EVI Power®

4257-3856 A

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EVI Power®

Three-Phase Online UPS

10-40kVA Long-Run Models

For use with external batteries only

UPS part no.	Rating	Batteries (12V)
EP-UPS10000YH33OT	10kVA / 10kW	20
EP-UPS20000YH33OT	20kVA / 20kW	30 – 50
EP-UPS30YH33OT	30kVA / 30kW	30 – 50
EP-UPS40YH33OT	40kVA / 40kW	30 – 50

User Manual

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About this manual

Thank you for choosing an EVI Power UPS.
This UPS series is an intelligent three-phase input / three-phase output, high-frequency, double-conversion online UPS. It offers excellent electrical performance, comprehensive monitoring and network communication functions, and is designed to comply with the applicable EMC and safety standards (IEC/EN 62040 series).
Read this manual carefully before installing, operating or servicing the UPS, and keep it near the UPS for future reference.
This manual covers the 10-40kVA long-run UPS models EP-UPS10000YH33OT, EP-UPS20000YH33OT, EP-UPS30YH33OT and EP-UPS40YH33OT. These models have no internal batteries and are used with external batteries only. It is intended for qualified installers and trained operators, and describes installation, operation, monitoring and troubleshooting of the UPS.

At the end of its service life, the UPS and its batteries must be disposed of in accordance with local regulations for electronic and hazardous waste. Contact your nearest recycling or hazardous-waste collection facility. Do not dispose of the UPS or batteries with household waste.

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1. Safety

IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS

Dangerous voltages and high temperatures are present inside the UPS. During installation, operation and maintenance, observe the local safety regulations and applicable laws; failure to do so may result in personal injury or damage to the equipment. The safety instructions in this manual supplement local safety regulations. The manufacturer accepts no liability for damage or injury caused by failure to observe these safety instructions.

1.1 Safety notes

1. Hazardous voltage (220/230/240Vac) may be present at the UPS terminals even when the UPS is disconnected from the utility supply, because the UPS can be powered by its batteries!
2. For personal safety, the UPS must be properly earthed (grounded) before it is switched on. Because of the high leakage current, the protective earth conductor must be connected first.
3. Do not open, crush or damage batteries. The electrolyte released from a damaged battery is toxic and harmful to skin and eyes!
4. Do not short-circuit the positive (+) and negative (-) terminals of a battery; this can cause sparks, fire or explosion!
5. Do not remove the UPS covers. There are no user-serviceable parts inside; risk of electric shock!
6. Check that no hazardous voltage is present before touching the batteries or battery terminals.
7. The operating and storage environment affects the service life and reliability of the UPS. Do not operate the UPS for prolonged periods in the following conditions:
    - Temperature or humidity outside the specified range (temperature 0 to 40°C, relative humidity 5%-95%, non-condensing)
    - Direct sunlight or proximity to heat sources
    - Areas subject to vibration, or where the UPS may be knocked or impacted
    - Areas with corrosive gas, flammable gas, excessive dust, etc.
8. Keep the ventilation openings clear. Insufficient ventilation causes the internal components to overheat and shortens the service life of the UPS.
9. Installation, wiring, commissioning and servicing must only be carried out by qualified personnel who are familiar with the UPS and with the precautions required for working on electrical equipment and batteries.
10. The internal capacitors may hold a hazardous charge after the UPS has been switched off and disconnected. Wait at least 5 minutes and check with a suitable meter that no hazardous voltage is present before working on the terminals.
11. This long-run UPS is used with external batteries only. Use only the battery type and quantity specified in this manual, and always install a suitably rated DC circuit breaker (or fuses) between the external batteries and the UPS.
12. Batteries present a risk of electric shock and high short-circuit current. Remove watches, rings and other metal objects, use tools with insulated handles, and wear insulating gloves and eye protection when working on batteries.
13. When replacing batteries, use the same type and number of batteries. Risk of explosion if batteries are replaced by an incorrect type. Do not dispose of batteries in a fire.
14. Backfeed protection: to warn against hazardous voltage being fed back to the input, the

installer must fit the following label on all upstream isolators that supply the UPS: "ISOLATE THE UNINTERRUPTIBLE POWER SUPPLY (UPS) BEFORE WORKING ON THIS CIRCUIT".

15. This UPS is not intended for use with life-support equipment or other critical medical equipment where a failure of the UPS could reasonably be expected to cause failure of that equipment.

1.2 Symbols used in this guide



WARNING!

Indicates a risk of electric shock or another hazard that could result in death or serious injury if not avoided.



CAUTION!

Indicates a situation that could result in minor injury or damage to the equipment if not avoided.

NOTE: Provides additional information or recommendations for correct use of the UPS.

2. Main Features

2.1 Overview

This UPS series is a three-phase input / three-phase output, high-frequency, double-conversion online UPS. The long-run models described in this manual (EP-UPS10000YH33OT, EP-UPS20000YH33OT, EP-UPS30YH33OT and EP-UPS40YH33OT) have no internal batteries and are designed to be used with external batteries only, for extended backup time.

The UPS protects the connected load against most power problems, such as blackouts, overvoltage, undervoltage, voltage sags, voltage fluctuations, surges, high-voltage transients, inrush current, harmonic distortion (THD), electrical noise and frequency variations.

Typical applications range from IT and computer equipment, automation and communication systems to industrial equipment.

2.2 Functions and Features

- Three-phase input / three-phase output

A high-density three-phase input / three-phase output UPS system. The input current is balanced across all three phases.

- Digital control

The UPS is controlled by a Digital Signal Processor (DSP), which improves reliability, performance, self-protection and self-diagnostics.

- Configurable battery quantity

EP-UPS10000YH33OT (10kVA): 20 battery blocks of 12V.

EP-UPS20000YH33OT, EP-UPS30YH33OT and EP-UPS40YH33OT (20-40kVA): 30 to 50 battery blocks of 12V, in steps of 2 blocks (30, 32, 34 … 50).

- Configurable charging current

Using the LCD panel or the monitoring software, the user can set the battery capacity, the charging current and the maximum charging current. The charger switches automatically and smoothly between constant-current, constant-voltage and float modes.

- Intelligent three-stage charging

The UPS uses an advanced three-stage charging method:

Stage 1 – constant current (high current):
recharges the batteries quickly to approximately 90% of capacity;

Stage 2 – constant voltage:
brings the batteries to full charge;

Stage 3 – float charge:
maintains the batteries at full charge. The three-stage method shortens recharging time and extends battery service life.

- LCD display

The LCD and LED indicators show the UPS status and operating parameters, such as input/output voltage, frequency, load %, battery capacity % and ambient temperature.

- Intelligent monitoring

With the optional SNMP card, the UPS can be monitored and controlled remotely over a network.

- EPO function

The UPS output can be shut down completely by the EPO (Emergency Power Off) function. The EPO port allows connection of a remote emergency stop switch (see Appendix 8).

• Parallel operation

UPS units of the same rating can be connected in parallel to increase capacity or provide redundancy (see sections 3.9 and 4.2.6).

• ECO mode and cold start

ECO mode increases efficiency for less critical loads. The cold start function allows the UPS to be started from the batteries when no AC supply is available (see section 4.2.4).

3. Installation

3.1 Transport, unpacking and inspection

1. Keep the UPS upright. Do not tilt the UPS when moving it or removing it from the packaging.

2. Inspect the UPS for any damage that may have occurred during transport. If any damage is found, do not switch on the UPS and contact the dealer immediately.

3. Check the accessories against the packing list and contact the dealer if any parts are missing.

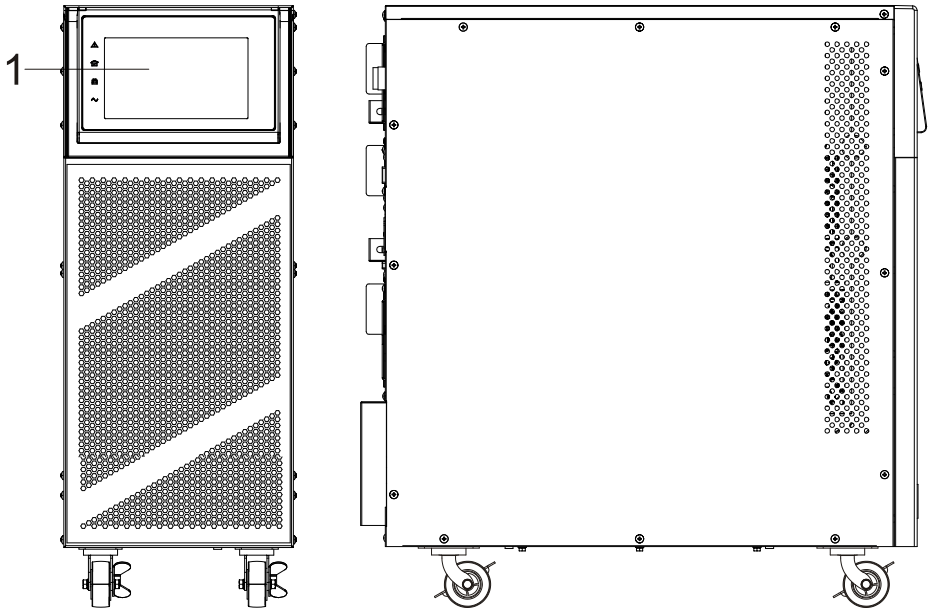
4. Use suitable handling equipment (e.g. a pallet truck or forklift) to move the UPS. Keep the original packaging for future transport.

5. If the UPS is moved from a cold to a warm environment, allow it to stand for at least 2 hours before installation so that any condensation can evaporate.

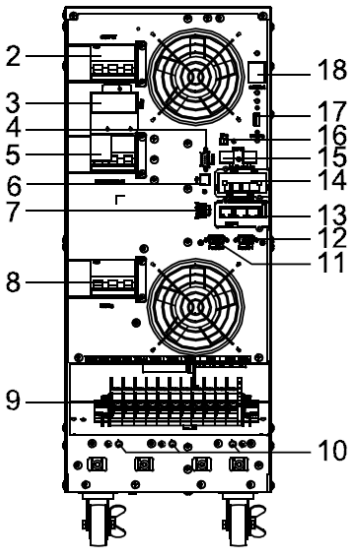
6. Standard accessories supplied with the UPS: user manual, warranty card, USB cable, RS232 cable, parallel cable (1.5m) and EPO terminal plug.

3.2 Cabinet overview

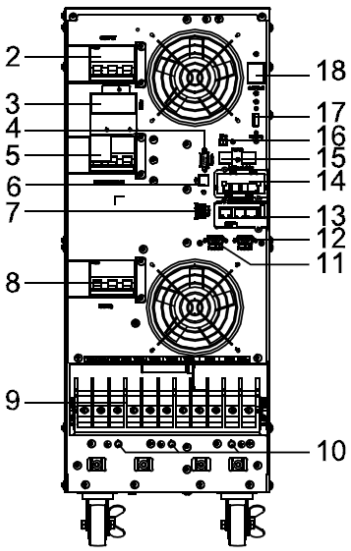
3.2.1 Front, side and rear views



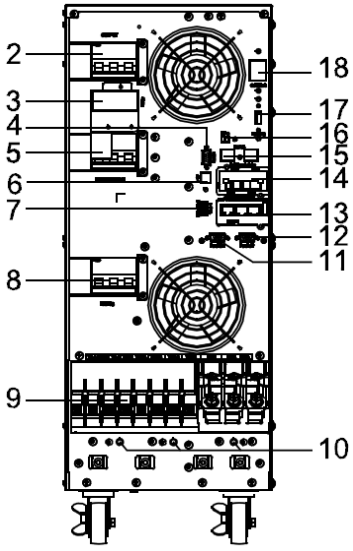
Front View **Side View**



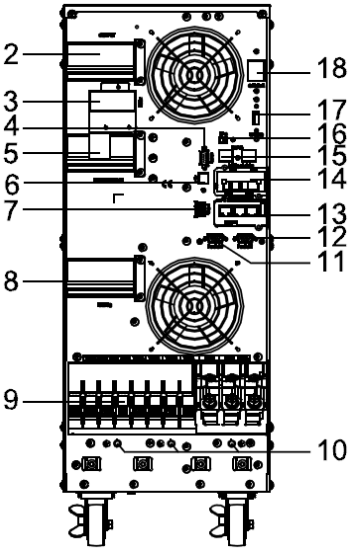
10kVA Rear View
(Terminal block without cover)



20kVA Rear View
(Terminal block without cover)



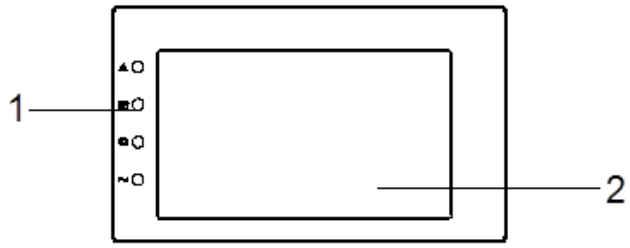
30kVA Rear View
(Terminal block without cover)



40kVA Rear View
(Terminal block without cover)

(1) LCD panel	(2) Output Switch
(3) External maintenance switch signal / Maintenance switch cover plate	(4) RS232 port
(5) Maintenance switch	(6) USB port
(7) Dry contact port	(8) Input Switch
(9) Terminal block for Input, output, battery & Ground	(10) Ground
(11) Parallel port 1	(12) Parallel port 2
(13) Intelligent Slot 2 (SNMP card/ Relay card)	(14) Intelligent Slot 1 (SNMP card)
(15) RS485 port	(16) EPO port
(17) EVENTS port	(18) Cold start button

3.3 LCD control panel



LCD control panel

(1) LED indicators (from top to bottom: Alarm, Bypass, Battery, Inverter) (2) LCD display

3.4 Installation requirements

Note: For ease of operation and maintenance, leave a clearance of at least 100cm at the front and 80cm at the rear of the cabinet.

- Install the UPS indoors in a clean, stable environment, free from vibration, dust, humidity, flammable gases and liquids, and corrosive substances. To prevent high room temperatures, a room extraction or ventilation system is recommended. Optional air filters are available if the UPS is operated in a dusty environment.

- The ambient temperature around the UPS should be kept between 0°C and 40°C. Above 40°C, the rated load capacity must be derated by 12% for every 5°C. The ambient temperature must never exceed 50°C.

- If the UPS is unpacked at low temperature, condensation may form. Do not install the UPS until it is completely dry inside and outside; otherwise there is a risk of electric shock.

- Install the batteries in an environment where the temperature is within the specified range. Temperature is a major factor in battery life and capacity; the recommended battery temperature is 15°C to 25°C. Keep the batteries away from heat sources and main air outlets.

WARNING!

Typical battery performance data are quoted for an operating temperature of 20°C to 25°C. Operating above this range reduces battery life; operating below this range reduces battery capacity.

- If the UPS is not installed immediately, store it indoors in its original packaging, protected from excessive humidity and heat sources (storage temperature -25°C to 55°C).

CAUTION!

Batteries that are not in use must be recharged every 6 months. To do this, temporarily connect the UPS to a suitable AC supply and switch it on for the time required to recharge the batteries. At high storage temperatures, recharge more often.

