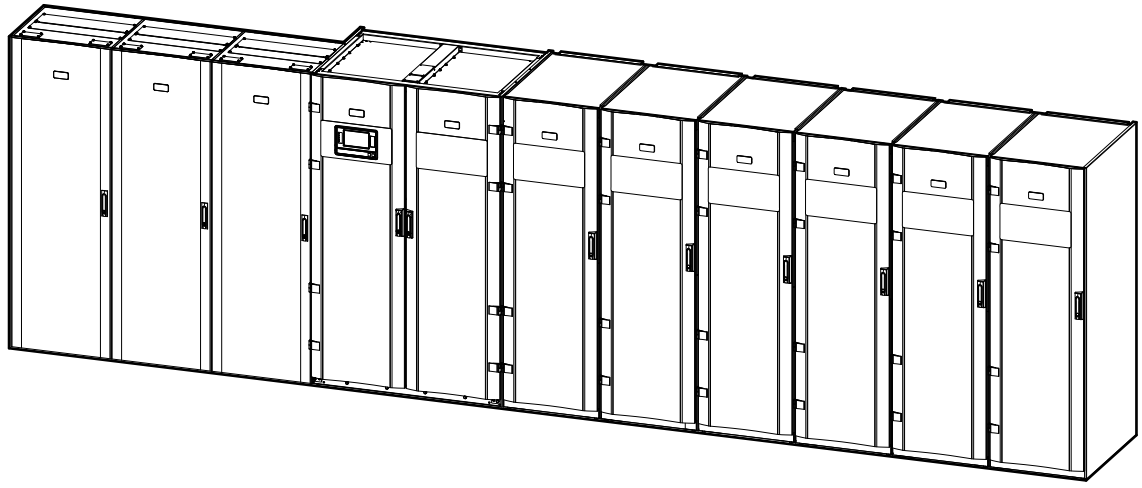
ESS Energy Storage System for UL9540

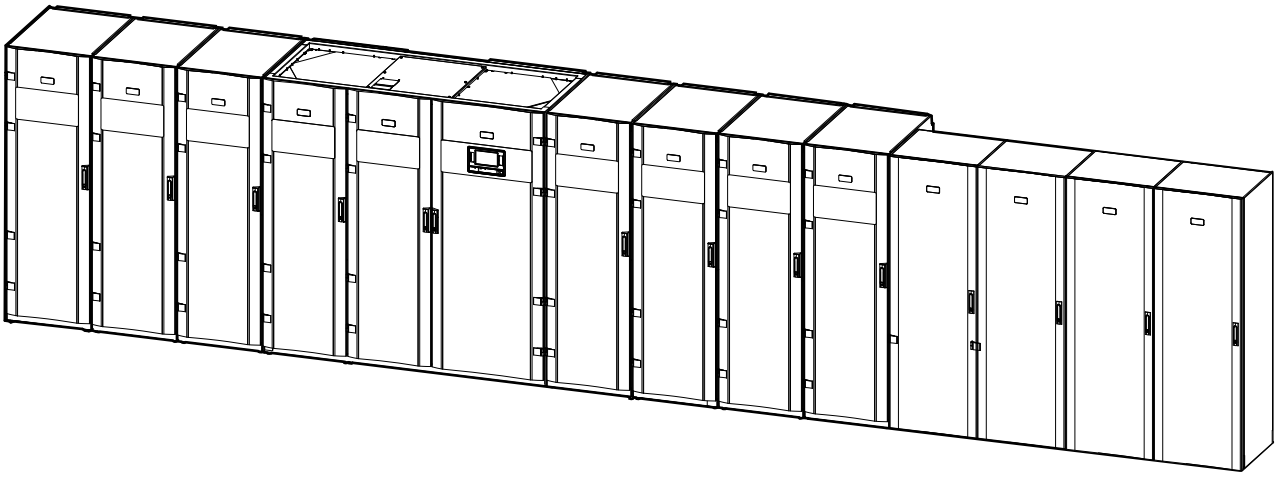
Galaxy VX UPS (1250 kW and 1500 kW I/O Cabinet) with Galaxy Lithium-ion Battery Cabinets

Operation

NOTE: This is a Solution Manual and replaces individual manuals for these products.

Latest updates are available on the Schneider Electric website
9/2024





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Find the ESS Energy Storage System Manuals Here:

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https://www.productinfo.schneider-electric.com/galaxyvx_ul/

Here you can find your ESS Energy Storage System manuals, Galaxy VX UPS manuals, and installation manuals for your auxiliary products and options.

