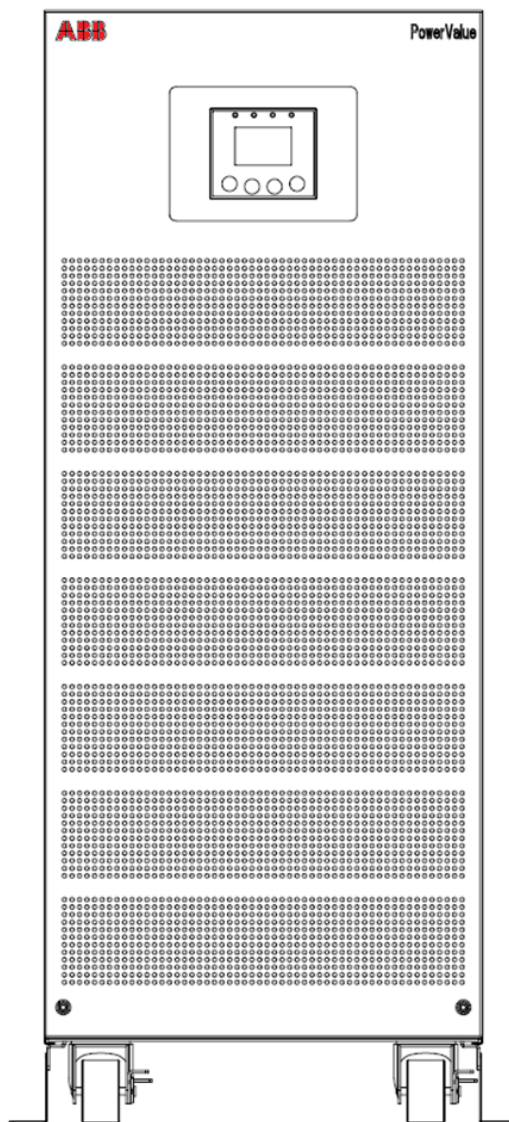


PowerValue 11/31 T

10 kVA, 10 kVA B, 10 kVA B2, 10 kVA S

20 kVA, 20 kVA B, 20 kVA S



Document information

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Foreword

The UPS system operates with mains, battery or bypass power. It contains components that carry high currents and voltages. The properly installed UPS system is grounded to earth and IP 20 rated against electrical shock and foreign objects.

This user manual contains guidelines to check delivery, installing and commissioning of the UPS and is intended for people who plan the installation, install, commission and use or service the UPS. The reader is expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.











**COMMISSIONING AND OPERATIONS INSIDE THE UPS
MUST BE PERFORMED BY A CERTIFIED SERVICE
ENGINEER FROM THE MANUFACTURER OR FROM AN
AGENT CERTIFIED BY THE MANUFACTURER.

BY NOT FULFILLING THIS OBLIGATION, THE
PRODUCT MAY LOSE ITS WARRANTY**

Read carefully all instructions and save this manual for future reference.

Symbols

The following symbols are used in this manual, the list below describes each symbol.

WARNING	SEVERE INJURY AND/OR SERIOUS DAMAGE TO THE SYSTEM WILL RESULT IF PROPER PRECAUTIONS ARE NOT TAKEN
CAUTION	MINOR INJURY AND/OR DAMAGE TO THE PRODUCT MAY RESULT IF PROPER PRECAUTIONS ARE NOT TAKEN
NOTE	REFER TO THE USER MANUAL TO AVOID PROPERTY DAMAGE
	SAFETY WARNING: THIS SYMBOL IS USED TO WARN THE USER ABOUT WARNINGS, CAUTIONS AND NOTES
	DANGER: THIS SYMBOL IS USED IN THE OCCURRENCE OF ELECTRICAL LIVE PARTS WITH HAZARDOUS VOLTAGE
	PROTECTIVE GROUNDING TERMINAL: A terminal which must be connected to earth ground prior to making any other connection to the equipment
	A terminal to which or from which an alternating current or voltage (AC) may be applied or supplied
	A terminal to which or from which a direct current or voltage (DC) may be applied or supplied
	Battery
	Power On, Idle or shutdown the UPS
	Overload indication
	Recycle
	Do not dispose with ordinary trash

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1 Safety instructions



1.1 Operator precautions



The user must follow the precautions and only perform the described operations. Also in these measures, the operator of the UPS System must adhere to the instructions in this manual. Any deviations from the instructions could be dangerous to the user or cause accidental load loss.



The only user operations permitted are:

- Use of the LCD control panel (LCD Display) and Maintenance Bypass (if present)
- Start up and shut down of the UPS (excluding the commissioning start up)
- Operation of additional connectivity devices

THE SUPPLIER DOES NOT TAKE ANY RESPONSIBILITY FOR DAMAGES CAUSED THROUGH WRONG MANIPULATIONS OF THE UPS SYSTEM

 DANGER!	DO NOT REMOVE ANY SCREWS FROM THE UPS SYSTEM OR FROM THE BATTERY CABINET: DANGER OF ELECTRICAL SHOCK.
 WARNING!	

 DANGER!	HIGH FAULT CURRENTS (LEAKAGE CURRENTS): BEFORE CONNECTING THE MAINS YOU MUST ENSURE THAT THERE IS A PROPER EARTH CONNECTION!
 WARNING!	

 DANGER!	THE USER MUST DISPLAY A WARNING LABEL ON ALL PRIMARY POWER ISOLATORS INSTALLED REMOTE FROM THE UPS AREA TO WARN ELECTRICAL MAINTENANCE PERSONNEL THAT THE CIRCUIT FEEDS A UPS. THE WARNING LABELS MUST CONTAIN THE FOLLOWING WORDING OR EQUIVALENT: "ISOLATE UNINTERRUPTIBLE POWER SUPPLY (UPS) BEFORE WORKING ON THIS CIRCUIT"
 WARNING!	

1.2 Environmental Considerations

To operate the UPS at the best efficiency point, your installation site should meet the environmental parameters outlined in this manual. Excessive amount of dust or moisture in the operating environment may cause damage or lead to malfunction. The UPS should be always protected from the outside weather and sunshine. The operating environment must meet the weight, airflow, size and clearance requirements specified in the technical datasheet.

Under no circumstances, the UPS should be installed in an airtight room, in the presence of flammable gases, or in an environment exceeding environmental requirements here below.

An ambient temperature of +20°C to +25°C is recommended to achieve a long life of the UPS and batteries. The cooling air entering the UPS must not exceed +40 °C and the humidity should be below 95% (non-condensing).

1.3 Declaration of Safety conformity and CE marking

PowerValue 11 RT is designed, manufactured and commercialized in accordance with the standard EN ISO 9001 of Quality Management Systems.

These products are in conformity with the directives:

- 2014/35/EU Low voltage directive
- 2014/30/EU Electromagnetic Compatibility directive (EMC)
- 2011/65/EU Restriction of the use of certain hazardous substances (RoHS) directive

and with the following product standards:

	Product Standards
Safety	IEC/EN 62040-1:2008+A1:2013
EMC	IEC/EN 62040-2:2006
RoHS	IEC/EN50581:2012

Figure 1: Standards

1.4 Inquiries

Address inquiries about the UPS to the local office or agent authorized by the supplier. Please note the type code and the serial number of the equipment and contact your nearest agent authorized by the supplier. The serial number is shown in the nameplate of the product. For further information on troubleshooting, go to Section 7.

1.5 Operation



DANGER!

DO NOT REMOVE THE ENCLOSURE OF THE UPS



WARNING!



CAUTION!

EARTH CONNECTION IS ESSENTIAL BEFORE CONNECTING TO THE BUILDING-WIRING TERMINAL



CAUTION!

DO NOT DISCONNECT THE MAINS CABLE FROM THE UPS OR THE BUILDING WIRING SOCKET DURING OPERATION AS THIS WOULD REMOVE THE GROUND TO THE UPS AND OF ALL CONNECTED LOADS.



CAUTION!

AN INTEGRAL SINGLE EMERGENCY SWITCHING DEVICE WHICH PREVENTS FURTHER SUPPLY TO THE LOAD BY THE UPS IN ANY MODE OF OPERATION SHOULD BE PROVIDED IN THE BUILDING WIRING INSTALLATION.



CAUTION!

AN APPROPRIATE DISCONNECTION DEVICE SUCH AS SHORT-CIRCUIT BACKUP PROTECTIONS SHOULD BE PROVIDED IN THE BUILDING WIRING INSTALLATION



TO DISCONNECT COMPLETELY THE UPS, FOLLOW THE INSTRUCTIONS
IN SECTION 5.3.2

NOTE!



INDISCRIMINATE OPERATION OF SWITCHES MAY CAUSE OUTPUT LOSS
OR DAMAGE TO EQUIPMENT

CAUTION!



ENSURE THAT NO LIQUID OR OTHER FOREIGN OBJECTS ENTER THE UPS

WARNING!

2 Maintenance



CAUTION!

PLEASE REFER TO YOUR AUTHORIZED SERVICE PARTNER FOR THE RECOMMENDED MAINTENANCE PLAN (INCLUDING THE SPECIFIC SCHEDULED REPLACEMENT OF FANS). PERFORMING REGULAR AND PREVENTIVE MAINTENANCE NOT ONLY KEEPS THE PERFORMANCE STABLE AND EXTENDS THE LIFE OF THE EQUIPMENT, BUT ALSO DECREASES THE RISK OF FAILURE. IN CASE THESE ACTIVITIES NOT PERFORMED, THE CORRECT FUNCTIONING OF THE EQUIPMENT MAY BE AFFECTED



DANGER!



WARNING!

ONLY QUALIFIED MAINTENANCE PERSONNEL SHOULD CARRY OUT REPAIRING AND BATTERY REPLACEMENTS



DANGER!



WARNING!

BEFORE CARRYING OUT ANY KIND OF SERVICE AND/OR MAINTENANCE, DISCONNECT THE BATTERIES. VERIFY THAT NO CURRENT IS PRESENT AND NO HAZARDOUS VOLTAGE EXISTS IN THE CAPACITOR OR BUS CAPACITOR TERMINALS.



DANGER!



WARNING!

EVEN AFTER THE UNIT IS DISCONNECTED FROM THE MAINS POWER SUPPLY, COMPONENTS INSIDE THE UPS ARE STILL CONNECTED TO THE BATTERY



DANGER!

THE BATTERY CIRCUIT IS NOT ISOLATED FROM THE INPUT VOLTAGE. HAZARDOUS VOLTAGES MAY OCCUR BETWEEN THE BATTERY TERMINALS AND THE GROUND. VERIFY THAT NO VOLTAGE IS PRESENT BEFORE SERVICING



WARNING!



DANGER!

A BATTERY CAN PRESENT A RISK OF ELECTRICAL SHOCK AND HIGH SHORT CIRCUIT CURRENT. THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED WHEN WORKING ON BATTERIES:

- REMOVE WATCHES, RINGS OR OTHER METAL OBJECTS
- MAKE USE OF PROPER PPE (PERSONAL PROTECTION EQUIPMENT)



WARNING!

AS PER LOCAL POLICIES AND RULES

- WEAR FLAME/ARC RESISTANT WHOLE BODY CLOTHING
- WEAR SUITABLE VOLTAGE RATED GLOVES
- USE SAFETY DIELECTRIC FOOTWEAR
- WEAR ARC FLASH FACE SHIELD
- USE VOLTAGE RATED TOOLS
- DO NOT LAY TOOLS OR METAL PARTS ON TOP OF BATTERIES
- DISCONNECT THE CHARGING SOURCE PRIOR TO CONNECTING OR DISCONNECTING BATTERY TERMINALS



CAUTION!

REPLACE BATTERIES WITH THE SAME NUMBER AND SAME TYPE OF BATTERIES.



CAUTION!

REPLACE FUSES ONLY BY DEVICES OF THE SAME TYPE AND OF THE SAME AMPERAGE IN ORDER TO AVOID FIRE HAZARDS.

- If the battery service life (3~5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced. In this case please contact your dealer.
- The UPS should be charged once every 4 to 6 months if it has not been used for a long time. The batteries charge to 90% capacity in approximately 4 hours. However, it is recommended that the batteries charge for 48 hours after long-term storage.
- In high temperature regions, the battery should be charged and discharged every 2 months. The standard charging time should be of at least 12 hours.
- Under normal conditions, the battery life lasts 3 to 5 years. In case the battery is not in good conditions, earlier replacement should be made.
- When the discharging time is less than 50% of specified after full charged, the battery may need to be replaced. Please check the battery connection or contact your local dealer to order new battery.

2.1 Battery Recycling



WARNING!

NEVER DISPOSE BATTERIES ON FIRE AS THEY MAY EXPLODE.



WARNING!

DO NOT OPEN OR MUTILATE THE BATTERIES.



WARNING!

RELEASED ELECTROLYTE IS HARMFUL TO THE SKIN AND EYES.

Discard appropriately the UPS, battery module and batteries and follow your local laws and regulations.

3 General Characteristics

The UPS and external battery cabinet mechanical structure are indicated in the tables and pictures of this section.