- The UPS can operate at full load at altitudes up to 1500 meters. Above 1500 meters, the load capacity must be derated as shown in the table below:

(Load coefficient = maximum load at the installation altitude ÷ rated power of the UPS)

Altitude (m)	1500	2000	2500	3000	3500	4000	4500	5000
Load coefficient	100%	95%	90%	85%	80%	75%	70%	65%

• The UPS is fan-cooled and must be installed in a well-ventilated area. Do not block the ventilation openings at the front and rear of the cabinet.

3.5 External protective devices

For safety reasons, external circuit breakers must be installed on the AC input supply and on the battery circuit. This section provides guidelines for qualified installers, who must be familiar with local wiring regulations for the equipment to be installed.

- **External battery**

  The UPS and its associated batteries must be protected against overcurrent by a DC-rated thermal-magnetic circuit breaker (or a set of fuses) located close to the external batteries.

- **UPS output**

  Any external distribution board used for load distribution must be fitted with protective devices that prevent overloading of the UPS.

- **Input overcurrent protection**

  Protective devices must be installed at the distribution panel of the incoming mains supply. They must be selected taking into account the current-carrying capacity of the power cables and the overload capacity of the system (see Appendix 1).

• Backfeed protection

Fit the backfeed warning label on all upstream isolators (see Chapter 1, item 14). The dry-contact output described in Appendix 7 (Function 1) can be used to trip an external backfeed isolation device.

3.6 Power cables

• Cables must be selected according to the voltages and currents given in this section. Follow local wiring regulations and take into account the environmental conditions (ambient temperature, installation method and cable support).



WARNING!

Before starting work, make sure you know the location and operation of the external isolators that supply the UPS input/bypass from the mains distribution panel. Check that these supplies are electrically isolated, and post the necessary warning signs to prevent accidental operation.

• To allow for future expansion, it is economical to install power cables rated for the full capacity of the UPS from the start. Recommended cable cross-sections are shown below:

UPS rating	Recommended cable cross-section			
	AC Input (mm^2)	AC Output (mm^2)	Battery (DC) (mm^2)	Earth (PE) (mm^2)
10kVA	4	4	10	4
20kVA	8	8	20	8
30kVA	12	12	35	8
40kVA	16	16	35	10

Note: The values are recommended minimum cross-sections for copper conductors at 30°C ambient temperature and short cable runs. The installer must verify cable sizes according to local regulations (e.g. IEC 60364-5-52), the installation method, cable length and ambient temperature. In installations with a high proportion of non-linear loads, consider oversizing the neutral conductor.

CAUTION!

Protective earth cable: connect each cabinet to the main earthing system using the shortest possible route.

WARNING!

Failure to follow adequate earthing procedures may result in electromagnetic interference, electric shock or fire.

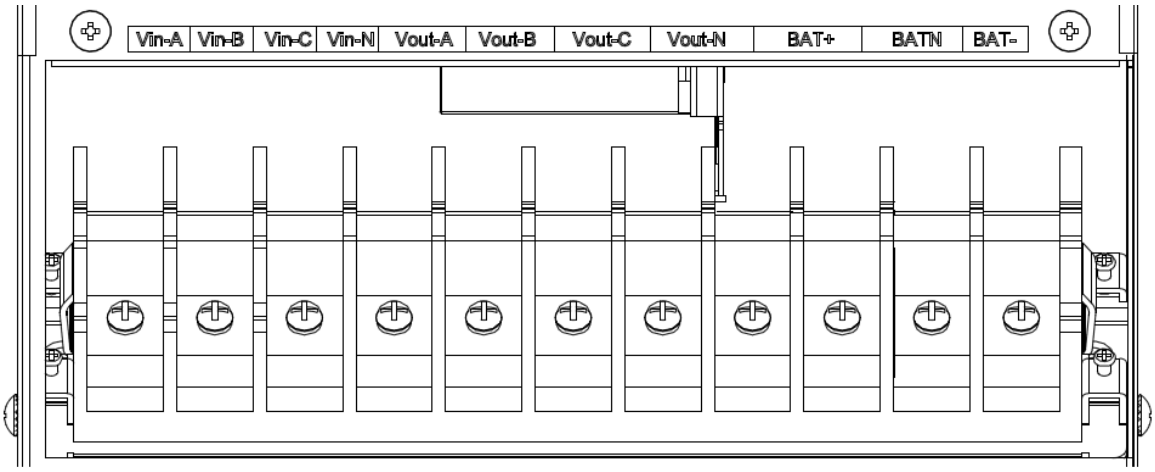
3.7 Power cable connection

When the UPS has been positioned and secured in its final location, connect the power cables as described in the following procedure.

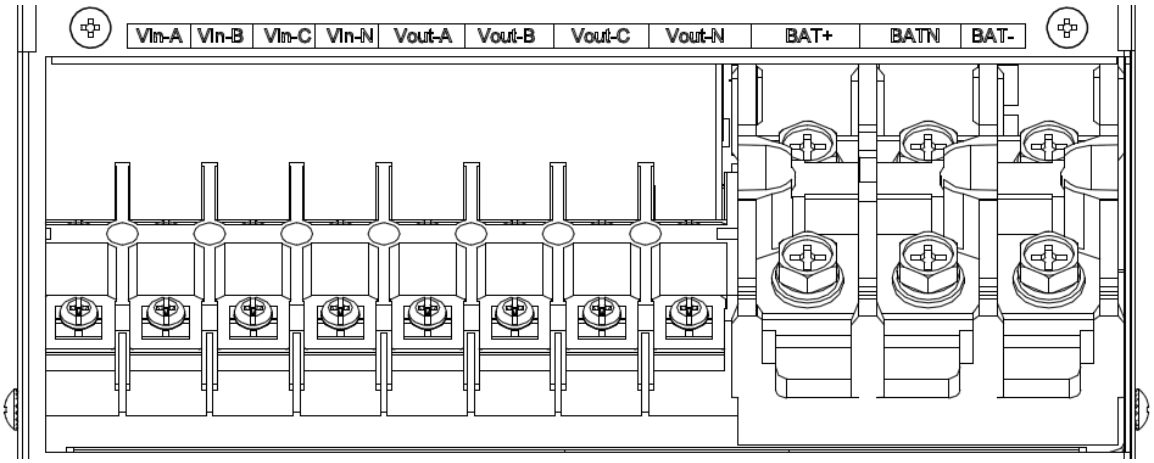
Verify that the UPS is completely isolated from its external power sources and that all UPS isolators are open. Check that they are electrically isolated, and post the necessary warning signs to prevent accidental operation.

Remove the terminal cover to gain access to the terminals.

10kVA and 20kVA

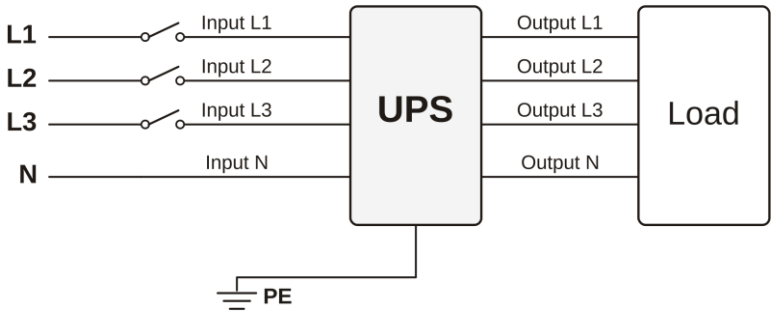


30kVA and 40kVA



Terminal sequence from left to right: Input L1, Input L2, Input L3, Input N, Output L1, Output L2, Output L3, Output N, Battery +, Battery N, Battery -. Three earth (PE) terminals are located below the terminal block.

Select power cables of the appropriate size (refer to the table above). The cable lugs must suit the terminals: the hole diameter of the lug must be equal to or greater than the diameter of the terminal stud.



WARNING!

If the load equipment is not ready to receive power when the commissioning engineer arrives, ensure that the system output cables are safely isolated at their ends.

Connect the safety earth and any necessary bonding earth cables to the copper earth screw located at the bottom of the cabinet, below the power connections. All UPS cabinets must be properly earthed.

CAUTION!

The earthing and neutral bonding arrangement must comply with local and national codes of practice.

3.8 External battery connection

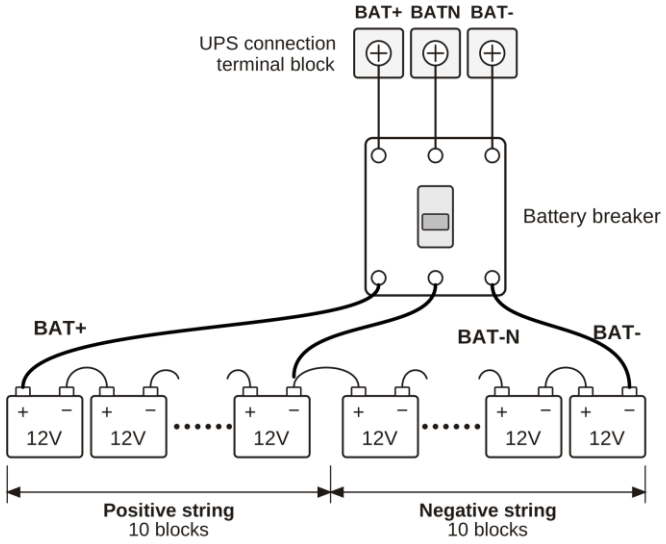
The long-run models are used with external batteries only. The batteries, battery cabinet/rack and DC circuit breaker are not supplied with the UPS unless ordered separately. Battery capacity (Ah) and quantity are selected according to the required backup time.

The battery room or battery cabinet must be ventilated in accordance with IEC 62485-2 and local regulations.

EP-UPS10000YH33OT (10kVA) – 20 blocks:

The UPS uses a split (positive and negative) battery configuration, with 20 battery blocks of 12V connected in series. A neutral cable is taken from the connection point between the negative terminal of block 10 and the positive terminal of block 11. The neutral cable, battery positive cable and battery negative cable are then connected to the UPS. The blocks between the battery positive and the neutral form the positive string; the blocks between the neutral and the battery negative form the negative string.

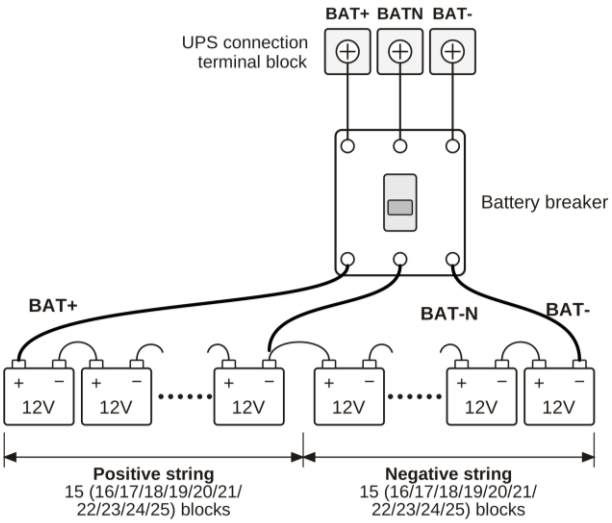
External battery connection, EP-UPS10000YH33OT (20 blocks):



EP-UPS20000YH33OT, EP-UPS30YH33OT and EP-UPS40YH33OT (20-40kVA) – 30 to 50 blocks:

The UPS uses a split (positive and negative) battery configuration, with 30 battery blocks of 12V (optionally 32/34/36/38/40/42/44/46/48/50) connected in series. A neutral cable is taken from the connection point between the negative terminal of block 15 (16/17/18/19/20/21/22/23/24/25) and the positive terminal of block 16 (17/18/19/20/21/22/23/24/25/26). The neutral cable, battery positive cable and battery negative cable are then connected to the UPS. The blocks between the battery positive and the neutral form the positive string; the blocks between the neutral and the battery negative form the negative string.

External battery connection, 20-40kVA models (30-50 blocks)



Note**:**

The BAT+ terminal of the UPS is connected to the positive terminal of the positive string. BAT-N is connected to the negative terminal of the positive string and to the positive terminal of the negative string. BAT- is connected to the negative terminal of the negative string.

EP-UPS10000YH33OT: use 20 battery blocks of 12V. After the UPS has started in AC mode, check that the battery quantity is set to 20 blocks and set the battery capacity (Ah). The charging current is adjusted automatically according to the selected battery capacity. All related settings can be made via the LCD panel or the monitoring software.

20-40kVA models: the factory default setting is 30 battery blocks of 12V 40Ah (charging current 6A). When 32/34/36/38/40/42/44/46/48/50 blocks are connected, set the correct battery quantity and capacity after the UPS has started in AC mode. The charging current is adjusted automatically according to the selected battery capacity. All related settings can be made via the LCD panel or the monitoring software.

CAUTION!
The battery quantity and capacity settings must match the batteries actually installed. Incorrect settings can cause overcharging or deep discharge and will shorten battery life.

CAUTION!

Ensure correct polarity of the series connections within each battery string, i.e. inter-tier and inter-block connections are made from (+) to (-) terminals.
Do not mix batteries of different capacities or brands, or new and old batteries.

WARNING!

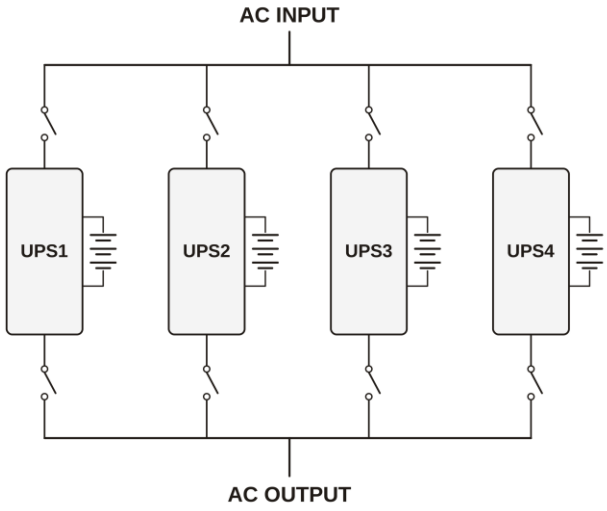
Ensure correct polarity of the string-end connections to the battery circuit breaker and from the battery circuit breaker to the UPS terminals, i.e. (+) to (+), (N) to (N) and (-) to (-). Check the polarity and voltage with a multimeter before closing the battery circuit breaker. Leave one or more inter-block links open in each tier; do not reconnect these links or close the battery circuit breaker until authorized by the commissioning engineer.

3.9 Parallel installation

This section describes the installation procedure specific to parallel systems.

3.9.1 Cabinet installation

Connect all UPS units of the parallel system as shown below.



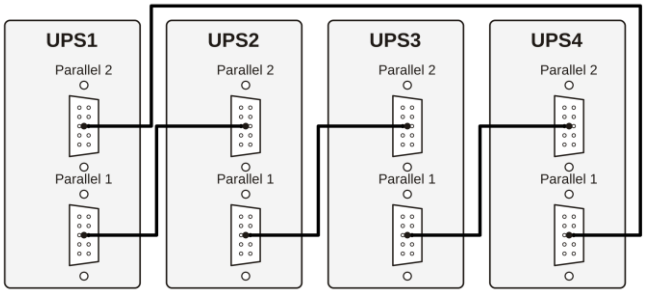
Make sure that the input breaker of each UPS is in the OFF position and that there is no output from any of the connected UPS units. The external batteries can be connected separately to each UPS or shared as common external batteries.

