

Galaxy 1000 PW

30–80 kVA 400 V

Operation

07/2014



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Important Safety Information

Read these instructions carefully and look at the equipment to become familiar with it before trying to install, operate, service or maintain it. The following safety messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety message indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages with this symbol to avoid possible injury or death.

⚠ DANGER
<p>DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p> <p>Failure to follow these instructions will result in death or serious injury.</p>
⚠ WARNING
<p>WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p> <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>
⚠ CAUTION
<p>CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.</p> <p>Failure to follow these instructions can result in injury or equipment damage.</p>
NOTICE
<p>NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this type of safety message.</p> <p>Failure to follow these instructions can result in equipment damage.</p>

Please Note

Electrical equipment should only be installed, operated, serviced, and maintained by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Safety Precautions

⚠ DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

All safety instructions in this document must be read, understood and followed.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

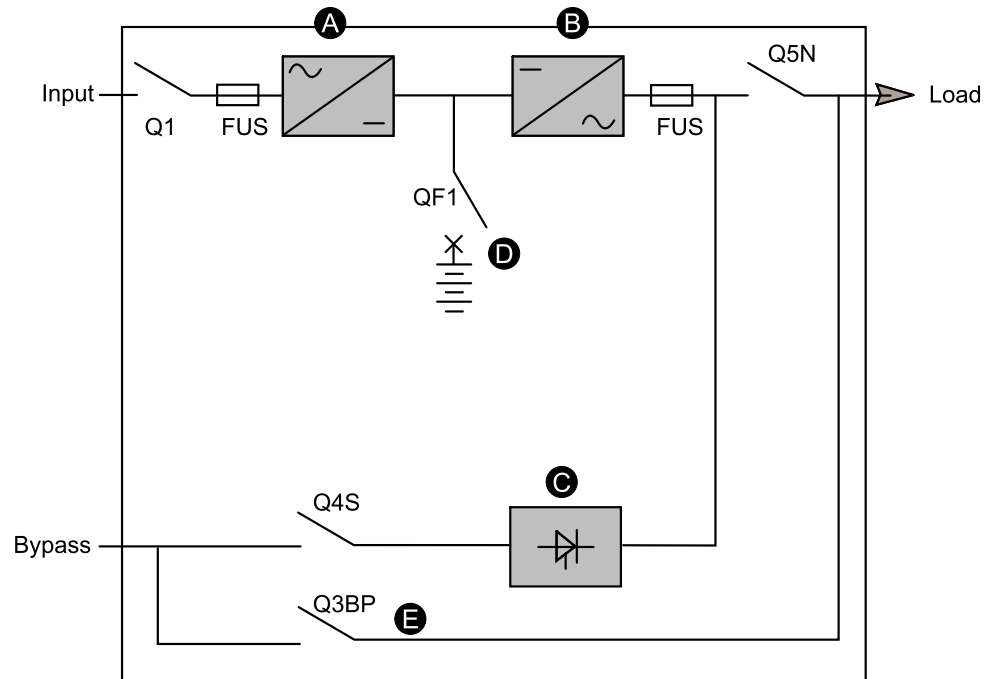
HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

After the UPS system has been electrically wired, do not start up the system. Startup must only be performed by Schneider Electric.

Failure to follow these instructions will result in death or serious injury.

Overview

Schematic Overview



- A. The rectifier/charger module converts 3-phase AC power from the input supply into DC power for the normal inverter input and float charges or recharges the battery.
- B. The inverter module converts the DC power supplied by the rectifier/charger module or the battery unit into single-phase AC power for the load.
- C. The static bypass module ensures the instantaneous transfer of the load to the bypass in the event of an inverter shutdown (initiated by the user or by a protective device) or a sudden overload.
- D. The battery unit provides backup power for the inverter in the event of a voltage drop or an input interruption.
- E. A maintenance bypass isolates the UPS for maintenance and transfers the load to the bypass without interrupting the supply of power. The maintenance bypass is made up of three manual switches (Q3BP, Q4S and Q5N).

The input and the bypass have different functions and, depending on the installation, may be protected differently upstream and/or come from different sources.

Frequency converters are available without backup batteries.

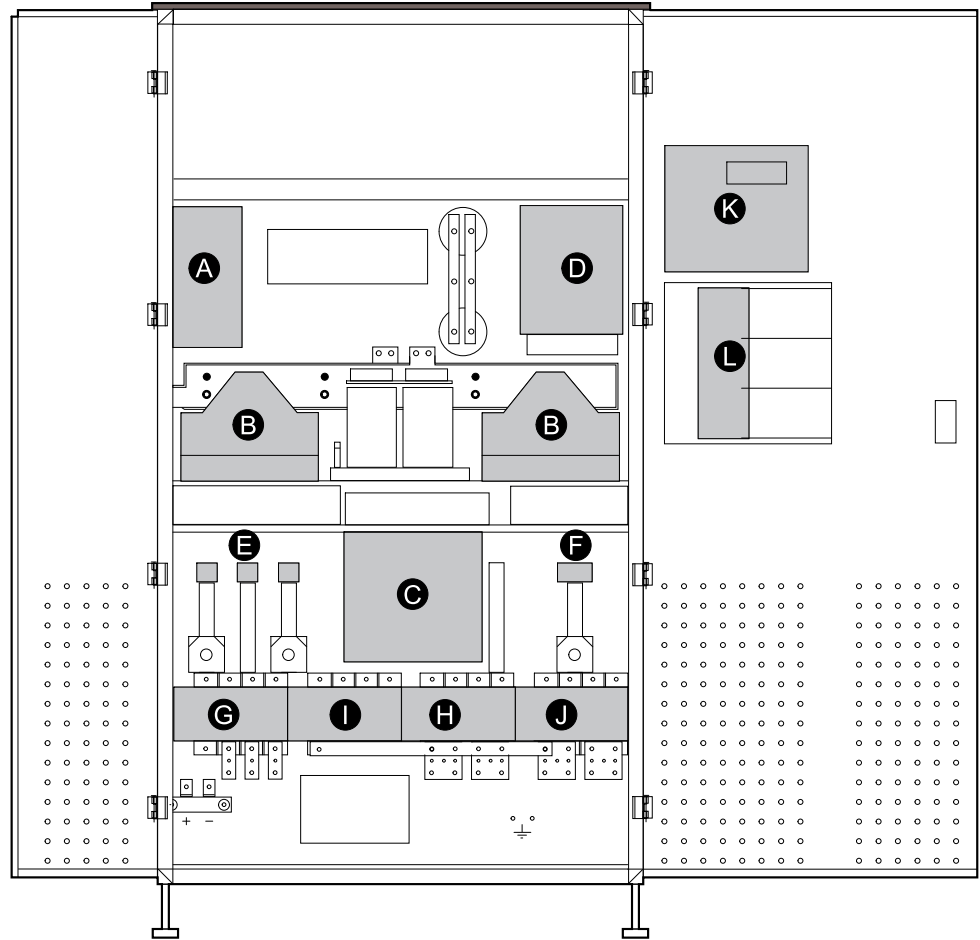
The static bypass line and the maintenance bypass line do not exist in installations where the load frequency and the bypass frequency are different (for example in frequency converters).

When more power is required, several Galaxy 1000 PW units can be connected in parallel. In parallel configurations, an external bypass is required to avoid power interruption during maintenance. This external bypass can be used as an Hot Swap option for a unitary UPS or for a parallel UPS with redundancy. This Hot Swap option allows complete isolation of the UPS for maintenance or replacement without power interruption on the load.

The system may also include :

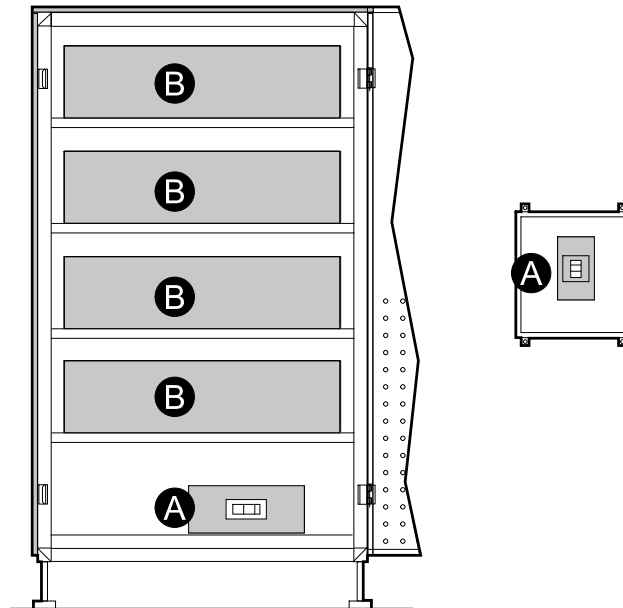
- An isolating transformer on the bypass
- An anti harmonics filter (FAH) on the input
- Different remote control, indication and display systems

UPS Cabinet



- A. Rectifier/charger module
- B. Inverter module
- C. Static bypass module
- D. Cage for electronic control boards
- E. Rectifier/charger input fuses “FUE”
- F. Inverter output fuses “FUS”
- G. Input switch Q1
- H. Bypass switch Q4S
- I. Maintenance bypass switch Q3BP (single or redundant parallel UPS units)
- J. Output switch Q5N
- K. Display board
- L. Media contacts 11 remote indications board

Battery Cabinet



- A. Battery isolation and protection circuit breaker QF1
B. Battery cells

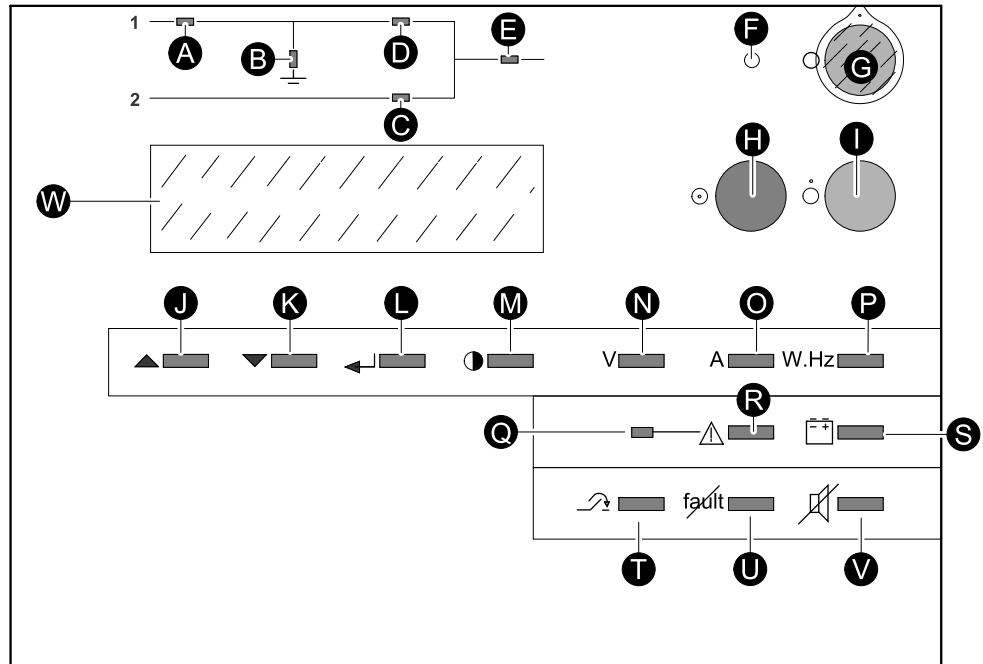
User Interface

The control panel on the Galaxy 1000 PW UPS comprises the basic controls and indications required to check the general status of the UPS.

The panel indicates:

- Normal operation (load protected)
- Operation with load on battery power
- Abnormal situations (operating problem)
- Dangerous situations (load not protected)

Overview of User Interface



A. Rectifier/charger LED:

- LED is off: Rectifier/charger OFF.
- LED is green: Rectifier/charger ON.
- LED is red: Rectifier/charger fault. The stored alarm indicates one or several of the following conditions:

The input switch Q1 is open.

The protection fuse at the rectifier/charger input (FUE) has blown.

An abnormally high internal rectifier/charger temperature is present.

An abnormally high battery charge current is present.

Fault, non-calibration or non-personalization of the electronic control board for the rectifier/charger.

Fault on the electronic power-supply board.

B. Battery LED:

- LED is off: The battery is float charging.
- LED is flashing green: The battery is recharging.
- LED is green: The load is on battery power.
- LED is flashing red: A low-battery shutdown warning is present.
- LED is red: The battery is at the end of backup time and circuit breaker QF1 is open, or there is battery fault present.

C. Static-bypass LED:

- LED is off: The bypass is within specified tolerances, and the static bypass switch is open.
- LED is green: The static bypass switch is closed.
- LED is red: The stored alarm indicates one or several of the following conditions:

The bypass voltage or frequency is outside of specified tolerances.

A static-bypass fault is present.

An abnormally high internal static-bypass temperature is present.

A static bypass ventilation fault is present.

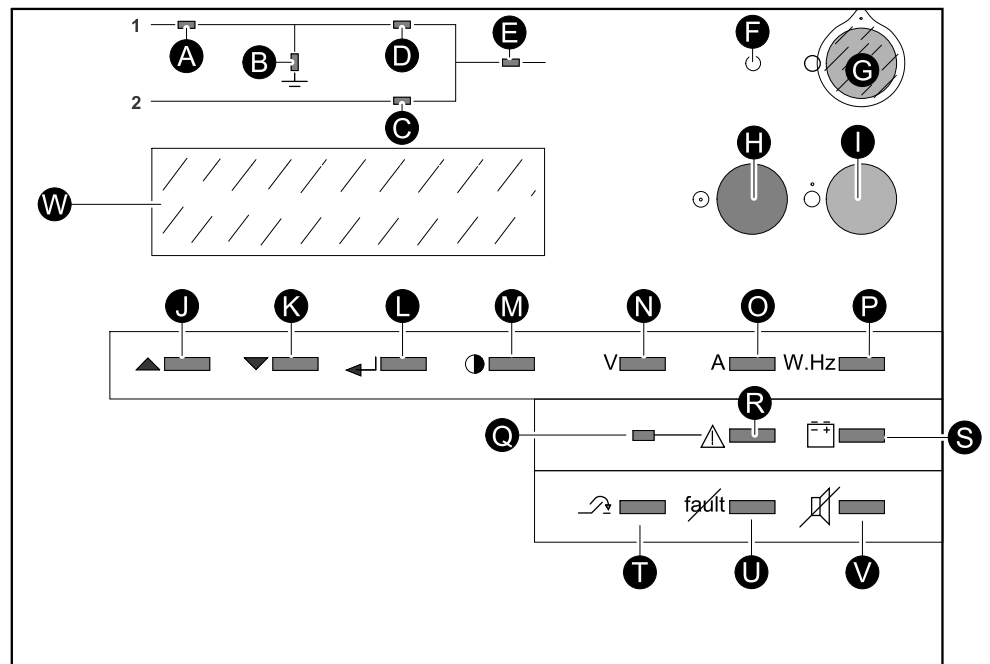
A power supply fault for the static bypass control function is present.