3.1 UPS front view

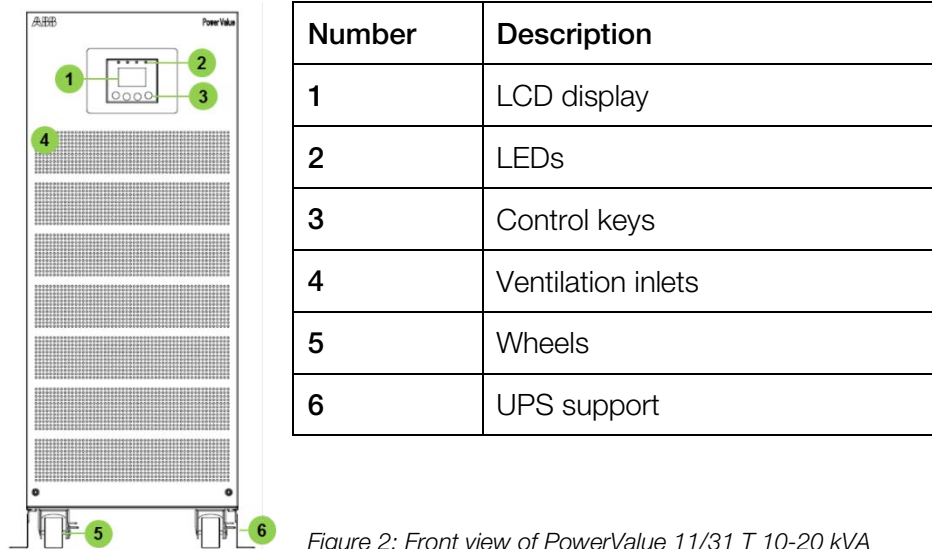


Figure 2: Front view of PowerValue 11/31 T 10-20 kVA

3.2 UPS rear view

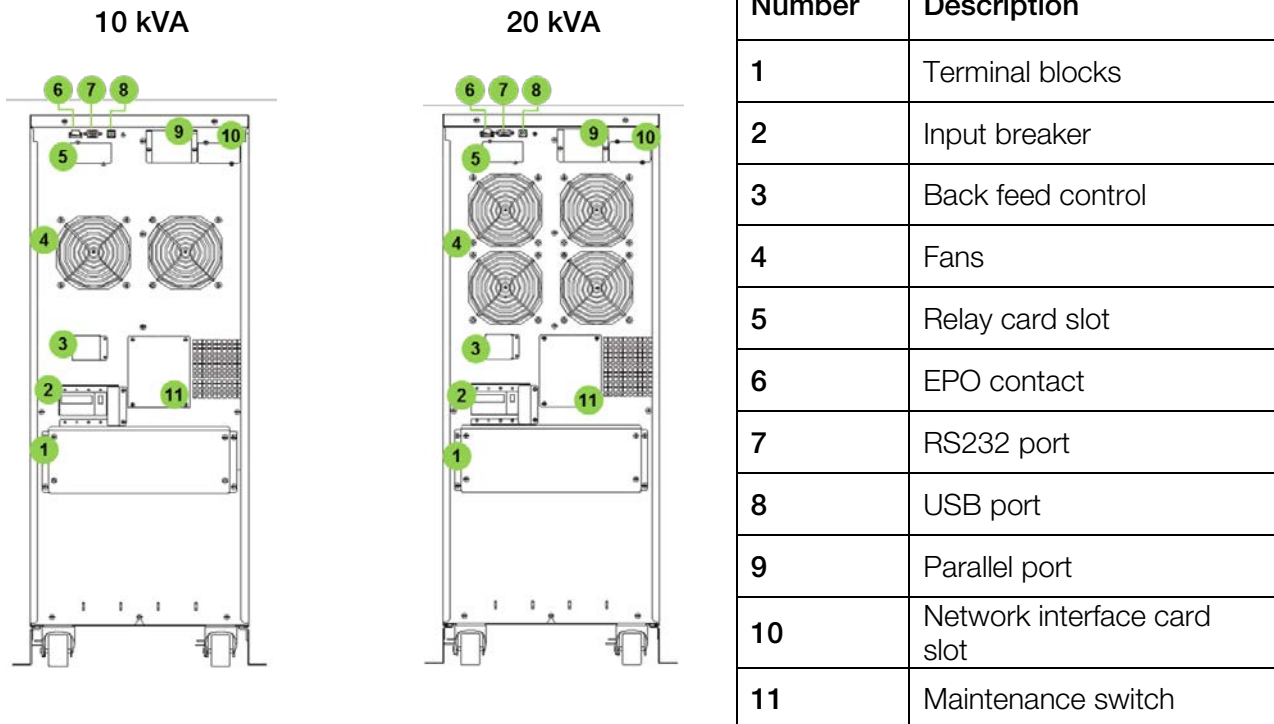
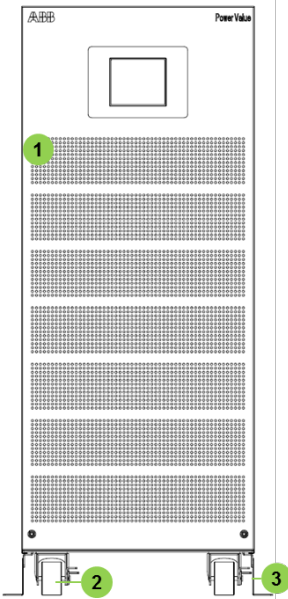


Figure 3: Rear view of PowerValue 11/31 T 10-20 kVA

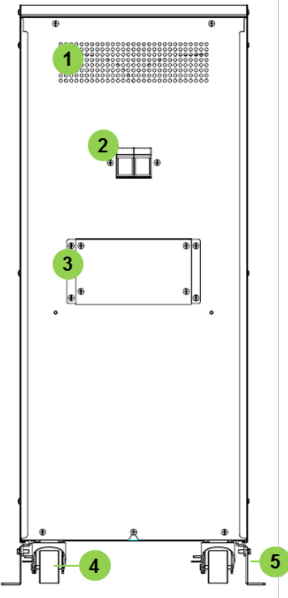
3.3 External battery cabinet front view



Number	Description
1	Ventilation inlets
2	Wheels
3	UPS support

Figure 4: Front view of external battery cabinet

3.4 External battery cabinet rear view



Number	Description
1	Ventilation inlets
2	Fuse holder
3	Connection terminals
4	Wheels
5	UPS support

Figure 5: Rear view of external battery cabinet

4 Installation

4.1 Delivery, Transportation, Positioning and Storage

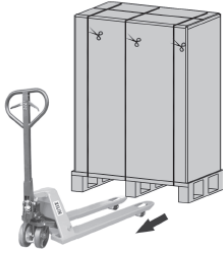
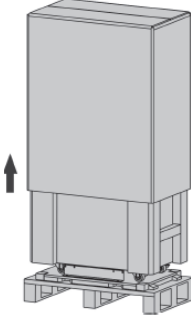
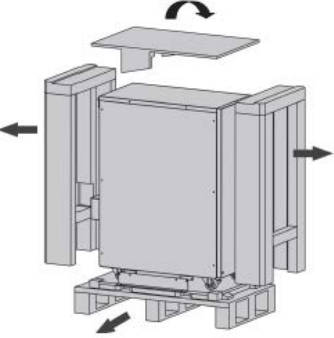
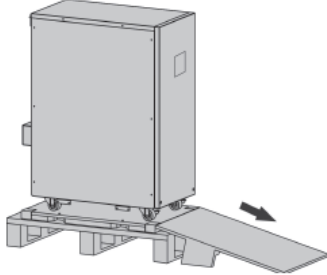
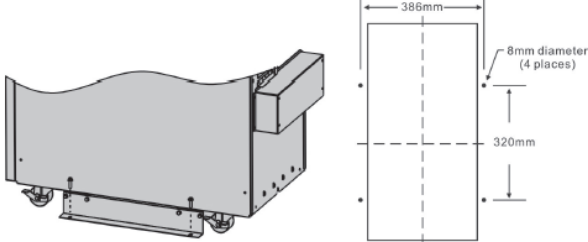
4.1.1 Receipt of the UPS and visual inspection

Upon receiving the UPS, carefully examine the packing container and the UPS for any sign of physical damage. In case of damage, notify immediately the carrier.

The packing container of the UPS protects it from mechanical and environmental damage. To increase its protection, the UPS is wrapped with a plastic sheet. Preserve the packaging for later re-use.

4.1.2 Unpacking

To unpack the unit, follow the steps below:

 <ol style="list-style-type: none">1. Using a forklift, position the unit in the place where it will be installed. The UPS has wheels that makes it easy to move be moved after unpacked but avoid dragging it long not to damage the wheels.	 <ol style="list-style-type: none">2. Remove the caron box from the top of the unit.
 <ol style="list-style-type: none">3. Remove the protection on the sides and top of the unit.	 <ol style="list-style-type: none">4. Using the wooden piece provided on the top of the UPS, slide the UPS out of the pallet with care.
 <ol style="list-style-type: none">5. Install the side mounting brackets (used for shipping) back to the unit to ensure higher stability of the UPS. If desired, the UPS can also be fixed to the floor with M8 bolts.	

Examine the UPS for any sign of damage and ensure that the received UPS corresponds to the material indicated in the delivery note. Notify your carrier or supplier immediately if damage is apparent. The content of the package is:

- 1 x PowerValue 11/31 T UPS
- 1 x User manual
- 1 x parallel cable
- 1 x parallel port cover plate
- 1 x Metal 3 pin connector
- 1 x Metal 2 pin connector
- 1 x Cable for connections from M2 to L3
- 4 x cable glands
- 1 x Monitoring Software CD

4.1.3 UPS storage

If you plan to store the UPS prior to use, keep the UPS in a dry, clean and cool storage room with an ambient temperature between -15 °C and +60°C and humidity of less than 95% non-condensing. If the packing container has been removed, protect the UPS from dust. Keep the UPS always in upright position and do not drop the equipment.

4.1.4 Planning before the installation

The appropriate place of installation for the unit is to be selected in such a way that the danger of damage to the UPS is minimized and a long service life of the device is thus ensured. Please observe the following instructions:

- Install the UPS in an indoor area.
- Leave 50 cm of space on each side of the cabinet to enable cooling airflow and ensure that the circulation of air to the ventilation slits is not obstructed.
- Avoid excessively high temperature and excessive moisture.
- Make sure that the surface is solid and flat.
- Note that water condensing may occur if the UPS is unpacked in a very low temperature environment.

In this case, it is necessary to wait until the UPS is fully dried inside out before proceeding with the installation to avoid hazards and electric shock.

4.2 Electrical Installation

4.2.1 Commissioning

The UPS must be commissioned by a fully trained and authorized field service engineer before being put into use. The commissioning of the UPS involves the connection of the UPS and batteries, the verification of the electrical installation and operating environment of the UPS, the controlled start-up and testing of the UPS and customer training.



TO ENSURE CORRECT OPERATION OF THE UPS AND BATTERIES, IT IS NECESSARY TO PROVIDE THE MAINS CABLES WITH APPROPRIATE FUSE PROTECTION

CAUTION!

4.2.2 Connections

Before installing the electrical wiring, check the nominal amperage of your incoming feeder.



DANGER!

THE CABLING CONNECTIONS MUST BE CARRIED OUT BY QUALIFIED ELECTRICAL PERSONNEL



WARNING!



CAUTION!

DO NOT USE THE WALL SOCKET AS THE INPUT POWER SOURCE FOR THE UPS. ITS RATED CURRENT IS NOT ADEQUATE TO FEED THE UPS AND MAY BURN THE SOCKET

The UPS is cabled through the terminal blocks as indicated in

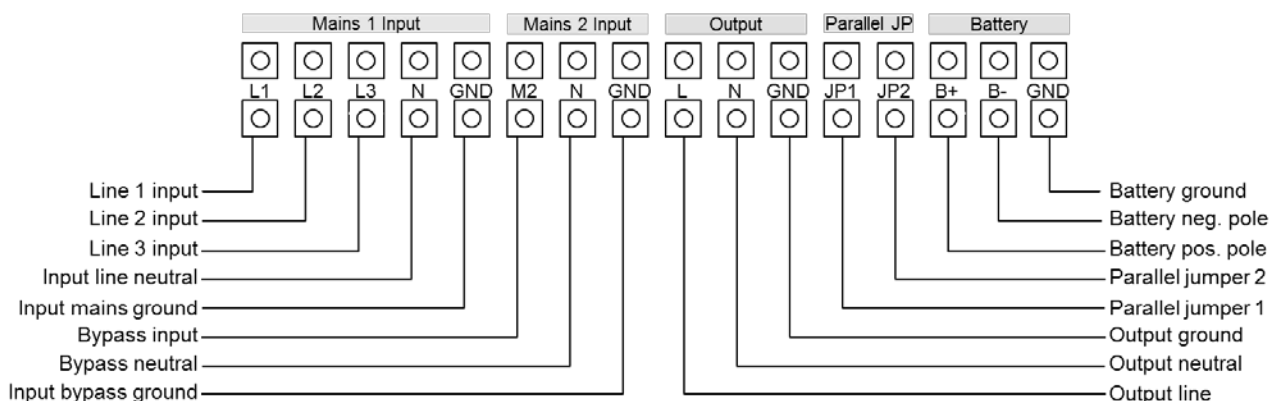


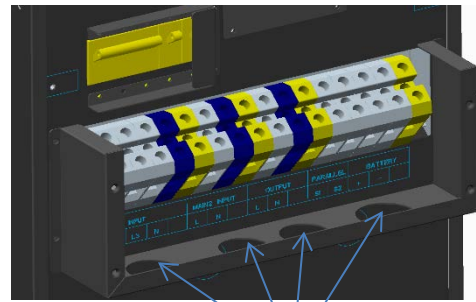
Figure 6: Terminal blocks

4.2.2.1 Procedure

1. Open the terminal block cover located on the rear panel of the UPS.

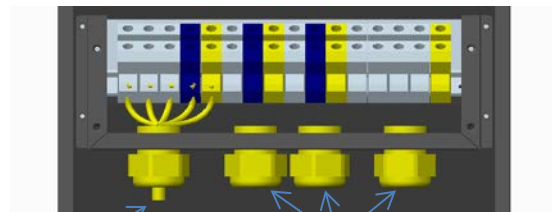


2. Remove the protective plates of the cable entries (the bypass hole should remain closed for safety purposes if it is not used)



Protective plates

3. Connect the wires according to the illustrations in the subsections that follow according to your configuration (11 or 31, single or dual input feed). Run the cables through the holes from the bottom to the top installing also the cable glands provided with the UPS.



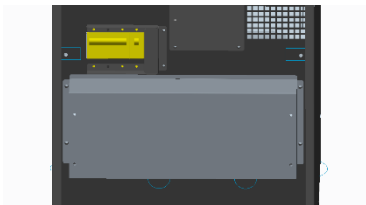
Cable gland
Cable outer diameter: 16-28mm

Cable gland
Cable outer diameter: 18-25mm

Note: If the UPS is used as a standalone UPS, JP1 and JP2 must be connected. If the UPSs are used in parallel configuration, the jumper between JP1 and JP2 must be removed.

4. Check that all wires have been properly connected.

5. Close the terminal box with the protective cover. This is very important to prevent access to energized cables and connectors.



6. Install the output breakers between the output terminal and the load. The breaker should have a leakage current protective function according to the UPS voltage and current ratings.

Single phase input – single phase output (11)

Single Input Feed

1. Connect the neutral cable to the neutral terminal of mains 2. Note that the mains neutral is connected internally in the UPS. For this, there is no need to connect the neutral cable to the mains 1 terminal.
2. Connect the 3 pin connector provided with the UPS between terminals L1, L2 and L3.

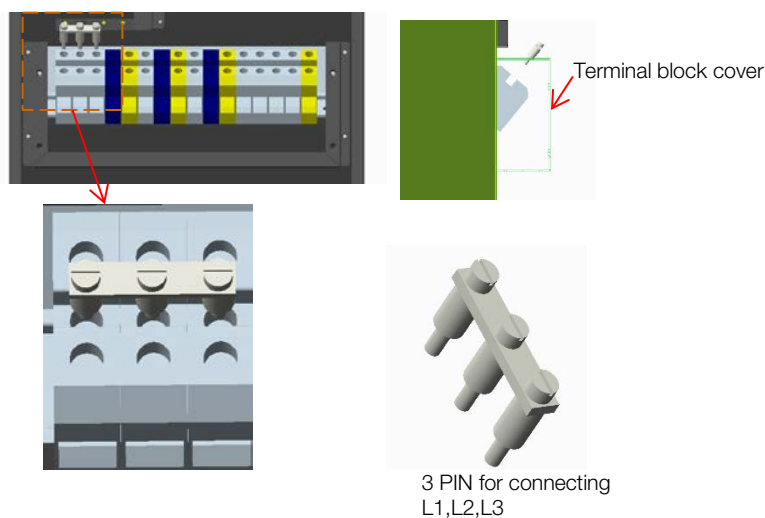


Figure 7: 3 pin connector installation

3. Connect the M2 cable provided with the UPS between terminal M2 and L3.
4. Connect the phase cable to terminal L1 (or L2)

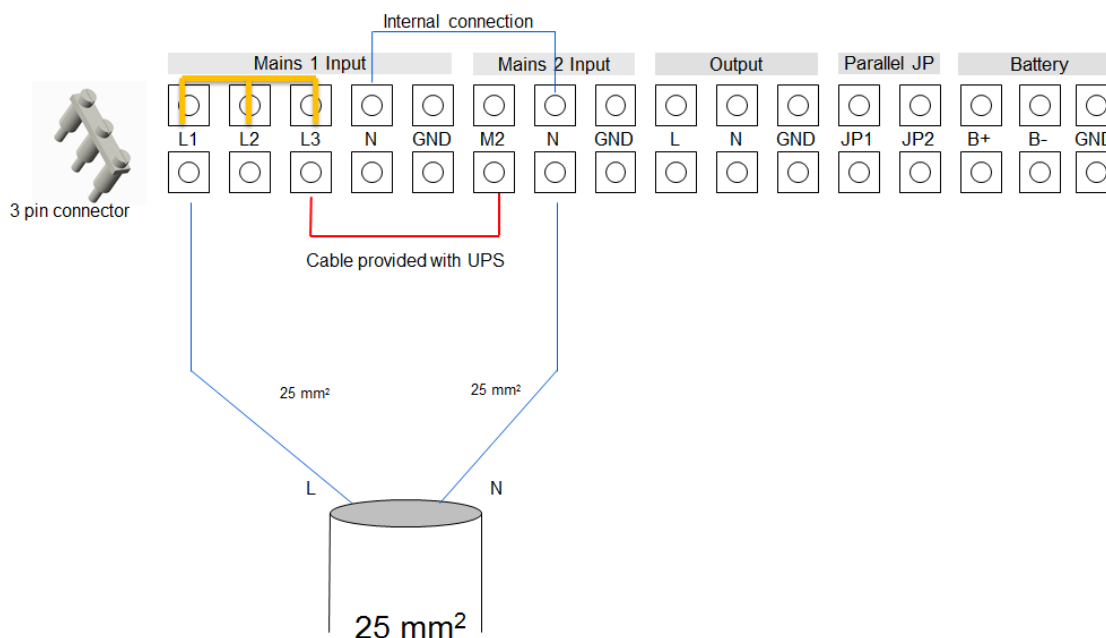


Figure 8: Single feed (11) wiring diagram

Dual Input Feed

1. Connect the neutral cable to the neutral terminal (mains 1 and mains 2).
2. Connect the 3 pin connector provided with the UPS between terminals L1, L2 and L3.

