
Personnel who are familiar with the installation, assembly, commissioning and operation of the product and are qualified to carry out the respective activities.

Display
The control panel comprises a liquid crystal, alphanumeric display, which provides diagnostic and operational information about the UPS.

2.4. DOCUMENTATION STRUCTURE

These instructions may be supplemented with additional sheets, describing specific extensions or options.

3. PREPARATION FOR USE

3.1. TRANSPORT

The equipment must be kept upright at all times and handled with care, damage may be caused if dropped or subjected to severe impact.

3.2. DELIVERY AND STORAGE

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The goods have been checked thoroughly before dispatch. On receipt check the packaging and ensure that the contents are undamaged. Any damage or missing parts must be reported to the supplier **within 8 days of delivery**.

3.3. UNPACKING

The utmost care shall be taken when removing the packaging in order to avoid damaging the equipment. Check all packaging materials to ensure that no items are discarded. Once the packaging has been removed, the UPS shall be taken off the pallet by removing the kick plate (ref. Fig. 5) and the retaining screws, as illustrated in Fig. 1, and lifting it off using a fork lift (max width between forks - 540mm - Ref EN 1757). Note also, that when moving the pallet, the maximum distance between forks is 690mm).

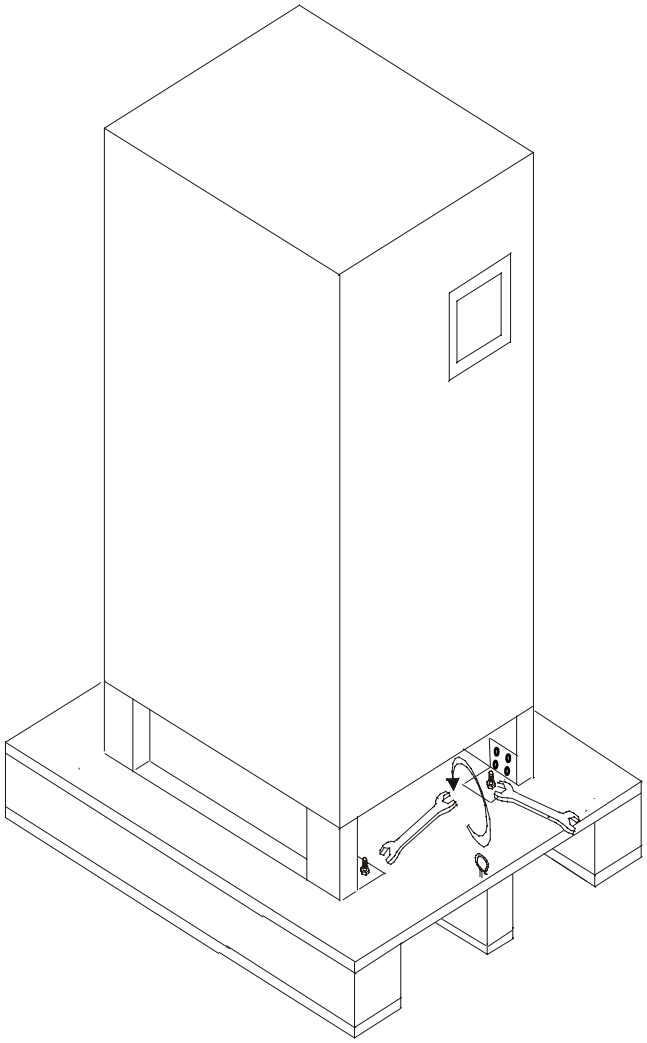

Figure 1 - Unpacking

If it is not intended that the UPS be used within seven days of delivery, attention shall be paid to the storage conditions.

- If the batteries or the equipment are to be stored they must be kept in a **clean, dry environment and away from extremes of temperatures**.

3.4. ENVIRONMENTAL CONDITIONS

The UPS must be installed vertically, on a level and even surface and in an area protected from extremes of temperature, water and humidity. Do not stack units and do not place objects on top of them.
The operating temperature range of the UPS is 0 °C to 35 °C (40°C for maximum 8 hours continuous operation).
The ideal environmental temperature range is 15 °C to 25 °C.The battery life is defined at 20°C. Each increment of 10 °C above 25 °C reduces the expected life by 50%.

Installation altitude

When operating the UPS at altitudes greater than 1000m above M.S.L., the load must be reduced according to Fig. 2. If the ambient temperature remains less than +30°C, no load reduction is necessary for altitudes up to 2000 m.

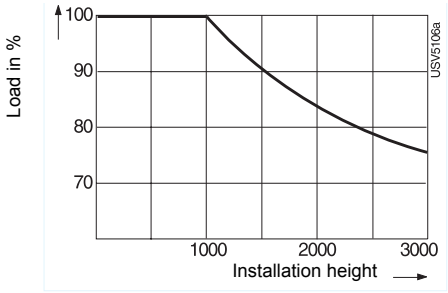

Figure 2 - Permissible load dependend on installation height

3.5. ACCESS TO AREA

The area must have sufficient space for installation manoeuvres to be carried out. Access doors must be wide enough to permit unobstructed transport of the device (See “Installation” on page 17.).

3.6. INSTALLATION SITE

It is necessary to leave the following minimum spaces around the UPS, to allow the flow of air (min. 5mm) and to provide access for the technician to carry out routine maintenance operations, which may involve removal of the panels (see Fig. 3).

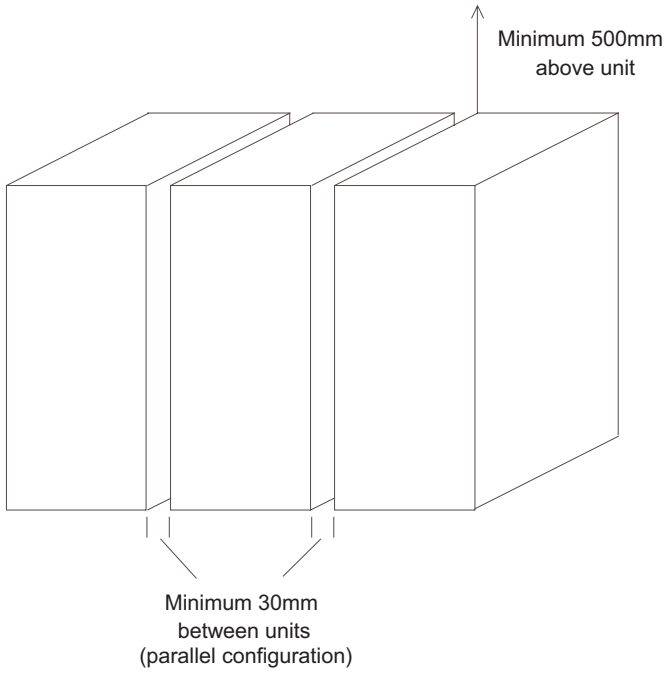

Figure 3 - Cabinet spacing

3.7. FLOOR

The floor where the UPS is installed must be even and level, its load-carrying capacity must also be sufficient to support the floor loading of the UPS - the footprint of the UPS is illustrated below (Fig. 4) and the weight may be found in the Data Tables in Chap. TECHNICAL DATA on page 49.

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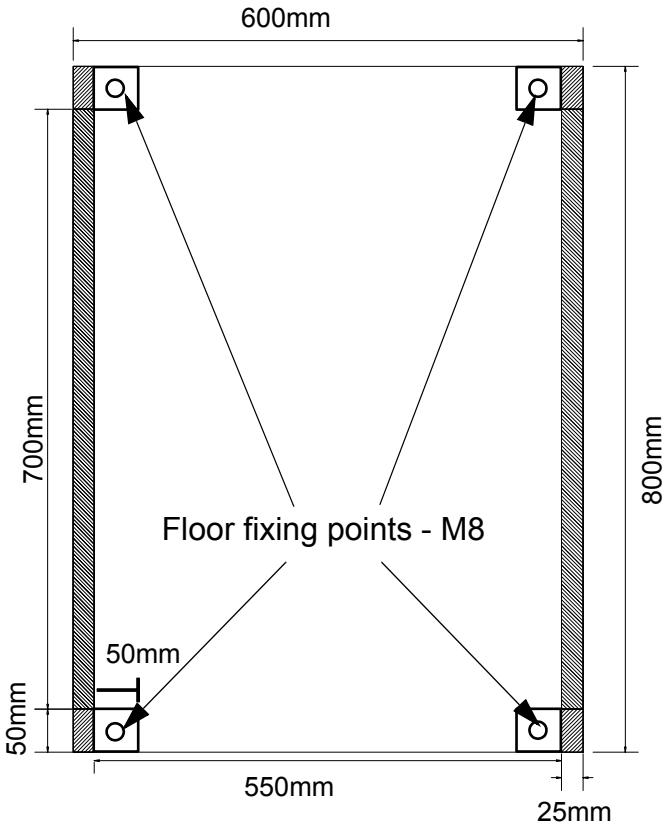

Figure 4 - Footprint

4. INSTALLATION

4.1. ELECTRICAL PREPARATIONS

It must be ensured that the live input source cannot accidentally be connected to the UPS during installation.

Notice

Installation may only be carried out by qualified technicians and in conformity with the applicable safety standards.

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For electrical installation, the nominal current rating of the source must be observed

4.2. PHYSICAL APPEARANCE

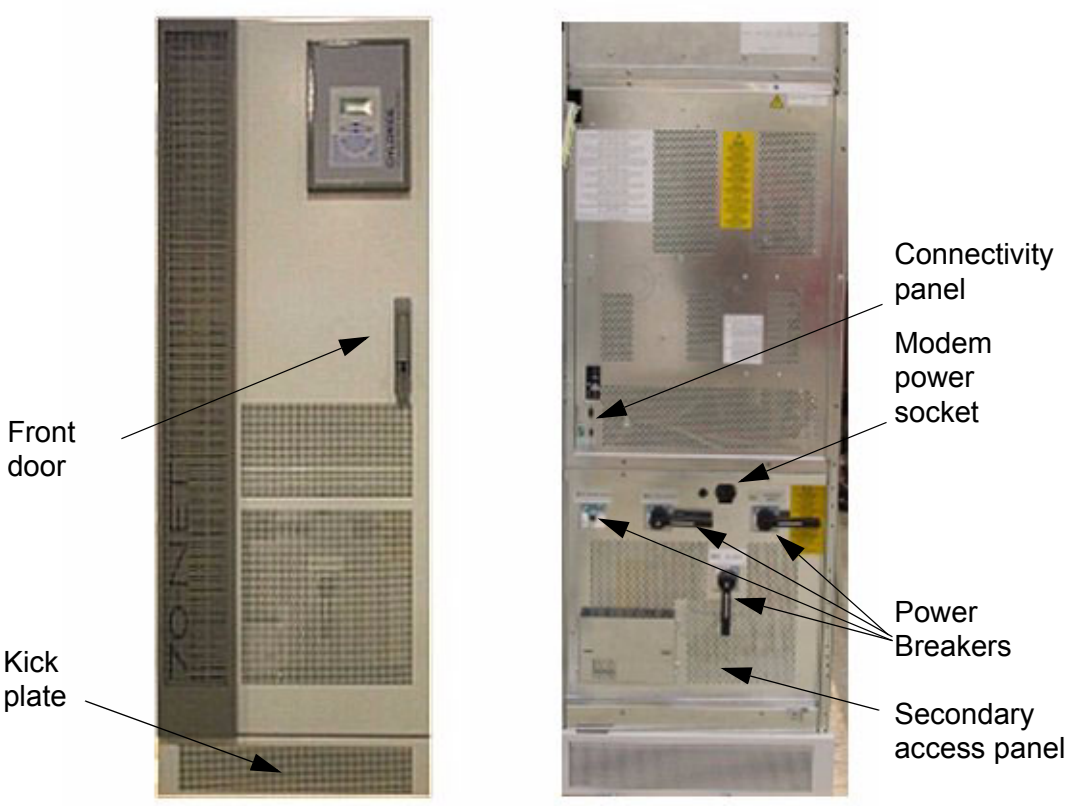

Figure 5 - Front view, with (left) and without panels (right)

4.3. CURRENTS AND SUGGESTED CABLE SIZES

Use cable cross section and fuses according to Table 11 on page 18. Connect the mains supply cables to the UPS terminals U, V, W, and U1, V1, W1, N. Connect the load to UPS terminals U2, V2, W2, N. The conductor cross sections apply for maximum currents:

1). For PVC-insulated copper cables (at 70 °C)
2). When routed in conduits for electrical installations
3). When air temperature surrounding the conduits does not exceed 30°C
4). For cable lengths up to 30 m
5). For stranded wires up to 35 mm^2 and for single wires above 35 mm^2 .