This online manual portal is available on all devices and offers digital pages, search functionality across the different documents in the portal, and PDF download for offline use.

Learn More About the Galaxy VX Here:

Go to *https://www.se.com/ww/en/product-range/63732* to learn more about this product.

Learn More About the Galaxy Lithium-ion Battery Cabinet Here:

Go to *https://www.se.com/ww/en/product-range/66102* to learn more about this product.

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Important Safety Instructions — SAVE THESE INSTRUCTIONS

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

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

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

⚠WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

Failure to follow these instructions can result in injury or equipment damage.

NOTICE

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.

Failure to follow these instructions can result in equipment damage.

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.

Per IEC 62040-1: "Uninterruptible power systems (UPS) -- Part 1: Safety Requirements," this equipment, including battery access, must be inspected, installed and maintained by a skilled person.

The skilled person is a person with relevant education and experience to enable him or her to perceive risks and to avoid hazards which the equipment can create (reference IEC 62040-1, section 3.102).

FCC Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Electromagnetic Compatibility

NOTICE

RISK OF ELECTROMAGNETIC DISTURBANCE

This is a product category C2 UPS product. In a residential environment, this product may cause radio inference, in which case the user may be required to take additional measures.

Failure to follow these instructions can result in equipment damage.

Electromagnetic Compatibility

NOTICE

RISK OF ELECTROMAGNETIC DISTURBANCE

This is a product Category C3 according to IEC 62040-2. This is a product for commercial and industrial applications in the second environment - installation restrictions or additional measures may be needed to prevent disturbances. The second environment includes all commercial, light industry, and industrial locations other than residential, commercial, and light industrial premises directly connected without intermediate transformer to a public low-voltage mains supply. The installation and cabling must follow the electromagnetic compatibility rules, e.g.:

- the segregation of cables,
- the use of shielded or special cables when relevant,
- the use of grounded metallic cable tray and supports.

Failure to follow these instructions can result in equipment damage.

Safety Precautions

⚠ DANGER

HAZARD OF ELECTRIC 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 ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read all instructions in the Installation Manual before installing or working on this UPS system.

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not install the UPS system until all construction work has been completed and the installation room has been cleaned.

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The product must be installed according to the specifications and requirements as defined by Schneider Electric. It concerns in particular the external and internal protections (upstream breakers, battery breakers, cabling, etc.) and environmental requirements. No responsibility is assumed by Schneider Electric if these requirements are not respected.
- After the UPS system has been electrically wired, do not start up the system. Start-up must only be performed by Schneider Electric.

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

The UPS system must be installed according to local and national regulations. Install the UPS according to:

- NEC NFPA 70, **or**
- Canadian Electrical Code (C22.1, Part 1)

depending on which one of the standards apply in your local area.

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Install the UPS system in a temperature controlled indoor environment free of conductive contaminants and humidity.
- Install the UPS system on a non-flammable, level and solid surface (e.g. concrete) that can support the weight of the system.

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

The UPS is not designed for and must therefore not be installed in the following unusual operating environments:

- Damaging fumes
- Explosive mixtures of dust or gases, corrosive gases, or conductive or radiant heat from other sources
- Moisture, abrasive dust, steam or in an excessively damp environment
- Fungus, insects, vermin
- Salt-laden air or contaminated cooling refrigerant
- Pollution degree higher than 2 according to IEC 60664-1
- Exposure to abnormal vibrations, shocks, and tilting
- Exposure to direct sunlight, heat sources, or strong electromagnetic fields

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not drill or cut holes for cables or conduits with the gland plates installed and do not drill or cut holes in close proximity to the UPS.

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not make mechanical changes to the product (including removal of cabinet parts or drilling/cutting of holes) that are not described in the Installation Manual.

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

⚠WARNING

CHEMICAL HAZARD

This product can expose you to chemicals including Tetrabromobisphenol A, which is known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTICE

RISK OF OVERHEATING

Respect the space requirements around the UPS system and do not cover the product's ventilation openings when the UPS system is in operation.

Failure to follow these instructions can result in equipment damage.

NOTICE

RISK OF EQUIPMENT DAMAGE

Do not connect the UPS output to regenerative load systems including photovoltaic systems and speed drives.

Failure to follow these instructions can result in equipment damage.