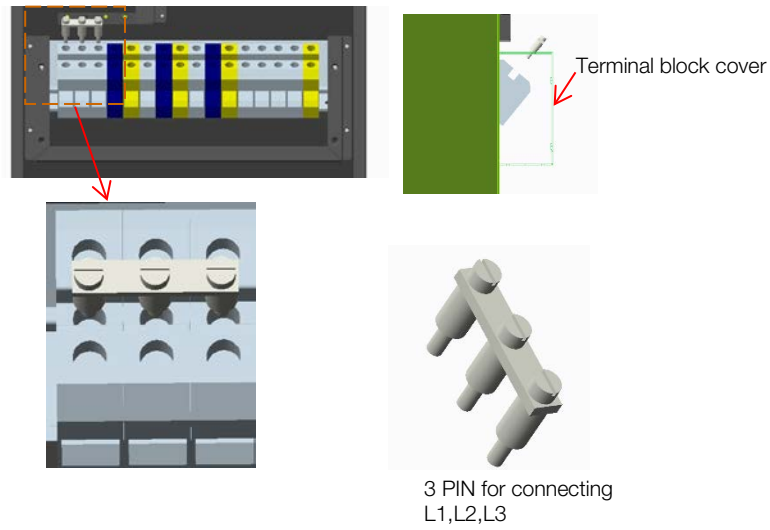


Figure 9: 3 pin connector installation

3. Connect the phase cables accordingly.

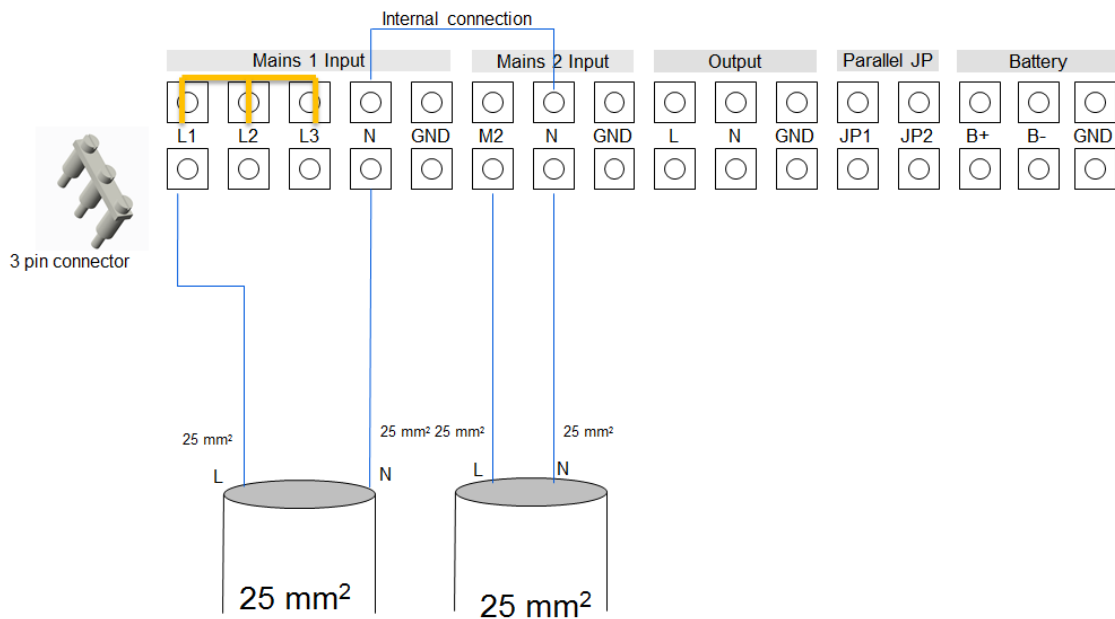


Figure 10: Dual feed (11) wiring diagram

Three phase input – single phase output (31)

Single Input Feed

1. Connect the neutral cable to the neutral terminal (main 2). Note that the mains neutral is connected internally in the UPS. For this, there is no need to connect the neutral cable to the mains 1 terminal.
2. Connect the 2 pin connector provided with the UPS between terminal L3 and M2.

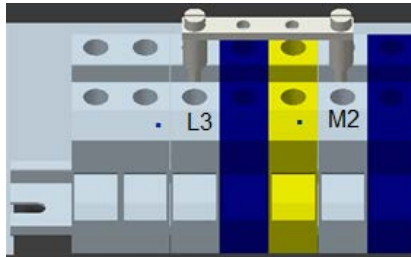


Figure 11: 2 pin connector installation

3. Connect the phase cables to the corresponding terminals.

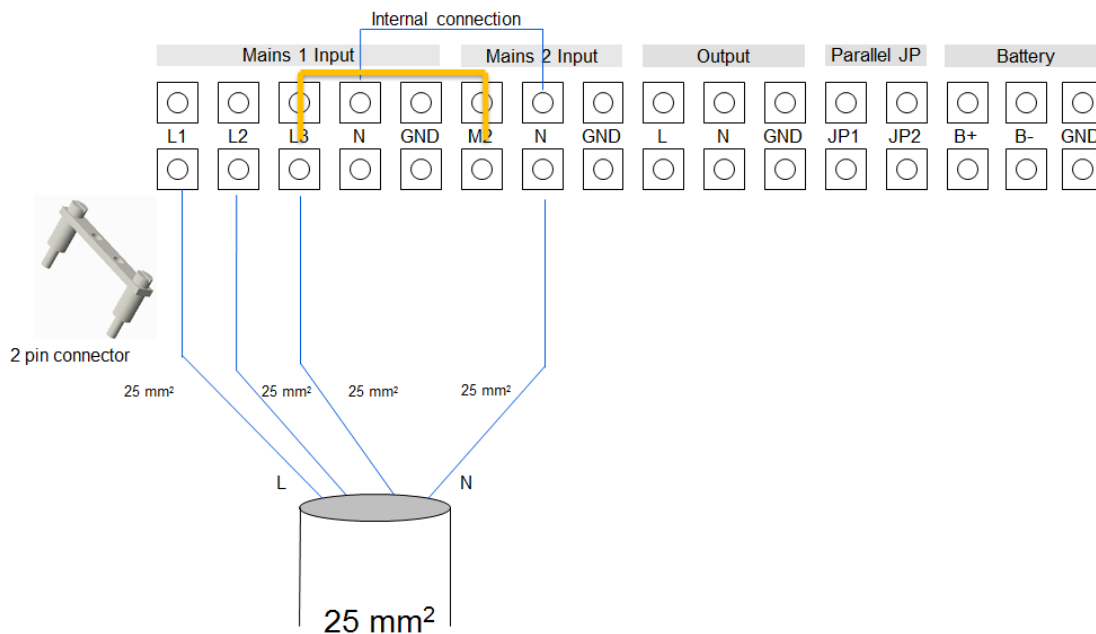


Figure 12: Single feed (31) wiring diagram

Dual Input Feed

1. Connect the neutral cable to the neutral terminal (main 2). Note that the mains neutral is connected internally in the UPS. Isolate the neutral cable of mains 1.
2. Connect the phase cables to L1, L2, L3 and M2.

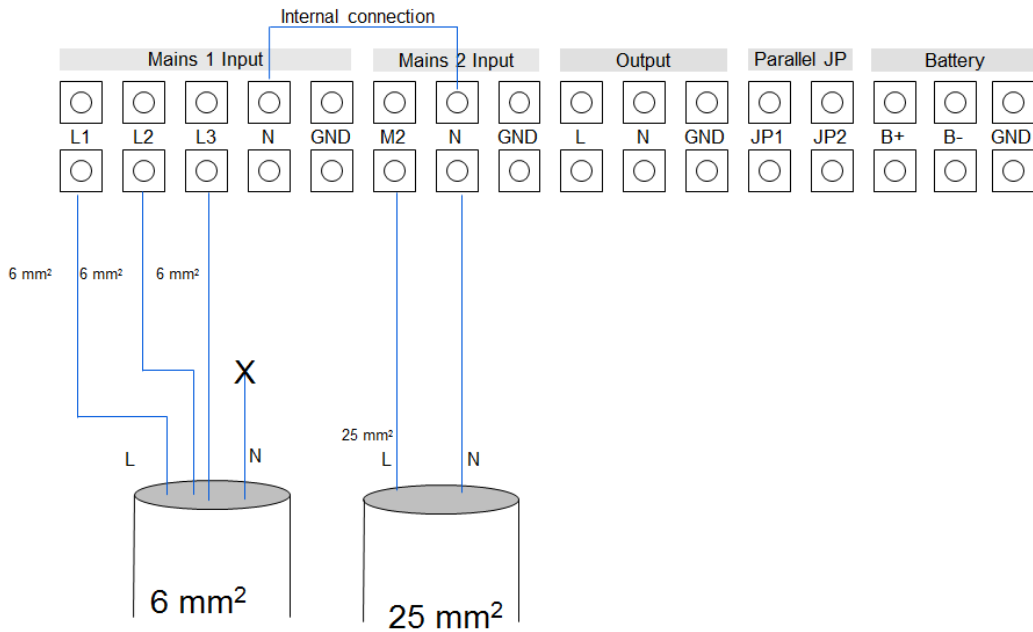


Figure 13: Dual feed (31) wiring diagram



DO NOT CONNECT EQUIPMENT THAT COULD OVERLOAD THE UPS SYSTEM (E.G. LASER PRINTERS)

CAUTION!

4.2.2.2 Parallel system cabling

1. Prepare the input and output wires, the output breaker, and the parallel cable according to section **Error! Reference source not found.**
2. Use the standard 25-pin communication cable provided with the UPS. (The length of the parallel cable should be lower than 3 meters.)
3. Remove the cover plate of the parallel port of the UPS (refer to Figure 3 and Figure 5), connect each UPS one by one with the parallel cable, and re-screw the parallel port cover supplied in the accessories.
4. Disconnect the jumpers JP1 and JP2 on the terminal block, and connect each output breaker to a main output breaker and then to the loads.
5. Strictly follow the wiring requirement of single UPS to perform the wiring of each UPS. Note that each UPS needs an independent battery pack.
6. Connect the output wires of each UPS to an output breaker panel.
7. It is recommended that the distance between the UPSs in parallel and the breaker panel is lower than 20 meters. The difference in length between the wires of the input and output of the UPSs is required to be less than 20%.

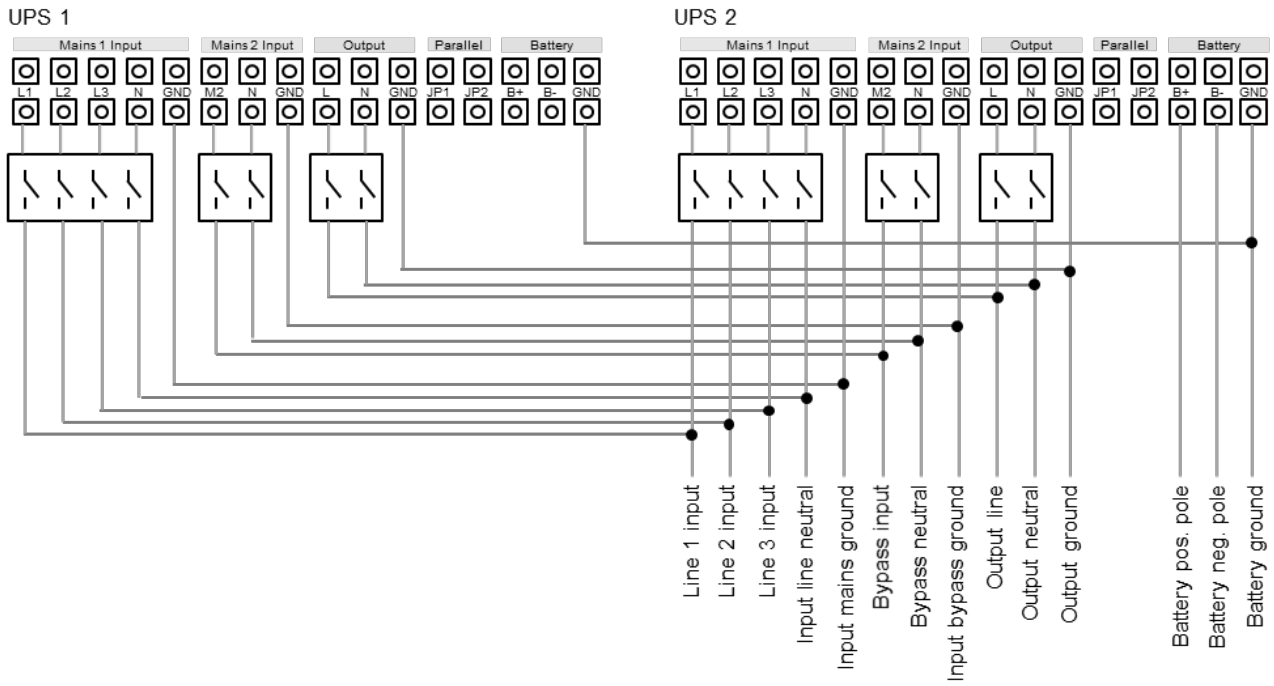


Figure 14: Terminal block wiring diagram in parallel configuration

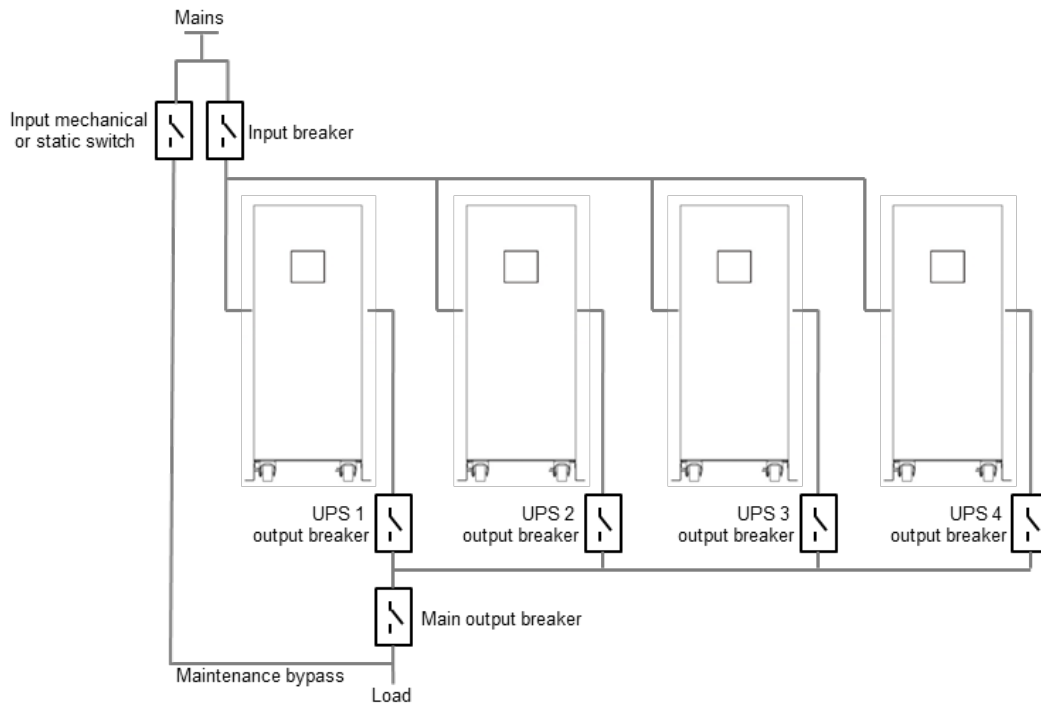


Figure 15: Parallel Installation Diagram

To add or to remove a UPS to an existing system, go to section 5.3.3

4.3 Batteries

Each battery block consists of 24 batteries of 12V in series. The nominal DC voltage of a battery block is therefore 288Vdc.