Notice
Should there be any variation in the conditions it will be necessary to verify whether the cable dimensions satisfy the requirements of IEC-287 and DIN VDE 0298. In cases where the cables are so long that they cause a drop in voltage of >3%, a larger dimension shall be selected.
If predominantly non-linear loads are present in your system, the neutral conductor (N) carries 1.6 times the current of the other conductors and should be dimensioned adequate.
Routing of cables (e.g. mains cables, communication or data lines) to other equipment should be kept separate from that of the UPS (input, output, and external battery cables).

4.4. EXTERNAL PROTECTION DEVICES

This device is equipped with manual switches intended only for Service Bypass and Internal Service operations. It is, therefore, essential that the customer install external protection devices at the installation site. This must be installed near the UPS and labelled as the mains separation device for the UPS.
(Devices for the protection of cables external to the UPS shall be installed upstream of the equipment. Such devices must be either curve C automatic circuit breakers or type GL/GG fuses.)

Notice
The following label must be displayed on all switching devices installed in the same electrical system as the UPS, even when these are located at a distance from the area in which it is located (according to European standard EN 50091-1):

ENSURE THAT THE UNINTERRUPTIBLE POWER SYSTEM IS ISOLATED BEFORE WORKING ON THIS CIRCUIT

Table 11 indicates cable dimensions and the protection devices (fuses) which must be installed by the user to protect both these and the equipment.

Table 11: Conductor cross sections and fuses

UPS devices nominal power [kVA]	50	60
Mains/Reserve Mains U,V,W / U1,V1,W1		
min. conductor cross section [mm²]	25	35
recommended fuse/breaker [A]	80	100
Load		
min. conductor cross section [mm²]	25	35
max. permissible selective fuse for loads [A]	50	50
Battery, external +, -		
min. conductor cross section [mm²]	35	50
max.possible cross section [mm²]	50	70
recommended fuse/breaker [A]		
Neutral (N) from mains/ to load N		
oversize if non-lin. load [coefficient]	1.6	1.6
Type of connector	busbars - except for battery connections which are M8 terminals	

4.5. EXTERNAL ELECTRICAL CONNECTIONS

In order to gain access to the external electrical connections it is necessary to open the front door of the UPS and remove the secondary access panel (see Fig. 5). Connect the earth cable (PE) first at ⏚.
If PEN instead of PE is available (TN-C System) connect an isolated 25 mm^2 jumper between ⏚ and PEN/N inside the UPS

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▶ **Ensure that the UPS is isolated before removing panels.**

4.6. POWER CONNECTIONS 50/60KVA

The power connections (see Fig. 6) on the front of the UPS are:

- U, V, W - MAINS INPUT
- U1, V1, W1 - RESERVE MAINS SUPPLY
- U2, V2, W2 - UPS OUTPUT TO LOAD
- D-, C+ - BATTERY TERMINALS)
- EARTH (⏚)
- NEUTRAL PLATE (PEN/N)

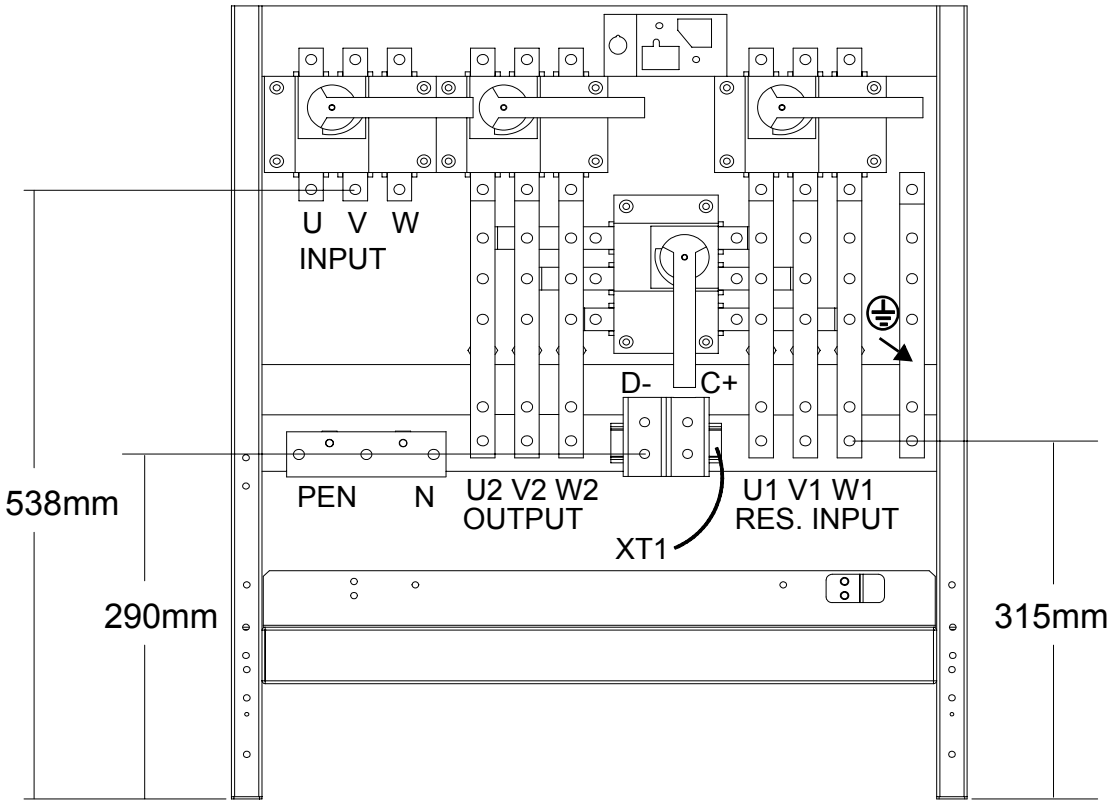

Figure 6 - Power connections

4.7. CONNECTING THE BATTERIES

▶ **The UPS unit has no separating device (no fuse, no switch) for the battery DC power connection. Ensure that this device on side of or inside the battery.**

▶ **Before connecting the batteries, please read the notice and warning label on the UPS or battery cubicle.**

Warning
Battery fuses are shipped together with the battery cabinets. They must be fitted during commissioning, NOT during installation.

Warning
In the event of malfunction, the battery shelves and/or cabinet chassis or battery frames may become live!

Notice
The requirements of the EC directives are satisfied when battery cubicles are used with original accessories. If alternative batteries are used, you must ensure that the applicable EC directives are met and declare conformity. The UPS must still be parameterised with the service software and fitted with an all-pole disconnecting device and fuses, according to Table 11 Conductor cross sections and fuses. When dimensioning your battery cables, note the connection tolerances at terminals +/-.

Warning
ENSURE CORRECT POLARITY !

4.8. CONNECTIONS BETWEEN BATTERY CUBICLES AND UPS

- The battery cubicle should be installed adjacent and to the right of the UPS.
- Make the ground connections (PE).
- Connect the batteries with cables as suggested in Table 11 to terminals + (positive pole) and - (negative pole), and in accordance with the connection diagram.
- Connect the cable for the temperature sensor between terminals XT1.1 and XT1.2 of the UPS terminal block and terminals X1.1 and X1.2 of the battery cabinet (Fig. 7).
- Shielded battery and temperature sensor lines must be used between the UPS cabinet and the battery cabinet for EMC interference suppression as specified by EN 50091-2 Class RS. The shielding is to be connected to both the UPS and battery cabinets.

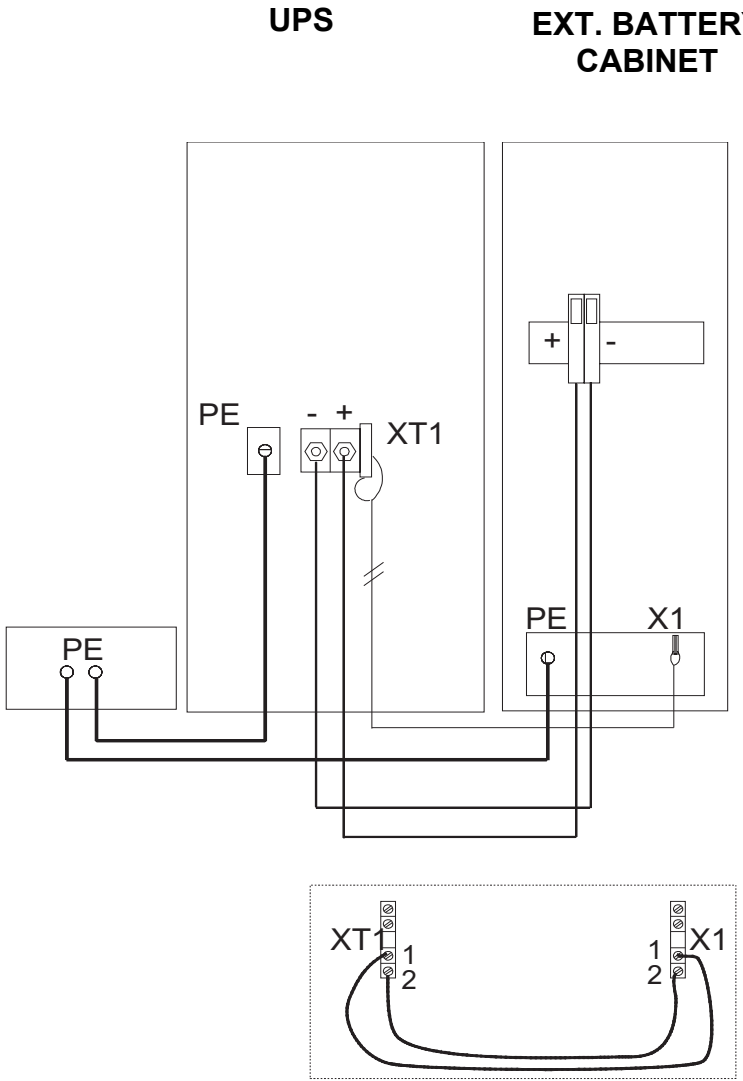

Figure 7 - External Battery Connections

4.9. HANDLING THE BATTERIES

Warning

Batteries are a potential source of danger due to their electrical charge and chemical composition. Therefore observe the battery handling instructions of the manufacturer. These usually can be found in the material which accompanies the shipment.