Electrical Safety

This manual contains important safety instructions that should be followed during the installation and maintenance of the UPS system.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Electrical equipment must be installed, operated, serviced, and maintained only by qualified personnel.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices.
- Disconnection devices for AC and DC must be provided by others, be readily accessible, and the function of the disconnect device marked for its function.
- Turn off all power supplying the UPS system before working on or inside the equipment.
- Before working on the UPS system, check for hazardous voltage between all terminals including the protective earth.
- The UPS contains an internal energy source. Hazardous voltage can be present even when disconnected from the mains supply. Before installing or servicing the UPS system, ensure that the units are OFF and that mains and batteries are disconnected. Wait five minutes before opening the UPS to allow the capacitors to discharge.
- The UPS must be properly earthed/grounded and due to a high touch current/leakage current, the earthing/grounding conductor must be connected first.

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

The label below must be added if:

1. The UPS input is connected through external isolators that, when opened, isolate the neutral, OR
2. The UPS input is connected via an IT power system.

The label must be placed adjacent to all upstream power disconnection devices that isolate the neutral.

The label below must be also added if backfeed protection is provided external to the equipment. See for more details. The label must be placed adjacent to all upstream power disconnection devices.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Risk of voltage backfeed. Before working on this circuit: Isolate the UPS and check for hazardous voltage between all terminals including the protective earth.

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Always perform correct Lockout/Tagout before working on the UPS.
- A UPS with autostart enabled will automatically restart when the mains supply returns.
- If autostart is enabled on the UPS, a label must be added on the UPS to warn about this functionality.

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

Add the label below on the UPS if autostart has been enabled:

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Autostart is enabled. The UPS will automatically restart when the mains supply returns.

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

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

This product can cause a DC current in the PE conductor. If a residual current-operated protective device (RCD) is used for protection against electrical shock, only an RCD of Type B is allowed on the supply side of this product.

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

Battery Safety

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Battery circuit breakers must be installed according to the specifications and requirements as defined by Schneider Electric.
- Servicing of batteries must only be performed or supervised by qualified personnel knowledgeable of batteries and the required precautions. Keep unqualified personnel away from batteries.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Do not dispose of batteries in a fire as they can explode.
- Do not open, alter, or mutilate batteries.

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

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Batteries can present a risk of electric shock and high short-circuit current. The following precautions must be observed when working on batteries

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear protective glasses, gloves and boots.
- Do not lay tools or metal parts on top of batteries.
- Disconnect the charging source prior to connecting or disconnecting battery terminals.
- Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electric shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

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

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

When replacing batteries, always replace with the same battery module type.

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

NOTICE

RISK OF EQUIPMENT DAMAGE

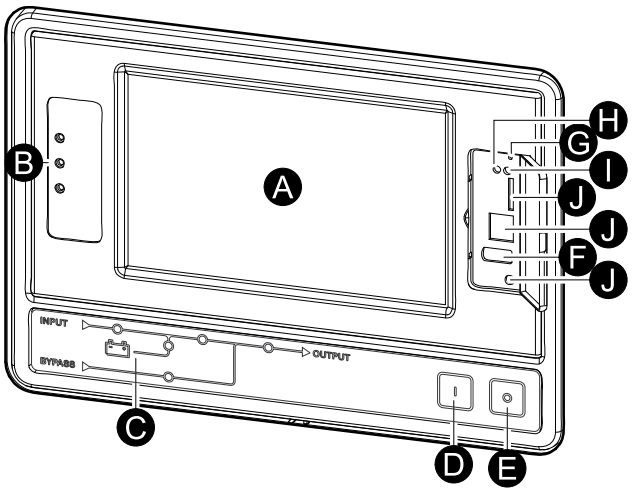
- Lithium-ion batteries should not be stored beyond 15 months from the date of production. If they are stored for longer the calendar degradation will cause the batteries to be irreversible degraded beyond what is expected – a reduced runtime will be the consequence. Performance guarantee will be measured from the time of deployment or from production date +15 months, whichever comes first. For storage beyond 15 months, contact Schneider Electric.
- If the UPS system remains de-energized for a long period, Schneider Electric recommends to shut down the battery cabinet completely.

Failure to follow these instructions can result in equipment damage.