4.3.1 In-built batteries

Some models of PowerValue 11/31 T have internal batteries. These batteries are already installed and connected when the units are delivered. To replace, reduce or increase the amount of battery blocks, connect the batteries as indicated in the figure 16. Connect the terminals to their matching color terminals.

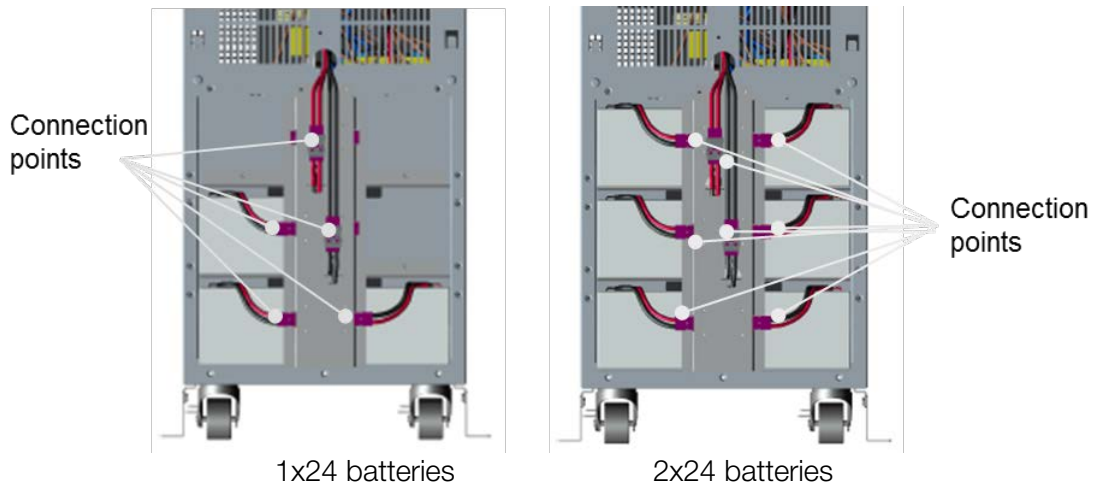


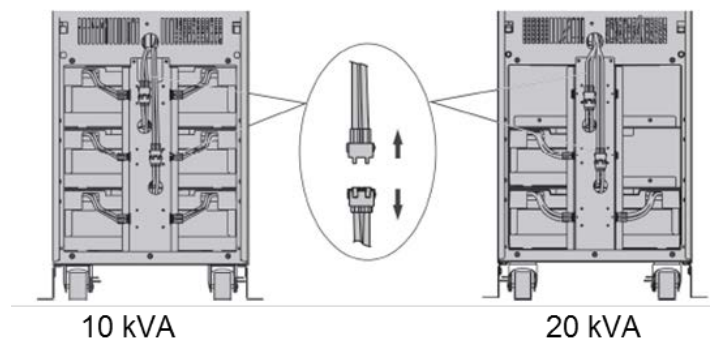
Figure 16: Internal batteries connections

4.3.2 External battery cabinets

To achieve longer back up times, external battery cabinets are available. Each can host up to 96 batteries 9 Ah and two configurations are possible: 2 x 24 x 9 Ah and 4 x 24 x 9 Ah.

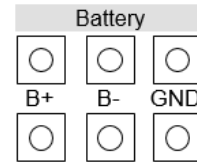
Battery cabinets are dispatched empty, with links and trays. Batteries for both of above configurations are available separately.

1. If the UPS has internal batteries, disconnect the battery connectors.



2. Connect a battery breaker between the external battery cabinet and the UPS according to the specifications contained in the technical datasheet
3. Set the battery breaker to the position OFF and connect the batteries (24 batteries in series).
4. Connect the battery cabinet to the battery terminals in the rear of the UPS.


5. Reconnect the internal battery cables (if present).
6. Connect the input wires of the UPS and then set the battery breaker to the position ON. The UPS will start charging the batteries





UP TO TWO STANDARD EXTERNAL BATTERY CABINETS CAN BE CONNECTED TO THE UPS

NOTE!



AFTER CONNECTING THE BATTERY CABINET, CONFIGURE THE NUMBER OF BATTERY MODULES IN THE CONTROL PANEL (REFER TO SECTION 5.4.2.5). SEE APPENDIX C FOR FURTHER DETAILS

NOTE!



REFER TO BATTERY CABINET FOR POWERSHIELD 11/31 T USER MANUAL FOR FURTHER INFORMATION

NOTE!

4.4 Backfeed Protection

To support protection against UPS back feed currents, an additional external isolation device must be installed in the bypass path according to the figure below.

Remove the protecting cover of the back feed terminals on the back of the UPS and install a contactor. Install the back feed control wire according to relevant wiring rules.

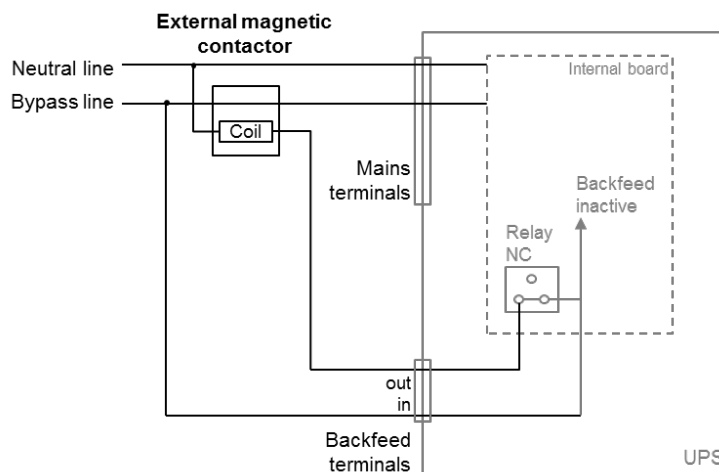
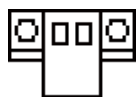


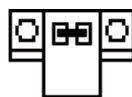
Figure 17: Back feed magnetic contactor installation

4.5 Emergency Power Off (EPO)

The EPO connector gives the user the possibility to block the output of the UPS in case of an emergency. As a default, the EPO is Normally Closed (NC) by a jumper in the rear panel. If the jumper is removed, the UPS output will not supply energy to the load until the EPO status is again modified.



Enable the EPO status



Disable the EPO status

To recover to normal status, close the EPO connector. Then, enter the LCD menu (refer to Section 5.4.2.3) to clear the EPO status. The UPS alarm will stop and will transfer to bypass mode. To transfer to online-mode, press and hold the power-on button for a few seconds.

Note: EPO connector can be configured as Normally Closed (NC) or Normally Opened (NO) through the USB or RS232 port. Contact your local supplier for further information before modifying the settings.

4.6 Installation Checklist

- All packing materials and restraints have been removed from each module.
- Each module in the UPS system is placed in the installed location.
- All conduits and cables are properly routed to the UPS and auxiliary enclosures.
- All power cables are properly sized and terminated.
- A ground conductor is properly installed.
- Battery enclosure installation instructions have been completed.
- Air conditioning equipment is installed and operating properly.
- The area around the installed UPS system is clean and dust-free.
- Adequate workspace exists around the UPS and other cabinets.
- Adequate lighting is provided around all UPS equipment.
- Any optional accessories are mounted in their installed location and properly wired.
- Summary alarms and/or building alarms are wired appropriately. (Optional)
- Start-up and operational checks performed by authorized service personnel.
- All network connections are completed.

5 Operation

This chapter describes how to operate the UPS through the LCD display.

User possible operations are:

- Operate the LCD display
- Start up and shut down of the UPS of the user field (excluding the commissioning start up)

Operation of additional SNMP adapters and their software

5.1 Control Panel

The user-friendly control panel is composed of LEDs, an LCD display and four selection keys.

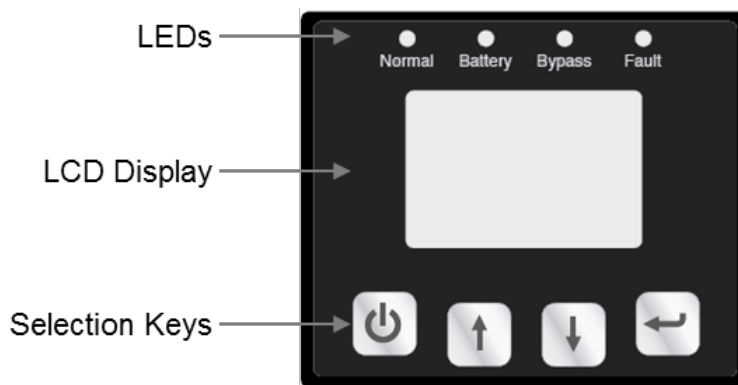


Figure 18: Control Panel

5.1.1 LEDs

The LEDs give info on the UPS mode or a faulty situation at a glance. The LEDs may blink or stay constantly on depending on the UPS status. Table 1 indicates the meaning of each LED.

UPS status	LED Normal (green)	LED Battery (yellow)	LED Bypass (yellow)	LED Fault (red)
Bypass mode / no power in output	-	-	A	D
Bypass mode / powered output	-	-	B	D
UPS is turning ON	C	C	C	C
Online mode	B	-	-	D
Battery mode	B	B	-	D
ECO mode	B	-	B	D
Battery test mode	C	C	C	C
Fault mode	-	-	D	B
Warning	D	D	D	A

Table 1: LEDs indication

Legend:





A: LED flashing

B: constantly lightened

C: lightened circularly

D: depends on the failure/warning

5.1.2 Selection Keys

The Button	Function	Illustration
	Power On/Off	Turn on and off the UPS or change operating mode.
	Scroll up	Enter/Exit the menus and scroll across the screens.
	Scroll down	Scroll down the menu
	Select / Edit	Select and confirm settings.

To see how to operate the UPS, go to Section 5.4.

5.1.3 LCD Display

The LCD display gives the user a complete overview on the status of the UPS. It shows information on the input, output, battery, load parameters, working mode and the settings on voltage, frequency and bypass presence.

It has two main backlight colors. The standard color is a blue background with white texts. In case of a critical alarm, the backlight color changes to orange with dark text. The buzzer also indicates different UPS status. **Error! Reference source not found.** indicates the buzzer status meanings.

UPS condition	Buzzer status
Active failure	Continuous
Active warning	Beep every second
Battery output	UPS on battery: Beeps every 4 seconds Low battery: buzzer beeps every second
Bypass	Beep every 2 minutes
Overload	Beep twice every second

Table 2: Definition of Alarms

When powering on, the UPS display enters the UPS status menu.

- The status screen provides the following information:
- Status summary, including operating mode and load information
- Alarm status, if present (including fault and warning information)
- Battery and charger status (including battery voltage, charge level and charger status)
- Current runtime information

If the user does not press any keys for more than 15 minutes, the UPS leads to the status display.

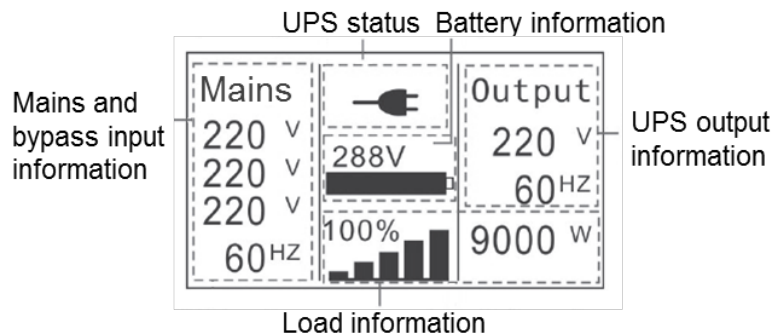


Figure 19: Main UPS screen

5.2 Operating Mode

Different symbols indicate the status and the operating mode of the UPS. Such symbols appear always in the position indicated in Figure 20.

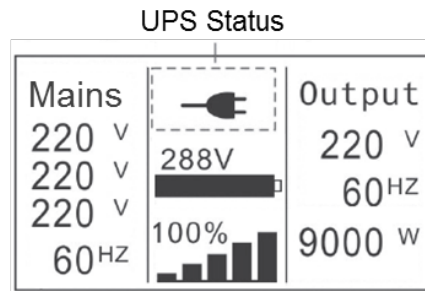













Figure 20: Operating mode


Status	Symbol	Description
Online-mode		UPS is running through the inverter (Online-mode)
Battery-mode		UPS running on battery.
Bypass-mode		The power used by the load is supplied from the mains power via internal filter. Note that if there is a power failure and the UPS is on bypass, it will not transfer back to mains or to battery-mode. (This only happens if the UPS is in ECO-mode).
Stand-by-mode		UPS is running on bypass but there is no power in the output.
ECO-mode		After the UPS is turned on, the power used by the load is supplied from the mains via internal filter if its power is in an acceptable range. This guarantees higher efficiency of the UPS. In case of mains failure, the UPS transfers to Online-mode or Battery-mode and the load is supplied continuously. Note: ECO-mode can be enabled/disabled through the LCD settings or through the monitoring software. Warning: The transfer time of UPS output from ECO-mode to battery-mode is 10ms and not recommended for sensitive loads.
Converter-mode		In converter-mode, the UPS runs with fixed output frequency (50Hz or 60Hz). In case of mains power failure, the UPS transfers to battery-mode and the load is supplied continuously. Note: - Converter-mode function can be enabled/disabled through the LCD settings or the monitoring software. - The load should be de-rated to 60% in converter-mode with single phase input. No de-rating is needed in three phase input configuration.
Warning		Warnings indicate abnormal situations that do not stop the UPS from working. In these cases, the UPS continues running but the user should do corrective actions. See Section 7 for details.