- A fault on the electronic board controlling the transfer function is present.
- Non-calibration or non-personalization of the electronic control board for the inverter.
- A fault on the electronic power-supply board is present.
- A fault is present on monitoring the inverter ready response channels (parallel UPS system).
- D. Inverter LED:
- LED is off: The inverter is OFF.
 - LED is flashing green: The inverter is starting, or the inverter is ON but is not connected to the load.
 - LED is green: Normal inverter operation.
 - LED is red: An inverter fault is present. The stored alarm indicates one or several of the following conditions:
 - Inverter shutdown due to inverter output voltage being outside of specified tolerances.
 - The protection fuse at the inverter output (FUS) has blown.
 - An abnormally high inverter output transformer temperature is present.
 - An abnormally high inverter temperature is present.
 - An output voltage fault (amplitude or phase) (parallel UPS units) is present.
 - A fault is present, non-calibration or non-personalization of the electronic control board for the inverter.
 - A fault on the electronic power-supply board is present.
- E. Load LED:
- LED is off: The load is not supplied.
 - LED is green: The load is supplied via the inverter or bypass (via the static bypass).
- F. Buzzer:
- The buzzer is activated in the following situations:
 - The load is supplied by the bypass source.
 - The load is on battery power.
 - Operating problems.
 - The beeping is slow and discontinuous for a minor problem or when the inverter is on battery power.
 - When the alarm LOW BATTERY SHUTDOWN is activated, the beeping is more rapid. Finally, if the inverter shuts down, the beeping is loud and constant. The buzzer is reset by pressing 'V', but a higher level alarm will set it off again.
- G. Full shutdown button: Pressing this button shuts down the entire UPS (shuts down the inverter and rectifier/charger, and opens the battery circuit breaker and activates a relay contact on the Media Contacts 11 board).
- H. Inverter ON button: Turns the inverter ON.
- I. Inverter OFF button: Turns the inverter OFF.
- J. Up-key: Use this key to move around in the main menu and access the secondary messages.
- K. Down-key: Use this key to move around in the main menu and access the secondary messages.
- L. Confirm key: This key is used to confirm the menu choices.
- M. Main menu key: This key is used to access the main menu: display language, display-contrast setting, sound level of the buzzer, lamp test, date and time settings, inverse-video, and event log.
- N. Voltage key: This key is used to access voltage measurements:

- The input phase-to-phase voltages.
 - The bypass voltage.
 - The load voltage.
- O. Currents key: This key is used to access current measurements:
- The input, bypass, and load currents.
 - The load percentage.
 - The load crest factor.
- P. Measurements key: This key is used to access other measurements:
- The input, bypass, and inverter frequencies.
 - The level of active and apparent power drawn by the load.
 - The load power factor.
 - The inverter load level (in percent).
- Q. Anomaly indicator LED: This LED indicates the presence of anomalies on the device.
- R. Primary message key: This key is used to access the primary messages.
- S. Battery key: This key is used to access battery measurements:
- The battery voltage (or the DC voltage on frequency converters without a battery).
 - The battery current (charge or discharge).
 - The battery temperature.
 - The available battery backup time.
 - The inverter load level (in percent).
- T. Forced transfer key: This key is used to manually transfer the load to the inverter or from the inverter to the static bypass (return transfer). Transfer and return transfer are carried out only following confirmation requested by the system display and a warning as to the risk of an interruption in the supply of power to the load.
- U. Alarm reset key: This key is used to reset stored alarms. The system accepts resetting only when alarms have been cleared.
- V. Buzzer reset: This key is used to stop the buzzer. However, new alarms will set the buzzer off again.
- W. Display: The display continuously indicates the system operating status.

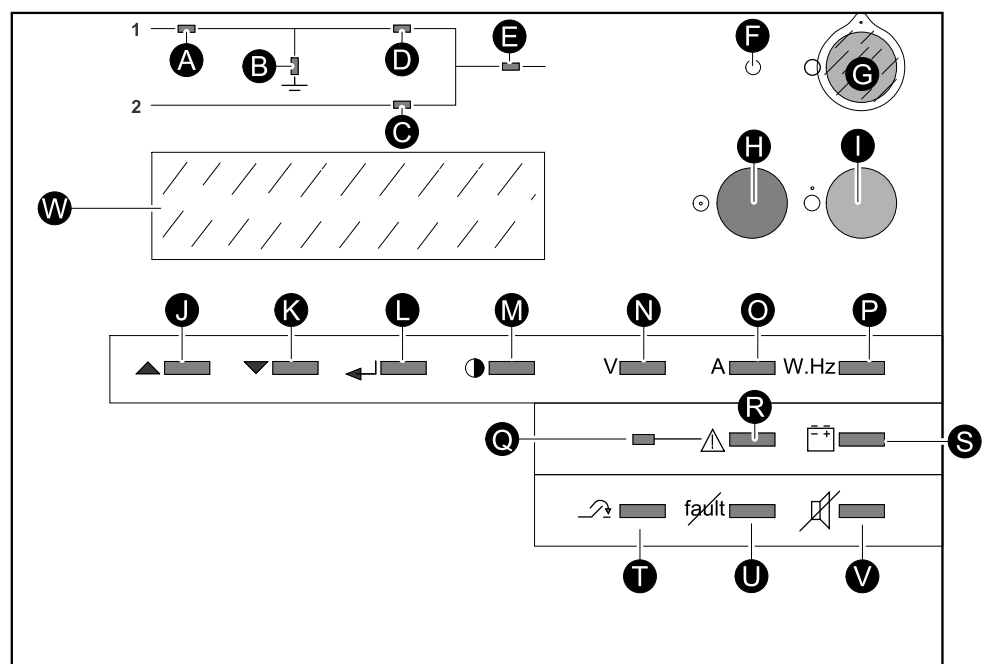
Configuration

Select Language



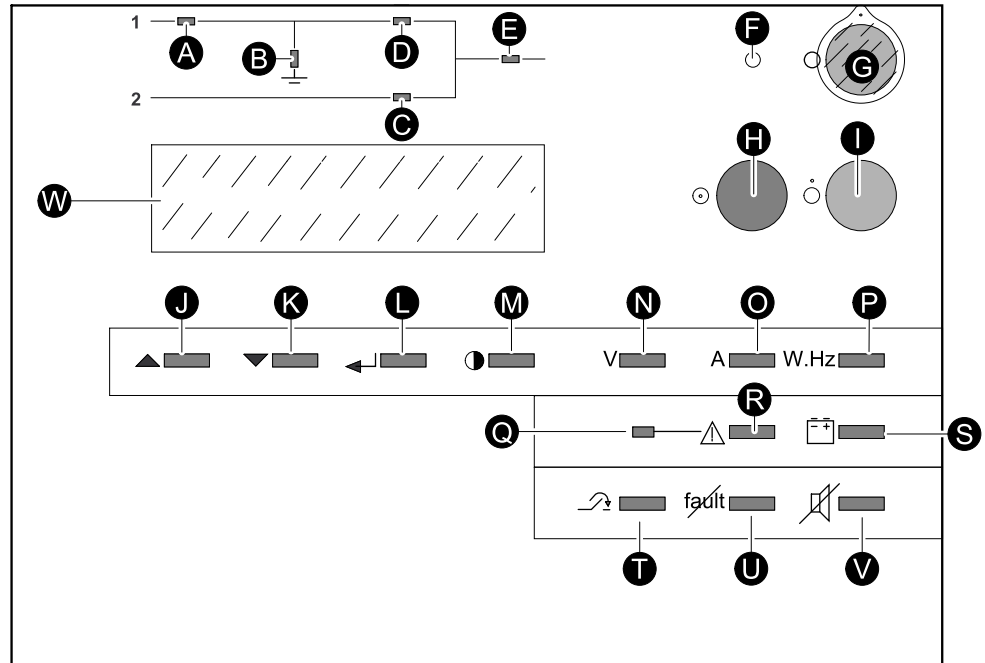
1. Press the **Main Menu** key (M) to open the Main Menu screen.
2. On the Main Menu screen, select **CHOOSE LANGUAGE** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.
3. Select the preferred language using the **Up** (J) and **Down** (K) keys and confirm your selection using the **Confirm** (L) key.

Set Display Contrast



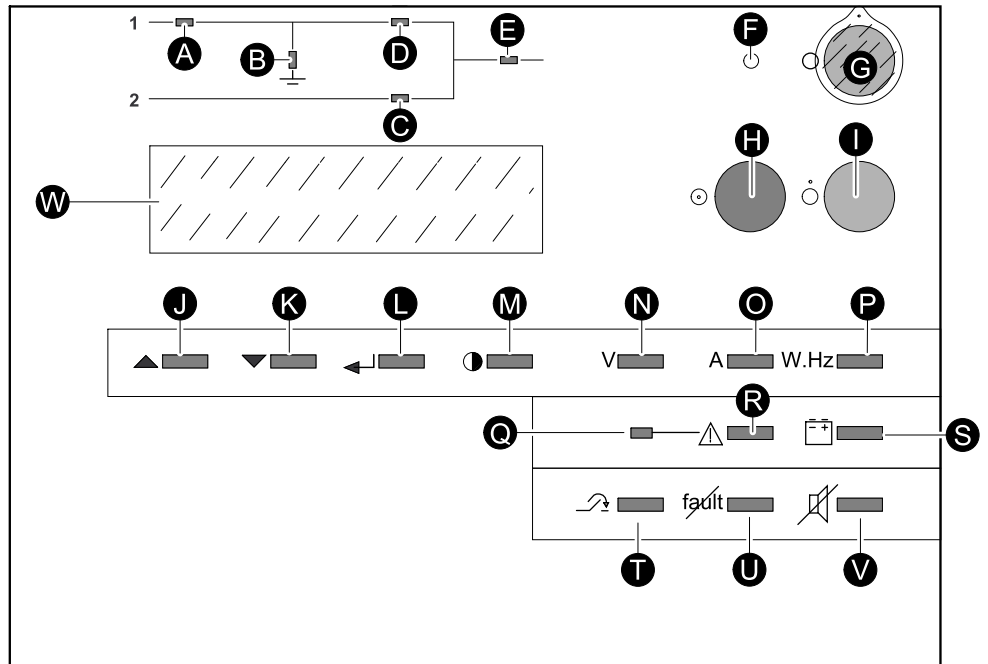
1. Press the **Main Menu** key (M) to open the Main Menu screen.
2. On the Main Menu screen, select **CONTRAST SETUP** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.
3. Select the preferred contrast level using the **Up** (J) and **Down** (K) keys and confirm your selection using the **Confirm** (L) key.

Set Buzzer Volume



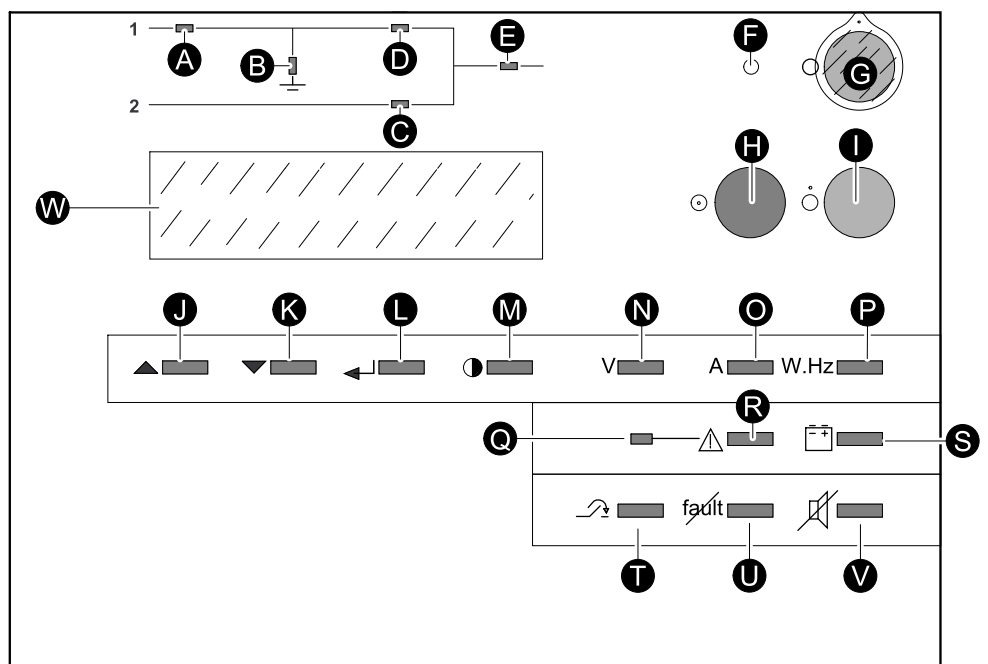
1. Press the **Main Menu** key (M) to open the Main Menu screen.
2. On the Main Menu screen, select **BUZZER SETUP** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.
3. Select the preferred volume level using the **Up** (J) and **Down** (K) keys and confirm your selection using the **Confirm** (L) key.

Set Date and Time



1. Press the **Main Menu** key (M) to open the Main Menu screen.
2. On the Main Menu screen, select **DATE AND TIME** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.
3. Set the date and time using the **Up** (J) and **Down** (K) keys and confirm your selection using the **Confirm** (L) key.

Inverse Display Color



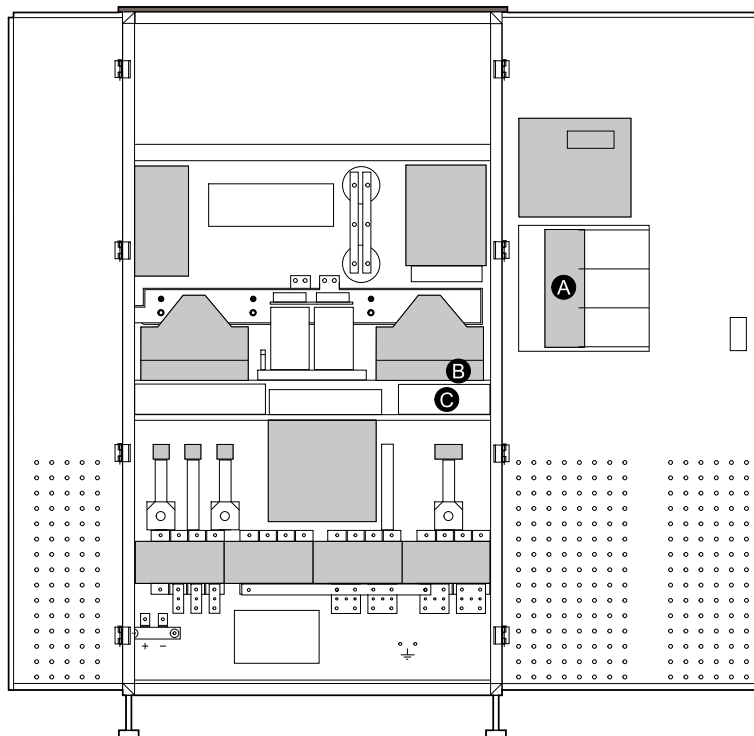
1. Press the **Main Menu** key (M) to open the Main Menu screen.