Recharging batteries

Warning
Batteries are a potential source of danger due to their electrical charge and chemical composition. Therefore, observethe battery handling instructions of the manufacturer. these can usually be found in the material which accompanies the shipment.

Notice
When recharging, observe the indications on the packaging

Exchanging batteries

Notice
*Before exchanging batteries, both the batteries in the cubicle, as well as those to be installed must be **fully discharged**.*

Connecting external batteries

Warning
If a battery has been disconnected and is to be reconnected, the battery isolator may only be re-connected after you have made certain that voltage with the correct polarity is present in the intermediate circuit (see Connecting the Batteries).

5. INTERFACES

70-Net is equipped with

- a standard serial interface RS232 COM for data transfer protocol or modem (X6);
- an AS400 contact interface for signal exchange (X7);
- an interface to provide emergency shut down (EPO) (X8).

All of which are located on the Connectivity Panel (see Fig. 5 on page 17).

- and a service Interface configured for use with PPVIS (X3);

The interfaces can be used for:

- Direct communication between UPS and computer
- Integration of the UPS as client into a network with centralised monitoring (SNMP)
- Transfer of operational states to external alarm systems

The necessary communication software packages and interface cables are available as options.

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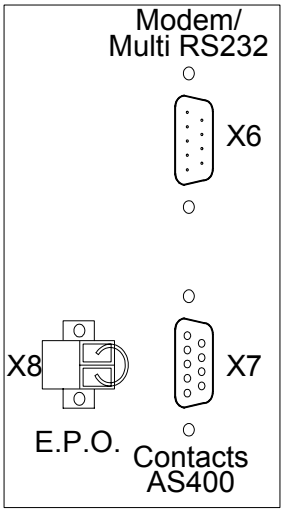

Figure 8 - Connectivity panel

5.1. STANDARD INTERFACE COM - X6

The 9-pole SUB-D connector (pin contacts) contains the RS 232 signals.

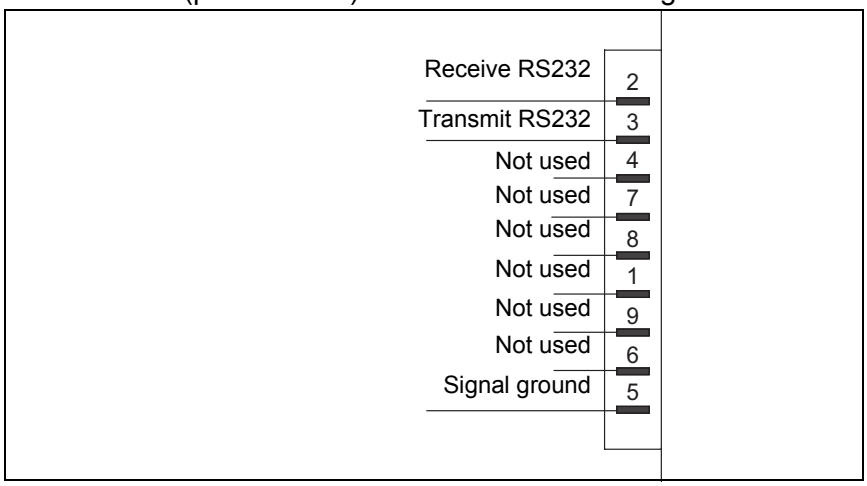

Figure 9 - Standard interface COM - X6

The COM interface is electrically isolated from all other current circuits.

SGN at pin 5

This connection is the reference point for all signals.

RXD at pin 2 and TXD at pin 3

Correspond to the normal assignment of an RS 232 interface.

5.2. COMPUTER RELAY INTERFACE - X7

The UPS is equipped with a "D"-type male 9-pole connector comprising potential-free contacts and conforming to the requirements of IBM AS/400 and other computing systems.

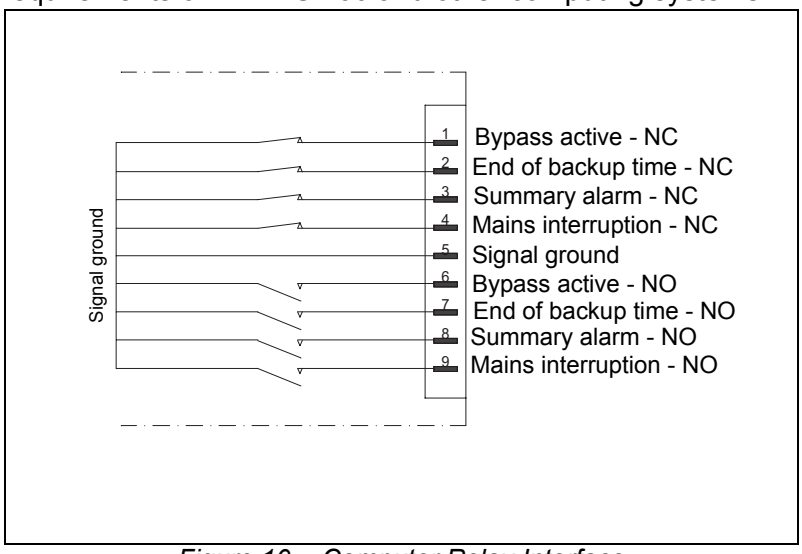

Figure 10 - Computer Relay Interface

The nominal rating of the potential-free contacts is 24V, 1A.

5.3. PPVIS SERVICE INTERFACE - X3

The service interface is a 9-pin D type connector for RS232 serial communications configured via the PPVis interface for monitoring and control software (PPVis).
The pin functions are as follows:

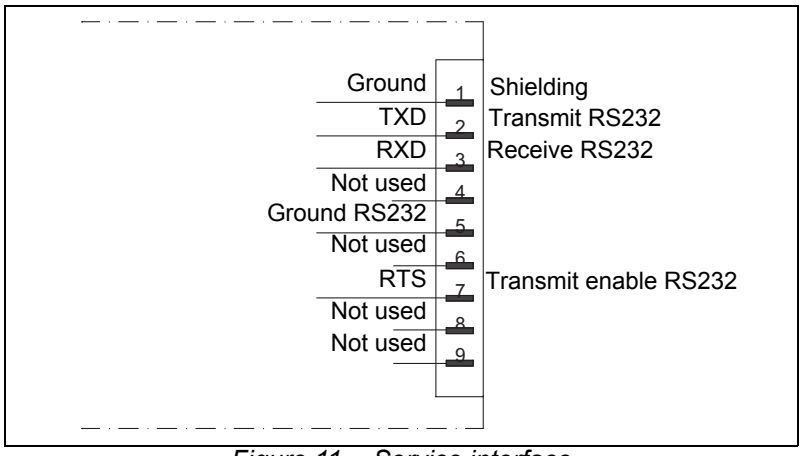

Figure 11 - Service interface

5.4. EMERGENCY POWER OFF (E.P.O.) - X8

To install an Emergency-Power-Off switch, install a switch, having the properties of an Emergency Off button (i.e. Normally Closed; held open mechanically when activated) between the contacts of X8.
In order that the safety of the wiring installation comply to the European Harmonized Document HD384-4-46 S1, an Emergency Switching Device (E.S.D.) shall be fitted downstream of the UPS.
As soon as the cause for the emergency which triggered the switch is removed, switch off all UPS switches (input, output, battery disconnector, and all external battery switches) and repeat the start-up procedure as described in Chapter 6 normal and safe operation.

Notice
The interface cables must be shielded and located away from the power cables (min. 20 cm). The shield must be connected at both ends. Control and power cables must cross at a 90° angle.

6. NORMAL AND SAFE OPERATION

6.1. FUNCTION

The uninterruptible power supply (UPS) is connected between the mains and the electrical load. It protects the load from mains interruptions and power failures.

On-line Principle

70-Net operates according to the on-line principle. In on-line operation, the alternating voltage of the mains is converted into direct voltage. This DC voltage is used simultaneously to charge the battery and supply the inverter. The inverter converts the direct voltage into interference-free alternating voltage at a fixed frequency and amplitude, from which are supplied the connected loads. This protects the load from mains supply disturbances and provides a secure supply for electrical loads (PCs, network servers, multi-console systems).

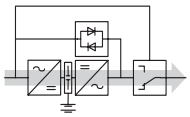

Fig. 12: UPS in on-line operation

In case of a mains failure, the batteries provide uninterrupted power to the loads for a given period, dependent on battery capacity and connected load.

Battery management

The battery is charged and discharged, as well as monitored, using a dedicated microprocessor control. This ensures battery lifetime is maximised. For details, see - para 6.2 - Special features.

Overload capacity

In the event of overload (e.g. > 150 % of nominal load) or inverter failure, the load is supplied directly by the mains supply via the automatic bypass. As soon as the system returns to normal operating conditions, it automatically switches back to inverter operation.

Communication

The UPS offers several interfaces for communication with computers. Further information is included in - Chapter 5 Interfaces.

6.2. SPECIAL FEATURES

Safe and reliable operation

- Real on-line functioning, i.e. complete de-coupling of the load from all anomalies in the mains supply
- The **C**ontrol **U**nit (internal processor CU) supports first class features of the UPS, i.e. vector control, highest flexibility and more.
- Electronic bypass increases the reliability of the electrical supply

Easy installation and operation

- Parameterisation using bundled PC software
- No requirement for presence of Operator during normal operation
- Simple LCD provides clear indication of status, load and battery quality, clear operating and display concept
- Event memory for fault analysis
- Fault display and audible signal

Battery management

- Automatic battery management ensures maximum battery life
- Automatic battery circuit test
- Temperature-dependent charging

Environment, EMC

- EMC limits values to comply with European regulations and standards
- Energy savings due to high efficiency
- Low noise level
- Special EMC filter for higher demands (optional)

Modern technology

- Interfaces with software for all operating systems
- IGBT power transistors
- Highly integrated digital electronics (ASICs)
- Especially well suited for computer loads

The UPS can also be used as a frequency converter for 50/60 Hz or vice versa.

6.3. BLOCK DIAGRAM

(see Fig. 13).