WARNING!

Make sure that the N, L1, L2 and L3 connections are correct and that all units are properly earthed.

3.9.2 Parallel cable installation

Shielded, double-insulated parallel control cables must be connected in a ring configuration between the UPS units, as shown below. The ring configuration ensures high reliability of the parallel control.



3.9.3 Requirements for the parallel system

A parallel system behaves as one large UPS, with the advantage of higher reliability. To ensure that all UPS units share the load equally and that the wiring complies with the relevant rules, observe the following requirements:

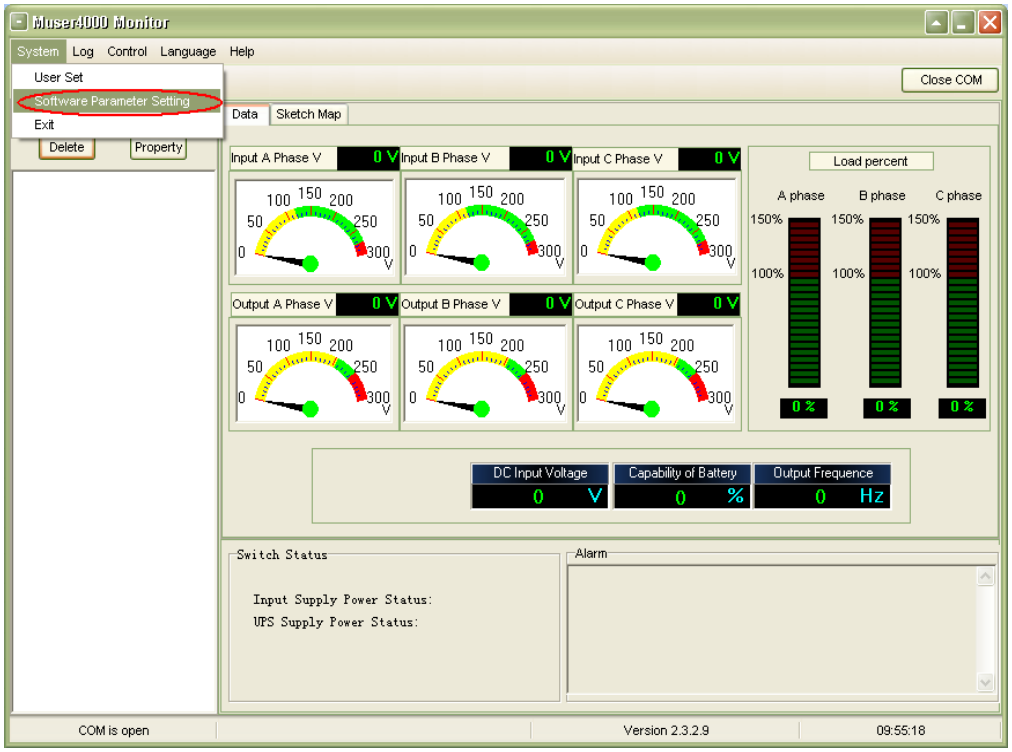
1) All UPS units must have the same rating and be connected to the same bypass source.

2) The outputs of all UPS units must be connected to a common output busbar.

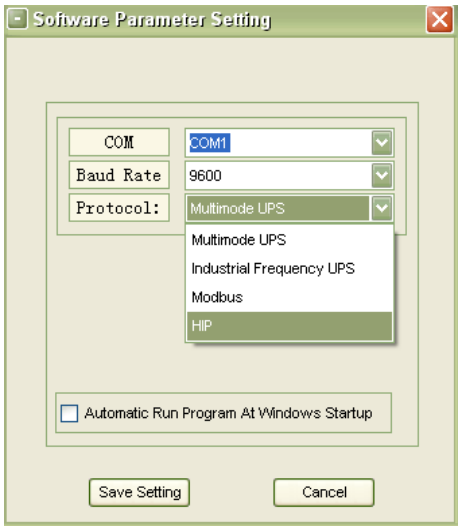
3) The power cables of each UPS, including the input and output cables, must be of the same length and specification. This ensures equal load sharing in bypass mode.

3.10 Connecting to a computer

- Connect one end of the USB cable to the computer and the other end to the USB port of the UPS.
- Open the Muser4000 software and click the “System” button.



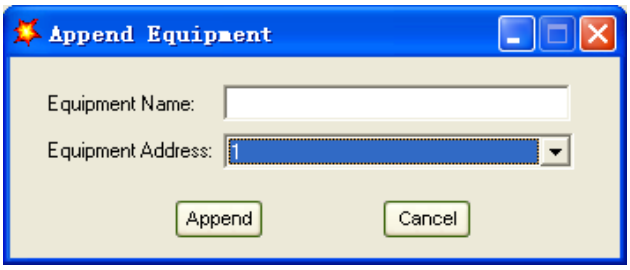
- The “Software Parameter Setting” window opens, as shown below. Select the COM port to which the UPS is connected, set the baud rate to 9600 and the protocol to “HIP”, then save the settings.



- On the main page of Muser4000, click “Append” to open the “Append equipment” window.



- Enter the UPS name in “Equipment Name” and the UPS ID address in “Equipment address”.



- Click “Append”. The connection between the UPS and the computer is now established.

CAUTION!

If the output voltage or frequency is to be changed from the computer while the UPS is running on inverter, the inverter must be shut down first.

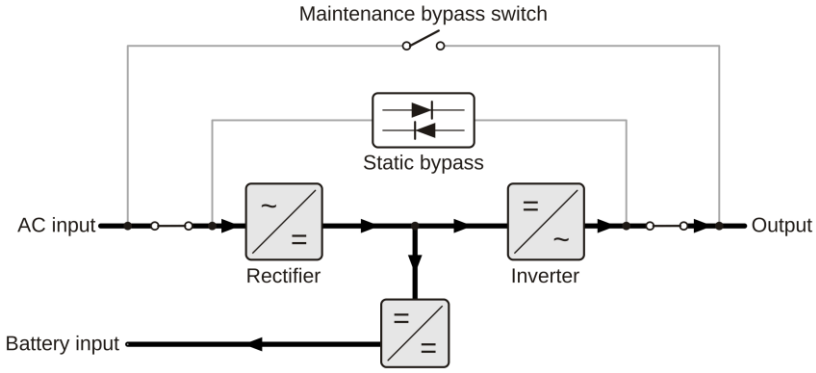
4. Operation

4.1 Operation Modes

The UPS is a double-conversion online UPS that can operate in the following modes:

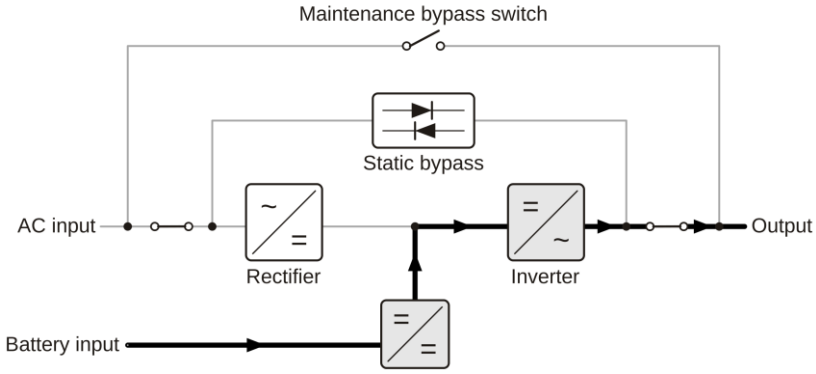
- **Normal mode (online mode)**

The rectifier/charger takes power from the AC mains and supplies DC power to the inverter, while float- or boost-charging the battery at the same time. The inverter converts the DC power to AC and supplies the load.



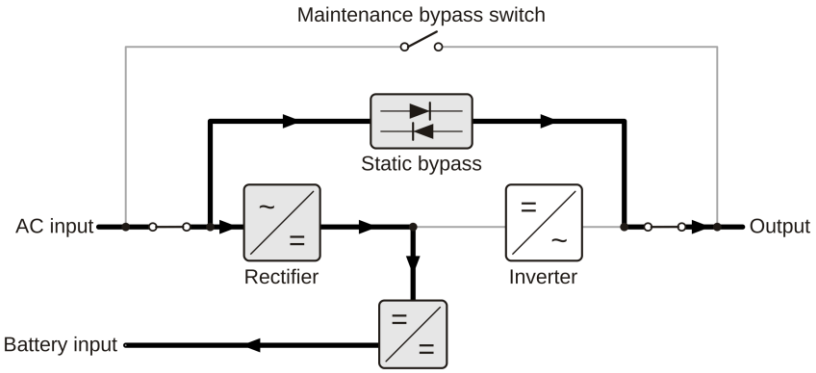
- **Battery mode (stored energy mode)**

If the AC mains supply fails, the inverter, powered by the battery, continues to supply the critical AC load without interruption. The UPS returns to normal mode automatically when the AC supply is restored.



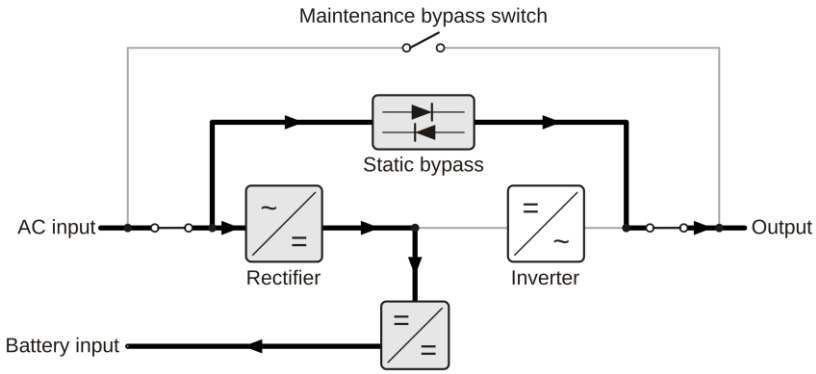
- **Bypass mode (static bypass)**

If the inverter fails or an overload occurs, the static transfer switch transfers the load from the inverter to the bypass supply without interruption. If the inverter output is not synchronized with the bypass AC source, the transfer from inverter to bypass involves a brief interruption of power to the load, to avoid connecting unsynchronized AC sources in parallel. This interruption is programmable, but is typically set to less than one electrical cycle, e.g. less than 15ms (50Hz) or 13.33ms (60Hz).



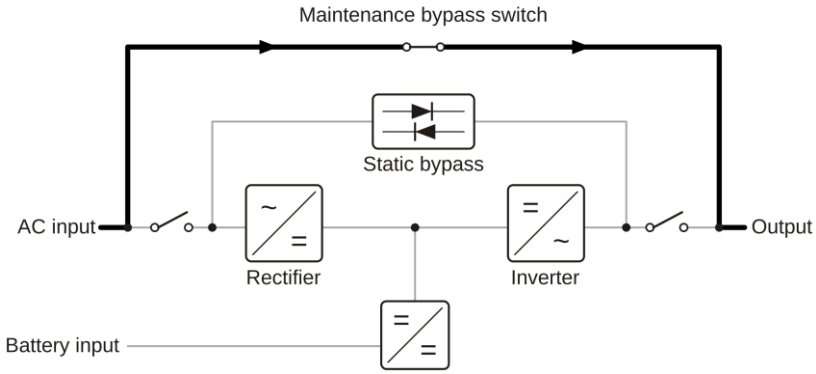
- **ECO mode (high-efficiency mode)**

  When the UPS is in AC mode and the load is not critical, the UPS can be set to ECO mode to increase efficiency. In ECO mode the UPS operates in line-interactive mode and the load is supplied from the bypass. When the bypass AC supply goes outside the set window, the UPS transfers from bypass to inverter and supplies the load from the battery; the LCD shows the related information. In ECO mode the load is not protected against mains disturbances to the same degree as in normal mode.



- **Maintenance mode (manual bypass)**

A manual (maintenance) bypass switch is provided to maintain the supply to the critical load when the UPS is faulty or being serviced. The manual bypass switch is rated for the full rated load of the UPS.



4.2 Start-up and shutdown

Note: The first start-up (commissioning) of the UPS should be carried out by an engineer authorized by EVI Power or its service partner. Commissioning by unauthorized persons may affect the warranty.

4.2.1 Start-up procedure

CAUTION!

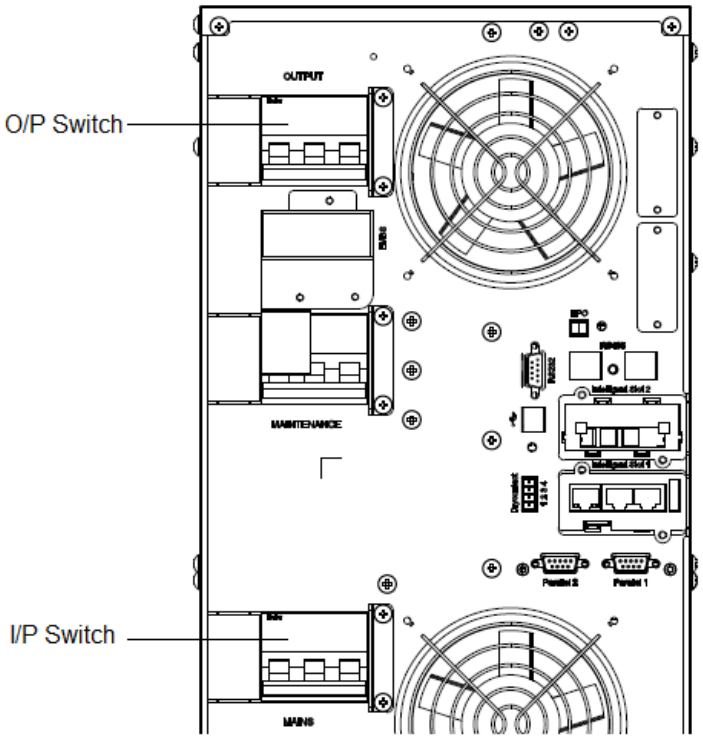
Make sure the UPS is properly earthed before start-up!

1. Switch ON the external battery circuit breaker.

CAUTION!

Check that the load is safely connected to the UPS output. If the load is not ready to receive power from the UPS, make sure it is safely isolated from the UPS output terminals.

2. Switch ON the UPS input switch.



If the rectifier input voltage is within range, the rectifier starts within 30 seconds, followed by the inverter.

3. Switch ON the UPS output switch.

The load is first supplied through the bypass and the Bypass LED lights up. When the inverter has started, the UPS transfers from bypass mode to inverter mode; the Bypass LED goes out and the Inverter LED lights up.

The UPS status is always shown on the LCD, whether or not the UPS is operating normally.

4.2.2 Test procedure

CAUTION!

With the UPS operating normally, allow approximately 60 seconds for the system to start up and complete its self-test.

1. Switch off the mains supply to simulate a utility failure. The rectifier switches off and the battery supplies the inverter without interruption. The Battery LED should light up.