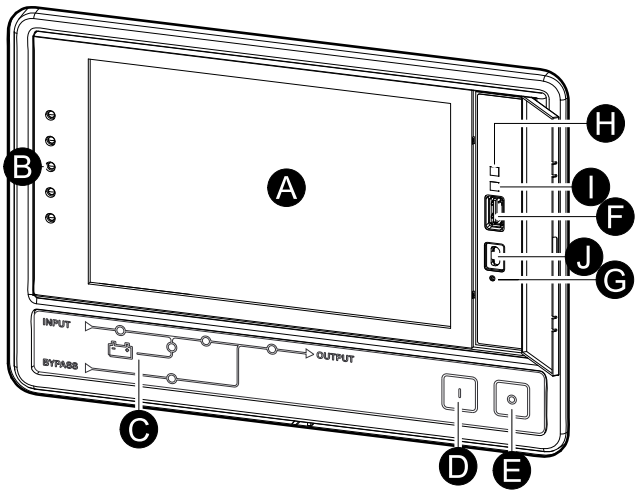
Galaxy VX UPS Operation

Overview of UPS User Interface

Display Model 1



Display Model 2



A. Display[1]
B. Status LEDs
C. Mimic diagram
D. Inverter ON button
E. Inverter OFF button
F. USB port for export of logs
G. Display reboot button
H. Network connection LED:
   - Solid green: The system has valid TCP/IP settings.

     See Configure the Network, page 38.
   - Flashing green: The system does not have valid TCP/IP settings.
   - Solid orange: The display is inoperable. Contact Schneider Electric.
   - Flashing orange: The system is making BOOTP requests.

     See Configure the Network, page 38.
   - Alternately flashing green and orange: If the LED is alternately flashing slowly, the system is making DHCP requests.

     See Configure the Network, page 38.

     If the LED is alternately flashing rapidly, the system is starting up.
   - Off: The display is not receiving input power or the display is inoperable.

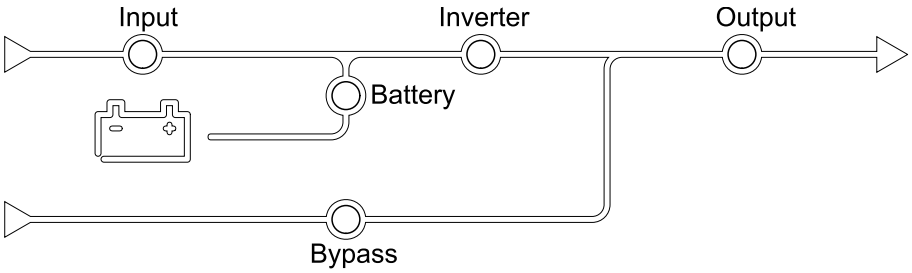
I. LED for indication of network connection type:
   - Solid green: The system is connected to a network operating at 10 Megabits per second (Mbps).
   - Flashing green: The system is receiving or transmitting data packets at 10 Megabits per second (Mbps).
   - Solid orange: The system is connected to a network operating at 100 Megabits per second (Mbps).

1. Note that the UPS comes with one of the two display models.

- Flashing orange: The system is receiving or transmitting data packets at 100 Megabits per second (Mbps).
- Off: One or more of the following exists: The display is not receiving input power, the cable that connects the system to the network is disconnected, the device that connects the system to the network is turned off, or the display is inoperable. Check the connections and if the LED remains off, contact Schneider Electric.

J. Reserved for service.

Overview of Mimic Diagram



The mimic diagram shows the power flow through the UPS system, and the status of the main functions.

Each LED can be in one of the below three states:

Green	The corresponding function is active and OK	
Red	The corresponding function is not working properly	
Off	The corresponding function is not active	

Overview of Status LEDs

The status LEDs placed next to the display show the current status of the UPS system:

Display Model 1 – LED symbols	Display Model 2 – LED symbols	LED color	LED description
		Green	• Green LED on: The load is protected • Green LED + orange LED on: The load is protected, but the system reports an alarm at warning level • Orange LED + red LED on: The load is unprotected and the system reports an alarm at warning level and an alarm at critical level • Red on: The load is unprotected and the system reports an alarm at critical level
		Yellow	
		Red	

Display Symbols

Symbol	Description
	The locked home button appears when the system is locked by a password protection. Tap this button to go to the home screen of the display.
	The unlocked home button appears when the system has been unlocked using the password. Tap this button to go to the home screen of the display.
	Tap the OK button to confirm your selections and exit the current screen.
	Tap the ESC button to cancel your changes and exit the current screen.
	Tap the filter button to set up the filters for your logs.
	Tap the recycle bin button to clear the log.