2. On the Main Menu screen, select **INVERSE VIDEO** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.
When this feature is selected, the text and background colors are inverted (white text on black background or black text on white background).

Communication and Management

Media Contacts 11 Board

Terminals XR2, XR3, XR4 and XR5 on the Media Contacts 11 board of each type of unit can be used to receive signals from the operating environment and to transmit signals concerning the operating status of the UPS.



Signal Reception

The signals must be provided by voltage-free contacts.

- **Emergency shutdown:** A Normally Closed (NC) contact causes shutdown of the inverter and the rectifier/charger, opening of the battery circuit breaker and activation of a relay contact on the Media Contacts 11 board.
- **Battery room ventilation fault:** A Normally Open (NO) contact causes shutdown of the rectifier/charger.
- **Battery circuit breaker QF1 closed:** A NO contact prevents inverter startup if the circuit breaker is open.
- **Battery temperature:** A printed circuit board, placed near the battery, supplies information on the battery temperature, thus enabling the rectifier/charger to regulate the battery voltage.
- **Auxiliary signals:** Depending on the settings, these signals can be used to indicate:
 - Forced shutdown of the inverter (regardless of the status of the bypass source).
 - Protected shutdown of the inverter (load transfer to the bypass source).
 - A change in the inverter output frequency (50 Hz or 60 Hz).
 - Limiting of the current drawn by the rectifier/charger (programmable value) when supplied by an engine generator set with an insufficient power rating. The additional power required by the inverter is supplied by the battery which starts to discharge.

- Limiting of the battery charge current (programmable value) if the input source is replaced by an engine generator set with an insufficient power rating.

Signal Transmission

- **An auxiliary 24 V power supply**, isolated and backed up, is used to supply:
 - The under-voltage release of the battery circuit breaker(s) QF1.
 - The board that measures the temperature in the battery room.
- **Low-battery shutdown warning signal:** A voltage-free changeover contact indicating that battery time is about to run out. The warning threshold may be personalized.
- **Load on inverter signal:** A voltage-free changeover contact indicating that the load is supplied by the inverter. For a single UPS unit, one voltage-free changeover contact may be used to indicate that the load is supplied by the bypass source.
- **Load on battery signal:** A voltage-free changeover contact indicating that the inverter is supplied by the battery under the following conditions:
 - A input outage or voltage drop.
 - A rectifier/charger shutdown.
 - A rectifier/charger current limiting.

This signal, which may be used to initiate process saving and shutdown procedures, is time-delayed for 30 seconds to avoid unnecessary operations following micro-breaks.

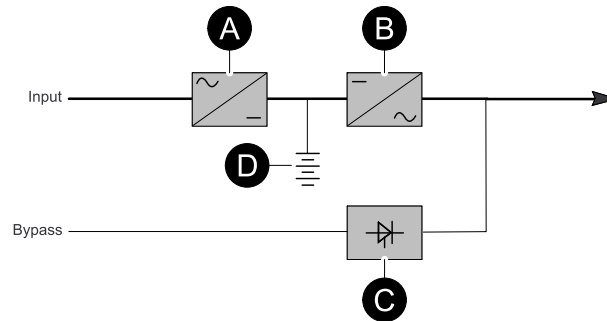
- **Maintenance position signal:** A voltage-free changeover contact indicating that:
 - The maintenance bypass switch Q3BP is closed.
 - The bypass switch Q4S is open.
 - The inverter output switch Q5N is open.
 - The battery circuit breaker QF1 is open.
- **Signal to open battery circuit breaker(s) QF1:** In the event where the emergency shutdown button is pressed or to avoid an excessive battery discharge (lasting more than three times the rated backup time).
- **Full shutdown contact:** A voltage-free changeover contact used to trip switching devices in the event of an emergency shutdown or a full shutdown.
- **General alarm information:** A voltage-free changeover contact which includes:
 - Internal faults.
 - Information on temperatures outside tolerances in the battery room (optional).
 - Overload information ($> I_n$).
 - Static-switch ventilation and power supply faults.

NOTE: The maximum breaking capacity of the changeover contacts is 5 A at 250 V. Information on the battery is not supplied for frequency converters without a battery.

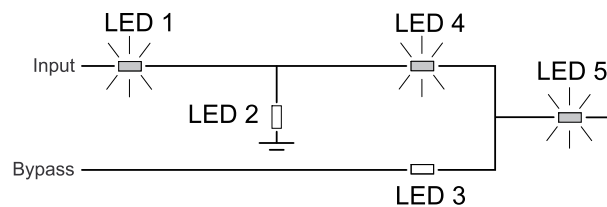
Operation Modes

On-Line Operation

Input Source Available

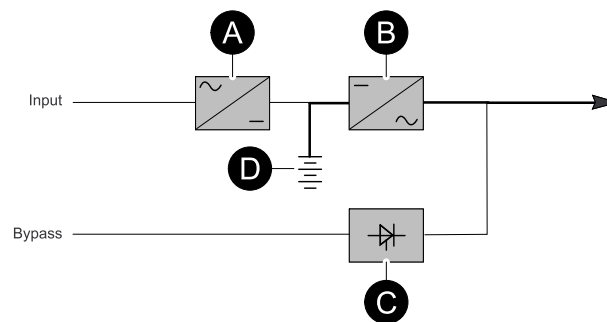


- The power necessary for the load is provided by input through the rectifier/charger (A) and the inverter (B).
- The rectifier/charger (A) also supplies the power to float charge and recharge the battery if any.

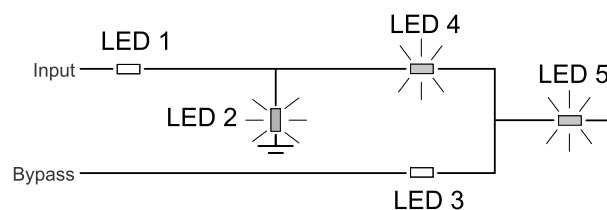


- LEDs 1, 4 and 5 are green on the control panel.

Input Source Unavailable



In the event of a input outage or input voltage outside specified tolerances of $\pm 10\%$ in amplitude ($\pm 15\%$ optionally), the rectifier/charger (A) stops and the battery (D) supplies the necessary backup power to the load via the inverter (B). The battery, float-connected between the rectifier/charger and the inverter, discharges during this operating mode.



LEDs 2, 4 and 5 are green. The user is warned of battery operation by the slow beeping of the buzzer and the message LOAD PROTECTED, BATTERY DISCHARGING, followed by the remaining backup time and the load percentage.

This information is also available via voltage-free changeover contacts for remote control devices.

NOTE: In the event of a input outage, frequency converters without a battery shut down and the load is no longer supplied.

The available battery time during a input outage depends on the:

- Rated capacity of the battery.
- Power consumed by the load.
- Temperature of the battery.
- Age of the battery.

The specified battery time corresponds to a minimum duration at full rated load. The actual backup time can therefore be greater if the system operates below its full rated load during the input outage. Operation on battery power can be extended beyond the specified time by reducing the load power consumption (by disconnecting noncritical loads).

A LOW-BATTERY SHUTDOWN WARNING signal is sent via voltage-free changeover contacts for remote control devices when the battery voltage reaches a level slightly above the minimum level. This signal warns the user of the imminent end of battery power. On the UPS, the buzzer beeps rapidly.

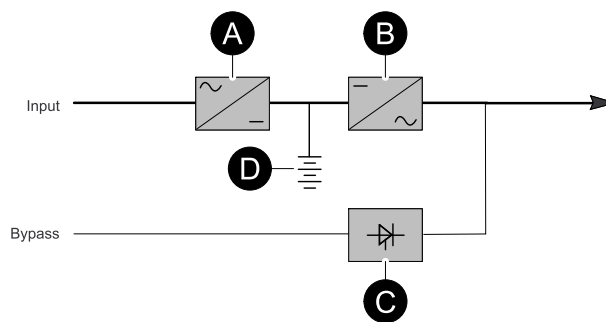
The message LOAD PROTECTED, LOW-BATTERY SHUTDOWN WARNING is displayed, followed by the remaining backup time and the load percentage. LED 2 turns red and flashes.

Battery power stops when the voltage supplied by the battery reaches the minimum threshold (335 V). This results in an inverter shutdown and transfer of the load without interruption to bypass. LED 2 is red (not flashing). The message LOAD NOT PROTECTED, ON-LINE MODE is displayed and the buzzer sounds continuously.

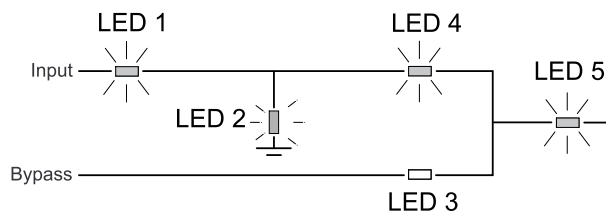
If bypass is unavailable, the load is no longer supplied. The inverter automatically shuts down when the time on battery power exceeds three times the specified backup time.

NOTE: The LOW BATTERY SHUTDOWN warning signal can be sent with an adjustable time delay prior to the effective end of battery power.

Input Source Restored



When input power is restored or its voltage returns to within specified tolerances, the system automatically returns to its normal operation mode (if the system did not reach the end of battery power). If the end of battery power was reached causing an inverter shutdown, the rectifier/charger (A) restarts automatically, but the inverter (B) must be restarted manually.



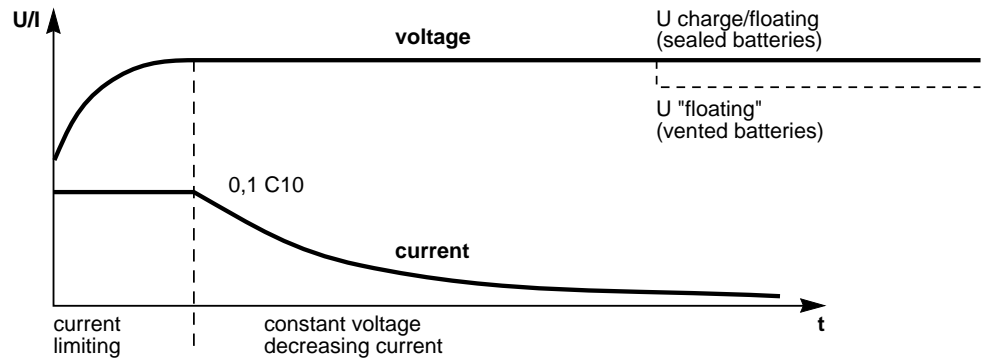
The rectifier/charger recharges the battery (D) which was discharged during the input outage. During battery charging, LED 2 flashes green. The message BATTERY CHARGING is displayed, together with the value of the recharging current and battery voltage.

The rectifier/charger output voltage (DC) is regulated to supply:

- The float-charging or the recharging voltage for vented lead-acid or Ni/Cd batteries.
- A single charge voltage for sealed lead-acid batteries.

The voltages depend on the number of battery cells and the battery manufacturer. Factory set, they may also be adjusted by a Schneider Electric service engineer. An electronic board continuously measures the battery temperature and automatically adjusts the voltages.

The battery charge cycle takes place in two steps :



- **Step 1:** the battery is recharged at a constant current limited to 0.1C10 (i.e. 1/10th of the battery capacity specified for a 10 hour discharge). The DC voltage increases with the battery charge until the charge level is reached.
- **Step 2:** the battery is recharged at a constant voltage equal to the charge level (maximum value 463 V). The charging current gradually decreases until reaching a specified low value (floating current).

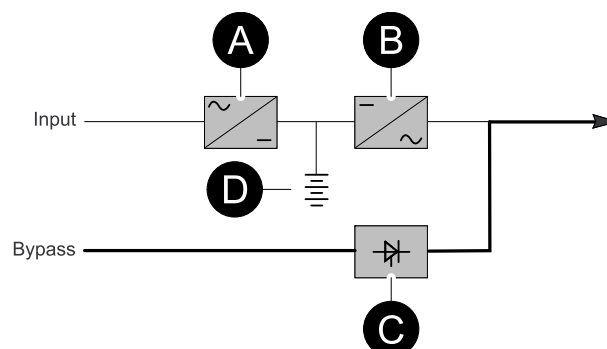
For vented lead-acid batteries, the rectifier/charger supplies the charging voltage for 0 to 255 hours (parameter defined by the after-sales support department) and then the floating voltage. For sealed lead-acid batteries, the charging and floating voltages are the same.

NOTE:

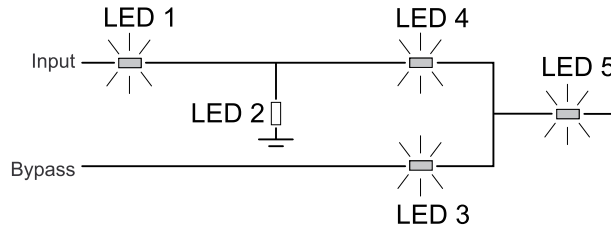
- If the input failure is shorter than 0 to 255 seconds (parameter defined by a Schneider Electric service engineer, the charger automatically supplies the floating voltage given the low battery discharge.
- In frequency converters without battery power, the return of input power results in the automatic restart of the rectifier/charger and the inverter.

ECO Mode

Bypass Source Available



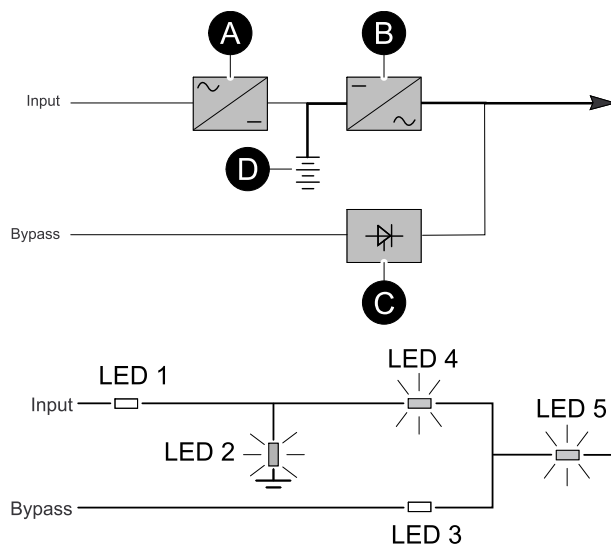
The power required by the load is supplied by bypass, via the static bypass (C). The rectifier/charger (A) supplies the power required to float charge and recharge the battery (D).