2. Switch the mains supply back on to simulate utility recovery. The rectifier restarts automatically after approximately 20 seconds and the inverter supplies the load. Dummy loads are recommended for testing; the UPS can be loaded up to its maximum capacity during the load test.

4.2.3 Maintenance bypass

To supply the load directly from the mains (e.g. during servicing), use the internal mechanical (maintenance) bypass switch.



CAUTION!

When the maintenance bypass is active, the load is supplied with unconditioned mains power and is NOT protected by the UPS. Do not use the maintenance bypass for long-term operation.

Transfer to maintenance bypass



CAUTION!

If the UPS is running normally and can be controlled through the display, carry out steps 1 to 5; otherwise, go directly to step 4.

1. Remove the maintenance switch cover. The UPS transfers to bypass mode automatically.
2. Switch ON the maintenance bypass breaker.
3. Switch OFF the external battery breaker.
4. Switch OFF the input (mains) breaker.
5. Switch OFF the output breaker.

The load is now supplied from the bypass source through the maintenance bypass breaker.

Return to normal operation (from maintenance bypass)



CAUTION!

Do not switch the UPS back to normal operation until you have verified that there are no internal UPS faults.

1. Switch ON the output breaker.
2. Switch ON the input breaker.

The UPS starts on static bypass and the Bypass LED lights up.

3. Switch OFF the maintenance bypass breaker. The output is now supplied through the static bypass of the UPS.
4. Refit the maintenance switch cover.

After approximately 30 seconds the rectifier starts. If the inverter operates normally, the system transfers from bypass mode to normal mode.

5. Switch ON the external battery breaker.

4.2.4 Cold start (start-up on battery)



CAUTION!

Use this procedure to start the UPS from the batteries when the AC input supply has failed but the batteries are in good condition.

1. Switch ON the external battery breaker.
2. Switch ON the output switch.
3. Press the cold start button.

If the batteries are in good condition, the rectifier starts; after approximately 30 seconds the inverter starts and the Battery LED lights up.



CAUTION!

Press the cold start button within 30 seconds after closing the battery breaker.

4.2.5 Shutdown procedure



CAUTION!

Follow this procedure to shut down the UPS and the load completely. When all power switches, isolators and circuit breakers are open, there is no output.

In normal (online) mode:

1. Shut down the UPS and wait approximately 30 seconds.
2. Switch OFF the external battery breaker.
3. Switch OFF the input breaker.
4. Switch OFF the output breaker. The UPS is now shut down.
5. To isolate the UPS completely from the AC mains, switch off all upstream utility input switches.
6. The main input distribution panel is often located far from the UPS. Post a warning label at the panel to inform service personnel that the UPS circuit is under maintenance.
7. Before opening the terminal cover, wait at least 5 minutes for the internal capacitors to discharge.

In battery mode:

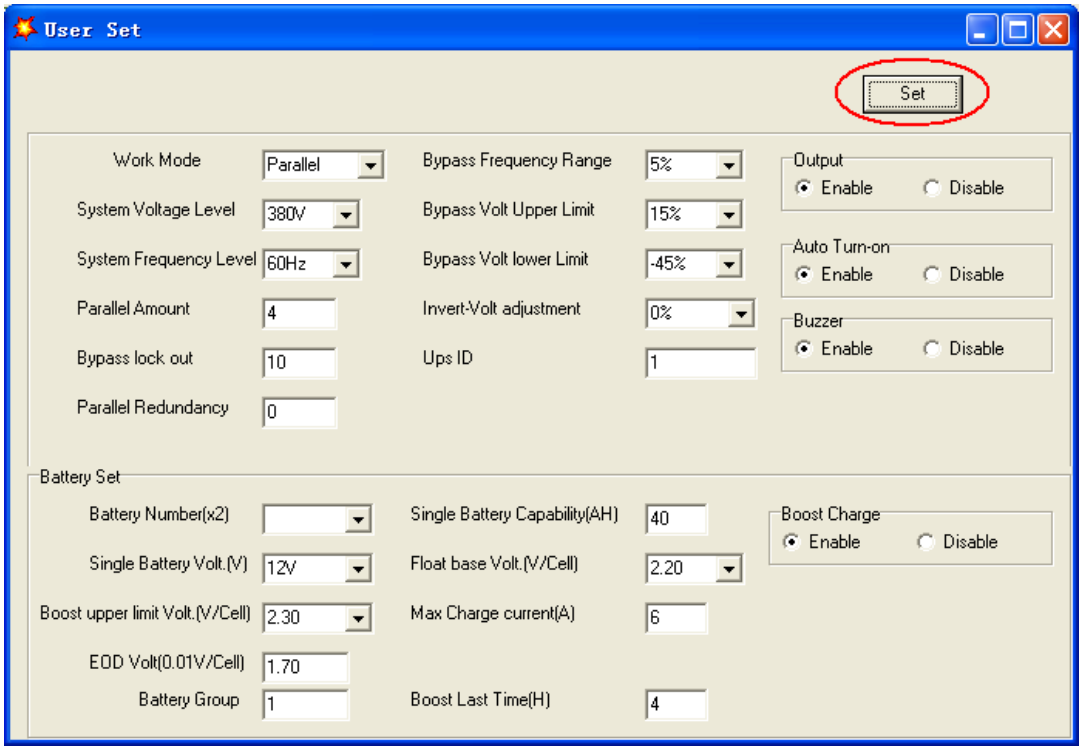
1. Shut down the UPS and wait approximately 30 seconds.
2. Switch OFF the external battery breaker.
3. Switch OFF the output breaker. The UPS is now shut down.

4.2.6 Parallel system settings

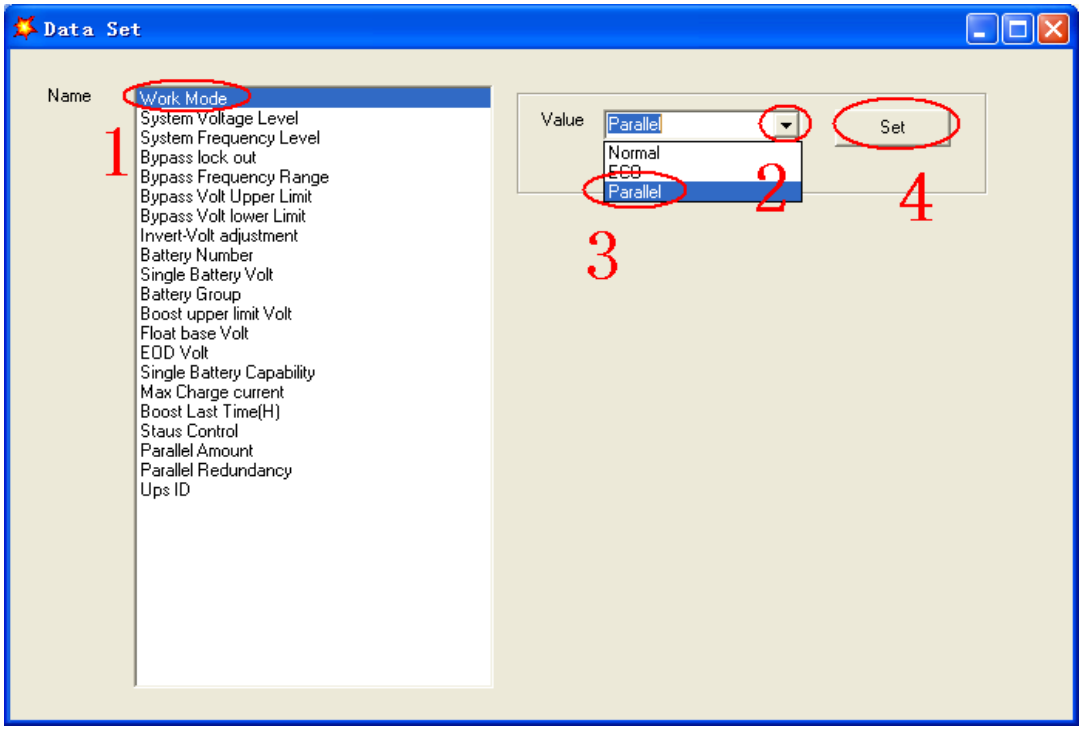
- Connect the UPS to the computer and switch on the UPS.
- Open the Muser4000 software. When the connection to the UPS has been established, click “System” -> “User Set”.



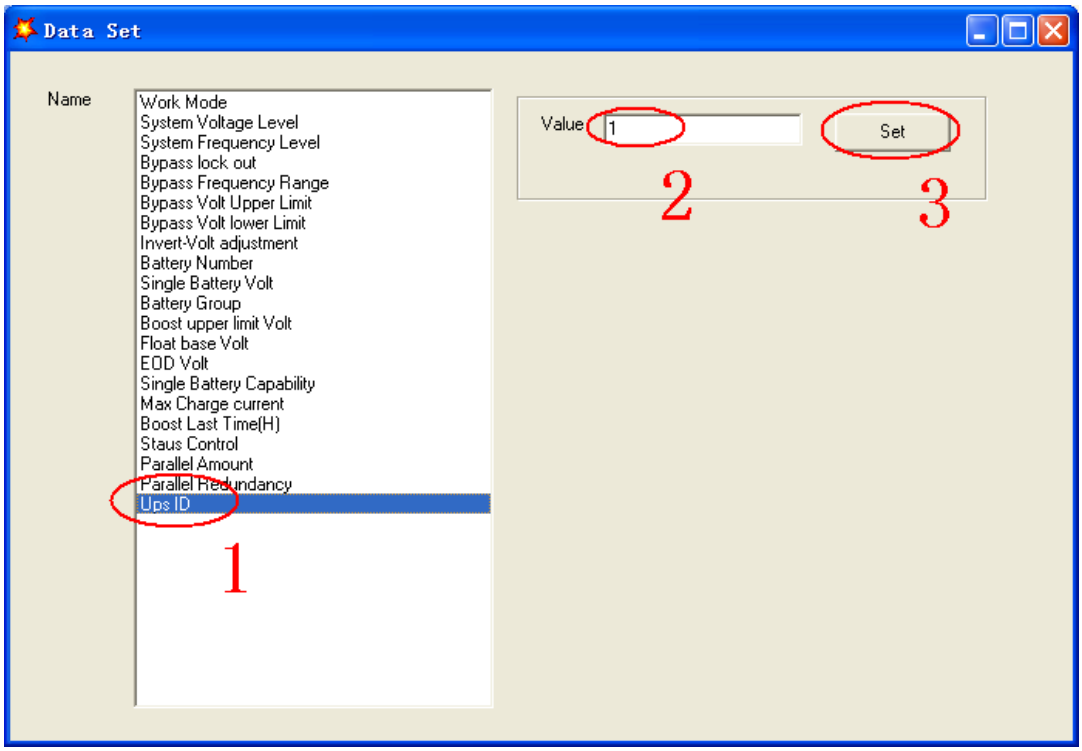
- Click “Set” in the “User Set” window.



- In the “Data Set” window, click “Work Mode”, select “Parallel” as the value, then click “Set” as shown below. A beep from the UPS confirms that the setting has been accepted.



- In the “Data Set” window, click “Ups ID”, enter the parallel UPS ID in the field on the right (e.g. “1”), then click “Set” as shown below. A beep from the UPS confirms that the setting has been accepted. Each UPS in the parallel system must have a different ID.



CAUTION!

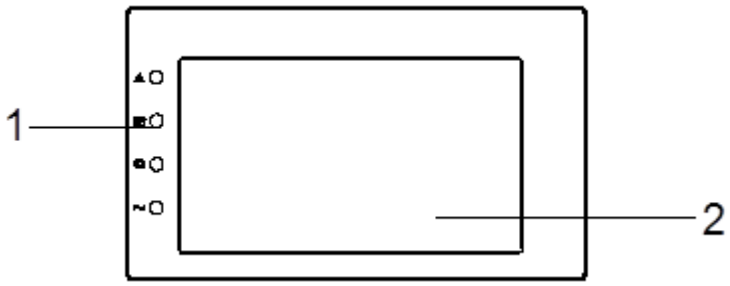
After the parallel ID has been changed, the connection between Muser4000 and the UPS may be interrupted. If this occurs, reconnect as described in section 3.10.

CAUTION!

Do not connect the parallel cables while setting the parallel parameters.

- When all UPS units to be paralleled have been set, switch off all UPS units. Connect the parallel cables as described in section 3.9.2, then switch on the UPS units.

4.3 LCD display



UPS operating panel

(1) LED indicators (from top to bottom: Alarm, Bypass, Battery, Inverter)