Operation Modes

The Galaxy UPS has two different levels of operation mode:

- UPS Operation Mode: The operation mode of the operated UPS. See UPS Modes, page 17.
- System Operation Mode: The operation mode of the complete UPS system. See System Modes, page 21.

UPS Modes

eConversion Mode

eConversion provides a combination of maximum protection and highest efficiency, that permits to reduce the electricity absorbed by the UPS by a factor three compared with double conversion. eConversion is now the generally recommended operation mode and is enabled by default in the UPS but it can be disabled via the display menu. When enabled, eConversion can be set to always active or on a set schedule configured through the display menu.

In eConversion the UPS supplies the active part of the load through the static bypass as long as the utility/mains supply is within tolerance. The inverter is kept running in parallel so the input power factor of the UPS is maintained close to unity, regardless of the load power factor, as the reactive part of the load is significantly reduced in the UPS input current. In case of an interruption of the utility/mains supply, the inverter maintains the output voltage providing an uninterrupted transfer from eConversion to double conversion. The batteries are charged when the UPS is in eConversion mode and harmonics compensation is also provided.

eConversion mode can be used for the Galaxy VX UPS in the following conditions:

- The minimum load on the UPS is 5-10%.
- Voltage fluctuation is ≤10% versus nominal voltage (adjustable setting from 3% to 10%).

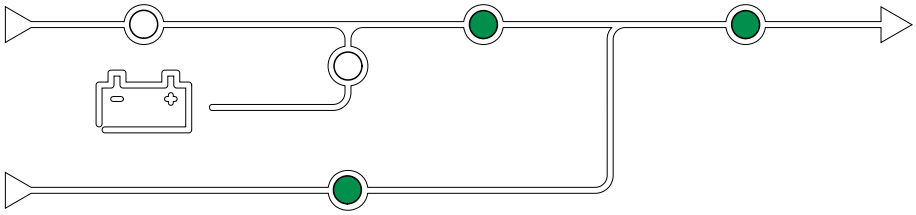
- THDU is ≤5%.

  NOTE: When changes to eConversion mode settings are made on one UPS in a parallel system, the settings are shared to all UPSs in the parallel system.

  NOTE: When a genset/generator is in use and frequency fluctuations are seen (typically due to downsizing), it is recommended to configure an input contact to disable high efficiency modes while the genset/generator is on.

  NOTE: If external synchronization is required, it is generally recommended to disable eConversion.

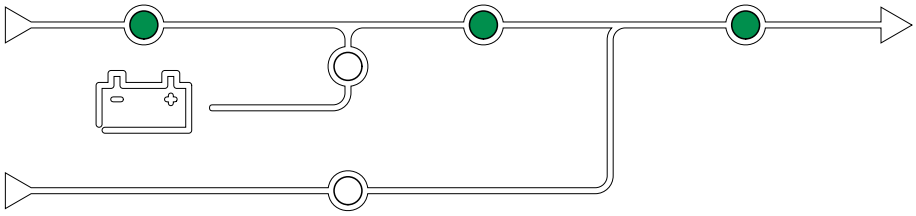
While the UPS is in eConversion, the bypass, inverter, and load LEDs are green, and the battery and input LEDs are off.



Double Conversion (Normal Operation)

The UPS supports the load with conditioned power. Double conversion mode permanently creates a perfect sinewave at the system output, but this operation also uses more electricity.

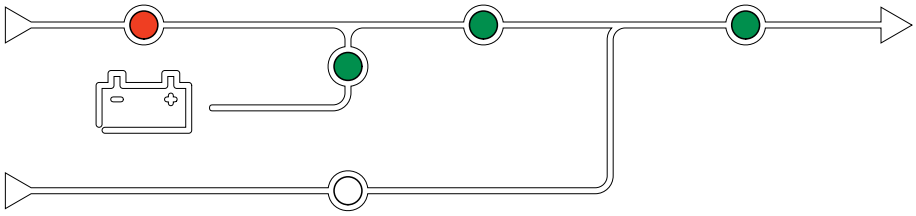
While the UPS is in double conversion, the input, inverter, and load LEDs are green, and the battery and bypass LEDs are off.



Battery Operation

If the utility/mains supply fails, the UPS transfers to battery operation and supports the load with conditioned power from the DC source.