LEDs 1, 3 and 5 are green and LED 4 flashes green. The message LOAD PROTECTED, ECO MODE is displayed.

Operation with Bypass Source Outside Tolerances

Input Source Unavailable



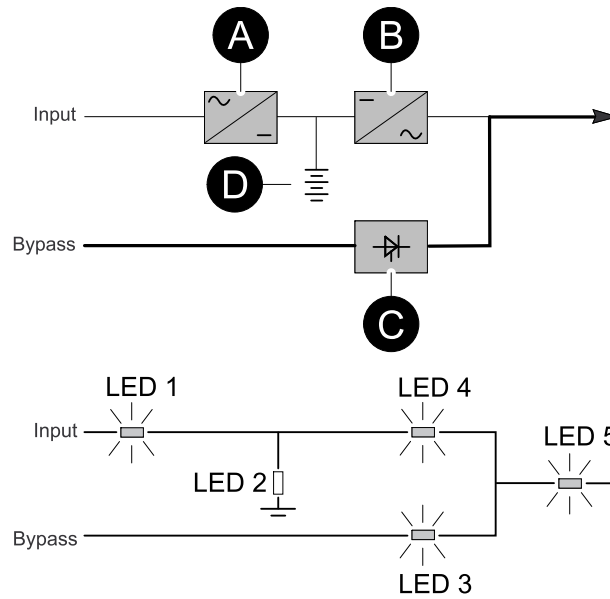
Whatever the status of input source, operation of the rectifier/charger (A) with the battery (D) is identical.

When bypass characteristics are outside tolerances (voltage: $\pm 10\%$; frequency as per personalization; phase sync with inverter $\pm 3^\circ$), the load is supplied via the inverter (B).

From then on, the minimum operating time on the inverter (B) is 2 minutes even if bypass returns to within specified tolerances. Refer to one of the two figures on the right. After this 2 minute period, the load is immediately transferred to bypass when the latter returns to within specified tolerances.

NOTE: The maximum transfer time of the load from the static bypass (C) to the inverter (B) is 15 ms.

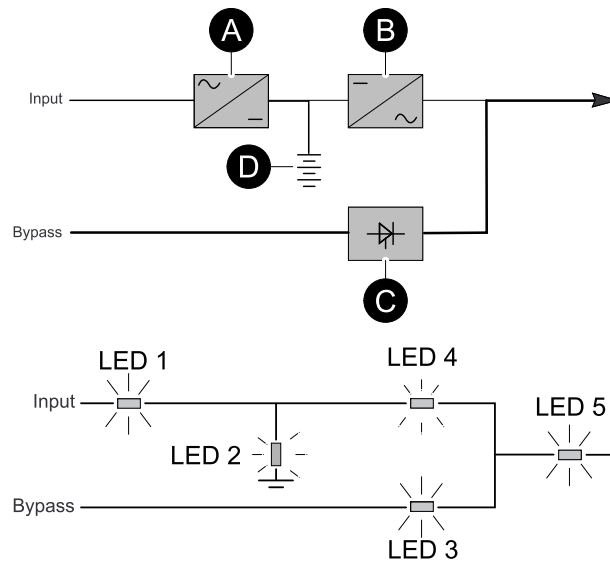
Bypass Source Restored



No battery discharge:

When the bypass power supply is restored or returns to within specified tolerances, the load is transferred back to the static bypass (C), without an interruption in the supply of power.

NOTE: This operating mode does not depend on the status of input Source, which may be within or outside the specified tolerances.



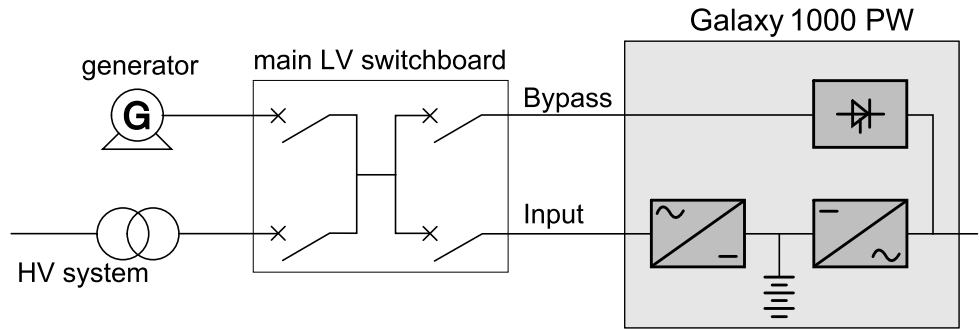
After battery discharge:

Operation of the rectifier/charger (A) with the battery (D) is identical to that presented in the section on on-line mode operation above.

Maintenance Bypass

Maintenance bypass is only available if the system includes a bypass supply. In maintenance bypass the load is being supplied directly by the bypass supply via the maintenance bypass switch Q3BP.

Operation with an Engine Generator Set



If a stand-by generator is included in the installation, it is generally started automatically in the event of a input source failure and connected to the main low voltage switchboard. It is disconnected when input source is restored.

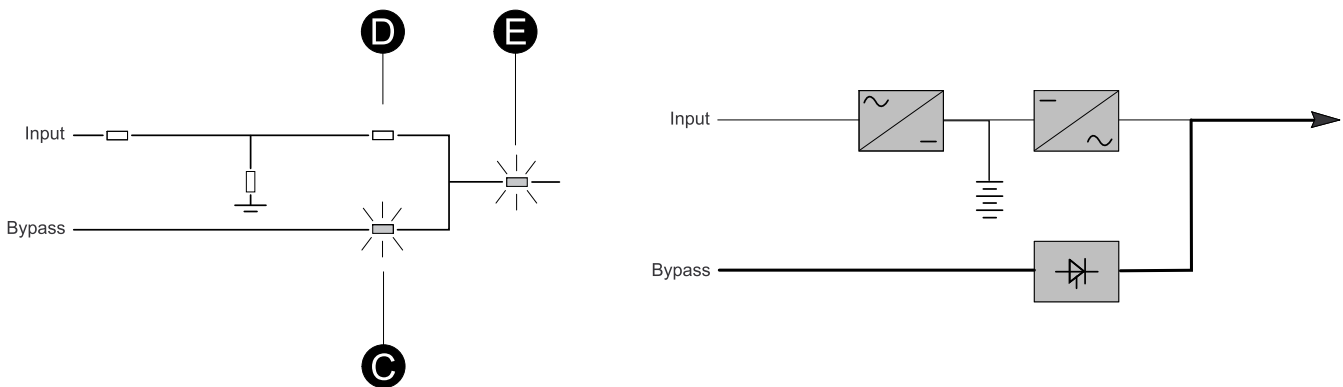
With such a system, the required battery time may be reduced to the time necessary for starting and bringing the stand-by generator on line. The battery (D) supplies power to the inverter (B) during the transfers of:

- Input source to the generator.
- Generator to the input source.

The transfer sequences described above (input ► battery, battery ► generator, generator ► battery, and battery ► input) are fully automatic. They in no way affect the load and require no manual operation by the user.

NOTE: To avoid load surges on the generator, the rectifier/charger is started with a 3–10 seconds current consumption walk-in (lasting 3 to 10 seconds, depending on the percent load). To avoid overloading an undersized engine generator set, it is possible to set a maximum power level drawn by the input. Any additional power required is supplied by the battery. This modification can be made on site by a Schneider Electric service engineer.

Inverter Shutdown or Overload



Systems operating in on-line mode with a bypass source.

Single UPS Unit

In the event of a UPS shutdown (initiated by the user or by an internal protective device), the load is automatically transferred to the bypass source. If transfer conditions are met, the transfer takes place instantly without interruption to the load.

NOTE: Transfer conditions are not met when bypass source characteristics are outside tolerances (voltage: $\pm 10\%$; frequency as per personalization; phase sync with inverter $\pm 3^\circ$).

In the event of a major transient overload (greater than $1.65 I_n$), immediate transfer takes place as above, without interruption to the load.

The return to the inverter happens automatically when the overload ends if the number of possible returns has not been reached (0 to 255, programmable). If this number has been reached, the load continues to be supplied by the bypass source. This operation mode allows start-up of load devices causing high inrush currents.

If the transfer conditions are not met, the inverter will current-limit to 165% of its rated current for one second before stopping.

In the event of a small but extended overload (i.e. a continuous level of power exceeding the full rated load), the inverter will continue to supply power for a period depending on the magnitude of the overload (10 minutes for a 125% overload, 1 minute for a 150% overload).

In all the above cases, inverter shutdown and supply of the load via the bypass source results in the following on the control panel:

- LED 4 goes off.
- Activation of the buzzer (continuous beep).
- LED 3 turns green.
- The message LOAD NOT PROTECTED, ON-LINE MODE is displayed.

Parallel UPS for Increased Capacity

NOTE: During maintenance when CB1 (MBP) is closed and CB2 (UPS isolation) is open, each UPS control panel display will show the message “LOAD PROTECTED” when the UPS is placed in ON-LINE MODE. However, in this mode the critical load is not protected because it is supplied by the maintenance bypass power.

The shutdown of one inverter results in an overload on the other inverters in operation.

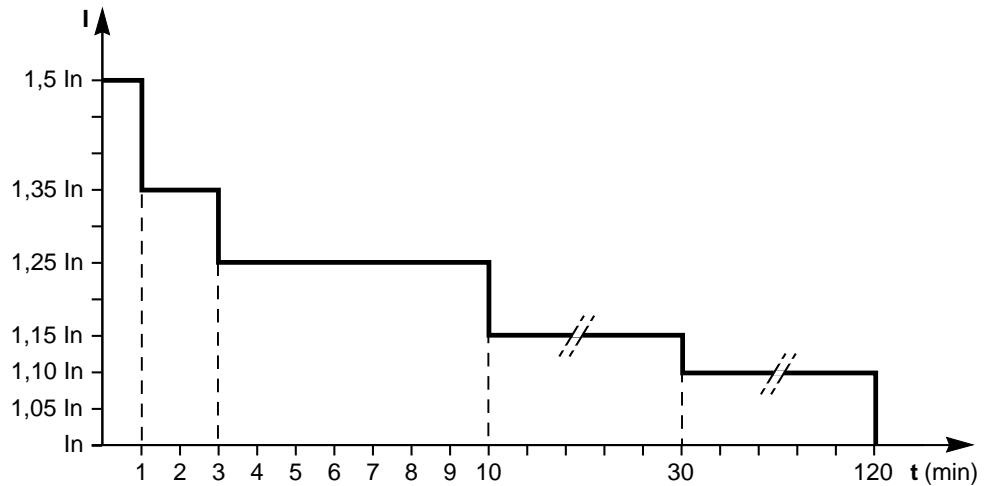
Two cases may then arise:

- If the overload on each remaining inverter is more than $1.65 I_n$, the load is immediately transferred to the bypass source.
- If the overload is less than $1.65 I_n$, the remaining inverters support the overload, and the load is transferred to the bypass source.

After this transfer:

- LED 4 goes off.
- The buzzer is activated and sounds continuously.
- LED 3 turns green.
- The message LOAD NOT PROTECTED, PARALLEL ON-LINE MODE is displayed.

Overload current diagram



Parallel Redundant UPS

The shutdown of one UPS is of no consequence to the load. The other UPS units will each supply an equal share of the load, and the load continues to be supplied.

A UPS shutdown results in the following on the control panel:

- LEDs 4 and 5 go off.
- Activation of the buzzer (continuous beep).
- The message LOAD NOT PROTECTED, PARALLEL ON-LINE MODE is displayed.

In case of an overload, the system will lose its redundancy if the overload is less than the total rated power of the functioning units. If the overload is greater, the operation mode is that previously described for parallel systems without redundancy.

Frequency Converter

- In the event of a shutdown, the load is no longer supplied with power.
- In the event of a major transient overload (greater than $1.65 I_n$), the inverter will current-limit to 165% of the rated current for one second before stopping.
- In the event of a smaller but prolonged overload, the inverter applies the same overload gauge as the single inverter and shuts down.

In all three of the above situations, an inverter shutdown results in the following:

- LEDs 4 and 5 go off.
- Activation of the buzzer (continuous beep).
- The message LOAD NOT PROTECTED, ON-LINE MODE is displayed.

Output Voltage Quality and Continuity

The output voltage is stable in amplitude and frequency and is free of interruptions or transients outside specified tolerances, irrespective of input source or load disturbances (outages, load step changes, etc.).

Steady State Voltage Regulation

For stable or slowly varying load conditions, the inverter output voltage is regulated to within $\pm 0.5\%$ in amplitude.

The frequency of the output voltage can theoretically be regulated to within 0.1% of the rated value. However, the output frequency range may be intentionally extended to a maximum of ± 2 Hz so that the inverter can remain synchronized with the bypass source and its inherent frequency fluctuations, thus enabling transfer of the load to the bypass line at any time.

NOTE: The output frequency range can be personalized and if necessary modified on the customer site from ± 0.25 Hz to ± 2 Hz in 0.25 Hz steps by a qualified Schneider Electric service engineer. When the bypass voltage moves outside this frequency range, the inverter is de-synchronized and operates in free-running mode, with the output frequency regulated to a high level of accuracy by a quartz oscillator. When the bypass frequency returns to within the specified tolerances, the inverter is gradually re-synchronized to the bypass line at a rate of 0.5 Hz to 2 Hz/s (as per the value personalized), thus avoiding exposing the load to sudden frequency variations.

Transient Voltage Regulation

The inverter output voltage is not notably affected by instantaneous major variations in load characteristics.

This is made possible by the PWM (Pulse Width Modulation) chopping technique and the microprocessor-based regulation system that instantly compensates for any variation. In particular, the inverter output voltage remains within $\pm 2\%$ of the rated voltage for load step changes of 0 to 100% or of 100 to 0%.