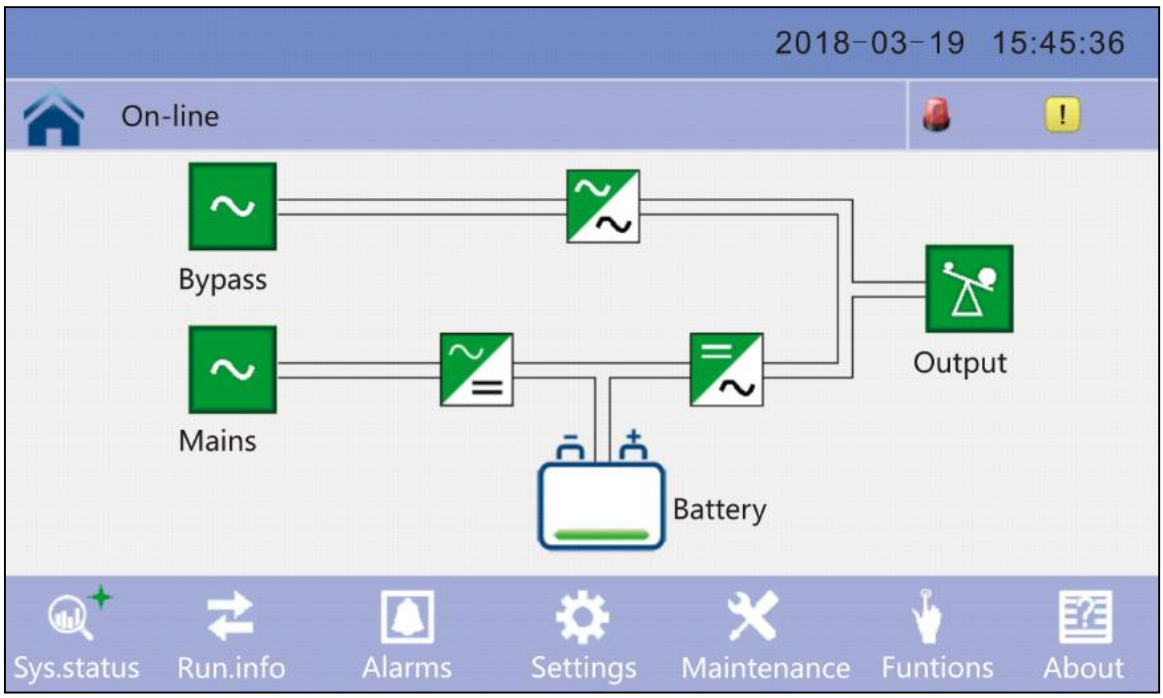
(2) LCD display

Introduction

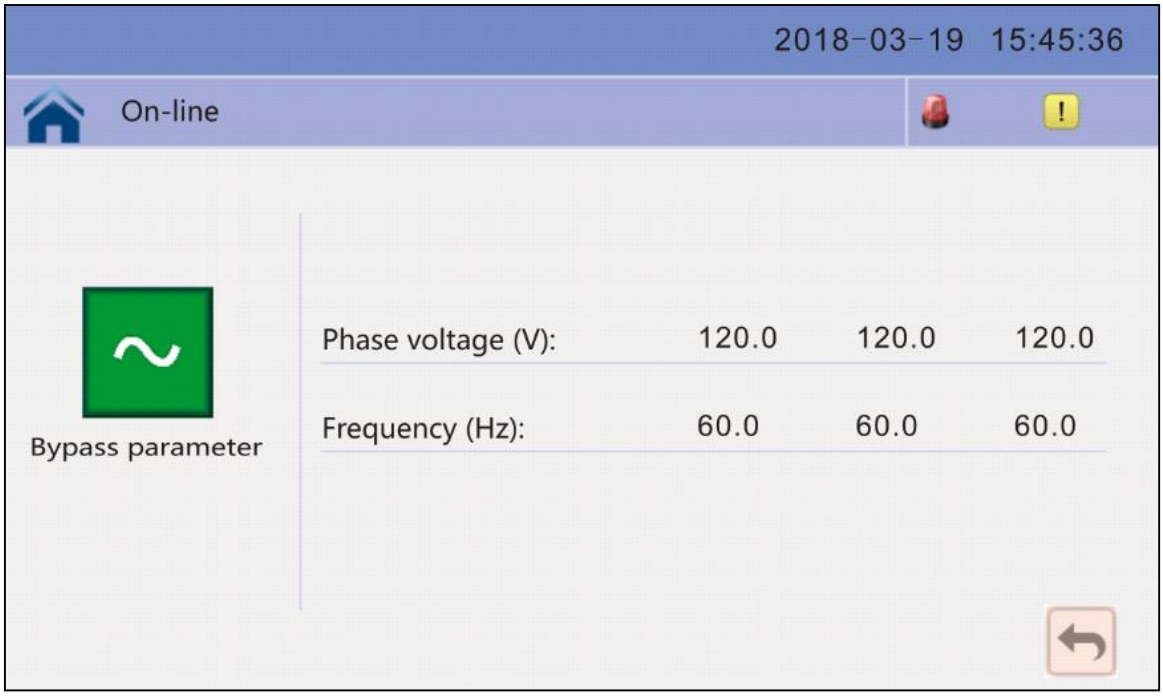
CAUTION!

The display offers more functions than are described in this manual.

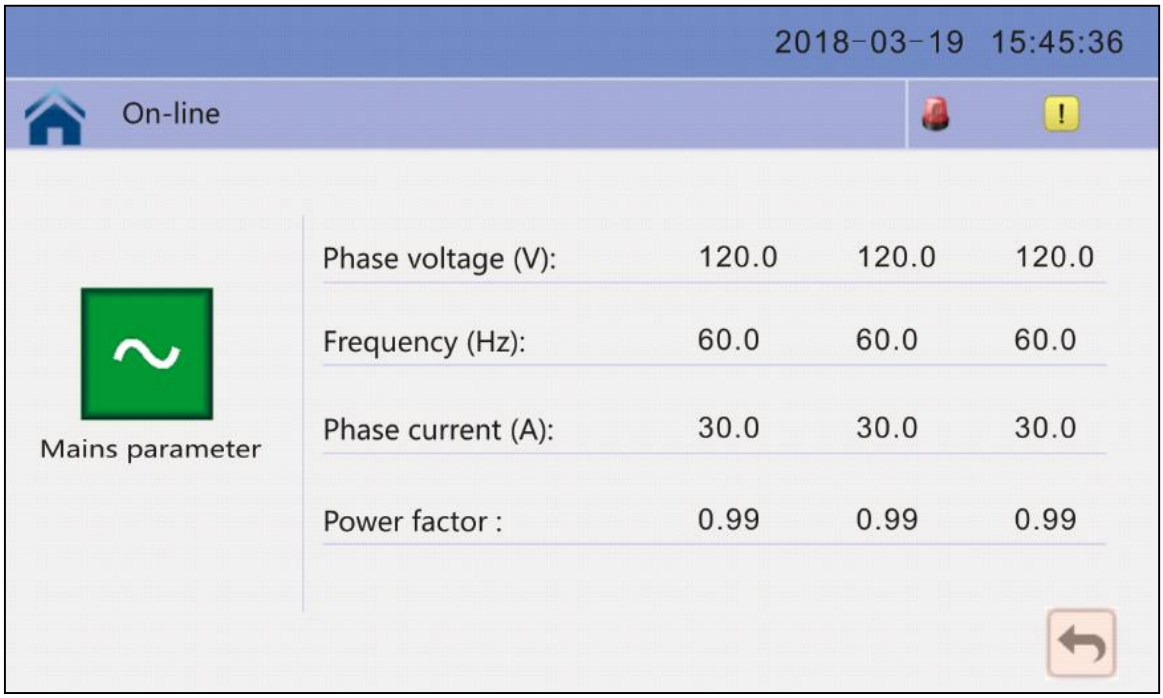
4.3.1 Home page: shows the UPS power flow diagram and gives access to the input, output and battery data.



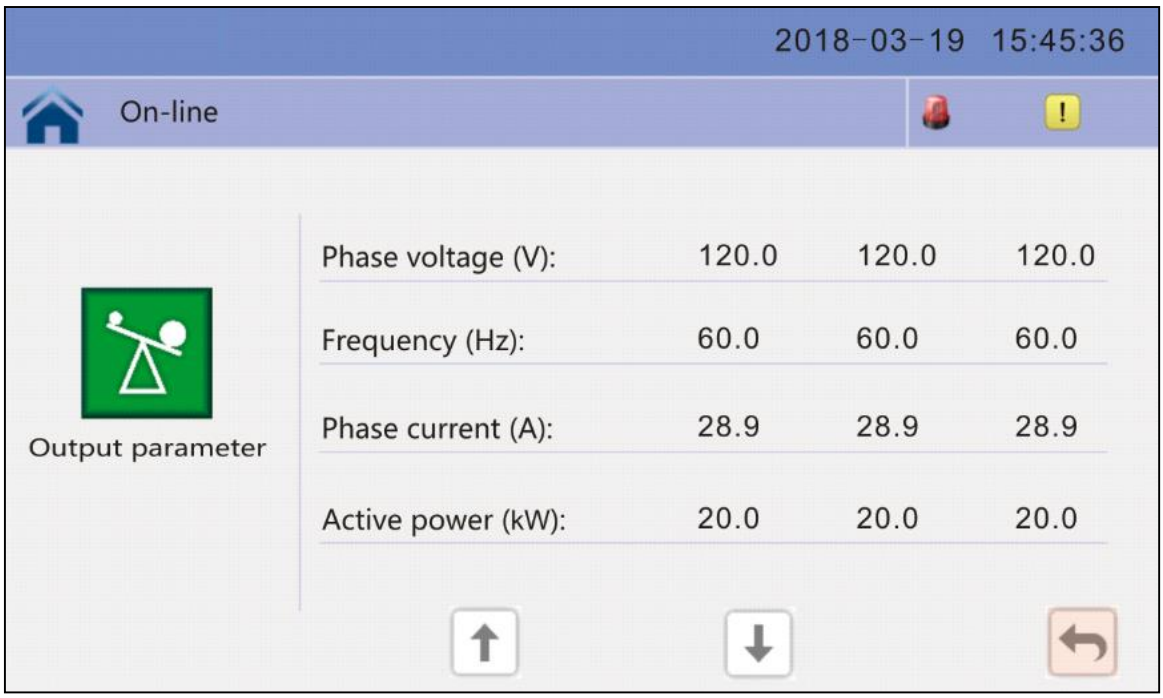
1) Tap the Bypass icon to open the bypass data window. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



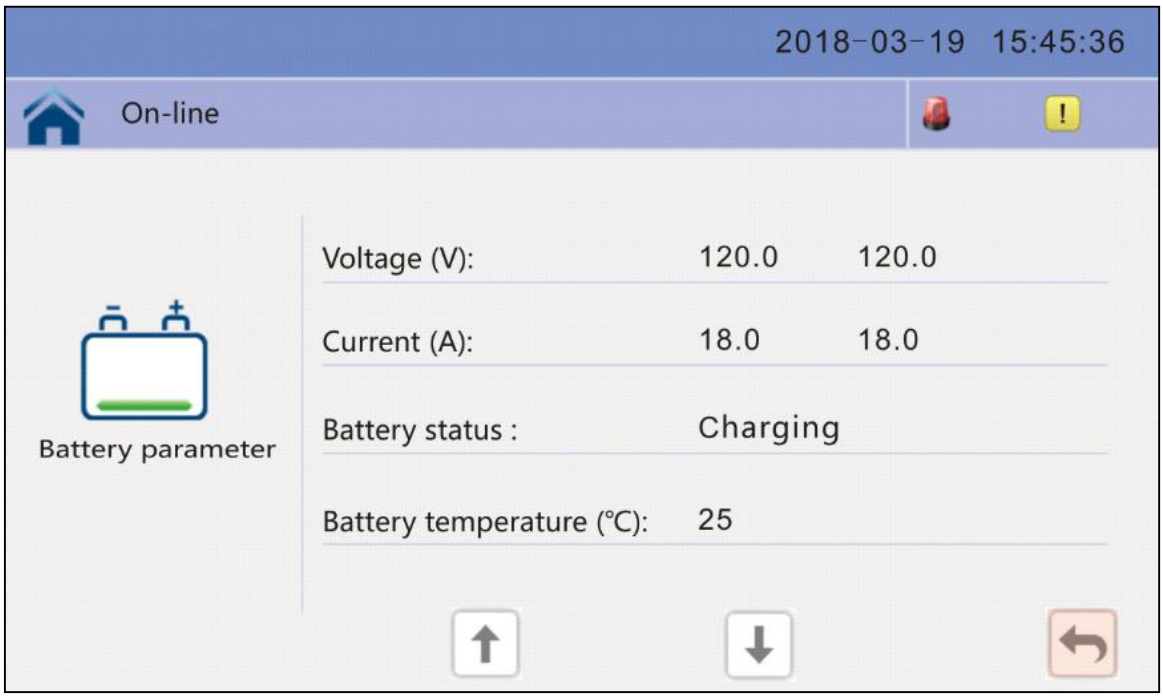
2) Tap the Mains icon to open the mains data window. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



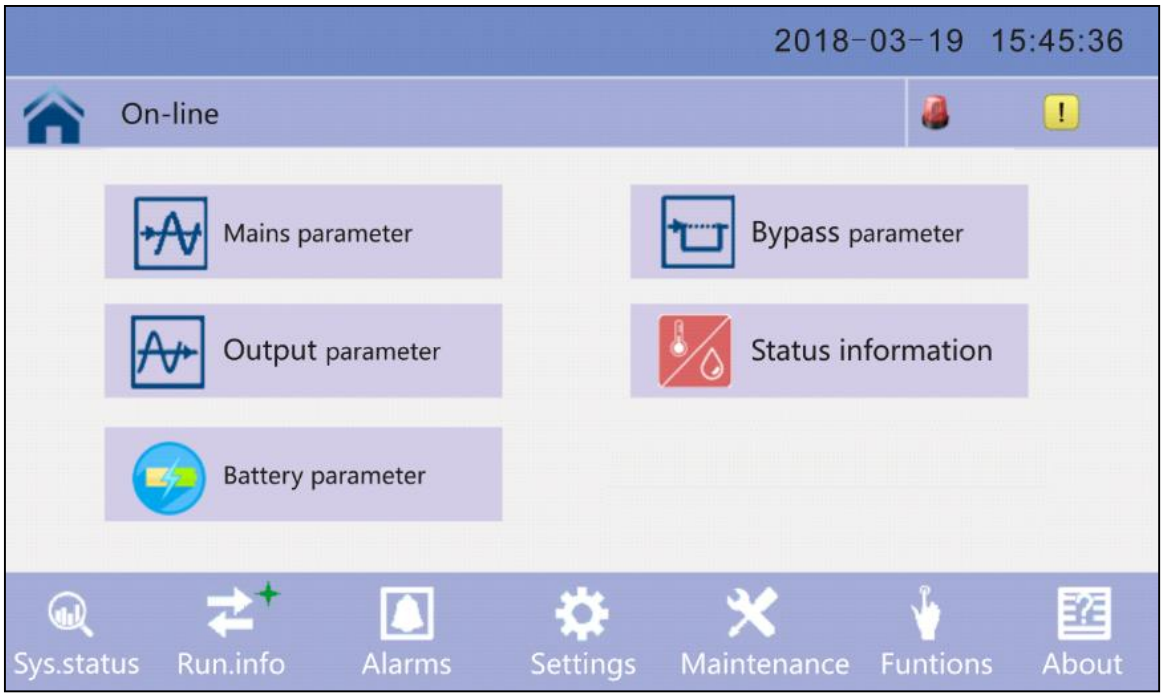
3) Tap the Load icon to open the output data window. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



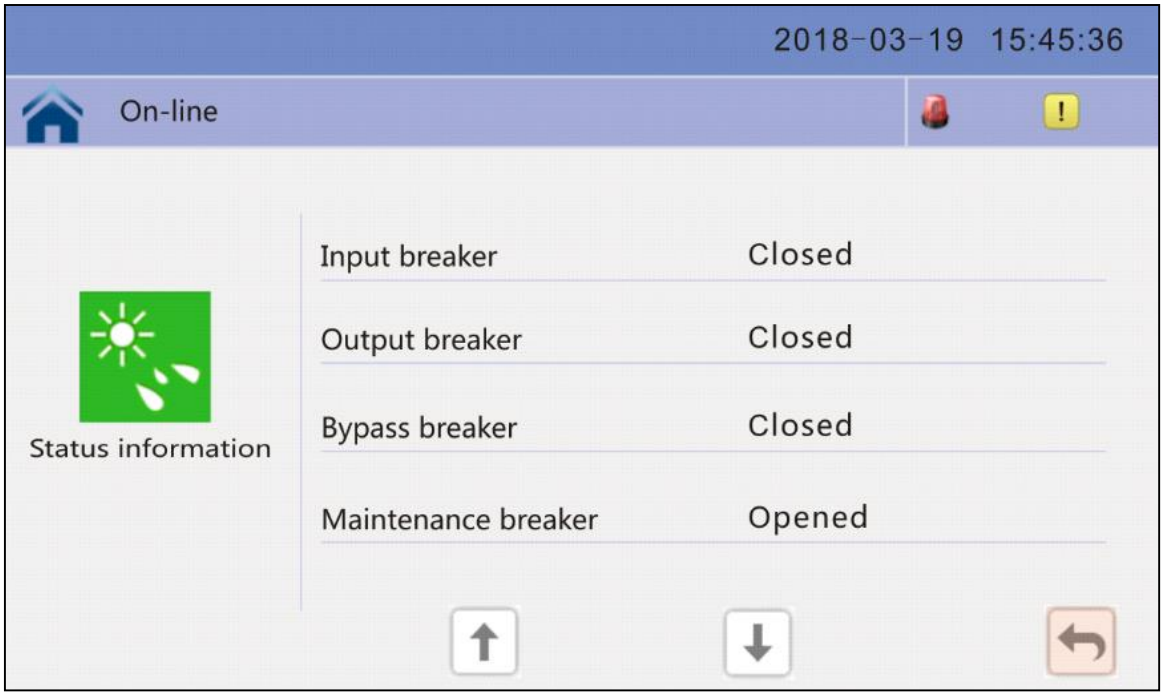
4) Tap the Battery icon to open the battery data window. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