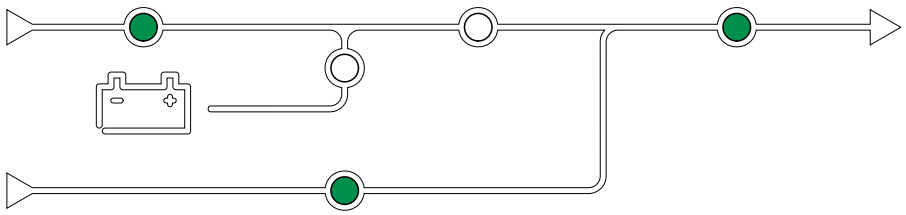
While the UPS system is in battery operation, the battery, inverter, and load LEDs are green, the bypass LED is off and the input LED is red.



Requested Static Bypass Operation

The UPS can be transferred to requested static bypass operation following a command from the display. During requested static bypass operation, the load is supplied from the bypass source. If a fault is detected, the UPS will transfer to double conversion (normal operation) or forced static bypass operation. If there is an interruption to the utility/mains supply during requested static bypass operation, the UPS will transfer to battery operation.

During requested static bypass, the input, bypass and output LEDs are green and the battery and inverter LEDs are off.

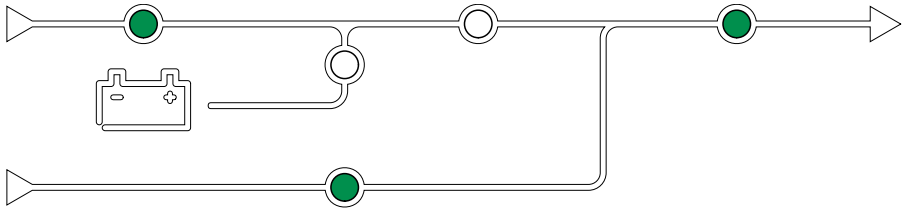


Forced Static Bypass Operation

The UPS is in forced static bypass operation following a command from the UPS or because the user has pressed the inverter OFF button on the UPS. During forced static bypass operation, the load is supplied from the bypass source.

NOTE: The batteries are not available as an alternate power source while the UPS is in forced static bypass operation.

During forced static bypass, the input, bypass and output LEDs are green and the battery and inverter LEDs are off or red if an alarm is present.



Maintenance Bypass Operation

When the maintenance bypass breaker MBB is closed in the external maintenance bypass cabinet, maintenance bypass panel, or third party switchgear, the UPS transfers to external maintenance bypass operation. The load is supplied with unconditioned power from the bypass source. Service and replacement can be performed on the entire UPS during external maintenance bypass operation via the maintenance bypass breaker MBB.

NOTE: The batteries are not available as an alternate power source while the UPS is in external maintenance bypass operation.

Static Bypass Standby Operation

Static bypass standby is only applicable to an individual UPS in a parallel system. The UPS enters static bypass standby operation if the UPS is prevented from entering forced static bypass operation and the other UPSs of the parallel system can support the load. In static bypass standby the output of the specific UPS is OFF. The UPS automatically transfers to the preferred operation mode when possible.

NOTE: If the other UPSs cannot support the load, the parallel system transfers to forced static bypass operation. The UPS in static bypass standby operation will then transfer to forced static bypass operation.

Inverter Standby

NOTE: Inverter standby is only applicable to an individual UPS in a parallel system.

The UPS enters inverter standby if there is an interruption to the utility/mains supply of one UPS and the other UPS units of the parallel system can support the

load with the configured redundancy level maintained. This is to avoid that the batteries are being drained in situations where it is not necessary.

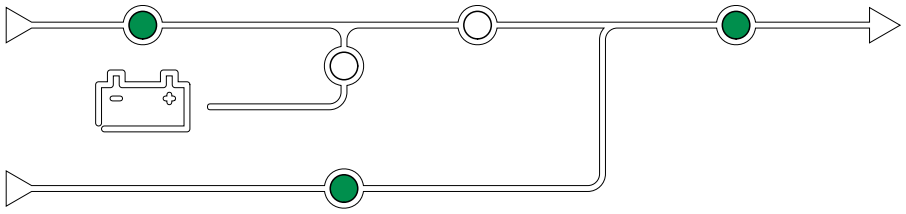
ECO Mode

NOTE: ECO mode must be enabled by a Schneider Electric field service engineer.