The battery charge cycle takes place in two steps:

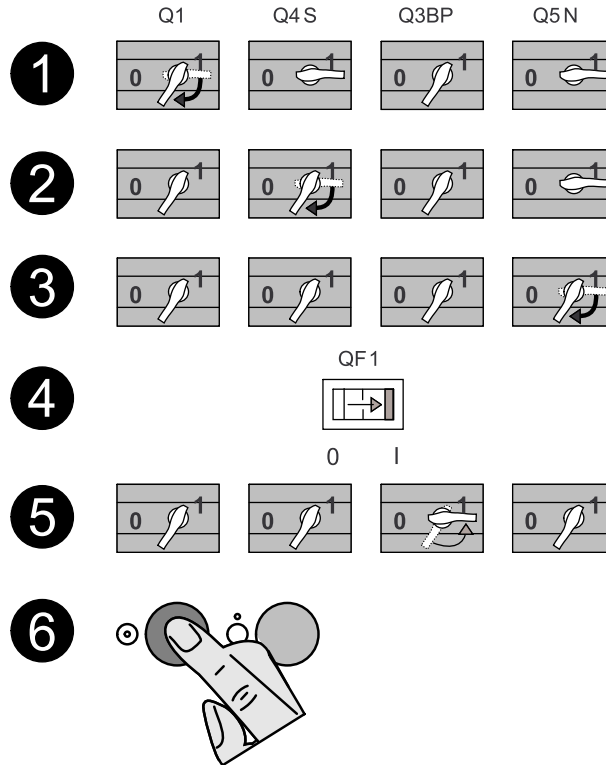
- Step 1: The battery is recharged at a constant current limited to $0.1C_{10}$ (i.e. 1/10th of the battery capacity specified for a 10 hour discharge). The DC voltage increases with the battery charge until the charge level is reached.
- Step 2: The battery is recharged at a constant voltage equal to the charge level. The charging current gradually decreases until reaching a specified low value (floating current).

For vented lead-acid batteries, the rectifier/charger supplies the charging voltage for 0 to 255 hours (parameter defined by a Schneider Electric service engineer) and then the floating voltage. For sealed lead-acid batteries, the charging and floating voltages are the same.

Operation Procedures

Single UPS

Start Up Single UPS or Redundant Parallel UPS System



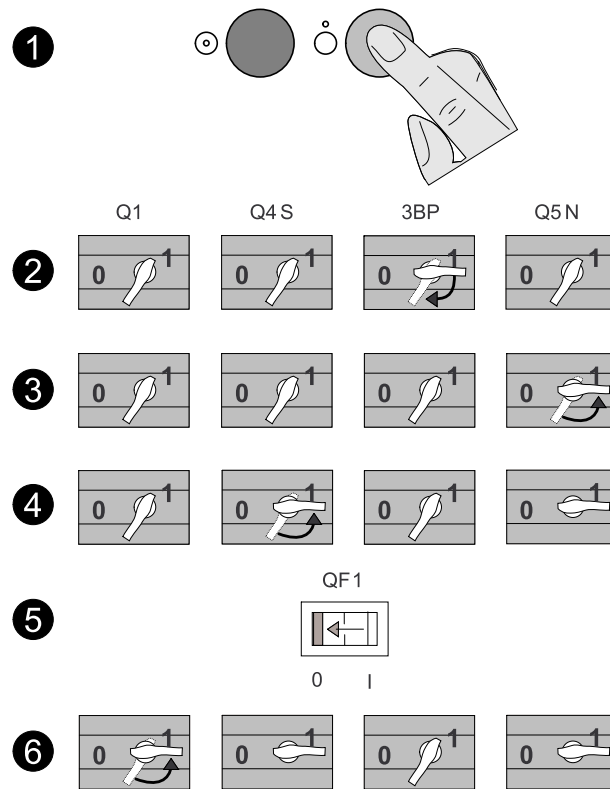
1. Close the input switch Q1. The system powers up:
 - a. The rectifier/charger automatically starts.
 - b. LED 1 on the control panel turns green.
 - c. LED 2 turns red.
2. Close the bypass switch Q4S.

The LEDs 3 and 5 on the control panel turn green.
3. Close the output switch Q5N.
4. Close the battery circuit breaker QF1.

LED 2 turns off.
5. Open the maintenance bypass switch Q3BP.
6. Press the **inverter ON** button on the control panel.
 - a. The inverter LED 4 flashes green.
 - b. The inverter starts, then, if the bypass source transfer conditions are met, the load is transferred to the inverter if the on-line mode is selected, or the load remains on the static bypass of ECO Mode is selected.
 - c. The green static bypass LED 3 turns off.
 - d. The green inverter LED 4 is on for on-line mode or flashes for ECO Mode.

Isolate Single UPS or UPS in ECO Mode for Maintenance

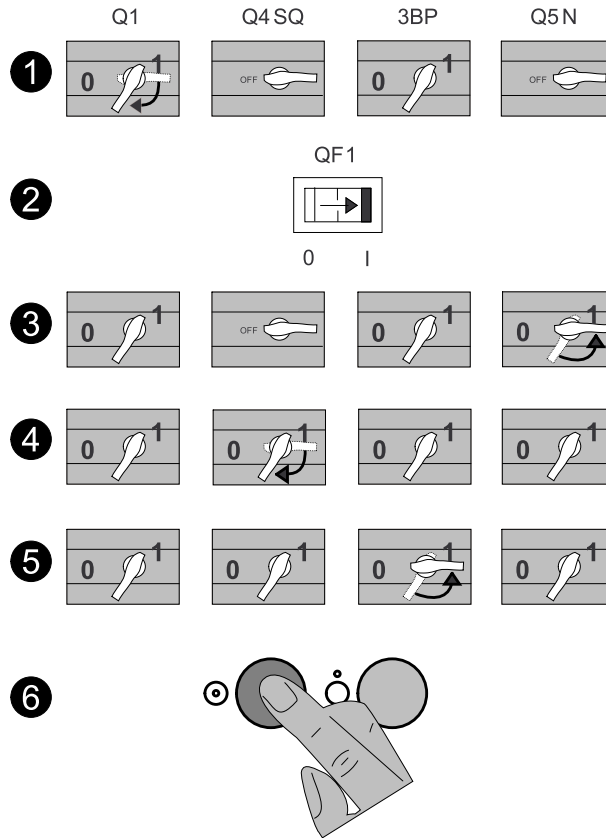
NOTE: During maintenance the UPS must be isolated from input and bypass sources, and from the battery and the load.



1. Shut down the inverter by pressing the **inverter OFF** button for three seconds.
2. Close the maintenance bypass switch Q3BP.
3. Open the output switch Q5N.
4. Open the bypass switch Q4S.
5. Open the battery circuit breaker QF1.
6. Open the input switch Q1.

The UPS is powered down once the capacitors have discharged (after a few minutes). Then maintenance can be carried out.

Restart Single UPS or UPS in ECO Mode after Maintenance



1. Close input switch Q1.
2. Wait approximately ten seconds and then close the battery circuit breaker QF1.
3. Close the output switch Q5N.
4. Close the bypass switch Q4S.
5. Open the maintenance bypass switch Q3BP.
6. Start the inverter by pressing the **inverter ON** button.

Start Up Inverter of a Single UPS

1. When the inverter is on, press the **inverter ON** button on the control panel. The green inverter LED flashes. The inverter starts, then, if the bypass transfer conditions are met, the load is transferred to the inverter if the on-line mode is selected, or the load remains on the static bypass if the ECO mode is selected.
 - For on-line mode: The green inverter LED 4 remains on and the static bypass LED 3 turns off.
 - For ECO mode: The green inverter LED 4 flashes and the static bypass LED remains on.

Shut Down Inverter of a Single UPS

1. Press the **inverter OFF** button on the control panel for three seconds.
 - a. The green inverter LED 4 on the control panel turns off.
 - b. The green static bypass LED 3 turns on.
 - c. The inverter stops.

If transfer to bypass conditions are met, the inverter shuts down and the load is transferred to bypass. If transfer to bypass conditions are not met, the inverter does not shut down. The message MAINS 2 OUTSIDE TOLERANCES, TRANSFER DISABLED is displayed.

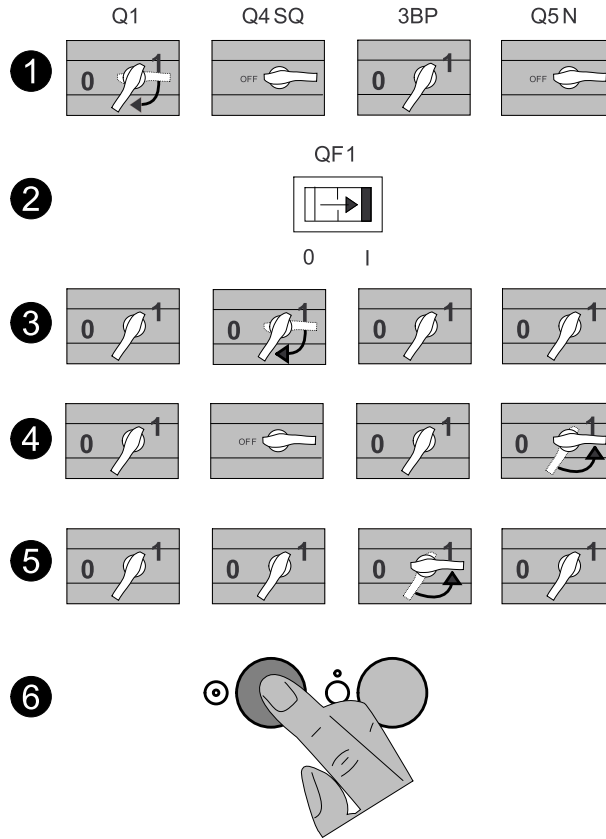
Shut Down Inverter of UPS in ECO Mode

1. Press the **inverter OFF** button on the control panel for three seconds.
 1. The green inverter LED 4 on the control panel turns off
 2. If the load was in static bypass, nothing is changed
 3. If the load was on the inverter:
 - The static bypass LED 3 turns green.
 - If transfer to bypass conditions are met, the inverter shuts down and the load is transferred to bypass.
 - If transfer to bypass conditions are not met, the inverter does not shut down. The message MAINS 2 OUTSIDE TOLERANCES, TRANSFER DISABLED is displayed.

Parallel UPS

Start Up Parallel UPS for Increased Output

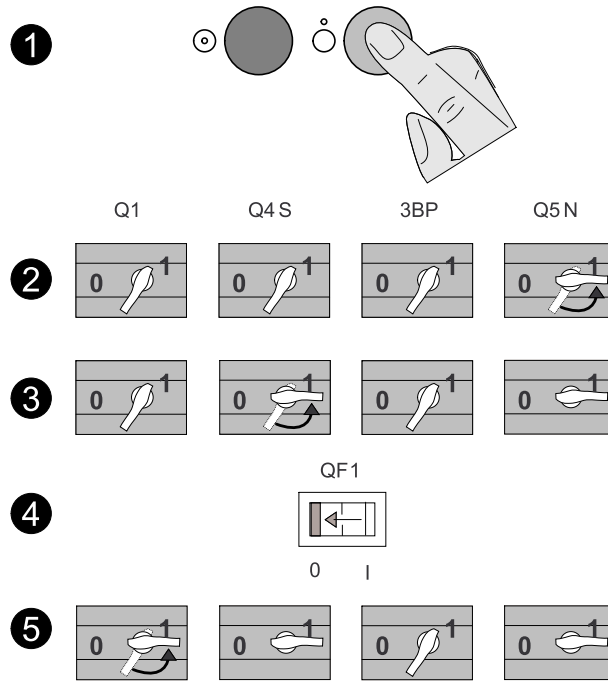
Check that all load devices are off or that the load is disconnected. Close the upstream switch supplying input source power (on the LV switchboard).



1. Close the input switches Q1 on the UPS units. The system powers up:
 - a. The rectifiers/chargers start automatically.
 - b. LEDs 1 on the control panel turn green.
 - c. LEDs 2 turn red.
2. Close the battery circuit breakers QF1.
LED 2 turns off.
3. Close the bypass switches Q4S on the UPS units.
LEDs 3 and 5 on the control panel turn green.
4. Close the output switches Q5N for the inverters in the external bypass unit.
5. Open the maintenance bypass switch Q3BP in the external bypass unit.
6. Press the **inverter ON** button on each control panel.
The inverter LEDs 4 flash green.
7. When a sufficient number of inverters are ready, the inverter output contacts close.
 - a. The inverter LEDs 4 turn green for on-line mode.
 - b. The static bypass LEDs 3 turn off.

Isolate One UPS of a Redundant Parallel UPS System for Maintenance

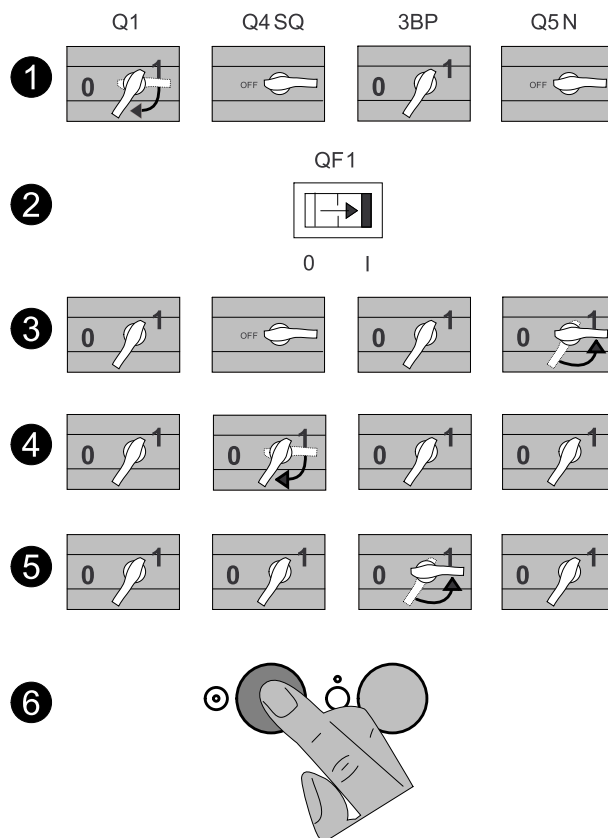
During maintenance a UPS must be isolated from the input source, its batteries, and the output circuits of the other UPS units.



1. Shut down the inverter by pressing the **inverter OFF** button for three seconds.
2. Open the output switch Q5N.
3. Open the bypass switch Q4S.
4. Open the battery circuit breaker QF1.
5. Open the input switch Q1

This UPS is powered down once the capacitors have discharged (after a few minutes). Then maintenance can be carried out.