Fault		In situations of failure, the UPS may disconnect the load or transfer to bypass depending on the cause of the failure. In all cases, there will be a constant alarm and the backlight of the UPS will become red. See Section 7 for details.
Overload		When the UPS is in overload, unnecessary loads should be disconnected one by one to decrease the load. The load should be lower than 90% of its nominal power capacity in order to stop alarming.
Battery test		UPS is performing a battery test.
Battery disconnected		The battery is disconnected or defective. The UPS alarm sounds.

5.3 UPS Start-up and Shutdown

Attention: The first time the UPS is started-up, the utility must be connected to the mains (no cold-start). This is to prevent turning on the UPS by mistake during transportation.

IMPORTANT: Switch off the connected loads before turning on the UPS. Then switch on the loads one by one after the UPS is turned on. Switch off all of the connected loads before turning off the UPS.



INSTALLATION OPERATION AND OTHER SERVICE INTERVENTIONS ON THE UPS SYSTEM HAVE TO BE PERFORMED BY SERVICE TECHNICIANS AUTHORIZED BY THE SUPPLIER

WARNING!

5.3.1 UPS start-up

With mains supply

1. Check that all cables are connected correctly and well-fixed mechanically.
2. Measure the power supply current and voltage to ensure it is energized.
3. Connect the mains power to the UPS.
4. Check that the battery cabinet breaker is on position ON (when using external battery cabinets).
5. Set input breakers (M1 and M2) to position-on. The fans start running, the UPS will perform a self-test and will then display the status menu.
6. Press the power-on button for more than 1s, the alarm buzzer sounds and the UPS start-up takes place.
7. After a few seconds, the UPS goes to online-mode. If the mains power is abnormal, the UPS will transfer to battery-mode without interruption of the UPS's output power.

Cold Start (UPS start-up without mains supply)

1. Check that all cables are connected correctly and well-fixed mechanically.
2. Check that the battery cabinet breaker is on position ON (when using external battery cabinets).
3. Press the power-on button. The UPS will perform a self-test and display the status screen.
4. Press the power-on button continuously for more than 1s, the alarm buzzer sounds and the UPS start-up takes place.
5. After a few seconds, the UPS transfers to battery-mode. When the UPS is again supplied with power from the mains, the UPS transfers to online-mode without interruption in the output of the UPS.

5.3.2 UPS Shutdown

With mains supply

1. If the UPS is working on bypass-mode, go to step 3.
2. If the UPS is on online-mode, press the power-on button continuously for more than 3s. The alarm buzzer will sound and the UPS will transfer to bypass-mode. Note: the output is still energized.
3. Disconnect the UPS from the mains power supply through the output breaker. A few seconds later the display will shut down and the output voltage will be removed from the UPS output terminal.

In case the bypass has been disabled through the Settings menu, press the power-on button for more than 3s to shutdown the UPS. The unit will change from online to stand-by-mode. Then, simply disconnect the input power cable and a few seconds later the display will shutdown.

Without mains supply

1. To power off the UPS, press the power on/off button continuously for more than 3s. The alarm buzzer will sound for 3s and the output power will be immediately cut-off.
2. After a few seconds, the display will shut down and the output voltage will be removed from the UPS output terminal.

5.3.3 Parallel UPS system

Installing a new parallel system

1. Do not switch on the output breaker of each UPS. Switch on the input breaker of the each UPS and the UPS will transfer to bypass.
2. Observe the UPS displays to check if there are warnings or fault information. Measure the output voltage of each UPS separately to check if the voltage difference between them is lower than 1V. If the difference is higher than 1V, check the wiring.
3. Press the power-on button of one UPS. Each UPS will start up and all of them will transfer to the inverter at the same time.
4. Measure the output voltage of each UPS separately to check if the voltage difference between them is lower than 0.5V. If the difference is higher than 1V, the UPSs must be regulated.
5. Press the power-on button of one UPS. Each UPS will transfer to the bypass-mode. Switch on the output breaker of each UPS to parallel the output of all UPSs at the same time.
6. Press the power-on button of one UPS, each UPS will start up and they will work in parallel in online mode.

Adding a UPS to an existing system

Read carefully section 5.4 before following the procedure below.

Note: The parallel system must have a main maintenance mechanical switch or static switch according to Figure 15.

1. Regulate the output voltage of the new UPS separately: check if the output voltage difference between the new UPS and the parallel system is lower than 0.5V.
2. Ensure that the bypass of the parallel system is working and the bypass setting is “enabled”.
3. Remove the cover plate of the maintenance switch on the rear panel of each UPS. The UPS system will transfer to bypass automatically.

4. Set the own maintenance switch of each UPS from “UPS” to “BPS”.
5. Switch off the main output breaker and the main input breaker. The UPS will shut down.
6. Check that that there is no current in the output and that the UPS is switched off.
7. Add the new UPS and reinstall the new UPS parallel system by following steps 1-7 of section 4.2.2.2.
8. Switch on the main input breaker and the main output breaker, and set the main maintenance switch or static switch from “BPS” to “UPS”.
9. Set the UPS own maintenance switch from “BPS” to “UPS” and screw the maintenance cover plate back again.
10. Press the power-on button of one UPS. Each UPS will start up and all UPSs will run in parallel in online mode.

How to remove a single UPS from a parallel system:

Note: The parallel system must have a main maintenance mechanical switch or static switch according to Figure 15.

1. Ensure that the bypass is working and that the bypass setting is “enabled”.
2. Remove the cover plate of maintenance switch on the rear panel of each UPS. The UPS system will transfer to bypass automatically.
3. Set the own maintenance switch of each UPS from “UPS” to “BPS”.
4. Switch-off the main output breaker and the main input breaker. The UPSs will shutdown.
5. Check that that there is no current in the output and that the UPS is switched off.
6. Remove the UPS and reinstall the new UPS parallel system by following steps 1-7 of section 4.2.2.2.
7. If the removed or the remained UPS are then used in a standalone configuration, JP1 and JP2 on the terminal block should be connected with a short connection wire.
8. Switch on the main input breaker/switch and the main output breaker/switch.
9. Set the main maintenance switch or static switch from “BPS” to “UPS” and screw the maintenance cover plate back to the UPS.
10. Press the power-on button of one UPS. Each UPS will start-up and all UPSs will run in parallel in online mode.

5.4 UPS Operation

Information regarding the status of the UPS, measurements, events and general information on the UPS are available through the LCD display. This chapter describes how to navigate through the display and how to adjust the user's settings.

5.4.1 Changing the operating-mode

To change the operating-mode, the power-on button is used as follows:


- From online-mode to bypass-mode: Press the power-on button for 3s.
- From bypass-mode to online-mode: Press the power-on button for 3s.
- From bypass-mode to battery: Disconnect the power supply cable
- From battery-mode to online-mode: Connect the power supply to the UPS and it will transfer automatically to online-mode.

Note: If the bypass is disabled in the settings menu, when pressing the power-on button for 3s, the UPS goes from online-mode to stand-by-mode.

5.4.2 Navigation

To navigate through the UPS screens, the scroll buttons are used.

From the main screen (UPS status screen), press  or  for information on alarm and battery.

From the main screen, press  for more than 1s to enter the main menu. The main menu includes the following submenus: Event log, measurements, control, identification, settings. Figure 21 shows details on how to navigate through the menus and submenus.

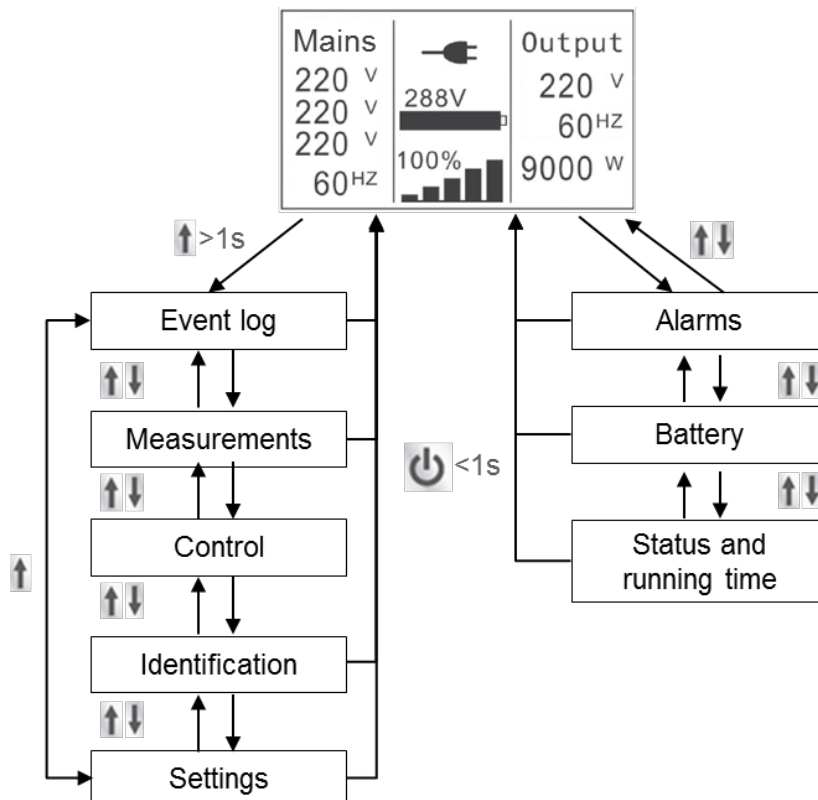


Figure 21: Main menu tree

5.4.2.1 Event log

To enter this menu, press . In this menu, the last 50 events, alarms and faults occurred in the UPS are displayed. The alarms are indicated by the corresponding event code and operating time of UPS when the event occurred. To navigate through the events and alarms, press or .

5.4.2.2 Measurements

To enter this menu, press . In this menu, the following measurements are displayed:

Measurements
Output power [W]
Output power [VA]
Output current [A]
Load percentage [%]
Output voltage [V]
Output Freq. [Hz]
Input voltage [V]
Input Frequency [Hz]
Battery Voltage [V]
Battery Capacity [%]
DC Bus Voltage [V]
Temperature [°C]

Table 3: Measurements menu information

To navigate through the measurements, press or .

To return to the last menu (event log), press for more than 1s.

5.4.2.3 Control

From this menu, the user can control some features of the UPS. The possible operations are indicated in Table 4.

Control	Description	Possible Values	Default Values
Buzzer mute	Mute the UPS sound	No/Yes	No
Single UPS battery test	Initiate test of the batteries of a single UPS	Schedule No/Yes	No
Parallel UPS battery test	Initiate test of the batteries of a group of UPSs	Seg1 and seg 2: on/off	On / On
Clear EPO status	Remove UPS from emergency power off status	No/Yes	No
Reset failure status	Reset warning and alarming status and buzzer	No/Yes	No
Clear event log	Reset all the events from the log file	No/Yes	No
Restore factory settings	Recover all settings in the LCD menu and the EPO polarity and locks the DC start-up (can be executed only when UPS is in bypass mode)	No/Yes	No

Table 4: Control menu parameters

To modify the parameters, press for less than 1s. Then scroll up or down to modify the parameters. To confirm the selection, press for more than 1s. Figure 22 gives an overview on how to navigate on the control menu.

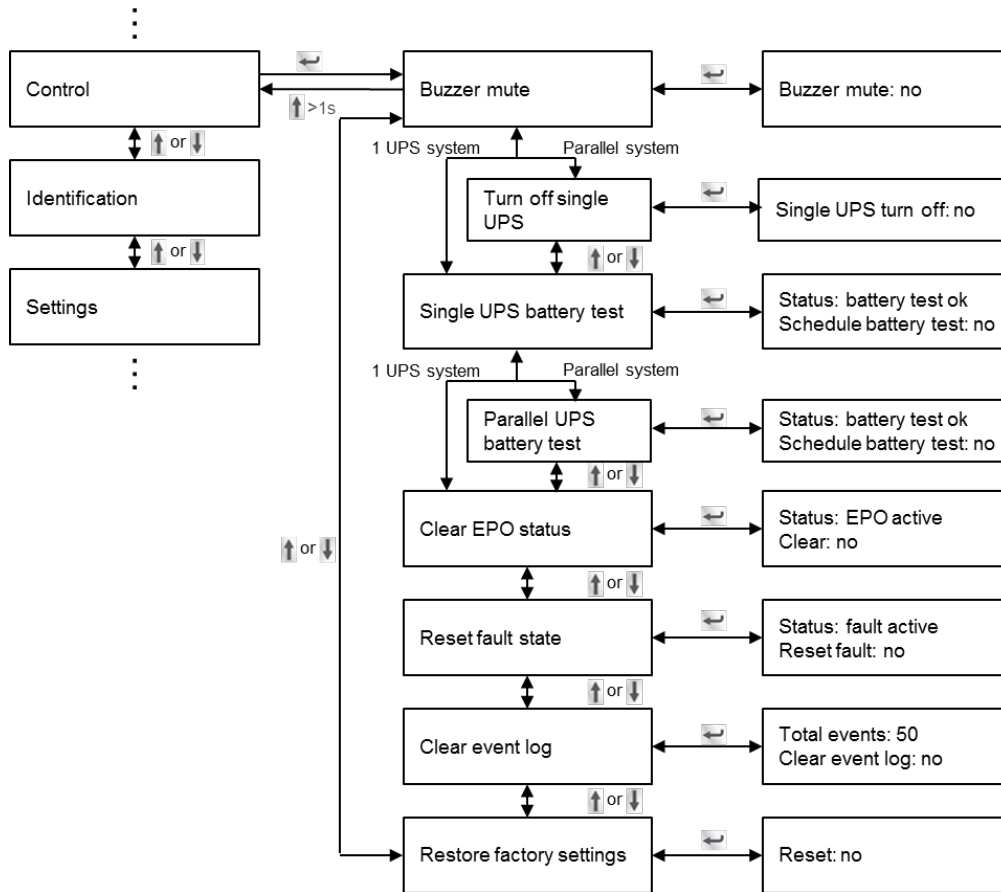


Figure 22: Control menu tree

5.4.2.4 Identification

Press on the Identification menu to navigate through its data. The identification information includes UPS serial number, firmware serial number and model type. Press for more than 1s to return to the last main menu.

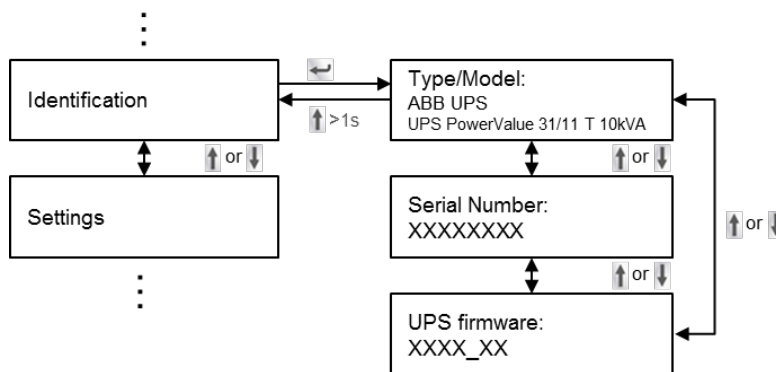


Figure 23: Identification menu tree

5.4.2.5 User's Settings

Some settings can impact on the performance of the UPS and others can enable and disable functions within the UPS. Failures and reduced protection can occur if the equipment is not set in an adequate way. Note that most settings should be done only with the UPS in bypass-mode.