KEY TO SWITCHES:

- QS1 = MAINS INPUT SWITCH
- QS2 = ELECTRONIC BYPASS SWITCH
- QS3 = SERVICE BYPASS SWITCH
- QS4 = OUTPUT SWITCH

Components

The UPS consists of the components:

- converter, consisting of rectifier, filter, booster and inverter with integrated battery charger
- filter for forming the three-phase sinusoidal output voltage
- electronic bypass
- reserve mains supply
- service bypass for disconnecting the Power Module during servicing, without interrupting the supply to the load
- EMC filter

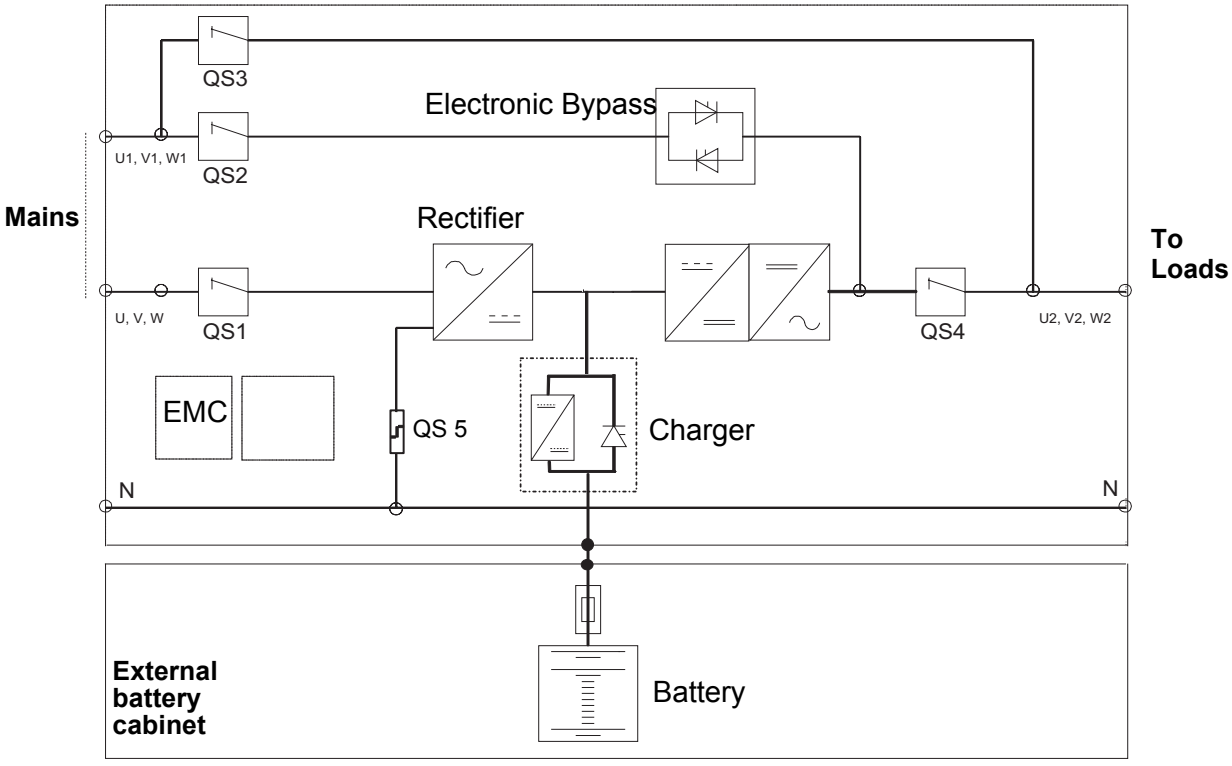

Figure 13 - UPS Overview

6.4. MAINTENANCE BYPASS

This is necessary for maintenance work, as well as for commissioning and putting in and taking out of service. With this mode selected, the loads continue to be supplied without interruption whatever switching actions are carried out. For Maintenance Bypass operation the power switches QS1, QS2 and QS4 must be switched OFF, QS 3 must be ON. These switches are located on the front of the UPS. After having removed the front panel, the location of the switches can be seen, as in the following figures:

ENG

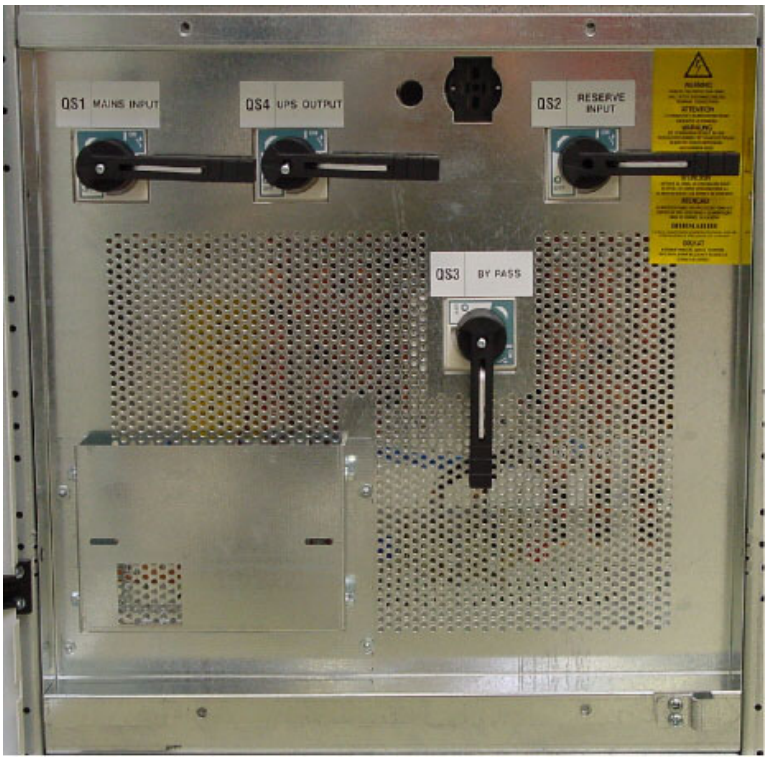

Figure 14 - Location of interruptors

Warning

During parallel operation of UPS units, the load switching function of the built-in service bypass must be carried out by an external switching device (see Chapter 8 Parallel operation).

6.5. OPERATING MODES

The UPS has four different operating modes. These are described below.

On-line operation

Normal UPS operating mode. The connected loads are supplied from the mains via the Inverter. The batteries are charged as necessary.
The inverter reliably filters mains disturbances and provides a stable, interference-free supply to the load.
On the control panel, the “OK” LED is illuminated when the UPS is in on-line operation.

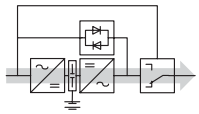

Fig. 15: Power flow in on-line operation

In this operating mode, the UPS switches to battery operation if a mains failure occurs. If an overload or short circuit occurs at the UPS output, or if there is a fault in the inverter, the UPS switches to bypass operation.

Battery operation

In this operating mode, the connected load is supplied from the batteries via the inverter.
In the event of power failure, battery operation is automatically activated and supplies the loads withput interruption. If the power failure lasts longer than 30 s, the UPS signals a fault condition.
In battery operation, the “OK” (green) LED on the control panel is flashing and the “WARNING” (yellow) LED flashes.

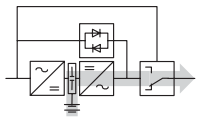

Fig. 16: Power flow in battery operation

From this operating mode, the UPS automatically returns to on-line operation within the backup time once the mains supply returns. If the power failure lasts longer than the loads can be supplied by the battery, the UPS provides relevant information via its interfaces. Computers can be automatically powered down with additional software (optional).

Bypass operation

In this operating mode, the connected loads are supplied from the mains via the electronic bypass.
The electronic bypass serves to further ensure power to the loads. If an overload or short-circuit at the UPS output occurs, it is automatically activated to ensure uninterrupted power supply to the loads.
The “WARNING” (yellow) LED on the control panel illuminates.

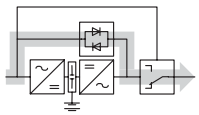

Fig. 17: Power flow in bypass operation

From this operating mode, the UPS automatically returns to on-line operation after the fault is corrected.
Bypass operation can also be specifically selected from the control panel with the key switch.

Service bypass

In this operating mode, the connected loads are supplied directly from the mains supply. Only QS 3 is ON.
There is no supply to the Display/Control Panel in this condition.
The service bypass is used to supply the connected loads with voltage during maintenance work on the UPS.

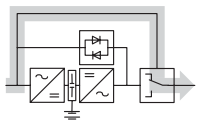

Fig. 18: Power flow in service bypass operation

6.6. COMMISSIONING

Forming

If the UPS devices have not been used for a period of more than one year, the intermediate circuit capacitors must be reformed. If the UPS devices are commissioned within one year after delivery (check nameplate), this action is not necessary.

Contact customer service if the intermediate circuit capacitors need to be reformed.
Carry out commissioning as follows:

ENG

Switch on the UPS

- Check that the UPS is connected according to Chapter 4 Installation. For parallel operation please check Chapter 8 Parallel operation.
- ensure that the ventilation grilles are unobstructed
- ensure the earth connection is in place
- ensure that any external switches are in the OFF (0) position
- ensure that **any external batteries are disconnected**
- ensure that neutral breaker breaker QS5 is ON

Danger
Do not connect any devices that may overload the UPS or draw direct current from the UPS (e.g. hair dryer, vacuum cleaner).

Notice
If these instructions are not observed correctly, problems may be experienced with the electrical supply.

- Set the UPS to Maintenance Bypass operation (see para 6.7 on page 30)
- Connect a PC to the service interface X3 (see para 5.3 on page 24) and set the correct battery data, if necessary, using the software provided with the shipment.

Connect the batteries

- Check whether the polarity of the charging voltage on the UPS side of the battery isolator is the same as that on the battery side (in case of an external battery).
- Insert the battery fuses and close the battery isolator. Warning indicator 13 disappears from the display.

Switch to on-line operation

- Set the UPS to On-line Operation (see para 6.7 on page 30)

The UPS is now in on-line operation and the loads are supplied from the inverter. Message 8 disappears from the display.

6.7. MAINTENANCE BYPASS OPERATING PROCEDURE

Procedures refer to Fig. 13

Table 12: Transfer from On-line to Maintenance Bypass operation

Step	Action	Status
1	Press Inverter OFF on Display Panel (Fig. 19) for 5 seconds	Normal Mode (Automatic bypass)
2	Switch QS3 to ON	
3	Switch QS4 to OFF	Service Mode
4	Switch QS1 and QS2 to OFF	Maintenance Bypass Mode

Table 13: Transfer from Maintenance Bypass operation to On-line mode

Step	Action	Status
1	Switch QS1 and QS2 to ON - Await Bypass Mode ON	
2	Switch QS4 to ON	Service Mode
3	Switch QS3 to OFF	
4	Press Inverter ON on Display Panel (Fig. 19) for 5 seconds	Normal Mode (On Line)

6.8. CONTROL PANEL AND DISPLAY

The control panel serves as the UPS user interface. An LCD informs the user about the operating status of the UPS.
See the tables on the following pages for an overview of the Display Message Structure.
Modifications and settings as shown below in menus 21/22/23 may only be carried out by appropriately qualified tecnicians. Settings should be tested only if the loads supplied by the UPS are non-critical.

6.8.1 OPERATING PROCEDURES

- *Start Inverter*

Press the Inverter ON  button for five seconds

- *Stop Inverter*

Press the Inverter OFF  button for five seconds

- *Silencing Buzzer*

To silence the Buzzer press the Reset button momentarily

- *Fault Reset*

In order to restore normal operation of the UPS following a fault condition, after having corrected the situation causing the fault, press the Reset button for at least one second.