Restart One UPS of a Redundant Parallel UPS System after Maintenance

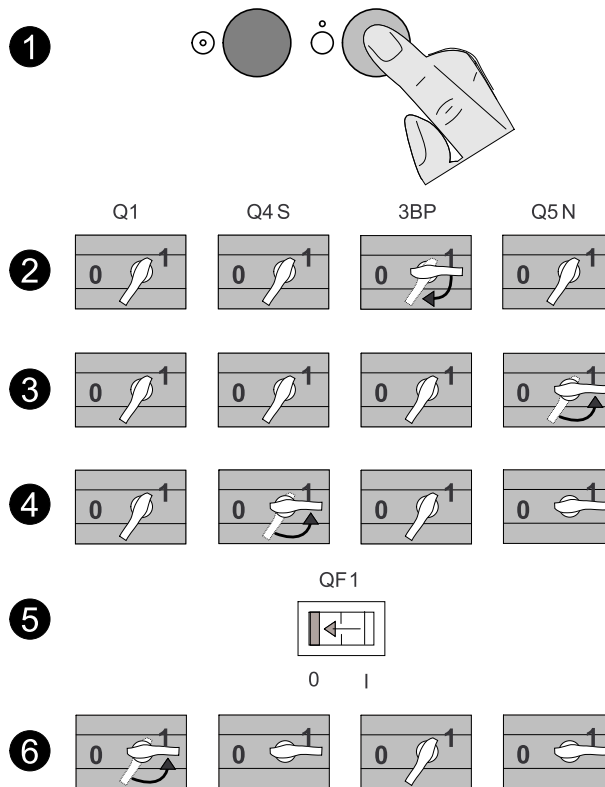


1. Close the input switch Q1.
2. Wait approximately ten seconds and then close the battery circuit breaker QF1.
3. Close the output switch Q5N.
4. Close the bypss switch Q4S.
5. Open the maintenance bypass switch Q3BP.
6. Start the inverter by pressing the **inverter ON** button.

Isolate Redundant Parallel UPS System for Maintenance

During maintenance all UPS units must be isolated from the input source, their batteries, and the output circuits of the other UPS units.

On all UPS units in the parallel system:

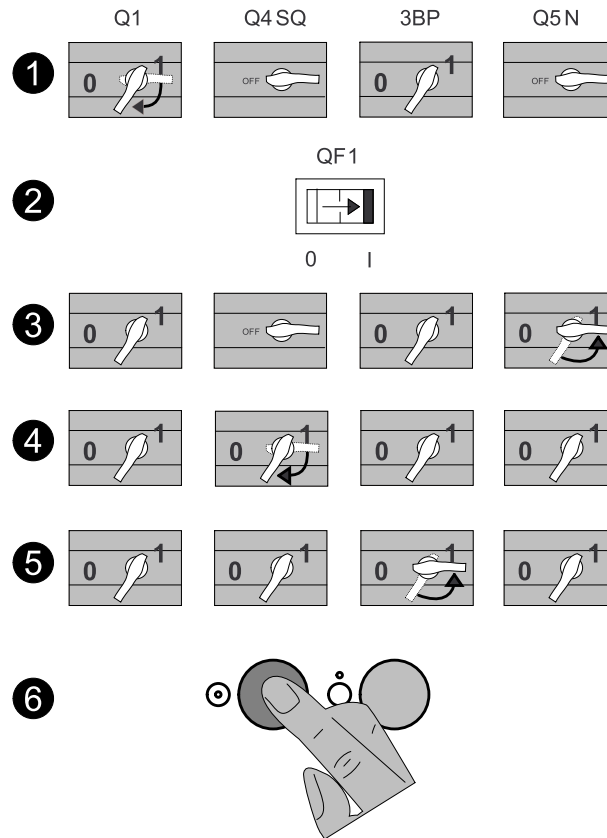


1. Shut down the inverters by pressing the **inverter OFF** button for three seconds.
2. Close the maintenance bypass switches Q3BP used to bypass the units (no units have priority).
3. Open the output switches Q5N.
4. Open the bypass switches Q4S.
5. Open the battery circuit breakers QF1.
6. Open the input switches Q1.

The UPS is powered down once the capacitors have discharged (after a few minutes). Then maintenance can be carried out.

Restart Redundant Parallel UPS System after Maintenance

On all UPS units in the parallel system:



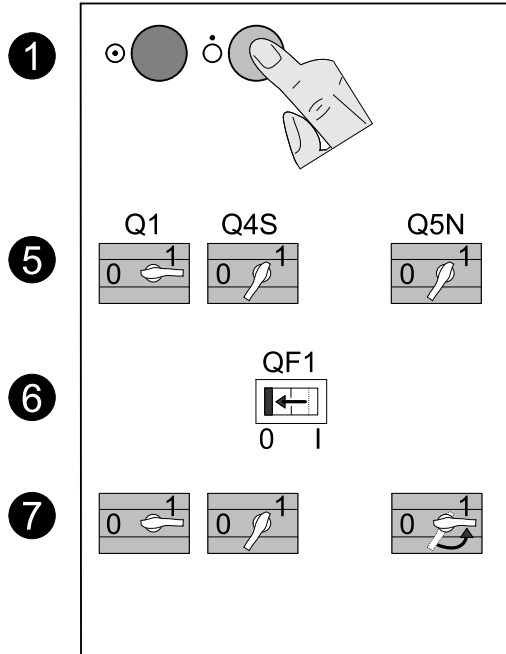
1. Close the input switches Q1.
2. Wait approximately ten seconds and then close the battery circuit breakers QF1.
3. Close the output switches Q5N.
4. Close the bypass switches Q4S.
5. Open the maintenance bypass switches Q3BP.
6. Start the inverters by pressing the **inverter ON** buttons.

Isolate Parallel UPS System for Increased Output for Maintenance

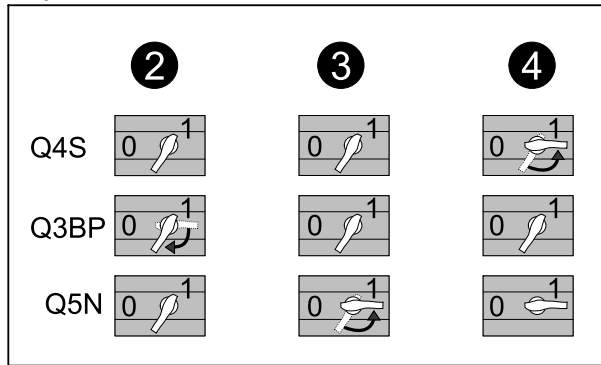
NOTE: It is not possible to isolate only one UPS, but this procedure must be performed with precautions to avoid load voltage interruption. We recommend that you call Schneider Electric to carry out this procedure.

On all UPS units in the parallel system:

Galaxy 1000 PW



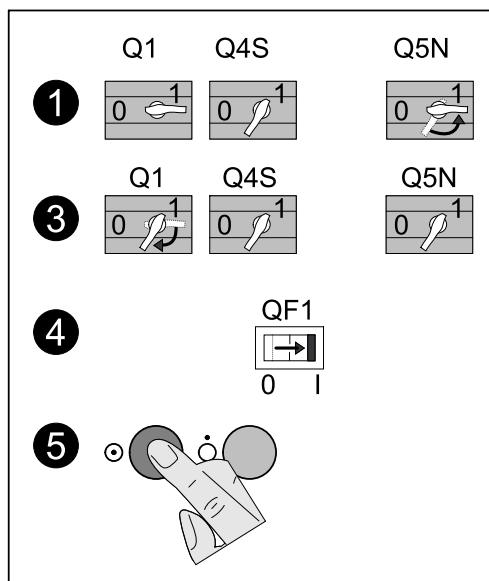
bypass



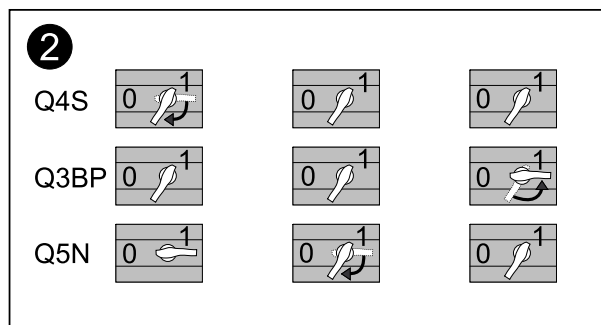
1. Shut down the inverters by pressing the **inverter OFF** buttons for three seconds.
2. Close the maintenance bypass switches Q3BP.
3. Open the output switches Q5N in the parallel connection module.
4. Open the bypass switch Q4S in the parallel connection module.
5. Open the input switches Q1 on the UPS units.
6. Open the battery circuit breakers QF1 on the battery units.
7. Open the output switches Q5N on the UPS units.

Restart Parallel UPS System for Increased Output after Maintenance

Galaxy 1000 PW



bypass



1. Close the output switches Q5N on the UPS units.
2. Close the bypass switch Q4S, the output switch Q5N, and open the maintenance bypass switch Q3BP in the parallel connection module.
3. Close the input switches Q1 on the UPS units.
4. Close battery circuit breakers QF1 on the battery units.
5. Start the inverters by pressing the **inverter ON** buttons.

Start Up Inverter of a Parallel UPS

1. When the inverter is on, press the **inverter ON** button on the control panel. The inverter LED flashes green. The inverter starts and awaits the start of the other inverters. When enough inverters to supply the rated load have been started, the output switch for each running inverter closes and the load is supplied with power:
 - a. The green static bypass LED 3 turns off.
 - b. The inverter LED 4 on the control panels of the running inverters turns green.

Shut Down Inverter of Parallel UPS Unit

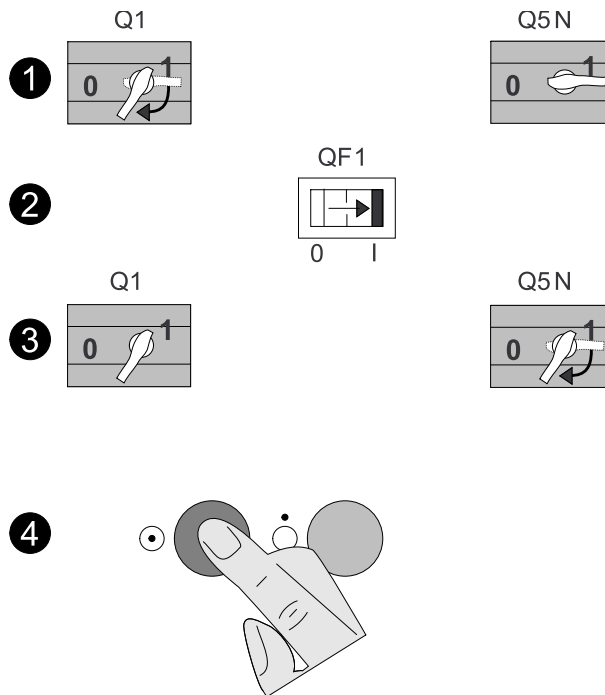
1. Press the **inverter OFF** button on the control panel for three seconds.
 - If the system is redundant, i.e. if the other parallel-connected inverters can supply the load on their own, the inverter shuts down and the green inverter LED 4 turns off. The load is not affected in that the other inverters continue to supply the load.
 - If the system is not redundant, the other inverters move to overload. After the overload gauges, the load is transferred to bypass:
 - The static bypass LED 3 turns green.
 - The green inverter LED turns off.

Single and Parallel Converter Units

[A60110] Error in document "x-wc://file=0000008120.xml" on reference (topicref) element at line 75: Unable to open document "x-wc://file=0000008226.xml". Scope="local" assumed. Should this be scope="external"?

Start Up Single Converter Unit or Redundant Parallel Converter Unit

Close the upstream switch supplying input power (on the LV switchboard).



1. Close the input switch Q1. The system powers up:
 - a. The rectifier/charger automatically starts.
 - b. LED 1 on the control panel turns green.
2. Close the battery circuit breaker QF1.
3. Close the output switch Q5N.
4. Press the **inverter ON** button on the control panel:
 - a. The inverter LED 4 flashes green. The inverter starts up, then connects. The load is then supplied by the inverter.
 - b. The LED 4 is green, and LED 5 turns green.

NOTE: Each time a device is switched on, a LED test is run: all the LEDs turn orange for about one second. The message AUTOTEST OK is displayed until the first primary message is sent.

Start Up Inverter of a Single Converter Unit

1. When the rectifier/charger is on, press the **inverter ON** button on the control panel. The inverter LED flashes green. The inverter starts up, then connects. The load is then supplied by the inverter.

The LEDs 4 and 5 turn green.

Shut Down Inverter in Single Converter Unit

1. Press the **inverter OFF** button on the control panel for three seconds.
 - a. The green inverter LED 4 and 5 on the control panel turn off.
 - b. The inverter stops.

Start Up Inverter of a Redundant Parallel Converter Unit

1. When the rectifier/charger is on, press the **inverter ON** button on the control panel. The inverter LED flashes green. The inverter starts and awaits the start of the other inverters. When they are all on or enough have been started to supply the rated load, the output switch for each running inverter closes and the load is supplied with power:

The LEDs 4 and 5 on the control panels of the running inverters turn green.

Shut Down Inverter of Redundant Parallel Converter Unit

1. Press the **inverter off** button on the control panel for three seconds.

The inverter shuts down and the green inverter LED 4 turns off. The load is not affected in that the other inverters continue to supply the load.

Rectifier/Charger

Start Up Rectifier/Charger

1. Close the input switch Q1.

The rectifier/charger LED 1 turns green on the control panel.

2. Close the battery circuit breaker QF1.

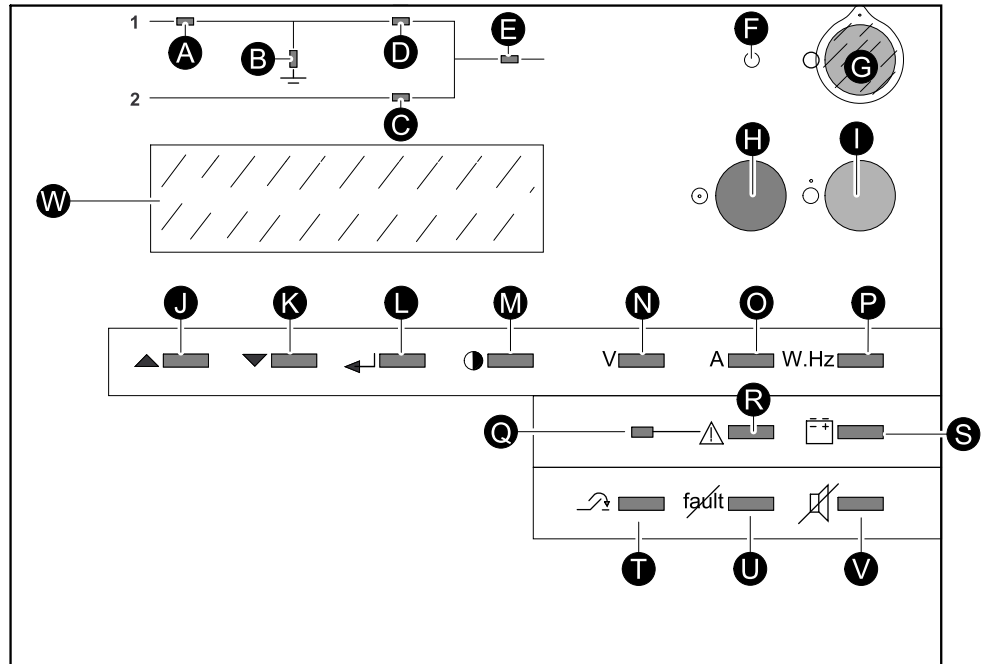
Shut Down Rectifier/Charger

Except in frequency converters without a battery, it is recommended not to stop the rectifier/charger because the battery will no longer be charged. Except in the case of a test of the inverter on battery power, the rectifier/charger should not be shut down after inverter shutdown to avoid unnecessary battery discharge.