Press for less than 1s in the Settings menu to enter the sub-menus.

To modify a parameter, press for less than 1 second and scroll up or down. To confirm the selection press this same button for more than 1 second.

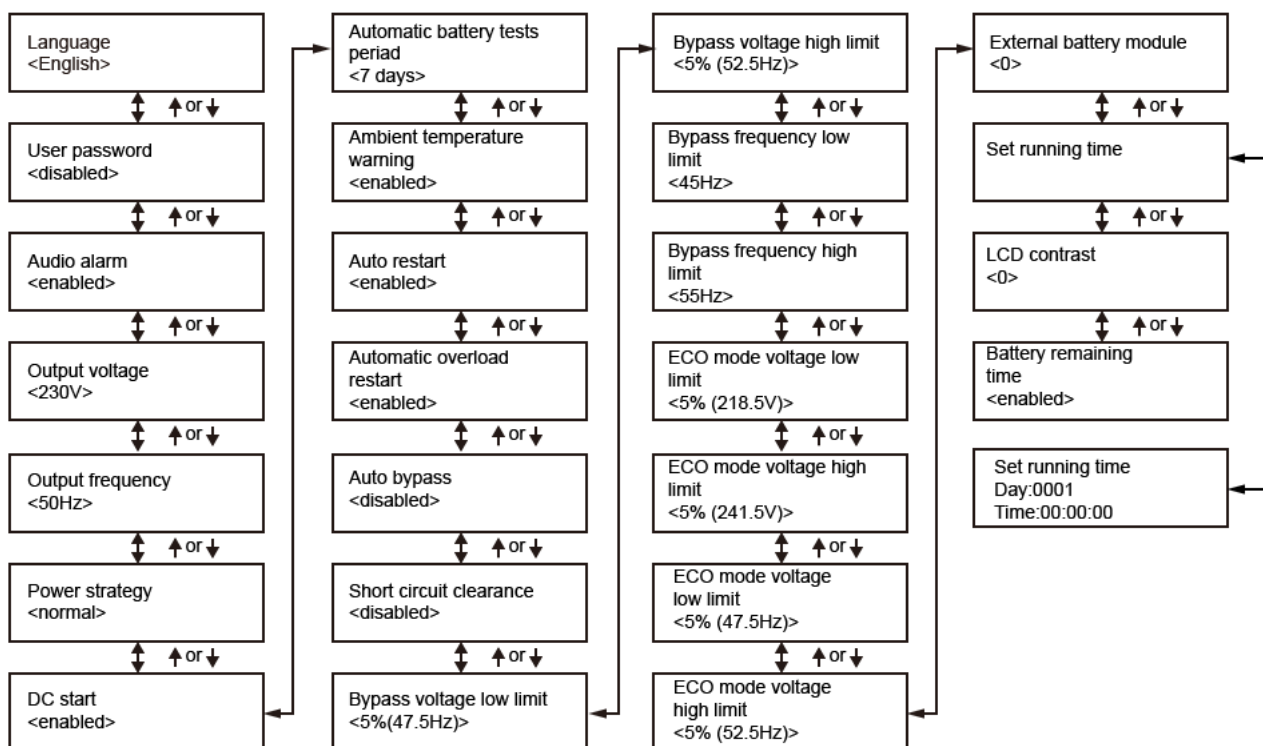


Figure 24: Setting menu tree

If the password is enabled, the user must enter the password **USER** by pressing the buttons , and . It is used mainly to protect against modifications in the Settings menu. The possible operations are indicated in table 5.

Submenu item	Description	Optional Values	Default value
Language	Select menu language	English / Chinese	English
User password*	Protects against settings modifications	enabled/disabled	disabled
Audio alarm	Enable/disable alarm sounds	enabled/disabled	enabled
Output voltage	Define local output voltage	200/208/220/230/240V	230V
Output frequency	Define local output frequency	autosensing/50/60Hz UPS detects the frequency when in 'autosensing'	autosensing
Power strategy**	Define the running mode to normal, ECO-mode or high efficiency and converter mode	normal/high efficiency (ECO-mode)/ converter	normal
DC start (Cold start)	Start the UPS from the batteries (without mains power)	enabled/disabled	enabled
Automatic battery tests period	Define the frequency of the battery tests	0-31 days	7 days
Auto restart	After power outage, the loads restart automatically when mains power is recovered.	enabled/disabled	enabled
Automatic overload restart	The UPS is automatically restarted if it shutdown for overload.	enabled/disabled	enabled

Auto bypass	The automatic bypass can be disabled for countries where the power supply is very unstable. UPS runs only online or on battery.	enabled/disabled	disabled
Short circuit clearance	- When enabled, short circuit will last for 4s before cutting off the output. If short circuit is removed during this time, the UPS will continue to run normally. - When disabled, short circuit will only last for 100ms before UPS output is cut off.	enabled/disabled	disabled
Bypass voltage low limit	When the voltage in the bypass is below this limit, the UPS changes running mode.	176~215V	184V
Bypass voltage high limit	When the voltage in the bypass is above this limit, the UPS changes running mode.	245~276V	264V
Bypass frequency low limit	When the frequency in the bypass is below this limit, the UPS changes running mode.	40~49.5 Hz	45 Hz
Bypass frequency high limit	When the frequency in the bypass is above this limit, the UPS changes running mode.	50.5~70 Hz	55 Hz
Eco-mode voltage low limit	When the voltage in the bypass is below this limit, the UPS changes running mode.	1%~10%	5%
Eco-mode voltage high limit	When the voltage in the bypass is above this limit, the UPS changes running mode.	1%~10%	5%
Eco-mode frequency low limit	When the frequency in the bypass is below this limit, the UPS changes running mode.	1%~10%	5%
Eco-mode frequency high limit	When the frequency in the bypass is above this limit, the UPS changes running mode.	1%~10%	5%
External Battery modules***	Define the number of external battery modules.	0 - 97	0
Set running time	Used to reset the UPS running time for tests purposes.	Day:hour:minute:second 0000:0000:00~9999:23:59:59	Running time
LCD contrast	Change the contrast in the LCD display	-5~+5	0
Battery remaining time	When enabled, the battery remaining time is displayed in the menu measurements	enabled/disabled	enabled

Table 5: Settings menu information

**Read Section 5.2, before using ECO-mode or converter function.

***Ensure the real battery quantity is same as indicated in the settings not to damage the batteries.

Example: Setting the rated output voltage value (figure 25).

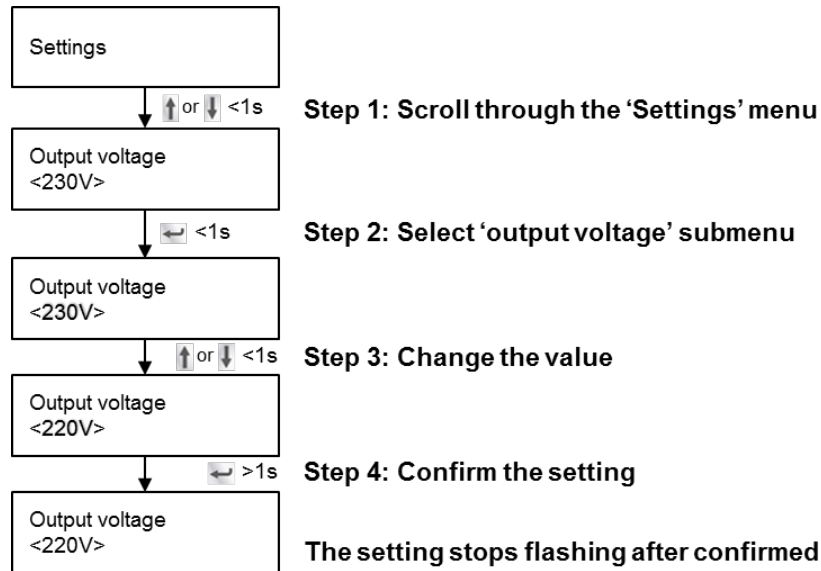


Figure 25: Setting rated output voltage value

6 Communication

A USB and an RS-232 port are available to enable the communication between the UPS and a remote computer/station. Only one communication port can be active at a time and the priority is given to the USB port.

Once the communication cable is installed, the power management software can exchange information with the UPS. The software collects information from the UPS and indicates the status of the device, the power quality of the mains and the battery autonomy of the units.

In case of a power failure and a predicted shutdown of the UPS due to low battery autonomies, the monitoring system is capable of saving the data in the load and of initiating the shutdown of the equipment connected to the UPS.

6.1 RS-232 port

An RS-232 port is available for UPS monitoring, control and firmware updates. To establish a communication between the UPS and a computer, connect one end of the serial communication cable that comes with the UPS to the RS-232 port on the UPS and the other end of the serial cable to the RS-232 port on a computer. The cable pins for the RS-232 communication port are described in Figure 26 and in Table 6.

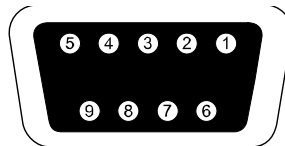


Figure 26: RS-232 Communication Port (DB-9 Connector)

Pin Number	Signal	Description	I/O
2	TXD	Transmit to external device	Output
3	RXD	Receive from external device	Input
5	GND	Ground (tied to chassis)	Input

Table 6: RS- 232 Port Pin Assignment

6.2 USB port

The UPS can communicate with an USB-compliant computers. To establish communication between the UPS and a computer, connect the USB cable that comes with the UPS to the USB port on the UPS. Connect the other end of the USB cable to the USB port on a computer. The USB port is compliant with USB 1.1 protocol.

6.3 Network Management Card (Optional)


PowerValue 11/31 T is equipped with two intelligent slots for optional cards for remote management of the UPS through internet / intranet. The accessories below can be installed in any of the intelligent slots.

SNMP Card - SNMP, HTTP and monitoring capabilities through a Web browser interface.

AS400 Card - AS400 card for AS400 communication protocol.

6.3.1 Installing a Serial Network Management Card (optional)

Each UPS has a communication slot for an optional Serial Network Management (SNMP) Card. After installing an SNMP card, an environmental monitoring probe can be connected to the UPS.

 <p>NOTE!</p>	<p>THE UPS DOES NOT HAVE TO BE SHUTDOWN BEFORE INSTALLING A COMMUNICATION CARD.</p>
--	--

To install the Network Management Card, go through the following steps:

1. Remove the two screws that protect the communication slot of the UPS.
2. Insert the SNMP card into the communication slot.
3. Screw the SNMP card onto the slot using the screws removed in step 1.

Compatible SNMP card: CS141 Basic, CS141 ModBus, CS141 Advanced, WinPower

For more information on the SNMP Cards, see the SNMP User's Manual. For more details about parameters available when using SNMP card with PowerValue 11/31 T, please refer to Appendix A and B.

6.3.2 AS400 Dry Contact card

Alarm indication is possible through the AS400 potential free (dry contact) card. The following is the pin assignment and description of DB-9 connector in AS400 card.

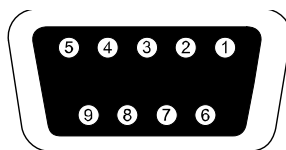


Figure 27: RS-232 Communication Port (DB-9 Connector)

Pin Number	Description	I/O
1	UPS Fail	Output
2	Summary Alarm	Output
3	GND	Input
4	Remote Shutdown	Input
5	Common	Input
6	Bypass	Output
7	Battery Low	Output
8	UPS ON	Output
9	Line Loss	Output

Table 7: RS- 232 Port Pin Assignment

For more information on the potential free cards, see the AS400 User's Manual.

6.3.3 Monitoring Software

ABB UPS can be monitored through a software that allows the user to monitor the UPS. The software provides a remote and safe shutdown for multi-client systems in case of absence of power in the output of the UPS. Instructions on how to install the software are provided with the network management cards.

7 Troubleshooting

7.1 Fault identification and rectification

Alarm and events identify warning situations and notify errors or potential failures of the system. The output of the UPS is not necessarily affected in case of an alarm but taking the correct actions may prevent loss of power to the load. If the UPS system does not operate correctly, attempt to solve the problem using the table below.

7.1.1 Troubleshooting without an error message

MESSAGE DISPLAYED	POSSIBLE CAUSE	REMEDY
No indication, no warning tone even though system is connected to mains power supply	<i>No input voltage</i>	Check the building wiring and input cable. Check if the input breaker is closed.
Bypass LED ON even if the power supply is available	<i>Inverter not switched on</i>	Press power-on button to turn on UPS.
Battery LED ON and audible alarm sounding	<i>Input voltage and/or frequency out of tolerance</i>	Check input power source. Check the building wiring and input cable. Check if the input breaker is closed.
Emergency supply period shorter than nominal value	<i>Batteries not fully charged / batteries defect</i>	Charge the batteries for at least 12 hours and then check capacity.

7.1.2 Troubleshooting based on error message

MESSAGE DISPLAYED	POSSIBLE CAUSE	REMEDY
Inv Overload Failure Alarm code:42	<i>Overload</i>	Check the loads and remove non-critical loads. Check if some loads have failures.
Byp Overload Failure Alarm code:43	<i>Overload</i>	Check the loads and remove non-critical loads. Check if some loads have failures.
Output short-circuit Alarm code:31	<i>Short circuited output</i>	Remove all the loads. Turn off the UPS. Check if UPS output and loads are short-circuited. Ensure short circuit is removed before turning on the system again.

Heat sink Over Temperature Fault Alarm code:81	<i>Inside temperature of UPS is too high</i>	Ensure the UPS is not overloaded, the air vents are not blocked and the ambient temperature is not too high. Wait for 10 minutes for the UPS to cool down before turning it on again. If failed, contact the service center.
DC BUS over-voltage Alarm code:21	<i>UPS internal fault</i>	Contact UPS supplier.
DC BUS under-voltage Alarm code:22	<i>UPS internal fault</i>	Contact UPS supplier.
DC BUS unbalanced Alarm code:23	<i>UPS internal fault</i>	Contact UPS supplier.
DC BUS short circuited Alarm code:24	<i>UPS internal fault</i>	Contact UPS supplier.
DC BUS softstart failure Alarm code:25	<i>UPS internal fault</i>	Contact UPS supplier.
INV over-voltage Alarm code:32	<i>UPS internal fault</i>	Contact UPS supplier.
INV under-voltage Alarm code:33	<i>UPS internal fault</i>	Contact UPS supplier.
INV softstart Failure Alarm code:34	<i>UPS internal fault</i>	Contact UPS supplier.
Negative power failure Alarm code:E1	<i>The load is totally inductive or totally capacitive</i>	Remove non-critical loads to ensure that it is not overloaded. Power on the UPS. If bypass is normal, the UPS will go on bypass mode.
Parallel cable loss Alarm code:E2	<i>The parallel cable is disconnected</i>	Check the parallel cable.
Backfeed Alarm code:93	<i>UPS internal fault</i>	Do not touch any terminal of the equipment even if the utility power has been cut-off. Contact UPS dealer.