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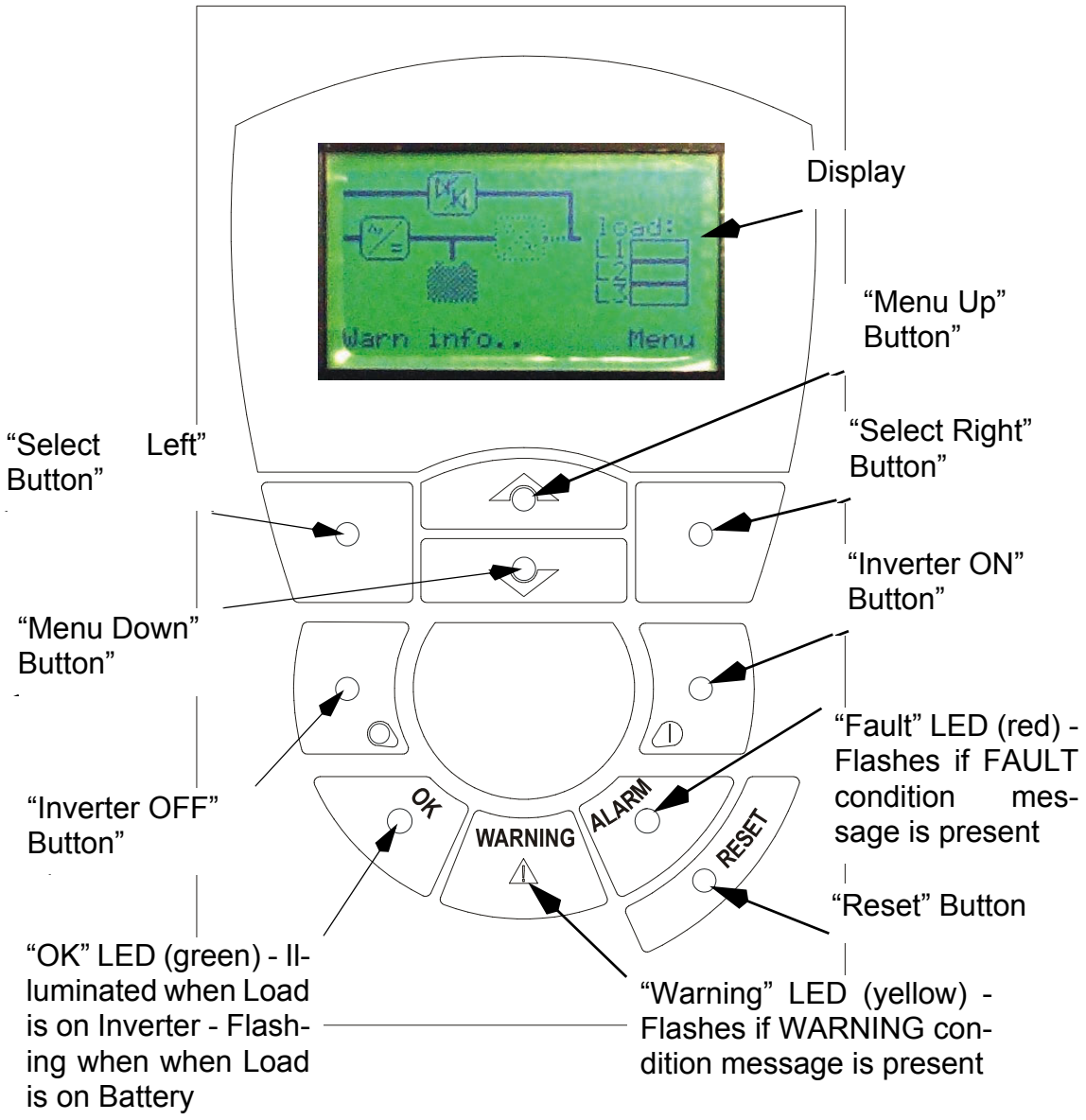


Figure 19 - Control Panel

The TEST / RESET button serves as a function control for the LEDs of the control panel and resets the UPS after the fault has been corrected. All LEDs on the control panel illuminate for approx. 1.5 s after pressing the button in normal operation (no warning or fault indicators present), followed by the last five warning indicators appearing one after the other in the two-digit display. If a fault occurs, pressing the button mutes the audible signal and, once the fault has been corrected, pressing the button brings the UPS into operation again. The UPS can be manually switched between bypass and on-line operation using the keys "Inverter ON" (I) and "Inverter OFF" (O). A PC can be connected to the service plug (SERVICE) via the serial interface (RS232). Using the service software included with the unit, settings of the UPS can be changed and the UPS data can be queried.

6.9. CONTROLS AND MESSAGES

The display provides the following structure of windows. Each window has an dedicated number (see figure). By pressing the keys „menu up“ or „menu down“ a walk through the windows can be made.
If it is necessary to modify the settings in menus 21/22/23 the UPS must be switched to Automatic Bypass.

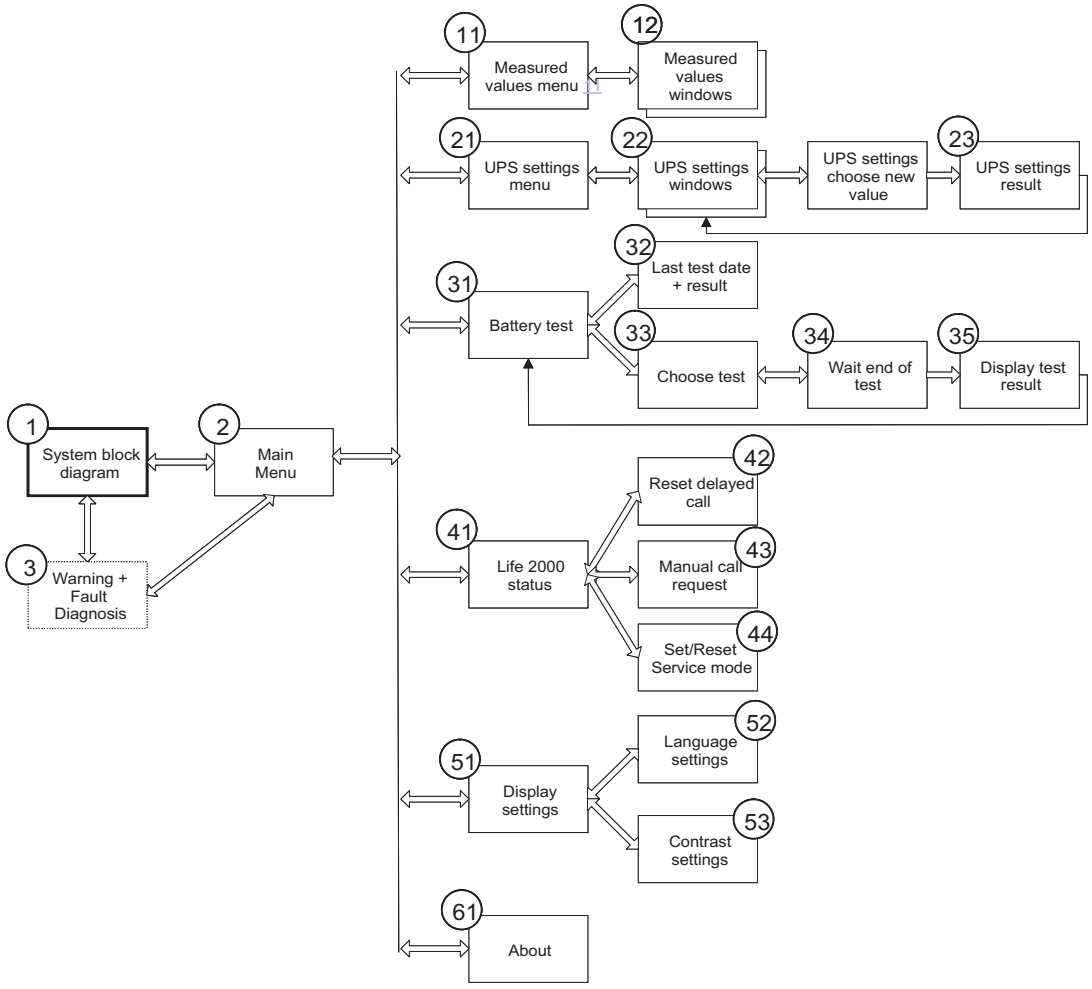


Figure 20 - System block, main- and submenus

Table 14: Displayed Text - System Block and Main Menu

N°.	Description
1* SYSTEM STATUS	"Load"
	"Back-up: .. in minutes"
	Presentation of "System Block Diagram"

ENG

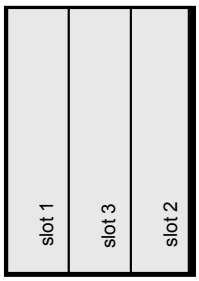
Table 14: Displayed Text - System Block and Main Menu

N°.	Description
2* MAIN MENU	"Actual Values"
	"UPS Settings"
	"Battery Yest"
	"LIFE"
	"Display Settings"
	"About"
3* WARNING/ FAULT DIAGNOSIS	For information on Warning and Fault messages, refer to para 6.10 - Warning and Fault indications

Table 15: Displayed Text - Sub Menus

N°.	Description	
11* - MEASURED MENU	UPS Input	UPS Output
	DC Link	Battery
12* - MEASURED VALUES	V Mains L1	Real Power Out
	V Mains L2	Real Power Out L1
	V Mains L3	Real Power Out L2
	Mains Frequency	Real Power Out L3
	V interm. circ.	Tot. Real Power Out
	V interm. circ. +	App. Power Out L1
	V interm. circ. -	App. Power Out L2
	V Output L1	App. Power Out L3
	V Output L2	Tot. App. Power Out
	V Output L3	Overload Threshold
	Output Frequency	V Batt. per Cell
	I Output L1	Batt. Temp.
	I Outout L2	Batt. Current
	I Output 3	Actual Capacity
	Output Frequency	Hold up Time

Table 15: Displayed Text - Sub Menus

<table>
<tr><th>N°.</th><th colspan="2">Description</th></tr>
<tr><td rowspan="4">21* - UPS SETTING MENU</td><td>Input Contact</td><td rowspan="4"> 

Communi-cation box (CU4/POB/Profibus)</td></tr>
<tr><td>Output Contact</td></tr>
<tr><td>Optional Boards (comms. box slot numbers - see right)</td></tr>
<tr><td></td></tr>
<tr><td rowspan="15">22* - UPS SETTINGS MENU</td><td>Input Contacts</td><td>Function AK3</td></tr>
<tr><td>Function EK1</td><td>On Delay AK3</td></tr>
<tr><td>On Delay EK1</td><td>Off Delay AK3</td></tr>
<tr><td>Off Delay EK1</td><td>Negate Output AK3</td></tr>
<tr><td>Negate Input EK1</td><td>Function AK4</td></tr>
<tr><td>Output Contacts</td><td>On Delay AK4</td></tr>
<tr><td>Function AK1</td><td>Off Delay AK4</td></tr>
<tr><td>On Delay AK1</td><td>Negate Output AK4</td></tr>
<tr><td>Off Delay AK1</td><td>Optional boards</td></tr>
<tr><td>Negate Output AK1</td><td>Board in slot 3</td></tr>
<tr><td>Function AK2</td><td>Profibus Bus Addr.</td></tr>
<tr><td>On Delay AK2</td><td>Profibus PZD5</td></tr>
<tr><td>Off Delay AK2</td><td>Profibus PZD7, PZD8</td></tr>
<tr><td>Negate Output AK2</td><td>Profibus PZD9</td></tr>
<tr><td>23* - SETTING VALUE AND RESET</td><td colspan="2">Parameter cannot be changed, verify if UPS has to be in Bypass Mode</td></tr>
<tr><td>31* - BATTERY TEST MENU</td><td>Test Status</td><td>Perform a Test</td></tr>
<tr><td rowspan="4">32* - BATTERY TEST STATUS (Window: Last Test Date and Result)</td><td colspan="2">Last Test Result</td></tr>
<tr><td colspan="2">Last Test Date</td></tr>
<tr><td colspan="2">OK...</td></tr>
<tr><td colspan="2">Failed...</td></tr>
</table>