1. Open the battery circuit breaker QF1.
2. Open the input switch Q1.
 - a. The rectifier/charger shuts down.
 - b. The green rectifier/charger LED 1 turns off.

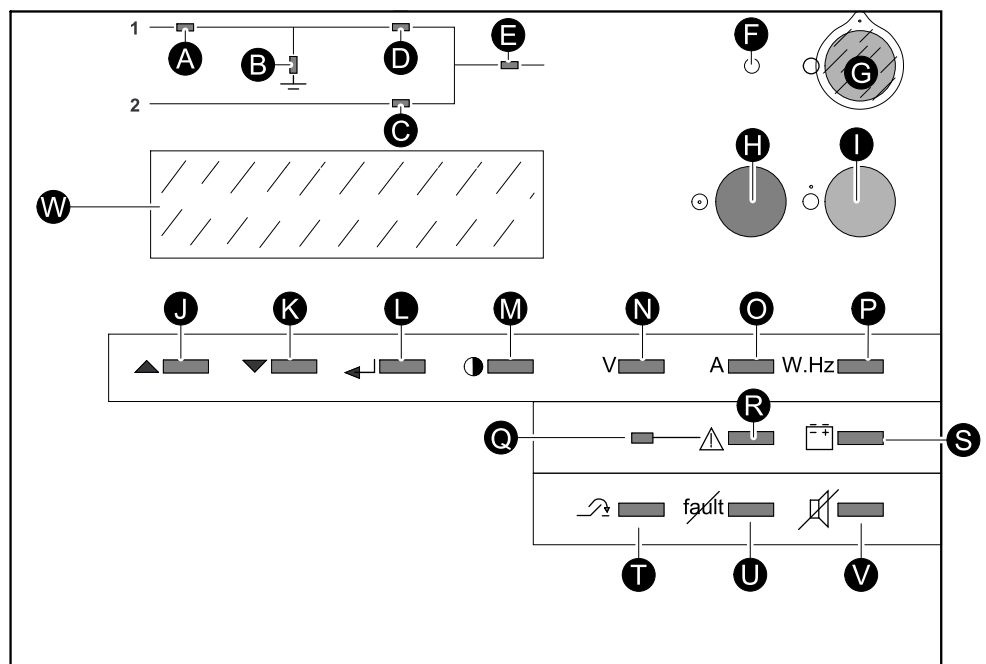
NOTE: In a frequency converter without a battery, rectifier/charger shutdown automatically results in an inverter shutdown.

Perform Lamp Test



1. Press the **Main Menu** key (M) to open the Main Menu screen.
2. On the Main Menu screen, select **LAMP TEST** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.
When this feature is selected, all the LEDs turn orange for three seconds.

Perform Battery Test

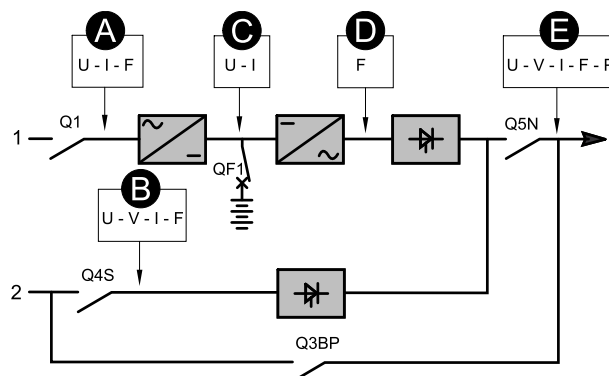


1. Press the **Main Menu** key (M) to open the Main Menu screen.

2. On the Main Menu screen, select **BATTERY TEST** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.
3. Use the **Up** (J) and **Down** (K) keys to select MANUAL TEST or AUTOMATIC TEST and confirm your selection using the **Confirm** (L) key.
When the battery test is complete, the display will show if the test was OK or NOT OK and the time since the latest battery test.

View System Measurements

The display may be used to read a number of input and output measurements made at different points in the system.



A. Input

- Phase-to-phase voltages
- Current of the three phases
- Frequency

B. Bypass

- Voltage
- Current
- Frequency

C. Battery

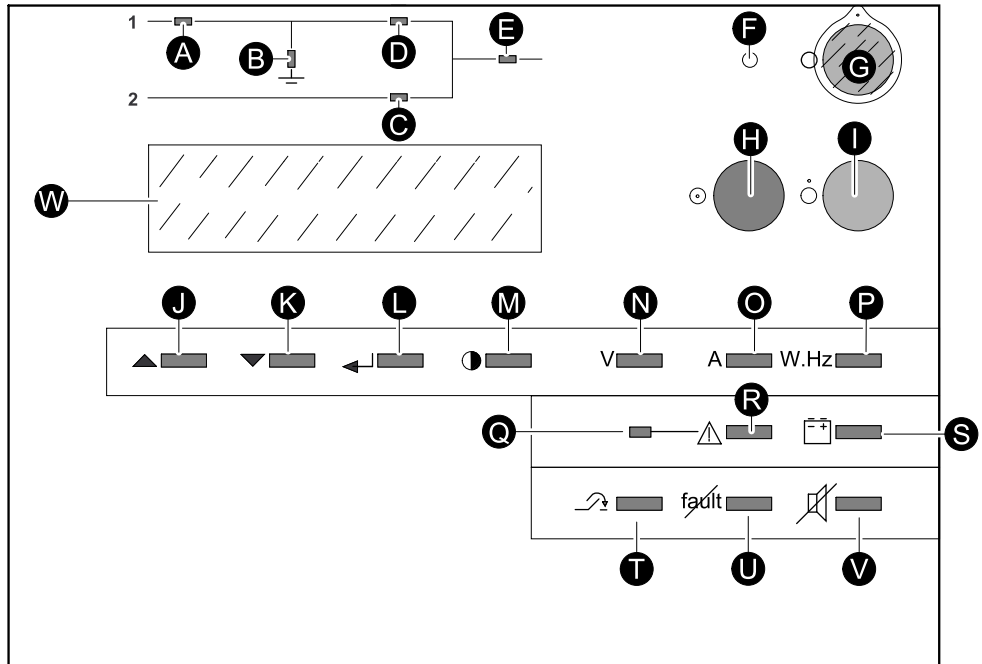
- Voltage
- Charge or discharge current
- Remaining battery time (for this UPS)
- Battery temperature

D. Inverter Output

- Frequency

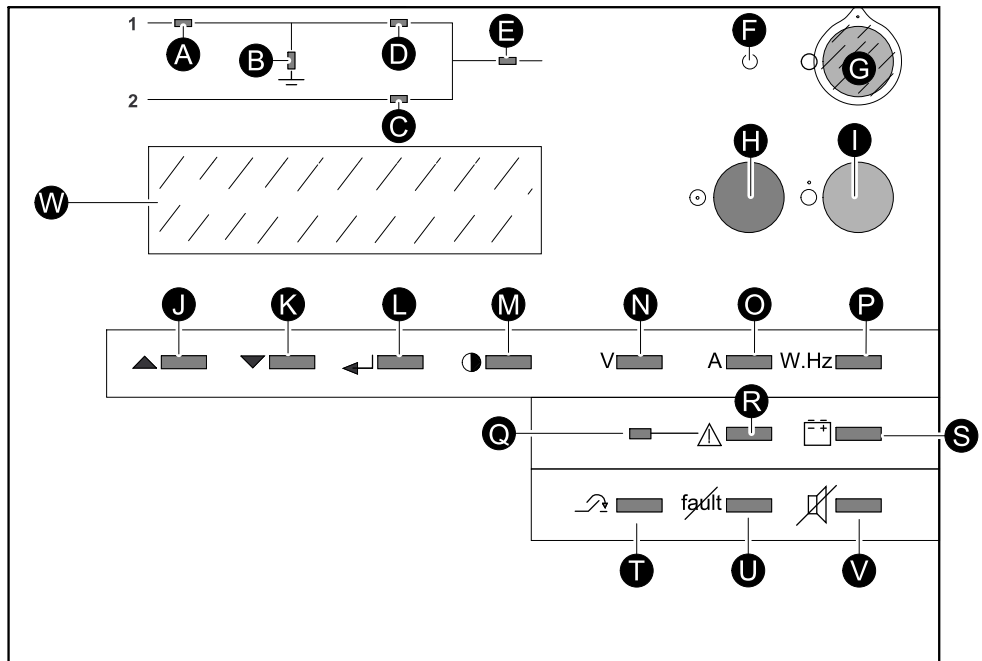
E. Total Load

- Voltage
- Current
- Frequency
- Active and apparent power



1. Press the **V** key (N) to access voltage measurements.
2. Press the **A** key (O) to access current measurements.
3. Press the **W.Hz** key (P) to access frequency measurements.
4. Press the **Battery** key (S) to access the battery measurements.

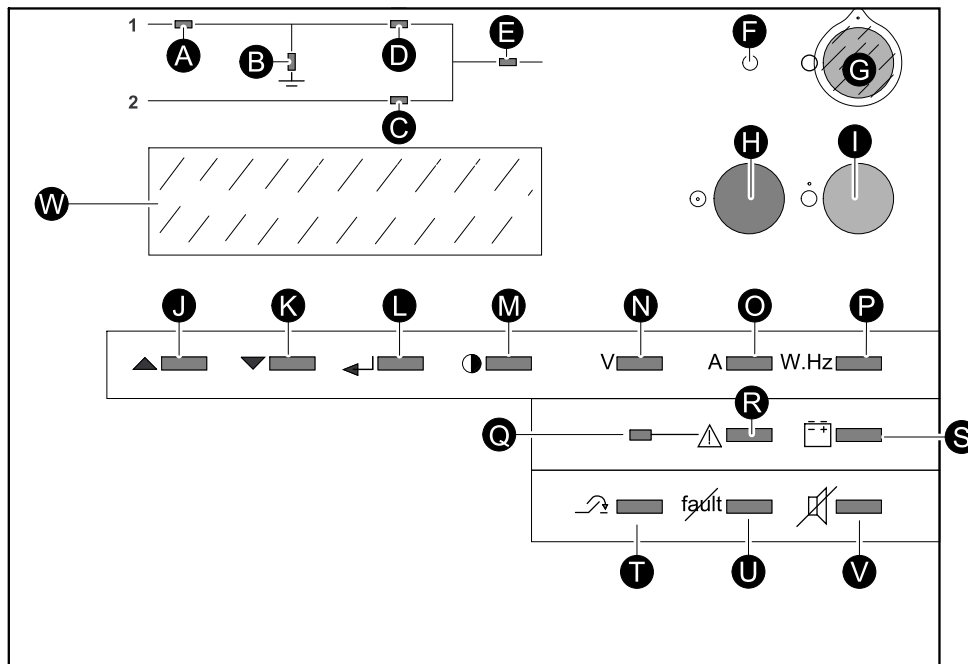
View Log



1. Press the **Main Menu** key (M) to open the Main Menu screen.
2. On the Main Menu screen, select **PAST EVENTS** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.

The log comprises up to 500 events. Use the **Up** and **Down** keys to browse through the events.

View Statistics

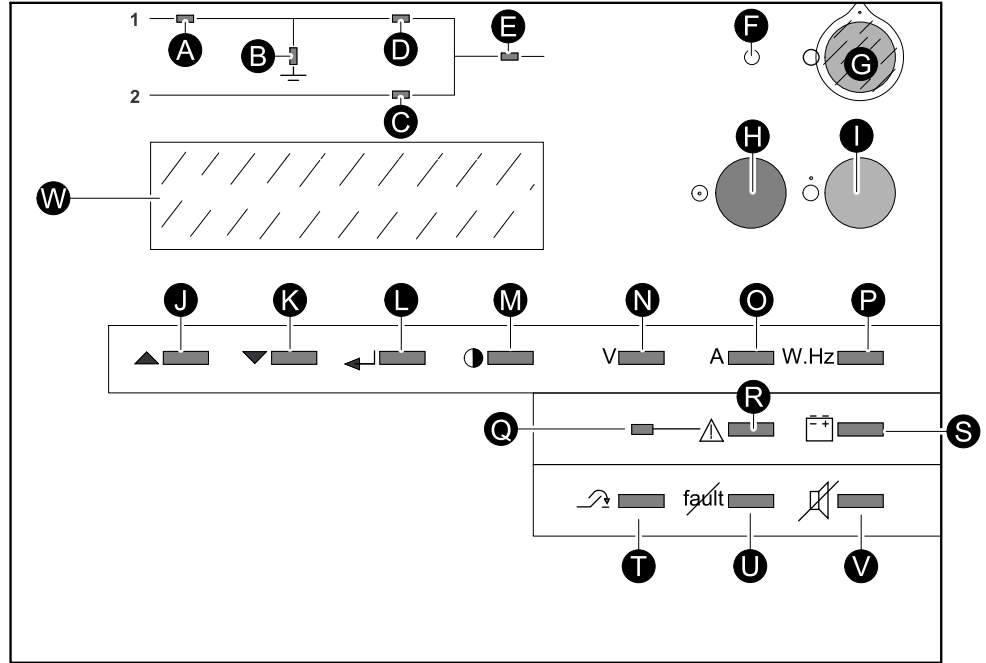


1. Press the **Main Menu** key (M) to open the Main Menu screen.
2. On the Main Menu screen, select **PAST EVENTS** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.

The below statistics are shown:

- Total backup time (h): The total time in hours on battery power since the initial startup of the UPS.
- Total time on static switch (h): The total time in hours on the static switch since the initial startup of the UPS.
- Total time on UPS (d): The total time in days that the load has been supplied by the UPS since the initial startup of the UPS.
- Total time with $T_{batt} > 25^{\circ}\text{C}$ (h): The total time with a battery temperature higher than 25°C since the initial startup of the UPS.
- Last reset: The date that the information was last set to zero using the Teleservice function.
- Elapsed backup time (min): The total time in minutes on battery power since the last reset.
- Nb of backups: The number of times the load was supplied by the UPS from battery power since the last reset.
- Nb of backups < 1 min: The number of times the load was supplied by the UPS from battery power for less than one minute since the last reset.
- 1 min < nb of backups < 3 min: The number of times the load was supplied by the UPS from battery power for more than one minute and less than three minutes since the last reset.
- Nb of backups > 3 min: The number of times the load was supplied by the UPS from battery power for more than three minutes since the last reset.
- Nb of overloads < 5 s: The number of times the UPS was overloaded (output current higher than I_n) for less than five seconds since the last reset.
- Nb of overloads > 5 s: The number of times the UPS was overloaded (output current higher than I_n) for more than five seconds since the last reset.
- Nb of times $T_{Batt} > 25^{\circ}\text{C}$: The number of times the measured battery temperature was higher than 25°C since the last reset.