Please collect the following information before calling the After-Sales Service Department:

1. Model number, serial number
2. Date on which the problem occurred
3. LCD/LED display information, buzzer alarm status
4. Mains power condition, load type and capacity, environment temperature, ventilation condition
5. Information on external batteries (battery capacity, quantity)

8 Appendix A

CS141 SNMP card available parameters (valid for CS141 Basic, CS141 ModBus, CS141 Advanced)

The parameters available from CS141 SNMP cards are herein described

Parameter	Units	Type	Available interface	Modbus register
Measurement Parameters				
Input Voltage	V	Input	Webserver / Modbus	104
Input Frequency	Hz	Input	Webserver / Modbus	111
Output Voltage	V	Output	Webserver / Modbus	97
Output Load Percentage	%	Output	Webserver / Modbus	100
Battery Voltage	V	Battery	Webserver / Modbus	110
Battery Capacity	%	Battery	Webserver / Modbus	103
Temperature	°C	Environmental	Webserver / Modbus	107
UPS Status Information				
On shutdown			Webserver / Modbus	109
On inverter			Webserver / Modbus	109
On battery			Webserver / Modbus	109
UPS Alarms				
Battery Low			Webserver / Modbus	117
Input Bad			Webserver / Modbus	120
On Bypass			Webserver / Modbus	123
General Fault			Webserver / Modbus	132
Test In Progress			Webserver / Modbus	138
Shutdown imminent			Webserver / Modbus	137
Diagnose test failed			Webserver / Modbus	133

9 Appendix B

Winpower SNMP card available parameters (webserver interface)

The parameters available from Winpower SNMP cards are herein described

Parameter	Type	View
UPS Status	General, status	UPS Monitoring >> UPS Status
UPS Temperature	General, measurement	UPS Monitoring >> UPS Status
Voltage	Input, measurement	UPS Monitoring >> UPS Status
Frequency	Input, measurement	UPS Monitoring >> UPS Status
Load (%)	Output, measurement	UPS Monitoring >> UPS Status
Voltage	Output, measurement	UPS Monitoring >> UPS Status
Frequency	Output, measurement	UPS Monitoring >> UPS Status
Battery Status	Battery, status	UPS Monitoring >> UPS Status
Capacity (%)	Battery, measurement	UPS Monitoring >> UPS Status
Voltage	Battery, measurement	UPS Monitoring >> UPS Status
Time on Battery	Battery, measurement	UPS Monitoring >> UPS Status
Output Rating Voltage	Output, Rating	UPS Monitoring >> UPS Parameters
Output Frequency Rating	Output, Rating	UPS Monitoring >> UPS Parameters
Output Rating VA	Output, Rating	UPS Monitoring >> UPS Parameters
UPS Model	Additional UPS Information	UPS Monitoring >> UPS Identification
UPS Description	Additional UPS Information	UPS Monitoring >> UPS Identification
Firmware Version	Additional Network card Information	UPS Monitoring >> UPS Identification
MAC Address	Additional Network card Information	UPS Monitoring >> UPS Identification

10 Appendix C

Introduction

The battery configuration is described in the following way:

“number of battery strings” x (“number of 12V battery blocks” x “battery capacity”)

UPS internal battery configuration

UPS Model	Battery configuration
UPS PowerValue 11/31 T 10 kVA	no internal
UPS PowerValue 11/31 T 10 kVA B	1 x (24 x 9Ah)
UPS PowerValue 11/31 T 10 kVA B2	2 x (24 x 9Ah)
UPS PowerValue 11/31 T 20 kVA	no internal
UPS PowerValue 11/31 T 20 kVA B	2 x (24 x 9Ah)
UPS PowerValue 11/31 T 10 kVA S	no internal
UPS PowerValue 11/31 T 20 kVA S	no internal

Standard battery cabinet (4 x 24 x 9 Ah) value setting through LCD display and RS232 (M is the total nr of standard battery cabinets connected, $M \geq 1$)

UPS Model	LCD display (path: Settings → Password (USER) → External battery modules)	RS232 command: SASV03[value]<cr>
UPS PowerValue 11/31 T 10 kVA	4M - 1	4M
UPS PowerValue 11/31 T 10 kVA B	4M	4M + 1
UPS PowerValue 11/31 T 10 kVA B2	4M + 1	4M + 2
UPS PowerValue 11/31 T 20 kVA	4M - 2	4M
UPS PowerValue 11/31 T 20 kVA B	4M	4M + 2
UPS PowerValue 11/31 T 10 kVA S	4M - 1	4M
UPS PowerValue 11/31 T 20 kVA S	4M - 2	4M

Settings with a customized battery pack of N Ah capacity, through LCD display and RS232 (take only the integer part)

UPS Model	LCD display (path: Settings→Password (USER)→External battery modules)	RS232 command: SASV03[value]<cr>
UPS PowerValue 11/31 T 10 kVA	N/9 – 1	N/9
UPS PowerValue 11/31 T 10 kVA B	N/9	N/9 + 1
UPS PowerValue 11/31 T 10 kVA B2	N/9 + 1	N/9 + 2
UPS PowerValue 11/31 T 20 kVA	N/9 – 2	N/9
UPS PowerValue 11/31 T 20 kVA B	N/9	N/9 + 2
UPS PowerValue 11/31 T 10 kVA S	N/9 – 1	N/9
UPS PowerValue 11/31 T 20 kVA S	N/9 – 2	N/9

Contact us

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ups.sales@ch.abb.com

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Technical Datasheet

PowerValue 11/31 T

10-20 kVA

Classification IEC/EN 62040-3
VFI-SS-111

Working mode
on-line double conversion

Power rating
10-20 kVA

Paralleling
up to 4 units (up to 80 kVA)

Output power factor
0.9

Efficiency double conversion
up to 93%

Efficiency in ECO-MODE
up to 97%

Maximum weight w/out batteries
66.8 kg

Input current distortion THDI
<5 %

Input power factor (PF)
0.99

Communication cards
SNMP / relay card



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Batteries

PowerValue can be configured with matching battery cabinets to satisfy extended runtime demands. Easily accessible, and replaceable batteries increase availability and reduce Mean Time to Repair (MTTR).

The new battery cabinet is mechanically identical to the previous version but is can host double amount of batteries with flexible configuration: double autonomy in the same footprint.



Battery autonomy

Battery cabinet configuration	Battery configuration
A*	2 x 24 x 9 Ah
B**	4 x 24 x 9 Ah

	UPS Internal Batteries	UPS + A*	UPS + B**	UPS + A* + B**	UPS + 2B**
10 kVA	-	69 / 30 / 18 / 12	151 / 69 / 42 / 30	262 / 109 / 69 / 49	380 / 151 / 96 / 69
10 kVA S	-	-	151 / 69 / 42 / 30	262 / 109 / 69 / 49	380 / 151 / 93 / 69
10 kVA B	29 / 12 / 6 / 4	109 / 49 / 29 / 21	208 / 87 / 55 / 39	302 / 130 / 82 / 58	442 / 176 / 109 / 79
10 kVA B2	69 / 30 / 18 / 12	151 / 69 / 42 / 30	262 / 109 / 69 / 49	380 / 151 / 93 / 69	651 / 208 / 122 / 87
20 kVA	-	29 / 12 / 6 / 4	69 / 29 / 18 / 12	69 / 49 / 29 / 21	151 / 69 / 42 / 29
20 kVA S	-	-	69 / 29 / 18 / 12	69 / 49 / 29 / 21	151 / 69 / 42 / 29
20 kVA B	29 / 12 / 6 / 4	69 / 29 / 18 / 12	69 / 49 / 29 / 21	151 / 69 / 42 / 29	208 / 97 / 55 / 39

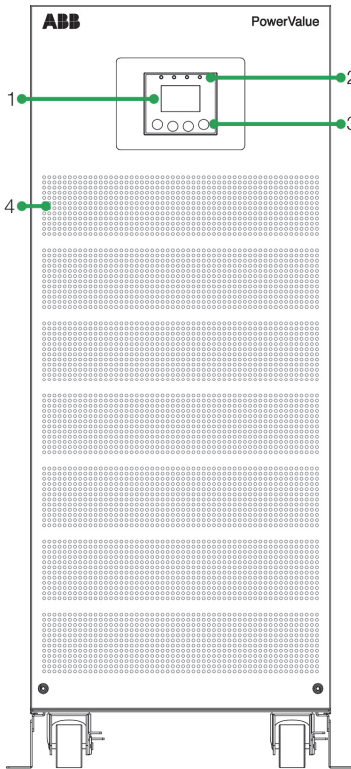
in minutes at 25 / 50 / 75 / 100% load

Given runtimes are estimates and valid at 20 degrees Celsius.

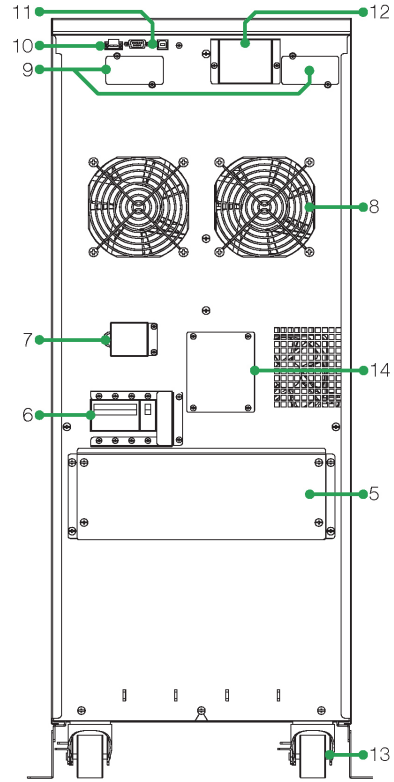
Actual runtime of the system will depend, among many variables, on the age of the batteries and environmental conditions

UPS devices

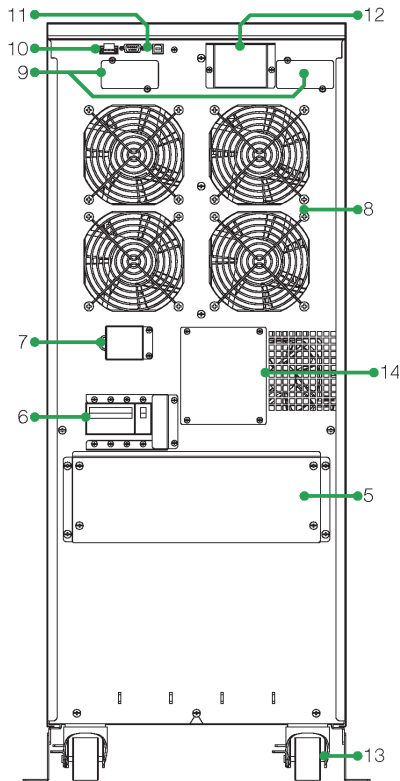
10 & 20 kVA - Front View



10 kVA - Rear View



20 kVA - Rear View



#	Device
1	LCD display
2	LEDs
3	Control keys
4	Ventilation inlets
5	Connection terminals
6	Input breaker
7	Back feed protection terminals
8	Fans
9	Network interface / AS400 slot
10	EPO contact
11	RS232 port / USB port
12	Parallel port
13	Wheels / support and brakes
14	Maintenance switch

Options

Network interface card

Enables real-time monitoring of your UPS system via a standard web browser.

ABB's monitoring devices provide real-time visibility of the condition of your power equipment and help in solving problems before they become critical.



Models

- CS141 Basic slot / box
- CS141 Advanced slot / box
- CS141 ModBus slot / box
- Winpower SNMP

Sensors

Temperature sensors, humidity sensors and alarm buzzers support monitoring the environmental condition and enables an efficient identification of the alarms.

Relay interface card

Provides contact closures for remote monitoring of alarm conditions of PowerValue 11/31 T systems.

The card is user-installable, hot-swappable and enables advanced communication between the UPS and the computer.

Models

- AS400



Technical specifications

GENERAL DATA	10 kVA	20 kVA
Apparent power	10 kVA	20 kVA
Active power	9 kW	18 kW
UPS type	On-line, transformer-free	
Parallel capability	Up to 4 frames	
Battery	Models with or without batteries	
Performance classification	VFI-SS-111	
MECHANICAL		
Dimensions (width×height×depth)	350x890x715 mm	
Weight (without batteries)	56.3 kg / 65.0 kg (for S model)	66.8 kg / 68.0 (for S model)
Weight (with 1x24 x 9Ah batteries)	116.1 kg	-
Weight (with 2x24 x 9Ah batteries)	177.6 kg	190 kg
ACOUSTIC NOISE (acc. to IEC 62040-3)		
in normal mode (at <=25°C) at 100 / 50 % Load	<55 dBA	<55 dBA
in battery mode (at <=25°C) at 100% / 50% Load	<55 dBA	<55 dBA
SAFETY		
Access	Operator	
Degree of protection against hazards and water ingress	IP 20	
ELECTROMAGNETIC COMPATIBILITY		
Compliant to IEC 62040-2		
Category Emission / Immunity	C3	
ENVIRONMENTAL		
Storage temperature range	-15°C – +50°C	
Operative temperature range	0°C – +45°C	
Relative humidity	≤ 95% (non-condensing)	
Max. altitude without de-rating	1000m	
ADDITIONAL AND USUAL INFORMATION		
Input connection	5 wires, 3 phase + N + PE or 3 wires, 1 phase + N + PE	
Output connection	3 wires, 1 phase + N + PE	
Cable entry	Rear	
Accessibility	Back and front (batteries)	
Air outlet	Back	
Color	Pantone process black C (PPC-48)	
OPTIONS		
Battery cabinets		
SNMP cards		
Relay card with potential-free contacts (customer outputs)		
INCLUDED (DEFAULT)		
Parallel Kit (parallel board pre-installed, parallel cable provided with each unit)		
Single or dual input feed kit (cables and metal plates)		
Sea freight packaging (carton box)		
INPUT CHARACTERISTICS	10 kVA	20 kVA
Rated voltage (steady-state, r.m.s)	1ph + N: 220 / 230 / 240 VAC 3ph + N: 380 / 400 / 415 VAC	
Frequency, rated	50 Hz / 60 Hz (selectable)	

Frequency tolerance	± 10%	
Tolerance, referred to 230V	-23% / +20% at <100% load, -33% / +20% at <80% load, -43% / +20% at <60% load, -48% / +20% at <40% load	
Current (r.m.s), rated (with battery charged and input 400/230V)	42 A	84 A
Current (r.m.s), maximum (with charging batt. and input 400/230V)	48 A / 54 A (for S model)	90 A / 97 A (for S model)
Total harmonic distortion (THDi)	≤5% (IEC 61000-3-4)	
Power factor	0.99 @ 100% load	
Rated short-time withstand current (I _{cw})	2 kA (10 kVA) 4 kA (20 kVA)	

AC POWER DISTRIBUTION SYSTEM: TN-S AND TT

Phases required	3 or 1
Neutral required	Yes

ADDITIONAL AND USUAL INFORMATION

Connection	5 wires, 3 phase + N + PE or 3 wires, 1 phase + N + PE
Cable entry	Rear
Accessibility	Rear
Walk In/Soft Start	Yes (Power supply needed only for first start-up)

OUTPUT CHARACTERISTICS	10 kVA	20 kVA
Power, rated:	9000 W	18000 W

AC POWER DISTRIBUTION SYSTEM: TN-S AND TT

Available phases	1
Neutral available	Yes
Rated voltage (steady state, r.m.s.)	208 / 220 / 230 / 240 VAC (90% de-rating at 200Vac)
Variation in normal mode / battery mode	± 1%