ENG

Table 15: Displayed Text - Sub Menus

N°.	Description	
33* - BATTERY TEST START (Window: Choose Test)	10 Second Test	8 Minute Test
	1 Minute Test	10 Minute Test
	2 Minute Test	15 Minute Test
	4 Minute Test	20 Minute Test
	6 Minute Test	Autonomy Test
34* - BATTERY TEST in Progress (Window: Wait end of Test)	Capacity:	
	Remaining:	
	Autonomy	
35* - BATTERY TEST RESULT (Window: Display Test Result)	Test not possible at this time	Result: OK
	Test Cancelled	Result: Failed
	Test passed	Measured Autonomy
41* - LIFE MENU (Window: LIFE Status)	LIFE not Active on this UPS	Wait Connection
	Next Call Date	Connected
	Next Call Time	Send LIFE Data
	Delayed call In (> Window 42)	Send Easy Data
	Connection Status	PPVIS Connection
	Call Type (> Windows 43)	Close in Progress
41* - LIFE MENU (Window: LIFE Status)	Service Mode (> Window 44)	Call Rescheduled
	UPS not Connected	
42* - LIFE DELAYED	Reset Delayed Call?	
43* - LIFE MANUAL	Perform a Manual Call	
44* - LIFE SERVICE	Enter Service	Exit Service
51* - DISPLAY SETTINGS	Language	Contrast
52* - LANGUAGE SETTINGS	English/Deutsch/Français/Italiano/Spanish/Portuguese/Chinese	
53* - CONTRAST SETTINGS	Contrast: Up or Down	

Table 15: Displayed Text - Sub Menus

N°.	Description	
61* - ABOUT	Manufacturer	LCD Firmware Date
	Type of UPS	CU Firmware Part N°.
	Website	CU Firmware Rev.
	LCD Firmware Part N°.	CU Firmware Date
	LCD Firmware Rev.	

6.10. WARNING AND FAULT INDICATIONS

The UPS recognises and draws attention to a number of events occurring during operation. These events are divided into Warning and Fault indications. Whether the message is a warning or fault can be determined from the number which appears in the Warning/Fault Diagnosis page of the display, and the buzzer signals.

Buzzer

The buzzer has two different patterns, which indicate the tyre of warning active.

- **Pattern 1: long intervals** - This event is less serious. It is not essential that the cause be rectified immediately, unless otherwise specified in table "Warning indicators".
- **Pattern 2: short intervals** - This is a serious event. The cause should be rectified straight away to avoid a fault condition.

The buzzer is silenced automatically as soon as the cause of the event is rectified. It can also be silenced manually by pressing the button TEST/RESET.

ENG

Warning indicators

If a warning indication appears, the UPS continues to operate. The yellow LED ALARM illuminates on the control panel. A number between 1 and 31 appears in the display indicating the type of warning.

Displayed Warnings

The various possible warning indications are listed in the following table.

Table 16: Warning indicators

Warning indicator- Buzzer pattern	Cause	Corrective steps
1 - 2	temperature too high in device	lower temperature (e.g. with ventilation); if necessary, reduce load; ensure ventilation outlets are unobstructed.
2 - 1	power failure (bypass power failure) *	
3 - 1	power failure (converter)	
4 - 2	load too high	reduce load
5 - 2	low intermediate circuit voltage	
6 - 1	load too high	reduce load
7 - 2	wrong phase sequence	check phase sequence
8 - 1	service bypass is on	
9 - 1	Battery operation	
10 - 2	battery rest time exceeded **	switch off load directly
11 - 2	discharge battery **	reduce load
12 - 1	operating state: commissioning, initial charging, converter	exit operating state after commissioning, initial charging
13 - 1	battery switch not engaged	engage battery switch
14 - 1	fan lifetime exceeded	replace fan - call customer service
15 - 1	battery charger comms. failure	call customer service
23 - 1	battery charger failure (from charger)	call customer service
24 - 1	battery charger failure (from CU41)	call customer service
*A power failure will only be indicated when the minimum time has been exceeded. **These messages may also appear if battery data have not been correctly entered. Call customer service.		

▶ **Please inform customer service of the indicator number(s) and the illuminated LEDs.**

Fault indications
If a fault occurs, the affected UPS component is always switched off, and the UPS automatically switches to the best possible operating mode for supplying the loads; the red FAULT LED illuminates on the control panel. A number between 33 and 99 appears in the Warning/ Fault Diagnosis page of the display indicating the type of fault. Fault indicators are also indicated by a continuous tone from the buzzer. If a fault occurs, proceed as follows:

Acknowledge horn
First acknowledge the horn by pressing the TEST/RESET button

Correct fault
Next correct the fault by following the indications in Table 17 on page 38
If the fault cannot be corrected:
Call Customer Service: The customer service addresses are given on the last page of this manual.

Acknowledge fault
After the fault has been corrected, it must be acknowledged by pressing the TEST/RESET button again.

Displayed Faults
The various possible fault indicators are listed in the following table

Table 17: Fault Indications

Fault	Cause	Corrective steps
33	temperature in converter too high	lower temperature (e.g. with ventilation); clean or replace filter mats (optional); check load and reduce if necessary; ensure ventilation outlets are unobstructed
37	overcurrent cut-off	check load or call customer service
39	overvoltage in intermediate circuit	check mains or call customer service (mains voltage too high; voltage peaks in mains; incorrect connection voltage)
41	electronics defective	HW defective (CU) - call customer service
42	pre-charging failure	HW defective - call customer service
44	overcurrent cut-off	check load
46	UPS output out of tolerance	check load or call customer service
47	overload at device output	check load or call customer service
50	bypass defective	HW defective (bypass) - call customer service
51	bypass failure during changeover	HW defective (bypass) - call customer service
52	bypass overload	check load or call customer service
55	EPROM defective	HW defective (EPROM) - call customer service
57	EPROM defective	HW defective (EPROM) - call customer service
59	options board defective	HW defective - call customer service
61	signal error parallel op. board	call customer service

▶ **Please inform customer service of the indicator number(s) and the illuminated LEDs. Fault indicators not listed in the table can only be corrected by customer service.**

6.11. TROUBLESHOOTING

Rectification of Errors

If, in spite of the high reliability of this device, problems should occur, please check the following points before contacting the responsible customer service representative:
Is the mains voltage present at the UPS input?
Is the input fuse defective or have circuit breakers tripped?
If you contact the responsible customer service representative, please have the following information ready:

- Device information = model, order no., series no. as per nameplate
- An exact description of the problem (what loads are being operated, does the problem occur regularly or sporadically etc.)

ENG

Problem	Possible cause	Action
No display No alarm (UPS switched off)	Main switch switched off	Switch on main switch
	No mains voltage present	Have mains inspected by qualified electrician
	Input fuse defective or input circuit breaker tripped	Replace with fuse of same type or reset circuit breaker. If the problem persists, contact the responsible customer service representative.
Green „OK“ LED does not illuminate, buzzer sounds at intervals	No mains voltage present	UPS operation (see “Operating modes” on page 28)
Green „OK“ LED does not illuminate when mains voltage present, buzzer sounds at intervals	Input fuse defective or input circuit breaker tripped	Replace with fuse of same type or reset circuit breaker. If the problem persists, contact the responsible customer service representative.
ALARM indicator illuminates, buzzer sounds continuously	UPS error	Contact the appropriate customer service representative
	Overheating	Reduce ambient temperature
Backup time less than that specified	The fuse switch of the battery extension(s) is in "OPEN" position.	Move the fuse switch to the "ON" position.
	Batteries are not completely charged	Charge batteries, See “Batteries - (EXTERNAL ONLY)” on page 9. and test backup time. If the problem persists, contact the appropriate customer service rep.
	Batteries are defective	Contact customer service
	Charging device is defective	Contact customer service
No communication between UPS and PC	Wrong serial connection cable	Check whether the correct cable has been used (standard modem/null modem cables are not permissible)
	Interface on the PC is being used by another process or is defective.	Check whether other software/service is accessing the interface on the PC; try selecting a different serial interface.
	Interference on the data cable	Lay cable differently.

7. MAINTENANCE

7.1. MAINTENANCE INTERVALS

Although regular maintenance of the UPS is not necessary in order to maintain the intrinsic reliability at nominal level, we recommend that the UPS functions be checked at regular intervals, e.g. on site by authorized customer service.
The UPS indicates when the end of a fan's lifetime has been reached (see Table 16 on page 36). A replacement fan is recommended.

ENG

7.2. DISPOSAL OF BATTERIES

When the useful lifetime of the batteries has expired, they must be replaced by the Customer Service representative responsible. Exhausted accumulator batteries are classified as "harmful toxic waste" and as such regulations demand that they be disposed of by an authorised recycling centre. The Customer service centre is fully equipped to deal with such batteries in accordance with regulations and with the greatest respect for the environment. The typical useful lifetime of the battery is 3 to 5 years at 25° C ambient temperature; it is, however, dependent on the frequency and duration of mains failures.

7.3. SERVICE ADDRESSES

Onsite service is available world-wide. Service telephone and fax numbers can be found on the last page of this manual.

7.4. DECOMMISIONING

Taking out of service

Switch to service bypass

- Switch the UPS to Maintenance Bypass operation (see Table 12 on page 30)

Disconnect batteries

- Open the battery isolator or battery switch if other external batteries are used.
- Before continuing work, measure the voltage at the battery terminals and at the mains input and wait until this has dropped to 0 V or wait at least 5 min. Failure to do this can lead to severe electrical shock and possibly death.

The UPS is now in maintenance bypass operating mode. The only voltage present is at the mains and load terminals. Qualified personnel may now carry out maintenance work while observing the corresponding safety measures.

Disconnect mains

If the loads no longer need power, you may now open the external mains separation device for the UPS.

7.5. DISPOSAL

Within the EU, batteries and other devices must be disposed of by a certified disposal specialist. Outside the EU, disposal is to be performed in accordance with the applicable regulations for the given country.

ENG

8. PARALLEL OPERATION

Uninterruptible power supplies can be connected in parallel to increase power capacity or for additional safety (redundancy). If the UPS units are equipped with the additional POB (Parallel Operation Board) assembly, up to 8 of the same UPS blocks can be operated in parallel for increased power capacity or redundancy. Your UPS units are equipped with this option if the order number on the nameplate contains the letter "B" in the ninth position: CH70 xx-xxBxx-xxxx.
This feature can also be added at a later time and is, therefore, available as an option.
A multiple-block system is automatically regulated and controlled via the controller of the individual UPS blocks. The available electronic bypasses in the individual blocks work together just as all the corresponding inverters and divide the load current between them. All necessary communication for parallel operation is carried out via a shielded 25 conductor cable. Each UPS block is shipped with a 5m long communication cable which is sufficient for most installation requirements.
When planning the system and during installation, power cables having the same length are to be used between the input distribution and the input terminals for the bypass and rectifier (U/U1, V/V1, W/W1, N), as well as from the UPS outputs (U2, V2, W2, N) to the parallel connection point on the load side. Differences of 20% are allowed for power cable lengths of up to 20 m. For larger distances, cable lengths may not vary by more than 10%.