View Recorded Measurements



1. Press the **Main Menu** key (M) to open the Main Menu screen.
2. On the Main Menu screen, select **PAST EVENTS** using the **Up** (J), **Down** (K), and **Confirm** (L) keys.

The list indicates the latest 30 measurements recorded. The below parameters are shown.

NOTE: When this screen is selected, it takes approximately ten seconds before the data is available.

- **Battery capacity:** The measured value in Ah. This value changes over time depending on the parameters of the battery itself and its environment. The value is used to check if the battery is capable of supplying the rated power in the event of a input outage.
- **Backup time:** The backup time in minutes calculated on the basis of battery measurements. The calculation uses the load percentage and the battery charge status at the time of the measurement.
- **Load level:** The ratio between the power supplied by the UPS to the load at the time of the measurement, and the rated output of the UPS.

Maintenance

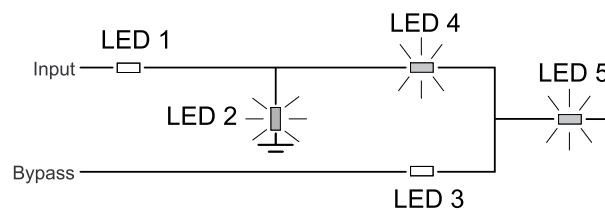
Perform a Visual Check

Power down the system prior to UPS maintenance operations.

NOTE: In redundant parallel UPS systems the check may be carried out successively on each UPS unit without interrupting the load. In other configurations, the load must be supplied via the maintenance bypass.

1. Clean the system regularly, particularly the air filter inlet and outlet grills. Check that the air circulates freely in the cabinets. Use a vacuum cleaner if necessary.
2. Check that nothing hinders the ventilation at the top and at the back of the system.
3. Check that all fans operate correctly.

Perform a Functional Check



1. Check that LEDs 1, 2 and 3 on the control panel are not red to avoid an interruption in the supply of power to the load due to incorrect transfer conditions or a battery problem.
2. Press the **Inverter OFF** button and check that the buzzer and control panel LEDs function correctly (see the section on operation modes).
3. Press the **Inverter ON** button and check again that the control panel LEDs function correctly.
4. Perform a transfer to battery test.
 - a. With the inverter on, open the input switch Q1. The battery LED on the control panel turns orange.
 - b. After two minutes on battery power, close the input switch Q1. The rectifier/charger automatically restarts and the orange battery LED on the control panel turns off.
5. In parallel systems, run these tests on each UPS unit.

Battery Maintenance

Consult the instructions supplied by the battery manufacturer. Below are a few general indications:

- Sealed lead-acid batteries: These batteries require no maintenance, but check the terminals of each cell from time to time and clean if necessary.
- Vented lead-acid batteries:
 - Check the electrolyte level regularly and add water if necessary.
 - Check the voltage of each cell to determine if it is necessary to equalize the battery.

- Check the terminals of each cell and clean if necessary.

⚠ DANGER**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Battery maintenance is undertaken with the system powered up. Operations must be carried out in accordance with applicable safety regulations by qualified personnel using insulated tools, gloves and safety goggles. Batteries contain dangerous substances that will harm the environment if thrown away. If you change the batteries yourself, call on qualified organizations for battery recovery and recycling.

Failure to follow these instructions will result in death or serious injury.

Troubleshooting

Alarms

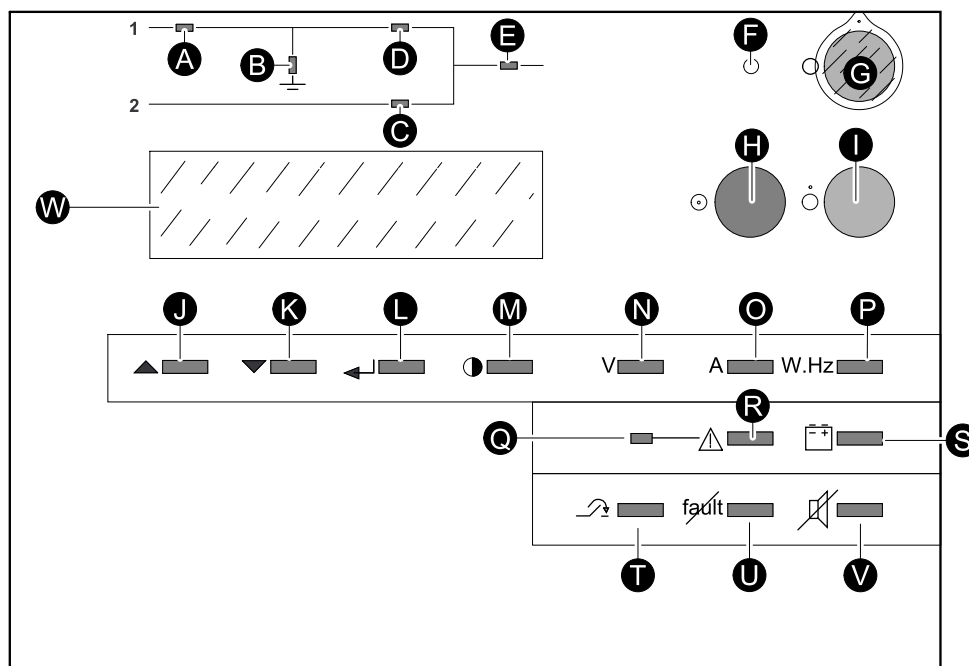
The auto-diagnostic system considers any system status other than normal as a problem.

Before taking any action, write down the messages displayed on the control panel.

Certain problems prevent the control panel from functioning. In this case, it is strongly recommended to call Schneider Electric.

- If the load is still supplied with power, it has been transferred to bypass (static bypass) and is therefore no longer protected (if the system is in on-line mode).
- If the load is no longer supplied with power, transfer it manually to maintenance bypass.

Display Messages



In addition to keypad operations, the graphic display shows a window with the global device status. The message displayed is a primary message. A primary message can be used to access the measuring tables using keys **N**, **O**, **P** and **S** on the keypad. The configuration screens can be accessed by pressing key **M**. A flashing arrow appears at the end of a primary message if there is a problem or an alarm; secondary messages can be accessed by pressing key **J** on the keypad. The presence of another message is indicated by the arrows and at the end of the secondary message. They can be accessed by pressing keys **J** and **K** on the keypad.

The return to the primary message is automatic after a 2 minute time delay or by pressing key **R** on the keypad.

List of Primary Messages

LOAD PROTECTED ON-LINE MODE	This is the normal display when there are no alarms and the load is supplied by the inverter, in on-line mode.
LOAD PROTECTED PARALLEL ON-LINE MODE	This is the normal display when there are no alarms and the load is supplied by the inverter in a parallel UPS system, in on-line mode.
LOAD NOT PROTECTED ON-LINE MODE	This display indicates that the load is not supplied by the inverter, or that there is no battery backup. The arrow indicates the presence of one or more problems specified in secondary messages. The buzzer sounds continuously.
LOAD NOT PROTECTED PARALLEL ON-LINE MODE	Situation identical to that in the previous screen, but for parallel UPS systems.
LOAD PROTECTED BATTERY DISCHARGING Remaining battery time (min) = XX % kW used = XXX	The load is supplied by the inverter, but input is down or outside tolerances and power is supplied by the battery. This message indicates the remaining battery time in minutes prior to inverter shutdown and the percent load. The battery time calculation takes into account: <ul style="list-style-type: none"> • The percentage of full rated load power currently being drawn • The type of battery • Battery temperature • Battery age The buzzer beep is slow and discontinuous.
LOAD PROTECTED, LOW-BATTERY SHUTDOWN WARNING Remaining battery time (min) = XX % kW used = XXX	This message replaces the preceding if the input outage persists and the warning level has been reached. The user is warned that the battery is about to shut down. The buzzer sounds rapidly and discontinuously.
LOAD PROTECTED ECO MODE	This is the normal display: the load is supplied by the inverter or bypass, and battery backup is available.
LOAD NOT PROTECTED ECO MODE	This display indicates that the load is supplied but has no battery backup. The arrow indicates the presence of one or more problems specified in secondary messages. The buzzer beep is continuous.
LOAD FORCED TO INVERTER ECO MODE	The load has been transferred to the inverter following a specific request by the user.

List of Secondary Messages

LOAD ON MAINS 2	The load has been transferred to bypass and is no longer protected (only in on-line mode). The buzzer beep is continuous.
MAINS 2 OUTSIDE TOLERANCES TRANSFER DISABLED CHECK MAINS 2	Bypass frequency or voltage is outside tolerances and the inverter is unable to synchronize. Transfer of the load from the inverter to bypass or vice-versa will result in an interruption of the supply of power to the load. The buzzer beep is slow and discontinuous.
BATTERY OVERTEMPERATURE, CHECK VENTILATION	The battery temperature is outside tolerances. The buzzer beep is slow and discontinuous.
BATTERY ROOM VENTILATION FAULT, CHECK VENTILATION	A fault requiring servicing has occurred in the battery room ventilation system. The rectifier/charger shuts down after a 30-second time delay. The user must take steps to re-establish correct operation of the ventilation system.

	<p>If a harmonic filter is present in the installation, this message also signals an abnormally high temperature in the filter inductor. The buzzer beep is slow and discontinuous.</p>
MAINS 1 OUTSIDE TOLERANCES, CHECK MAINS 1	<p>Input frequency or voltage is outside specified tolerances and the rectifier/charger has shut down. The inverter is on battery power.</p>
MAINS 1 INPUT SWITCH Q1 IS OPEN	<p>Input switch Q1 is open. It must be closed for rectifier/charger start-up. The buzzer beep is slow and discontinuous.</p>
INTERNAL UPS FAULT, LOAD TRANSFER FAULT, CALL MAINTENANCE	<p>A fault has occurred in the static switch that transfers the load between the inverter and bypass. Servicing by the after-sales support department is required. The buzzer beep is continuous.</p>
OVERLOAD RATED CURRENT = XXX A CHECK LOAD LEVEL	<p>This display informs the user that load current is greater than rated current, and gives the value. The buzzer beep is continuous.</p>
UPS SHUTDOWN DUE TO AN OVERLOAD, CHECK LOAD LEVEL	<p>This message follows the preceding when the overload persists. The UPS has shut down and the buzzer beep is continuous.</p>
INVERTER NOT IN PHASE WITH MAINS 2. TRANSFER DISABLED, CHECK MAINS 2	<p>The phase difference between the inverter and bypass is outside tolerances. Transfer of the load between the inverter and bypass will result in an interruption in the supply of power to the load. For parallel UPS units, this message should be interpreted as meaning the phase difference between the inverter for which the message is displayed and the other inverters is outside tolerances.</p>
UPS SHUTDOWN BY AN EXTERNAL COMMAND	<p>The inverter has received a command to shut down. The command is in the form of a signal received from the remote-indications relay board which has been set for this function.</p>
FREQUENCY CHANGE BY AN EXTERNAL COMMAND	<p>The inverter has received a command to change its output frequency (50 Hz or 60 Hz). This command is not effective unless the inverter has been shut down first. The frequency is changed when the inverter is started again.</p>
MAINS 2 INPUT SWITCH Q4S IS OPEN	<p>Bypass switch Q4S is open, i.e. backup power for the load via bypass is not available.</p>
INVERTER OUTPUT SWITCH Q5N IS OPEN	<p>Inverter output switch Q5N is open, i.e. the load cannot be supplied via the inverter.</p>
BYPASS SWITCH Q3BP IS CLOSED	<p>Maintenance bypass switch Q3BP is closed. The system is in maintenance configuration and the load is supplied by bypass.</p>
STATIC SWITCH (M2) OFF DUE TO AN OVERLOAD	<p>The load is no longer supplied by bypass, due to an extended overload. The buzzer beep is continuous.</p>
BATTERY CHARGING I BAT. = XXX A U BAT. = XXX V	<p>The battery is currently being recharged.</p>
EMERGENCY OFF OR FULL SHUTDOWN	<p>This message is displayed when either the external emergency-off pushbutton or the full-shutdown button on the control panel are pressed. The result is:</p> <ul style="list-style-type: none"> • Shutdown of the inverter. • Shutdown of the rectifier/charger. • Opening of the battery circuit breaker. • Activation of a relay contact on the remote-indications relay board. <p>To fully de-energize the installation, these functions must also open the external, upstream circuit breakers on the input and bypass supply lines. The buzzer beep is continuous.</p>

THE BATTERY C.B. QF1 IS OPEN, CHECK THE INSTALLATION	Battery circuit breaker QF1 is open. The load is no longer protected because battery power is no longer available in the event of a input outage. The buzzer beep is continuous.
LOW BATTERY SHUTDOWN	The inverter has shut down at the end of battery power. The buzzer beep is continuous.
INTERNAL UPS FAULT, INVERTER FAULT, CALL MAINTENANCE	A fault has occurred in the inverter. Servicing by the after-sales support department is required. The buzzer beep is continuous.
INTERNAL UPS FAULT, CHARGER FAULT, CALL MAINTENANCE	A fault has occurred in the rectifier/charger. Servicing by the after-sales support department is required. The buzzer beep is slow and discontinuous.
FORCED TRANSFER TO INVERTER REQUESTED, POWER TO LOAD MAY BE INTERRUPTED, CONFIRM YOUR REQUEST WITH KEY	The requested transfer to bypass may provoke an interruption in the supply of power to the load if bypass characteristics are not within the specified tolerances.
THE NUMBER OF UPS READY IS INSUFFICIENT, LOAD TRANSFER IN STAND BY	This message may be displayed in non-redundant, parallel UPS systems, when the number of ready inverters is not sufficient to supply the load.
INVERTER NOT CONNECTED	This message may be displayed in parallel UPS systems, when the inverter is not connected to the load.
PARALLEL UPS, FORCED TRANSFER INHIBITED	This message is displayed when forced connection is requested on a parallel UPS system for a power extension.
INTERNAL UPS FAULT, SELF-TEST FAULT	Communication between the system and the display is faulty. The buzzer beep is slow and discontinuous.
FORCED TRANSFER TO M2 REQUESTED, POWER TO LOAD MAY BE INTERRUPTED CONFIRM YOUR REQUEST WITH KEY	This message is displayed following pressing of the "forced-transfer" key, when the load is supplied via the inverter.

Schneider Electric
35 rue Joseph Monier
92500 Rueil Malmaison
France

+ 33 (0) 1 41 29 70 00
www.schneider-electric.com

As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.