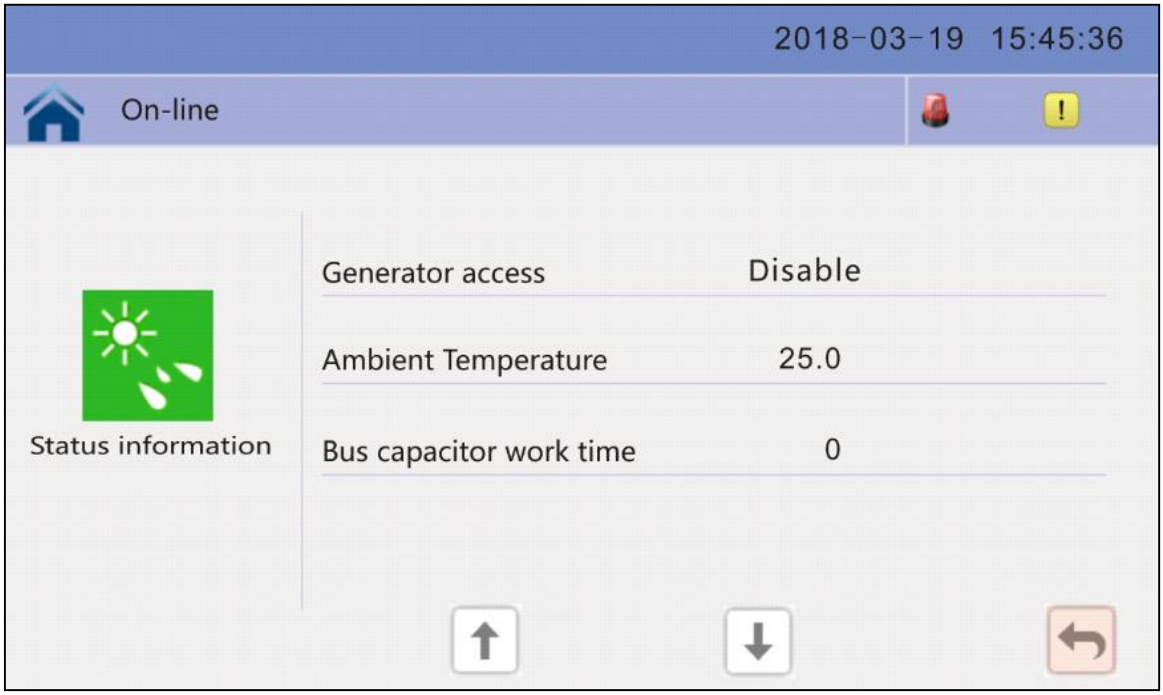
4.3.2 Tap the “Runn. info” icon to open the information page.



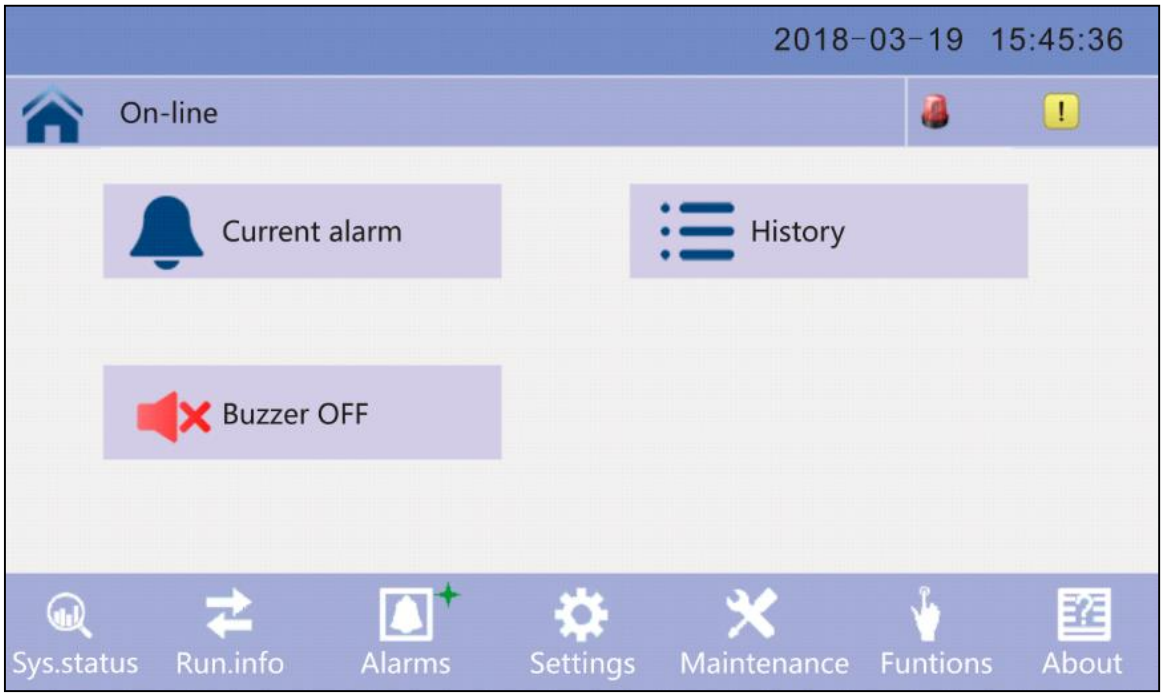
1) Tap the “Run time” icon to open the status data window, which shows the breaker status. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



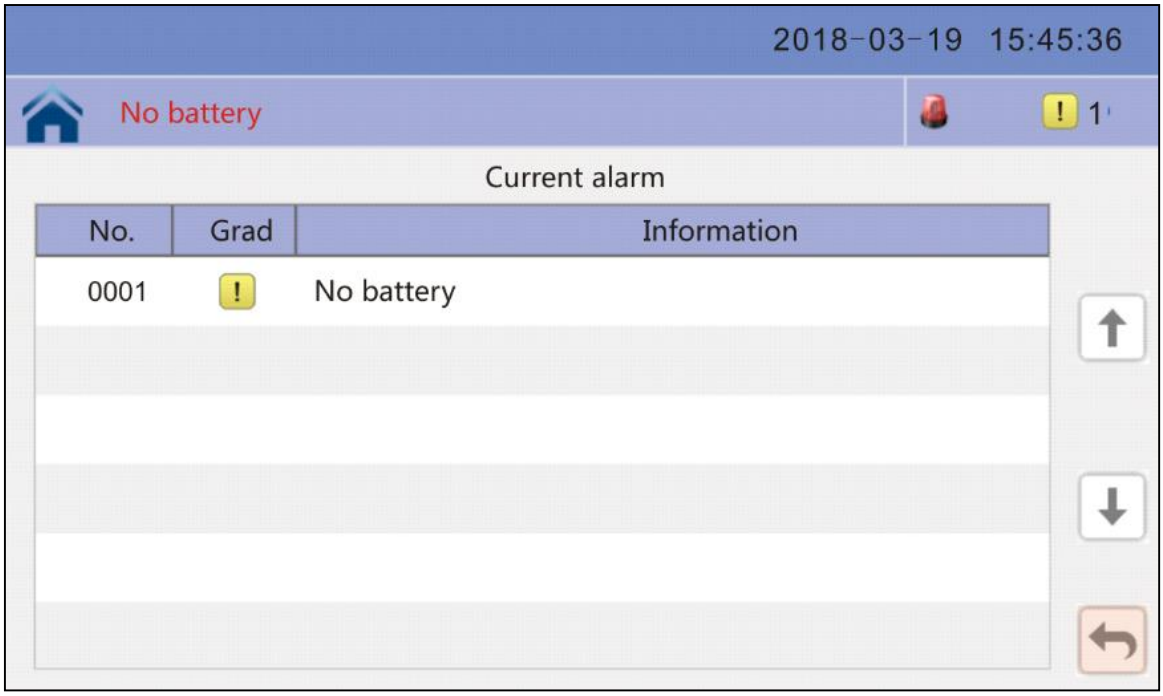
2) Tap the “ENV data” icon to open the environment data window, which shows the temperature data when a temperature sensor is connected. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



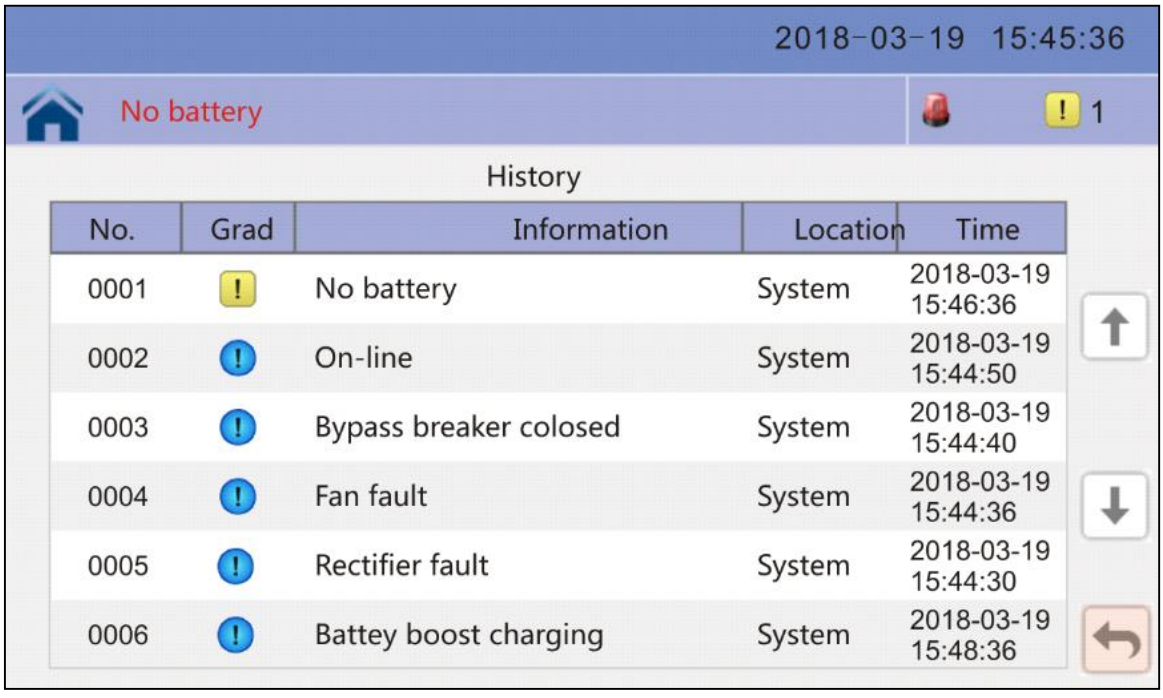
4.3.3 Tap the “Alarm” icon to open the alarm page.



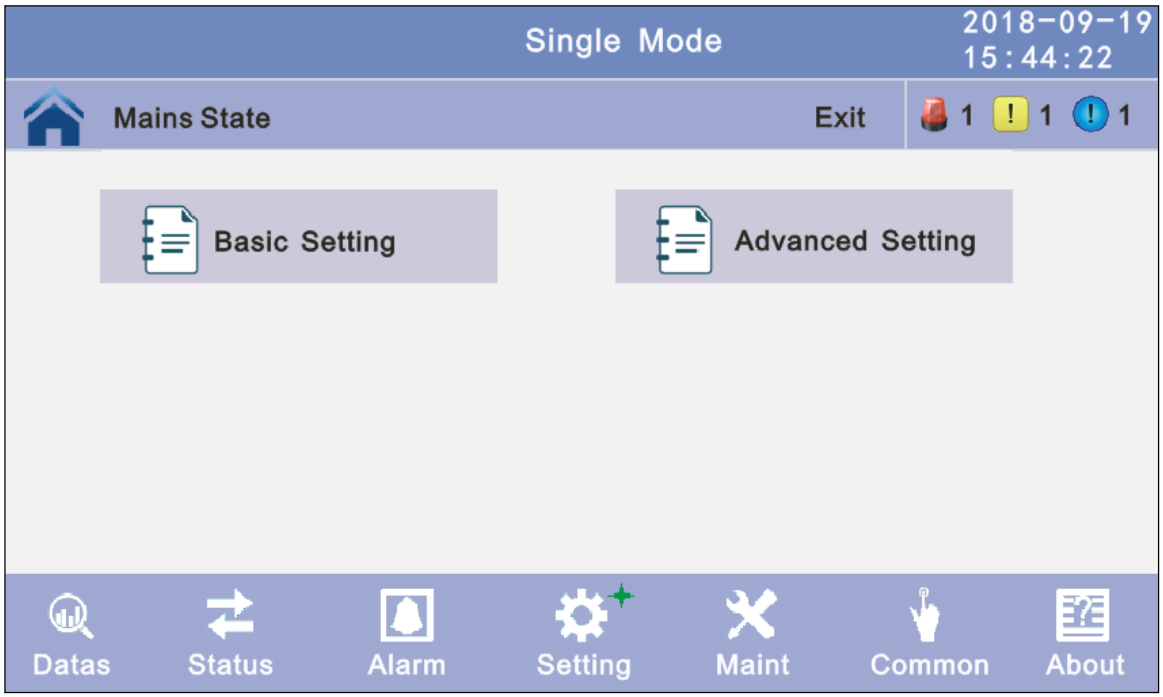
1) Tap the “Active Alarm” icon to view the current alarms. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



2) Tap the “History” icon to view the alarm history. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.