TOTAL HARMONIC DISTORTION (THDU), 100% LOAD, NORMAL MODE:

Linear	< 2%
Non-linear (acc. to IEC 62040-3)	< 5%

TOTAL HARMONIC DISTORTION (THDU), 100% LOAD, BATTERY MODE:

Linear	< 2%
Non-linear (acc. to IEC 62040-3)	< 5%
Voltage unbalance and phase displacement, 100% load unbalance	N/A

VOLTAGE TRANSIENT AND RECOVERY TIME, 100% STEP LOAD:

Linear	IEC 62040-3 Class 1
Non-linear (acc. to IEC 62040-3)	IEC 62040-3 Class 1
Transfer normal mode --> battery mode	0 ms
Frequency (steady-state), rated	50 / 60 Hz (selectable)
Variation in normal and battery mode	Max ± 10%
Variation in free-running	± 0.05 Hz
Max synch phase error (referred to a 360° cycle)	≤3°
Max slew-rate	1 Hz/s

Nominal current (In, r.m.s. rated)	42 A	84 A
Overload on inverter	30 sec @ 150% load 5 min @ 125% load 20 min @ 110% load	
Fault clearing capability normal mode and battery mode (100ms) [A]	1.5 x In	
Crest factor (Load supported)	3 : 1	
Load power factor, rated	0.9	
Displacement (permissible lead-lag range)	0.8 lead – 0.5 lag	

AC / AC EFFICIENCY IN NORMAL MODE, LINEAR LOAD:

100% load	93.1%	93.7%
75% load	92.7%	93.9%
50% load	91.6%	93.6%
25% load	87.6%	91.5%
Eco-mode efficiency, linear load	≥97	

BYPASS—AUTOMATIC: STATIC SWITCH

Transfer time: inverter => bypass / bypass => inverter / eco-mode => inverter	0 / 0 / 10 ms	
Fault clearing capability (bypass mode) for 20 ms	10 x In ¹⁾ (420)	10 x In ¹⁾ (840)
Overload on bypass mode	Continuously @ <130% load 1 minute @ >130% load	
Bypass - maintenance	Yes, standard	
Bypass protection fuse or circuit breaker rating	External fusing according to section <i>Cables and Fuses</i>	

BATTERY CHARACTERISTICS	10 kVA	20 kVA
Technology	VRLA, vented lead-acid	
Number of 12 V blocks (fixed)	24 (10 kVA B) / 48 (10 kVA B2)	48 (20 kVA B)
Battery charger max. current charger capability	4 A / 8 A (for S model)	
Battery charger max. power charger capability	1.15 kW / 2.3 kW (for S model)	
Floating voltage (VRLA)	2.28 VDC/cell	
End of discharge voltage (VRLA)	1.65 VDC	
R.m.s. ripple current (% of the battery capacity)	±2%	
Temperature compensation	Yes	
Battery test	Automatic and periodic battery test (selectable)	

¹⁾ With recommended fuses, see section *Cables and Fuses*

USER INTERFACE – COMMUNICATION

STANDARD ITEMS

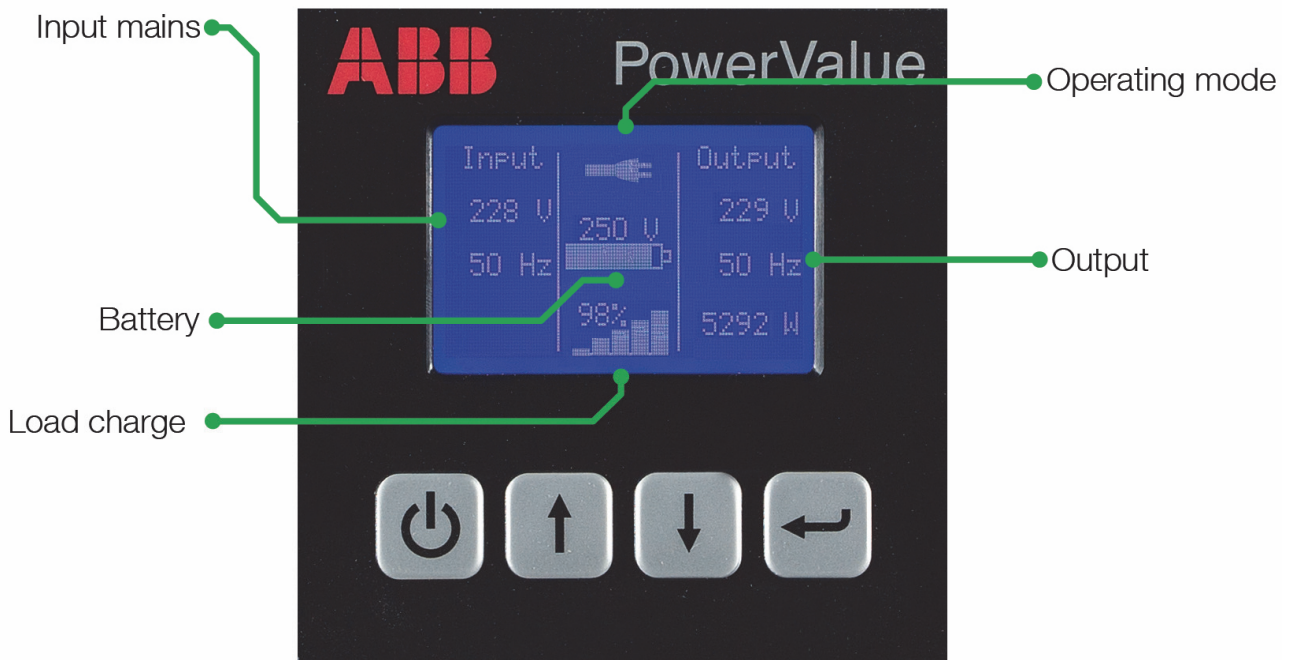
USB and RS232 on Sub-D9 port	For service and for SNMP box
Parallel port	Parallel board included
SNMP/AS400 slot	For integration of optional SNMP or relay cards
Display + LEDs	Dot matrix 128x64 LCD display + 4 LEDs

OPTIONAL ITEMS

SNMP card	For monitoring and integration in network management
Relay card	For additional signal-monitoring and control

DISPLAY & MIMIC DIAGRAM

10 kVA



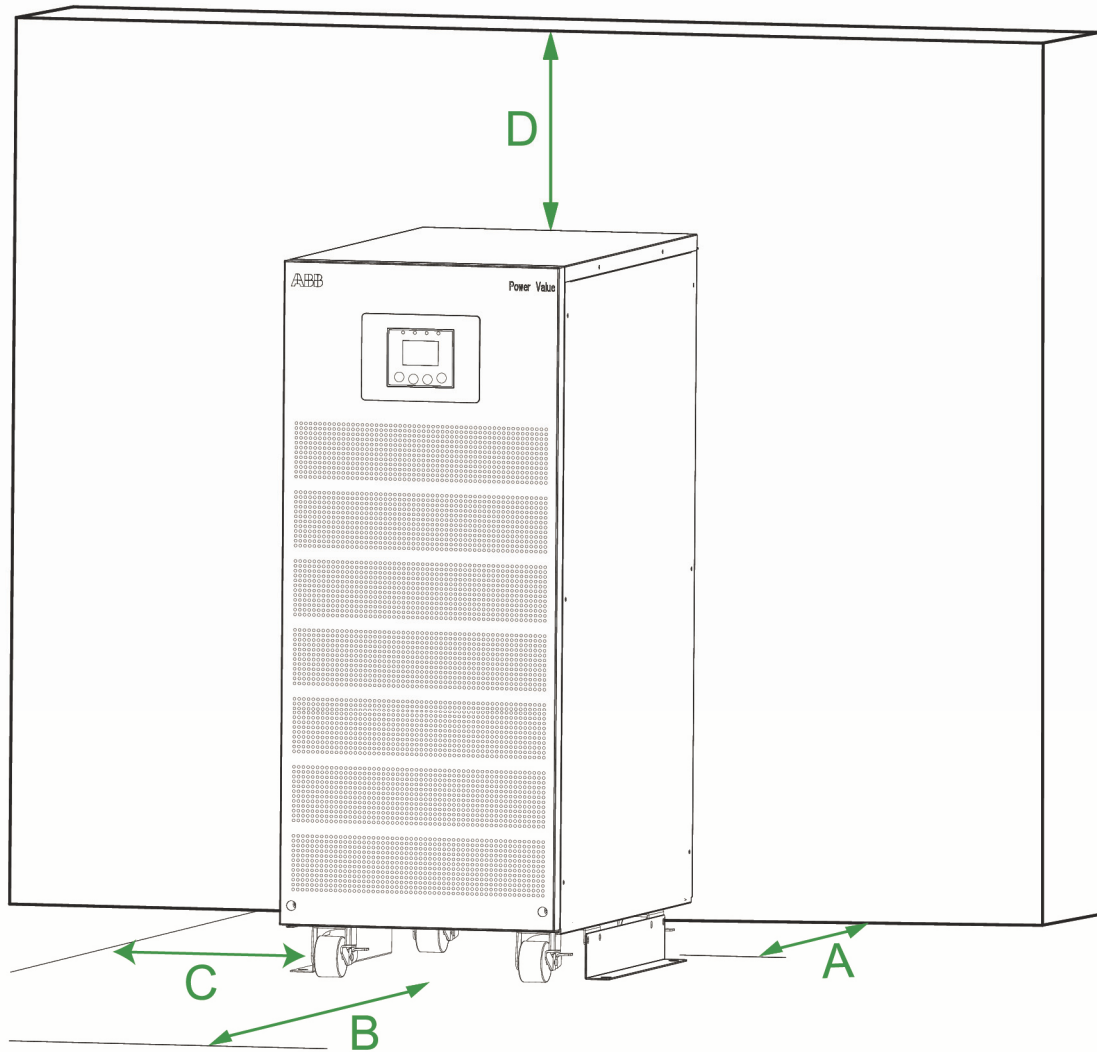
CLEARANCES	10 kVA	20 kVA
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MINIMUM CLEARANCES FOR SINGLE UPS		
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A	50 cm	50 cm
B	50 cm	50 cm
C	0 cm	0 cm
D	5 cm	5 cm

MINIMUM CLEARANCES FOR UPS PLUS OTHER CABINETS IN ROW		
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A	50 cm	50 cm
B	50 cm	50 cm
C	0 cm	0 cm
D	5 cm	5 cm

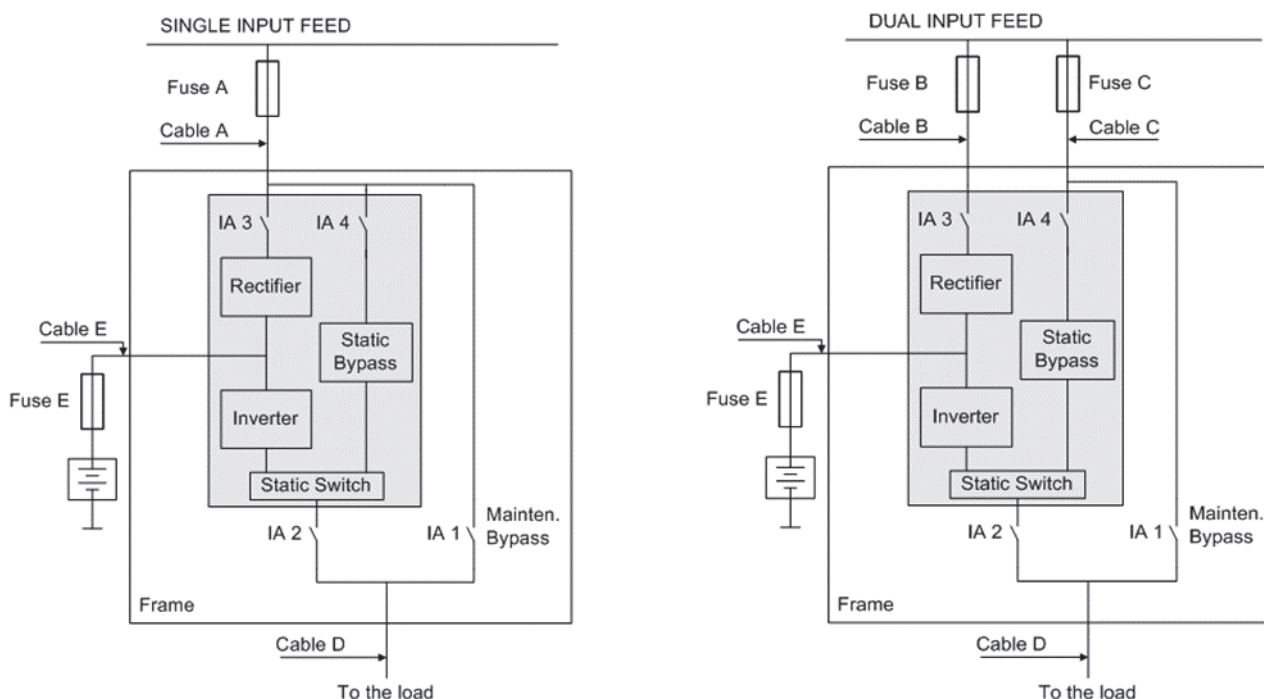


HEAT DISSIPATION	10 kVA	20 kVA
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Air-flow	From front to back	
Heat dissipation with 100% linear load	669 W / 2282.7 BTU	1207 W / 4118.5 BTU
Heat dissipation with 100% non-lin. load (acc. to 62040-3)	669 W / 2282.7 BTU	1207 W / 4118.5 BTU
Air-flow (25° - 30°) with 100% non-linear load	133 m³/h	240 m³/h
Heat Dissipation without load	160 W	170 W

CABLES & FUSES

Cable sections and fuse ratings recommended according to (IEC 60950-1)
Alternatively, local standards to be respected!



RATINGS	10 kVA (1-1)	10 kVA (3-1)	20 kVA (1-1)	20 kVA (3-1)
SINGLE INPUT FEED				
Input fuse A-Type: gL or CB	1 x 63A	3 x 63A	1 x 100A	3 x 100A
Input cable A	3 x 16mm ²	5 x 16mm ²	3 x 25mm ²	5 x 25mm ²
Output cable D	3 x 16mm ²	3 x 16mm ²	3 x 25mm ²	3 x 25mm ²
Battery fuse E-Type: gR or CB	2 x 40A	2 x 40A	2 x 80A	2 x 80A
Battery cable E	3 x 6mm ²	3 x 6mm ²	3 x 16mm ²	3 x 16mm ²
DUAL INPUT FEED				
Input fuse B-Type: gL or CB	1 x 63A	3 x 25A	1 x 100A	3 x 50A
Input Cable B	3 x 16mm ²	5 x 4mm ²	3 x 25mm ²	5 x 10mm ²
Input fuse C-Type: gR or CB	1 x 63A	1 x 63A	1 x 100A	1 x 100A
Input cable C	3 x 16mm ²	3 x 16mm ²	3 x 25mm ²	3 x 25mm ²
Output cable D	3 x 16mm ²	3 x 16mm ²	3 x 25mm ²	3 x 25mm ²
Battery fuse E-Type: gR or CB	2 x 40A	2 x 40A	2 x 80A	2 x 80A
Battery cable E	3 x 6mm ²	3 x 6mm ²	3 x 16mm ²	3 x 16mm ²

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