8.1. COMMISSIONING

Commissioning of multiple-block systems must be carried out by appropriately trained technicians.

8.2. SYSTEM CONFIGURATIONS

Fig. 21 illustrates the schematic diagram of a 4-block system with common battery and external Service Bypass Switch (SBS). The shown SBS can be used in parallel systems 70-Net where UPS units are of standard 400 V type. If 208V LAM-version units are used (see “LAM-Version” on page 54) a correctly-configured transformer must be installed at the SBS input.
UPS blocks have been designed for use with separate batteries (Fig. 21). Where a common battery is used, the battery manager does not carry out autonomy time and capacity calculations.

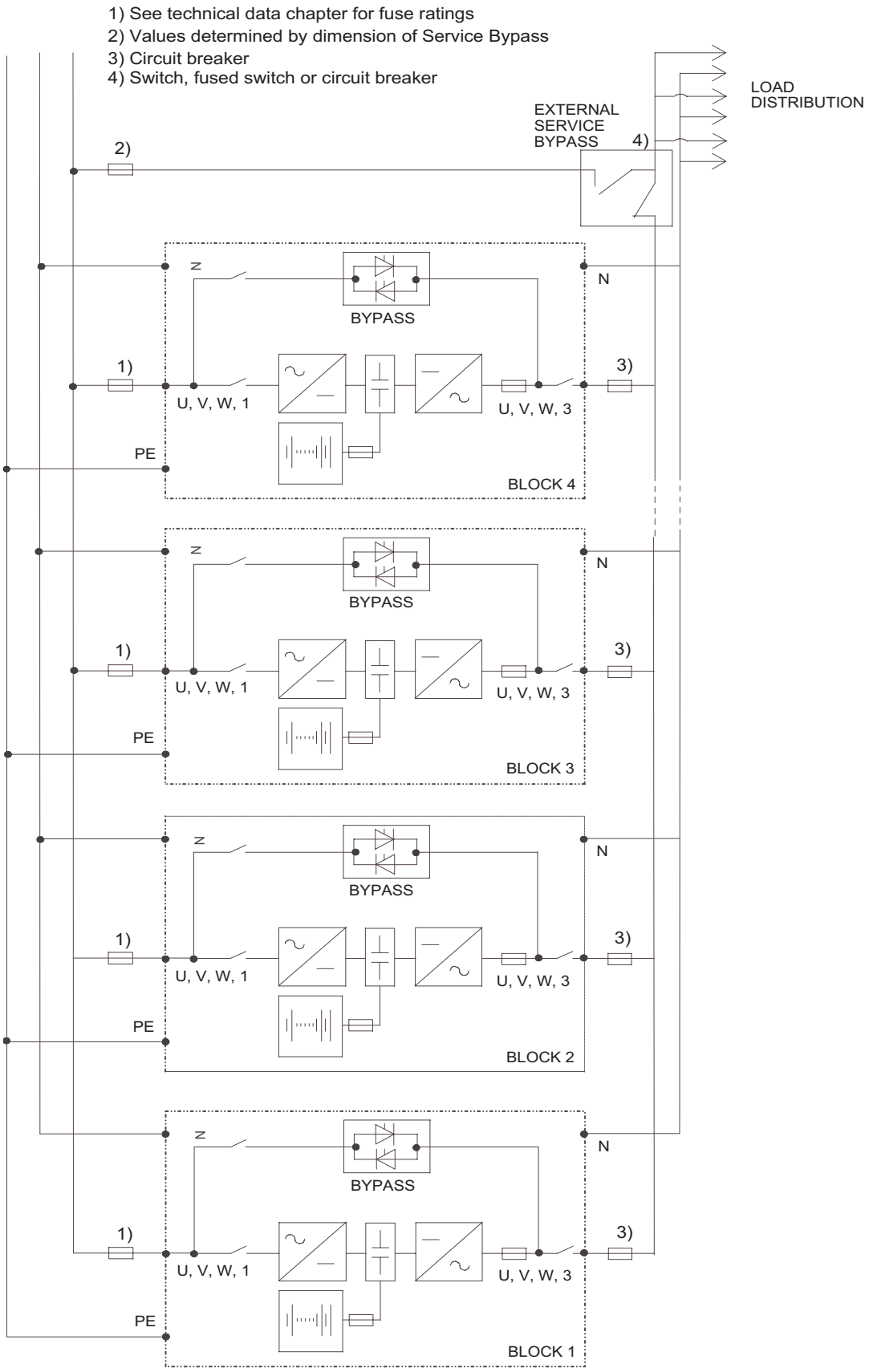
8.3. COMMUNICATION BETWEEN THE UPS BLOCKS

UPS units exchange information between each other via the connector cable (25 pin connector) shipped with each unit. Fig. 22 displays the loop circuit which is electronically monitored. The communication cables are shielded and must be run separately and away from all power cables.

8.4. OPERATION

With reference to para. 6 normal and safe operation - once the inverters of each UPS are On-line, the inverters of the UPS units synchronise and take over the load. The UPS in now in On-line operation. Switching from On-line to Bypass operation is carried with reference to para. 6 normal and safe operation. The UPS are switched, one after the other, to the Maintenance Bypass position. Once the last UPS is switched into the Maintenance Bypass position, all inverters switch off and all bypasses switch on. The external service bypass may only be connected in bypass operation (Fig. 21).

Figure 21 - Schematic diagram of a 4-block system



ENG

3) 25-way Sub-D plug cable

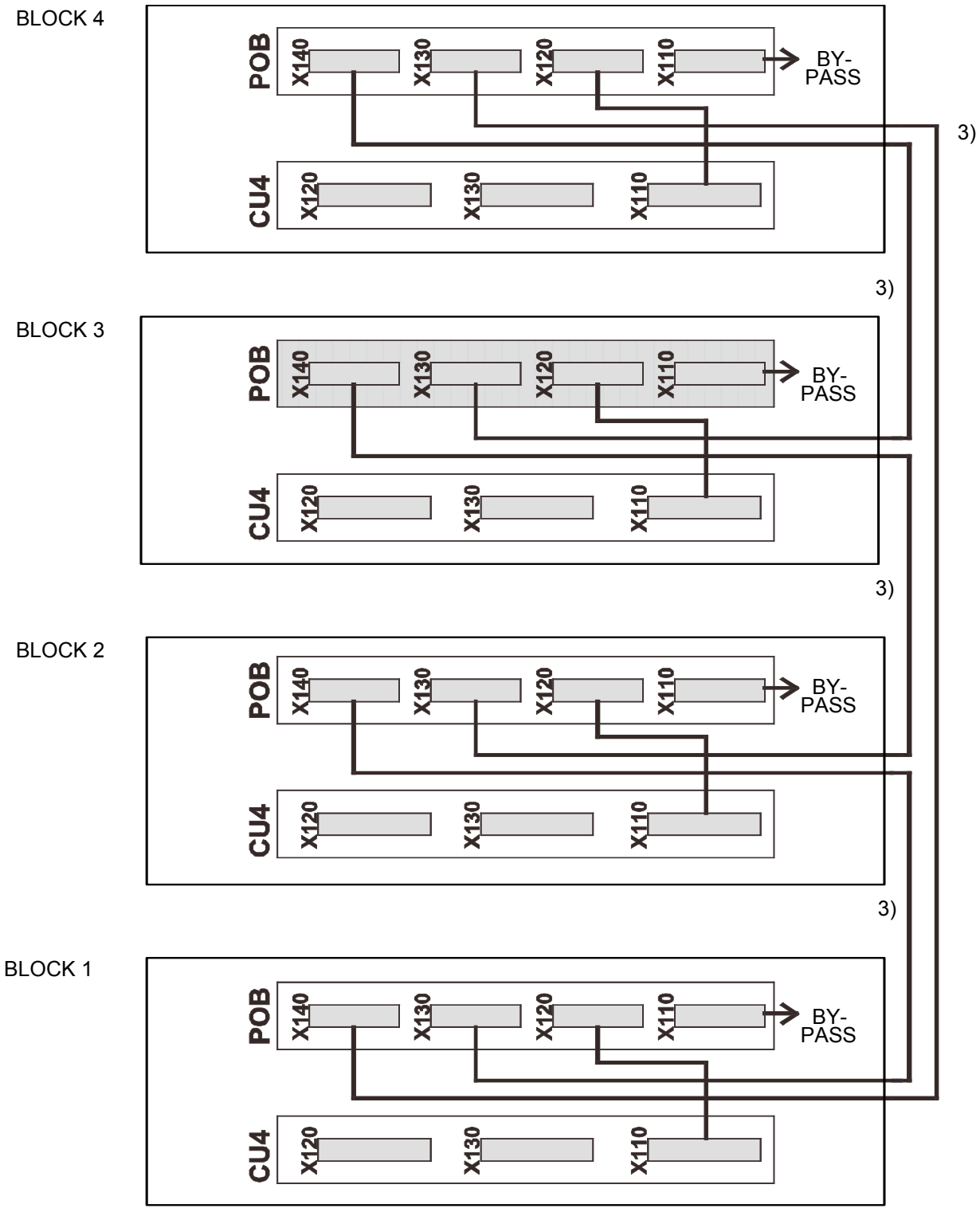


Figure 22 - Loop circuit for parallel UPS (25 pin connector)

9. OPTIONS

9.1. EXTERNAL BATTERIES

Additional, external battery solutions are available to increase the autonomy of operation of the UPS. These include the following components:

- Cubicle
- Disconnecting device
- Fuses
- Safety screen
- Power terminal block

in addition to the approriate battery solution, if requested.
Three cubicle sizes are available:

ENG

Table 18: . Empty battery cubicles

	Width mm	Depth mm	Height mm	Weight mm
Type A	820	830	1780	220
Type A1	500	800	1600	100
Type A2	500	800	1400	90

9.2. SHUTDOWN AND MONITORING SOFTWARE

MopUPS^{PROFESSIONAL}

The primary function of MopUPS^{PROFESSIONAL} for Windows is to shut down the operating system of an unattended computer, safely, in the event of a power failure. All files are closed and directory pointers are written to disk while the system is supplied from UPS battery power.
MopUPS^{PROFESSIONAL} for Windows provides this function and offers other features, useful to network administrators, including:

- Automated responses to a variety of events – E-mail, messaging, paging, running script files, etc.
- Logging of various events and UPS status information to files
- Real time viewing of site power and UPS status information
- Administrative shutdown for scheduling planned system shutdowns
- Control of UPS performance features - set restart to manual, silence alarms, adjust trip points
- Remote access and monitoring of UPS connected to remote servers on the network using Named Pipes or TCP/IP

9.3. SHUTDOWN SOFTWARE FOR COMPUTER INTERFACE PORT

Network adaptor ManageUPS$_{NET}$

ManageUPS$_{NET}$ (formerly known as the SNMP adapter) allowing 70-Net UPS to be monitored and controlled over a network using TCP/IP protocol. The adapter allows:

- UPS monitoring from an NMS station using SNMP
- UPS monitoring from a PC using a Web Browser
- Notification of events via E-mail

9.4. AS400 MULTIPLEX

For connection between the UPS and an AS400 type computer, or similar, a 50 m cable, complete with the appropriate connectors, is available.