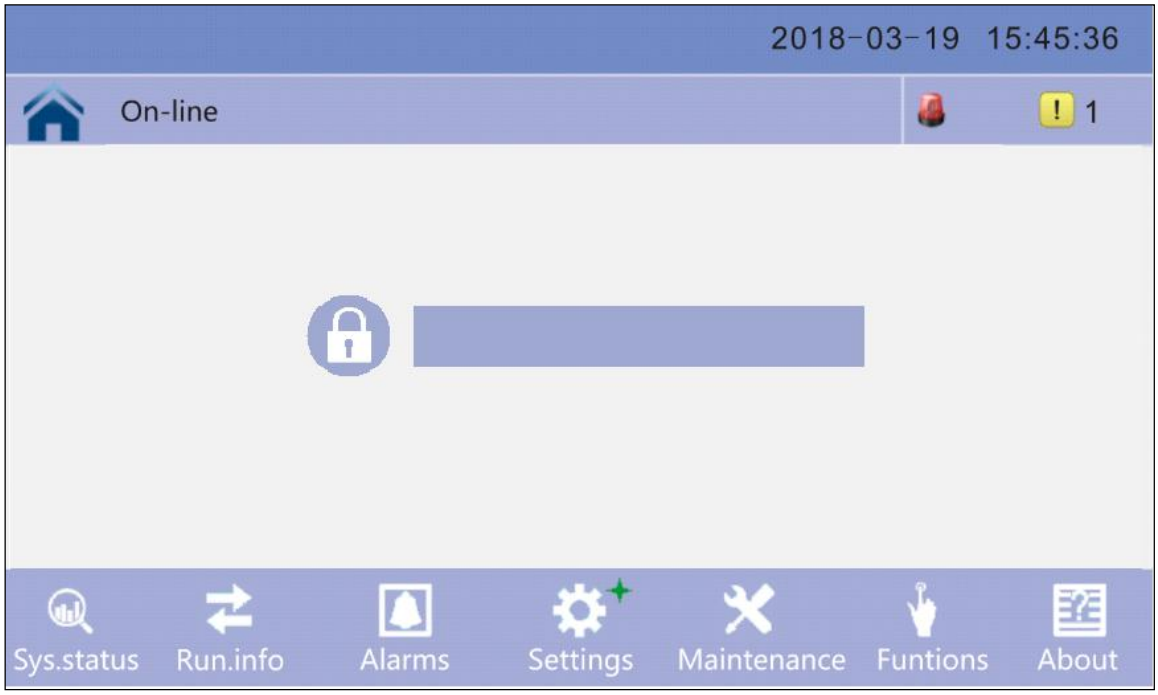


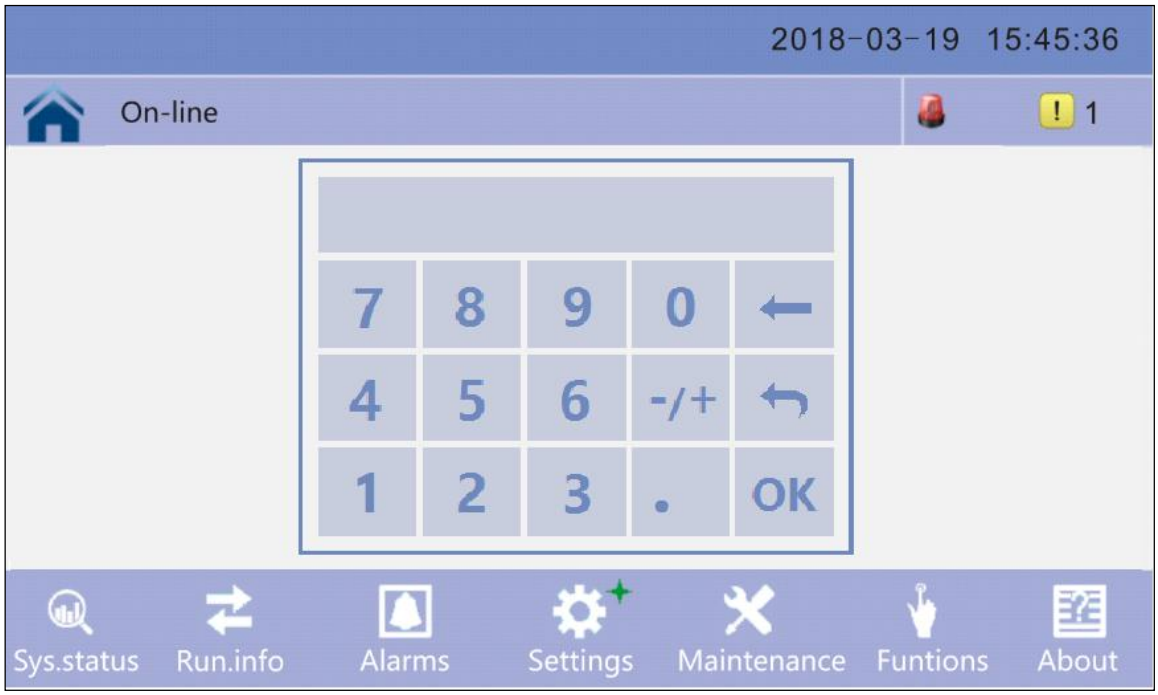
4.3.4 Tap the “Setting” icon to open the settings page. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



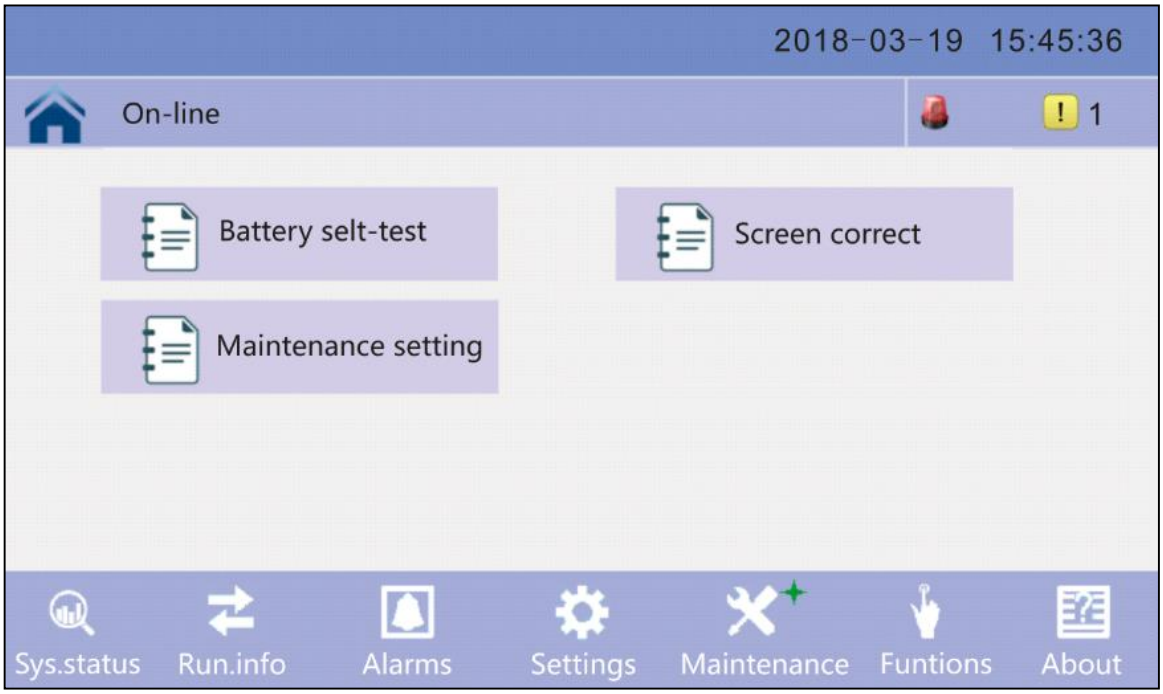
4.3.5 Tap “Advanced setting” and enter the correct password to access the advanced settings.

Note: Advanced settings should only be changed by qualified personnel or under their guidance. Contact your UPS supplier to obtain the password.

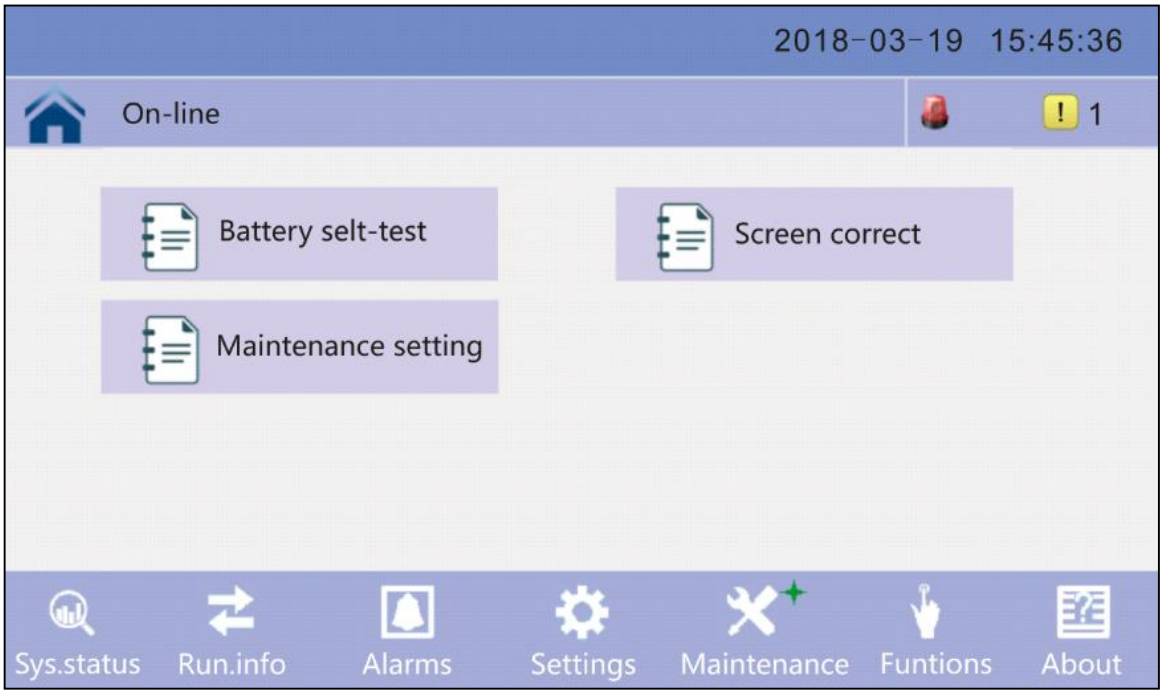




4.3.6 Tap the “Maintenance” icon to open the maintenance page. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



4.3.7 Tap the “Function” icon to open the function page. Tap the Back icon to return to the previous window, or the Home icon to return to the main page.



Alarm information

Fault code (Err)	Alarm description	Buzzer	LED
1	Rectifier Fault	Beep continuously	Fault LED lit
2	Inverter fault (including inverter bridge short circuit)	Beep continuously	Fault LED lit
3	Inverter Thyristor Short	Beep continuously	Fault LED lit
4	Inverter Thyristor Broken	Beep continuously	Fault LED lit
5	Bypass Thyristor Short	Beep continuously	Fault LED lit
6	Bypass Thyristor Broken	Beep continuously	Fault LED lit
7	Fuse Broken	Beep continuously	Fault LED lit
8	Parallel Relay Fault	Beep continuously	Fault LED lit
9	Fan Fault	Beep continuously	Fault LED lit
10	Reserved	Beep continuously	Fault LED lit
11	Auxiliary power 1 fault	Beep continuously	Fault LED lit
12	Initialization Fault	Beep continuously	Fault LED lit
13	P-Battery Charger Fault	Beep continuously	Fault LED lit
14	N-battery Charger Fault	Beep continuously	Fault LED lit
15	DC Bus Over Voltage	Beep continuously	Fault LED lit

Fault code (Err)	Alarm description	Buzzer	LED
16	DC Bus Below Voltage	Beep continuously	Fault LED lit
17	DC Bus Unbalance	Beep continuously	Fault LED lit
18	Soft Start Failed	Beep continuously	Fault LED lit
19	Rectifier Over Temperature	Twice per second	Fault LED lit
20	Inverter Over Temperature	Twice per second	Fault LED lit
21	Input Neutral Line Missing	Twice per second	Fault LED lit
22	Battery counter	Twice per second	Fault LED lit
23	Parallel Cable Connection Error	Twice per second	Fault LED lit
24	CAN Comm. Fault	Twice per second	Fault LED lit
25	Parallel Load Sharing Fault	Twice per second	Fault LED lit
26	Battery Over Voltage	Once per second	Fault LED blinking
27	Mains Site Wiring Fault	Once per second	Fault LED blinking
28	Bypass Site Wiring Fault	Once per second	Fault LED blinking
29	Output short circuit	Once per second	Fault LED blinking
30	Rectifier over current Fault	Once per second	Fault LED blinking
31	Bypass Over Current	Once per second	BPS LED blinking
32	Overload	Once per second	INV or BPS LED blinking
33	No battery	Once per second	Battery LED blinking
34	Battery Under Voltage (Low Battery protection)	Once per second	Battery LED blinking
35	Battery volt warning (Battery Voltage Low)	Once per second	Battery LED blinking
36	Internal communication fault	Once per 2 seconds	Fault LED blinking
37	DC Component Over Limit. (Unbalance INV. DC)	Once per 2 seconds	INV LED blinking
38	Parallel Overload	Once per 2 seconds	INV LED blinking
39	Mains Volt. Abnormal	Once per 2 seconds	Battery LED lit
40	Mains Freq. Abnormal	Once per 2 seconds	Battery LED lit
41	Bypass Not Available		BPS LED blinking
42	Bypass unable to track		BPS LED blinking
43	Inverter On Invalid		

4.4 Optional accessories

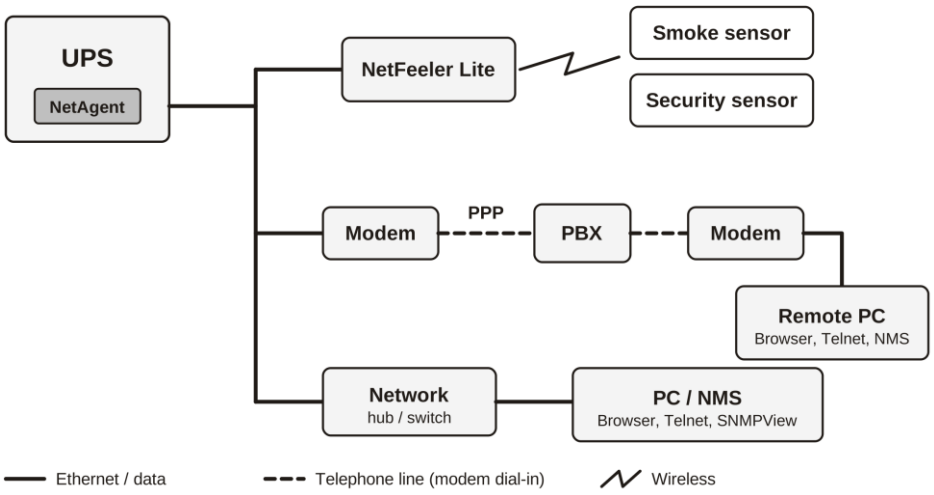
SNMP card: internal or external SNMP card (optional)

- To remove the card, loosen the two retaining screws (one on each side of the card).
- Carefully pull out the card. To install the card, reverse the procedure.

The SNMP slot supports the MEGAtec protocol. The NetAgent II-3 Port card can also be used to monitor and manage the UPS remotely.

The NetAgent II-3 Port card supports the modem dial-in (PPP) function, allowing remote control of the UPS when the network is unavailable.

In addition to the features of the standard NetAgent Mini, NetAgent II can be combined with the optional NetFeeler Lite to monitor temperature, humidity, smoke and security sensors, making it a versatile management tool. NetAgent II supports multiple languages with automatic browser-language detection.



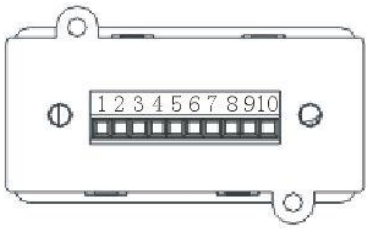
Typical UPS network management topology

Relay card (optional)

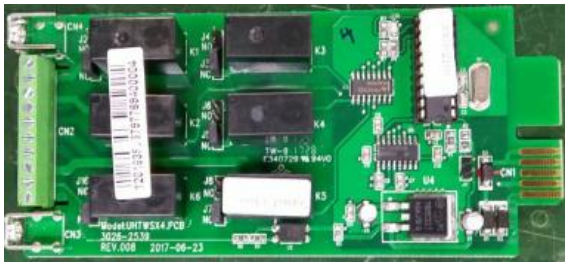
A 10-pin terminal provides the following signals: Bypass, Utility failure, Inverter on, Battery low, UPS fault, UPS alarm and UPS shutdown.

The relay card provides six dry-contact outputs and one dry-contact input. The inputs and outputs are factory-programmed with the functions listed in the table below.

Table: Relay contacts (relay card)



Pin	Function Description	Input or Output
1	Utility Failure	Output
2	Battery Low	
3		
4	Bypass On	
5	UPS Fault	
6	Inverter On	
7	Summary Alarm	
8	Common	
9	Remote Shutdown +	Input (5~12V)
10	Remote Shutdown -	



5. Maintenance

5.1 Safety precautions

Maintenance inside the UPS must only be carried out by qualified service personnel. Before any work inside the UPS, transfer the load to maintenance bypass or shut down the UPS (see section 4.2), switch off the external battery breaker, and wait at least 5 minutes for the internal capacitors to discharge. Hazardous voltage remains on the battery terminals and the bypass terminals while the maintenance bypass is in use.

5.2 Routine checks

• Monthly: check the LCD for active alarms and review the alarm history.

• Monthly: check that the ventilation openings are clean and unobstructed and that the fans run normally.

• Monthly: check that the ambient temperature and humidity are within the specified range and that the load is within the UPS rating.

• Annually (qualified personnel): check power cable connections and terminals for overheating or looseness, and clean dust from inside the cabinet.

5.3 Battery maintenance

• Keep the batteries clean and dry. Check regularly for leakage, swelling, corrosion or loose connections.

• Measure the string and block voltages every 6 months. Replace weak blocks only together with the whole string, using batteries of the same type, capacity and brand.

• Battery life depends strongly on temperature and number of discharges. The recommended battery temperature is 15°C to 25°C.

• If the UPS is not used for a long time, recharge the batteries at least every 6 months.

5.4 Parts with limited life

Cooling fans and electrolytic capacitors are wear parts whose service life depends on ambient temperature and load. They should be inspected during the annual preventive maintenance and replaced by qualified service personnel when necessary.

5.5 Service and support

For service, contact your local EVI Power distributor or service partner. Please have the UPS model, serial number, firmware version and any fault codes ready (see also Appendix 2).

Appendix 1 Specifications

Part no.	EP-UPS10000YH33OT	EP-UPS20000YH33OT	EP-UPS30YH33OT	EP-UPS40YH33OT
Rated power	10kVA / 10kW	20kVA / 20kW	30kVA / 30kW	40kVA / 40kW
INPUT				
Rated input voltage	380/400/415Vac (3Ph+N+PE)			
Input voltage range	305~478Vac (full load); 208~478Vac (50% load)			
Input frequency	40-70Hz			
Input power factor	0.99			
Input current THDi	≤3% (100% non-linear load)			
Rated bypass voltage	380/400/415Vac (3Ph+N+PE)			
Bypass voltage range	Max.: +25% at 220Vac (+10%/+15%/+20% selectable) +20% at 230Vac (+10%/+15% selectable) +15% at 240Vac (+10% selectable) Min.: -45% (-20%/-30% selectable)			
Bypass frequency range	±10%			
Synchronization window	±1%/±2%/±4%/±5%/±10% selectable (default ±10%)			
Bypass input breaker	20A	40A	63A	80A
Upstream protection, bypass line	Thermal-magnetic circuit breaker, rated up to 125% of nominal output current, IEC 60947-2 curve C			
Neutral cable current rating	1.7 × In			
Generator input	Supported			
OUTPUT				
Output power factor	1.0			
Rated output voltage	380/400/415Vac (3Ph+N+PE)			
Voltage regulation	±1%			
Transient voltage response	±5% (linear load)			
Phase balance	120° ±1° (100% unbalanced load)			
Output frequency	Line mode: synchronized with input; if the input frequency is outside ±10% (±1%/±2%/±4%/±5% selectable): 50/60Hz ±0.1% Battery mode: 50/60Hz ±0.1%			
Crest factor	3:1			
Output voltage THD	<2% (linear load); <5% (non-linear load)			
Overload, AC mode	≤110%: 60min; ≤125%: 10min; ≤150%: 1min; >150%: immediate transfer to bypass			
Overload, battery mode	≤110%: 10min; ≤125%: 1min; ≤150%: 5s; >150%: UPS shuts down immediately			
Efficiency (normal mode)	Up to 93.5%	Up to 94.5%		
BATTERY (external batteries, not supplied)				
Battery blocks (12V)	20	30 to 50, in steps of 2		
Battery voltage	±120Vdc	±180Vdc (30 blocks) to ±300Vdc (50 blocks)		
Float charge voltage	2.25V/cell (selectable 2.20-2.29V/cell)			
Boost charge voltage	2.30V/cell (selectable 2.30-2.40V/cell)			
End-of-discharge voltage	1.75V/cell (selectable 1.60-1.90V/cell)			
Max. charging current	14A	18A	20A	20A
SYSTEM				
Transfer time, synchronous	Mains to battery: 0ms; inverter to bypass: 0ms			
Transfer time, asynchronous	15ms (50Hz); 13.3ms (60Hz)			
Alarms	Overload, mains abnormal, UPS fault, battery low, etc.			
Protection	Short circuit, overload, over-temperature, battery low, fan fault			
Communication	USB, RS232, RS485, parallel port, dry contact, EPO, intelligent slot Optional: SNMP card, relay card, battery temperature sensor			
ENVIRONMENT				
Operating temperature	0°C to 40°C			
Storage temperature	-25°C to 55°C			
Relative humidity	0-95%, non-condensing			
Noise (at 1m)	<55dB	<58dB	<61dB	<64dB
Altitude	≤1500m; above 1500m derate according to section 3.4			

Part no.	EP-UPS10000YH33OT	EP-UPS20000YH33OT	EP-UPS30YH33OT	EP-UPS40YH33OT
PHYSICAL				
Dimensions W×D×H	250 × 580 × 655mm			
Net weight	35kg	40kg	43kg	46kg
STANDARDS				
Safety	IEC/EN 62040-1, IEC/EN 60950-1			
EMC	IEC/EN 62040-2; IEC 61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8			
Marking	CE			

Appendix 2 Troubleshooting

If the UPS does not operate normally, the cause may be in the installation, wiring or operation. Check these first. If no problem is found, contact your local dealer immediately and provide the following information:

(1) Product model and serial number.

(2) A detailed description of the fault, e.g. LCD messages, fault codes and LED status.

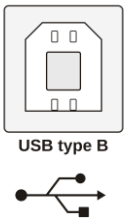
The table below lists common problems and their solutions.

No.	Problem	Possible reason	Solution
1	Utility is connected but the UPS cannot be switched on.	Input power supply is not connected; Input voltage is too low; The UPS input switch is not switched on.	Check that the UPS input voltage/frequency is within the permitted range. Check that the UPS input switch is switched on.
2	Utility is normal but the Utility LED does not light up, and the UPS operates in battery mode	The UPS input breakers are not switched on; The input cable is not properly connected.	Switch on the input breaker; Make sure the input cable is properly connected.
3	The UPS does not indicate any failure, but there is no output voltage	The output cable is not properly connected; The output breaker is not switched on.	Make sure the output cable is properly connected; Switch on the output breaker.
4	Utility LED is flashing	Utility voltage is outside the UPS input range.	The UPS operates in battery mode. Pay attention to the remaining backup time required by your system.
5	Battery LED is flashing and there is no charging voltage or current	The battery breaker is not switched on, the batteries are damaged, or the batteries are connected with reversed polarity. The battery quantity and capacity are not set correctly.	Switch on the battery breaker. If the batteries are damaged, replace the whole battery string. Connect the battery cables correctly; Set the correct battery quantity and capacity on the LCD.
6	Buzzer beeps every 0.5 seconds and the LCD shows “output overload”	Overload	Reduce the load.
7	Buzzer sounds a long beep and the LCD shows fault code “29”	Short circuit at the UPS output	Make sure the load is not short-circuited, then restart the UPS.
8	The UPS operates only in bypass mode	The UPS is set to ECO mode	Set the UPS operating mode to normal mode.
9	Cannot cold start (start on battery)	The battery breaker is not properly closed; The battery fuse is blown;	Close the battery breaker; Replace the fuse; Recharge the batteries;

No.	Problem	Possible reason	Solution
		The battery voltage is low; The battery quantity is set incorrectly.	Switch on the UPS with AC supply and set the correct battery quantity and capacity.
10	Buzzer beeps continuously and the LCD shows fault codes such as 1, 3, 5, 9, 15	UPS fault	Contact your local dealer for repair.

Appendix 3 USB communication port definition

Port definition:



Connection between the PC USB port and the UPS USB port.

PC USB port	UPS USB port	Description
Pin 1	Pin 1	PC : +5V
Pin 2	Pin 2	PC : DPLUS signal
Pin 3	Pin 3	PC :DMINUS signal
Pin 4	Pin 4	Signal ground

Available USB functions:

- Monitor UPS power status.
- Monitor UPS alarm info.
- Monitor UPS running parameters.
- Scheduled shutdown/start-up settings.

Communication data format:

Baud rate ---------- 9600bps

Data bits ---------- 8bit

Stop bit ---------- 1bit

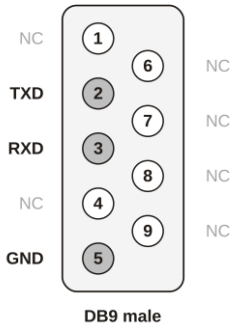
Parity check ---------none

CAUTION!

USB, RS232 and RS485 interfaces cannot be used at the same time; only one of them can be used at a time.

Appendix 4 RS232 communication port definition

Port definition (male connector):



Connection between the PC RS232 port and the UPS RS232 port.

PC RS232 port	UPS RS232 port	Description
Pin 2	Pin 2	UPS transmit, PC receive
Pin 3	Pin 3	PC transmit, UPS receive
Pin 5	Pin 5	Ground

Available RS232 functions:

- Monitor UPS power status.
- Monitor UPS alarm info.
- Monitor UPS running parameters.
- Scheduled shutdown/start-up settings.

RS232 communication data format:

Baud rate ---------- 9600bps

Data bits ---------- 8bit

Stop bit ---------- 1bit

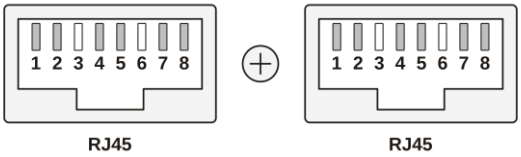
Parity check ---------none

CAUTION!

USB, RS232 and RS485 interfaces cannot be used at the same time; only one of them can be used at a time.

Appendix 5 RS485 communication port definition

Port definition:



Connection between the device RS485 port and the UPS RS485 port.

RJ45	UPS(RJ45)	Description
Pin 1/5	Pin 1/5	485+ “A”
Pin 2/4	Pin 2/4	485 - “B”
Pin7	Pin7	+12Vdc
Pin8	Pin8	GND

Available RS485 functions:

- Monitor UPS power status.
- Monitor UPS alarm info.
- Monitor UPS running parameters.
- Scheduled shutdown/start-up settings.
- Battery ambient temperature monitoring.
- Temperature-compensated battery charging voltage.

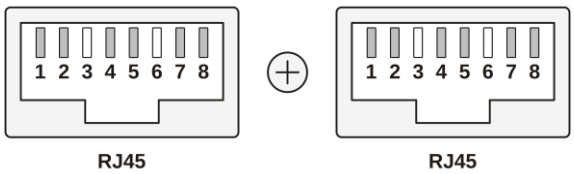
CAUTION!

USB, RS232 and RS485 interfaces cannot be used at the same time; only one of them can be used at a time.

RS485 port pin 7 carries +12Vdc!

Appendix 6 BAT_T (battery temperature sensor) port definition

Port definition:



Connection between the temperature sensor RJ45 port and the UPS RJ45 port.

RJ45	UPS(RJ45)	Description
Pin 1/5	Pin 1/5	485+ “A”
Pin 2/4	Pin 2/4	485 - “B”
Pin7	Pin7	+12Vdc
Pin8	Pin8	GND

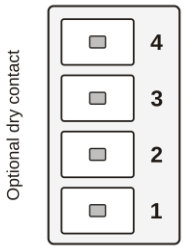
Available BAT_T functions:

- Battery ambient temperature monitoring.
- Temperature-compensated battery charging voltage.

Note: The battery temperature sensor is an optional accessory and is not supplied with the UPS as standard.

Appendix 7 Optional dry-contact port definition

Port definition (male connector):



Rating:

Relay dry-contact port: 5A / 277Vac

UPS	Description
Pin1	Normally closed (NC)
Pin2	Normally open (NO)
Pin3	Not used
Pin4	Common

Function 1 (default, internal jumper J6):

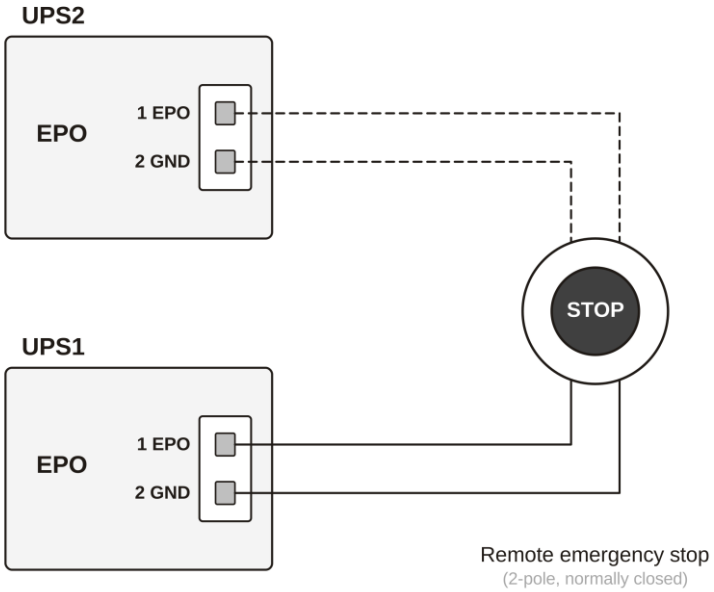
- Trips the external bypass (backfeed protection) breaker when a backfeed alarm occurs.

Function 2 (optional, internal jumper J5):

- Trips the external battery breaker when the battery voltage is low.

Appendix 8 EPO (emergency power off) connection

Connection diagram:



Connection between the emergency stop button and the UPS EPO port.

Button	UPS EPO	Description
Pin 1	Pin 1	EPO
Pin 2	Pin 2	GND

- A remote emergency stop switch can be installed at a remote location and connected to the EPO connector with simple wiring.
- In a parallel system, one remote switch can be connected to several UPS units, allowing all units to be shut down at once.

Note: The EPO input is normally closed (NC) as standard. Use a normally closed emergency stop switch: the UPS output is switched off when the contact between pin 1 and pin 2 opens.