9.5. LIFE.net

This option provides remote monitoring of the UPS, via a dedicated telephone line, to ensure maximum reliability for the duration of its operational life. The UPS automatically telephones the service centre at predefined intervals, to provide detailed information, which is analysed in order to predict any short term failures. In addition it is possible to control the UPS remotely.

Transmission of UPS data to one of the service centres is by modem and can be:

- ROUTINE: typically once a week
- EMERGENCY: when something goes wrong or when parameters are out of tolerance.
- MANUAL: when requested by the Customer
- BIDIRECTIONAL: when requested by the service centre

During the calls the service centre shall:

- Identify the connected UPS
- Recognize the kind of call
- Request the data stored in the UPS since the previous connection
- Request information from the UPS on line (selectable).

The storage of the data, and their subsequent analysis, permits the service engineer to compile a detailed report, that will be forwarded to the Customer periodically, with the aim of informing her/him of the condition of the UPS and of preventing potentially critical situations.

Telephone switch for LIFE.net

The installation of this switch permits the Customer to use a telephone line, which is normally used for other purposes (fax or telephone), for LIFE2000.

9.6. CONNECTIVITY

The following tables give details of the connectivity solutions which can be used in association with 70-Net . For further information please refer to Chloride Connectivity Solutions specifications:

Single Connectivity Solutions

Solution	Recommend. Port	Optional Port	Comments
ManageUPS$_{NET}$	- XS3 rsp. - X3	- XS6 rsp. - X6	- Internal slot-in card - X6 External network adapter
MopUPS^{PROFESSIONAL}	X3	X6	Serial port X3 or X6 may be used
PPVis	X3	X6	Serial port X3 or X6 may be used
LIFE.net	X3	X6	Only serial port X6 may be used

Simultaneous (up to 2) Connectivity Solutions

solution	solution	ManageUPS$_{NET}$	MopUPS^{PROFESSIONAL}	LIFE.net
	Port no.	Port no.	Port no.	Port no.
ManageUPS$_{NET}$	XS3	XS6	X6	X6
MopUPS^{PROFESSIONAL}	X3	XS6	X6	X6
PPVis	X3		X6	X6
LIFE.net	X6			N/A

10. TECHNICAL DATA

10.1. UPS DEVICES

UPS model		70-NET 50	70-NET 60
Power		50 kVA	60 kVA
Permissible ambient temperature	in operation	0° - 40°C - Load reduction at higher temperatures	
	Max. daily average (24 hrs)	35°C	
	Max. (8 hrs)	40°C	
	in storage	-40°C - 70°C	
Climate class according to IEC 721		Better than 3K2, however heed notices about installation site, check in accordance with IEC 68-2	
Immunity to electrical interference		IEC 801/-2/-3/-4/-5/-6	
EMC CLASS	standard	EN 50 091-2 Class RS	
Degree of protection acc. to EN 60 529	standard	IP20	
Humidity test		EN 068-2-56	
Overvoltage category		II (EN 60 950)	
Permissible pollution degree		2 (EN 60 950)	
Protection class		1 (with Earth conductor)	
Installation altitude		Up to 1000m above M.S.L., higher with load reduction (83% at 2000m; 76% at 3000m)	
Cabinet colour	standard	RAL 7035 (Light Grey)	
Dimensions	[mm] W	620	
	H	1780	
	D	835	
Efficiency at 100% load	Digital Interactive mode [%]	98	
	Double conversion [%]	92	
Noise level acc. to DIN 45 635	[dB (A)]	<65	
Weight max. [kg]	approx. [kg]	260	

ENG

Input

UPS input Rating kVA	50	60
Mains supply for rectifier rsp. bypass	Separate/Common	
Mains voltage and tolerances [V]	3 AC/N 400 +15% / -25% (-30% with output derating)	
Nominal supply frequency [Hz]	50/60 (selectable) +/- 10%	
PF	> 0.95	
Max. current at 400V, basic batt. loading (1 charger) [A]	71	85
Input current harmonic distortion	<25%	
Mains configuration	Symmetrical 3ph. mains, e.g. TN-C, TN-S, TN-C-S	

External Battery

UPS devices Rating kVA	50	60
Nominal battery voltage [V]	396	
External battery configuration		
Inverter input power [kW]	42.5	51
Max. battery current at final discharge [A] $_{DC}$	130	156

ENG

Output

UPS output	Rating [kVA]	50	60
Nominal voltage		3 AC/N - 400V, 380V, 415V - parameterisable	
Voltage tolerances	static	+/- 1% with balanced load +/- 3% with 50% unbalanced load +/- 4% with 100% unbalanced load (single phase)	
	dynamic	acc. IEC/EN 62040-3,cl.1 (VFI,SS,111)	
Nominal frequency	[Hz]	50/60 +/- 10%	
Frequency tolerance	self-clocked	+/- 0.1%	
	line-clocked	+/- 1% (adjustable to 2, 3, 4%)	
Frequency slew rate	[Hz/s]	<1 (adjustable from 0.1 to 2)	
Permissible non-linear load according to EN 50 091-1		100%	
Overload capability (3-phase)	up to 5 min up to 30 s	1.25 x I_{nom} 1.5 x I_{nom}	
Nominal apparent power	at [kVA] cos φ_{ind} = 0.8	50	60
Nominal active power	[kW]	40	48
Nominal current	at 400 V, cos φ = 0.8 [A]	71	85

Heat

UPS Battery	Rating [kVA]	50	60
Heat emission[a)]	[kW] at 100% load	3550	4200
	idle	800	
Airflow rate	[m^3/h]		
Electronic bypass: Max. overload current for 10ms, with selective external bypass fuse F1	[A]	4000	4000

a) Conversion power loss in BTU[h] = P_V[kW] *3412

Notice
Consider the information given on the back of the device.

10.2. SPECIAL VERSIONS

70-Net can be customised to provide galvanic isolation and voltage adaption for specific load requirements. The following versions are available upon order:

T-version

70-Net-T includes an isolation transformer at the input. This transformer provides complete electrical isolation between the load and the input mains utility. Technical data differs according to the following table:

DESCRIPTION		Unit	Rating	
		kVA	50	60
Electrical Data				
INPUT	Voltage	Vrms	400, 3ph (+N), +15%, (-30% with derating)	
	Current (single phase)	Arms	85	100
	Frequency	Hz	50/60 (auto selection)	
OUTPUT	Power rating	kVA	50	60
		kW	40	48
	Voltage	Vrms	380, 400, 415, 3ph (+N)	
	Current @400V_{rms}	Arms	72	87
	Frequency	Hz	50/60 (auto selection)	
	Waveform	-	Sinusoidal	
Max. dissipation (@ nominal load; battery recharging)		W	970	1400
Mechanical Data				
Depth		mm	835	
Width		mm	620	
Height		mm	1780	
Weight		kg	560	
Max. noise level (@1m)		dB	<65	

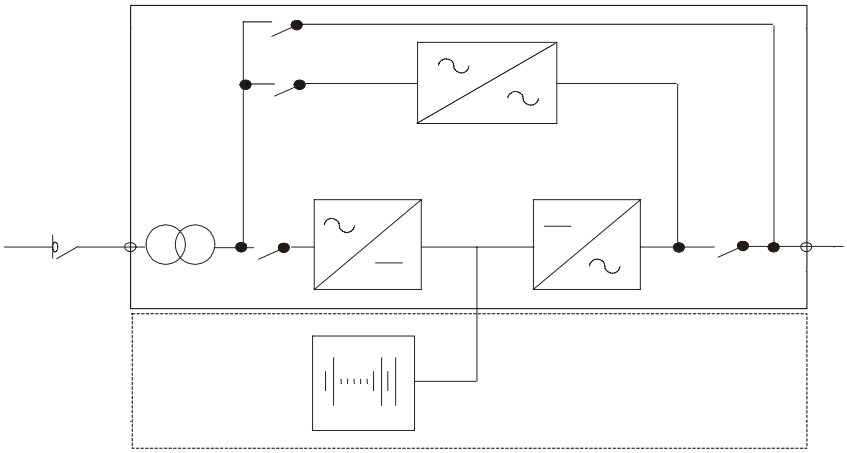


Figure 23 - T Version

A further variation of the T version, intended for installation in environments where the mains supply is particularly prone to voltage spikes, is also available. This version, known as 70-Net-R , features TVSS (Transient Voltage Surge Suppressors) connected in parallel to the input transformer primary; these devices are housed within the UPS cubicle. For further information about the improved imunity of 70-Net-R to voltage surges, please contact Chloride Technical Support.

LAM-Version

70-NET-LAM includes two internal transformers for isolation and voltage adaptation from 400V to 208/220V phase to phase. The Isolation Transformer is installed at the input and provides full electrical isolation and voltage adaptation (208/220 primary, 400V secondary), while the output auto-transformer allows voltage adaptation (400V primary, 208/220V secondary).

Technical data differs according to the following table.

DESCRIPTION		Unit	Rating	
		kVA	50	60
Electrical Data				
INPUT	Voltage	Vrms	208/220, 3ph (+N), +15%, (-30% with derating)	
	Current (single phase)	Arms	165	198
	Frequency	Hz	60	
OUTPUT	Power rating	kVA	50	60
		kW	40	48
	Voltage	Vrms	208/220, 3ph (+N)	
	Current @208V_{rms}	Arms	139	167
	Frequency	Hz	60	
	Waveform	-	Sinusoidal	
Max. dissipation (@ nominal load; battery recharging)		W	6220	7450
Mechanical Data				
Depth		mm	835	
Width		mm	620	
Height		mm	1780	
Weight (without batteries)		kg	720	
Max. noise level (@1m)		dB	<65	

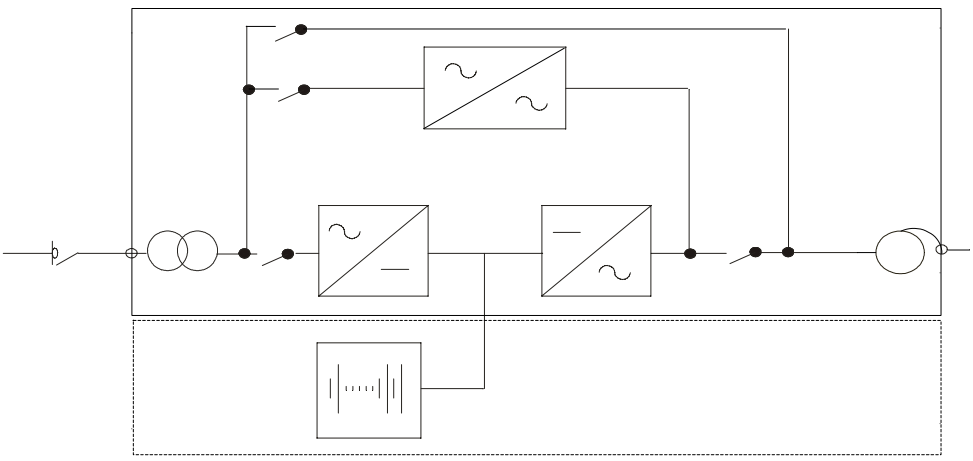


Figure 24 - LAM Version