In ECO mode the UPS uses requested static bypass to power the load as long as the power quality is within tolerance. If a fault is detected (bypass voltage out of tolerance, output voltage out of tolerance, power interruption, etc) the UPS will transfer to double conversion (normal operation) or forced static bypass. Depending on the transfer conditions, a minimal interruption of the load supply may happen (up to 10 ms). The batteries are charged when the UPS is in ECO mode. The main advantage of ECO mode is a reduction in the consumption of electrical power compared with double conversion.

NOTE: When changes to ECO mode settings are made on one UPS in a parallel system, the settings are shared to all UPSs in the parallel system.

During ECO mode, the input, bypass and output LEDs are green and the battery and inverter LEDs are off.



Self-test

After start-up of the UPS system, the UPS will perform an automatic self-test. The status and progress of the self-test are indicated by the flashing LEDs on the mimic diagram.

When the self-test has been passed, the LEDs will indicate the operation mode of the UPS system.

NOTE: If an LED continues to flash after completion of the self-test, please call Schneider Electric.

Battery Test Mode

The UPS is in battery test mode when the UPS is performing a battery self-test or a runtime calibration.

NOTE: The battery test will be aborted if the utility/mains supply is interrupted or if a critical alarm is present and the UPS will return to normal operation upon return of utility/mains.

OFF Mode

The UPS is not supplying the load with power. The batteries are charged and the display is on.

System Modes

The system operation mode indicates the output status of the complete UPS system including the switchgear and indicates which source supplies the load.

eConversion Mode

eConversion provides a combination of maximum protection and highest efficiency, that permits to reduce the electricity absorbed by the UPS by a factor three compared with double conversion. eConversion is now the generally recommended operation mode and is enabled by default in the UPS but it can be disabled via the display menu. When enabled, eConversion can be set to always active or on a set schedule configured through the display menu.

In eConversion the UPS system supplies the active part of the load through the static bypass as long as the utility/mains supply is within tolerance. The inverter is kept running in parallel so the input power factor of the UPS system is maintained close to unity, regardless of the load power factor, as the reactive part of the load is significantly reduced in the UPS system input current. In case of an interruption of the utility/mains supply, the inverter maintains the output voltage providing an uninterrupted transfer from eConversion to double conversion. The batteries are charged when the UPS system is in eConversion mode and harmonics compensation is also provided.

eConversion mode can be used for the Galaxy VX UPS system in the following conditions:

- The minimum load on the UPSs is 5-10%.
- Voltage fluctuation is ≤10% versus nominal voltage (adjustable setting from 3% to 10%).
- THDU is ≤5%.

NOTE: When changes to eConversion mode settings are made on one UPS in a parallel system, the settings are shared to all UPSs in the parallel system.

NOTE: When a genset/generator is in use and frequency fluctuations are seen (typically due to downsizing), it is recommended to configure an input contact to disable high efficiency modes while the genset/generator is on.

NOTE: If external synchronization is required, it is generally recommended to disable eConversion.

Inverter Operation

In inverter operation the load is supplied by the inverters. The UPS mode can be in either double conversion (normal operation) or battery operation when the UPS system operation mode is inverter operation.

Requested Static Bypass Operation

When the UPS system is in requested static bypass operation, the load is supplied from the bypass source. If a fault is detected, the UPS system will transfer to inverter operation or forced static bypass operation.

Forced Static Bypass Operation

The UPS system is in forced static bypass operation following a command from the UPS system or because the user has pressed the inverter OFF button on the UPSs. During forced static bypass operation, the load is supplied directly by the bypass source with unconditioned power.

NOTE: The batteries are not available as an alternate power source while the UPS system is in forced static bypass operation.

Maintenance Bypass Operation

In maintenance bypass operation, the load is supplied directly by the bypass source with unconditioned power via the maintenance bypass breaker MBB.

NOTE: The batteries are not available as an alternate power source in maintenance bypass operation.

ECO Mode

In ECO mode the UPS system uses requested static bypass to power the load as long as the power quality is within tolerance. If a fault is detected (bypass voltage out of tolerance, output voltage out of tolerance, power interruption, etc) the UPS system will transfer to double conversion (normal operation) or forced static bypass. Depending on the transfer conditions, a minimal interruption of the load supply may happen (up to 10 ms). The batteries are charged when the UPS system is in ECO mode. The main advantage of ECO mode is a reduction in the consumption of electrical power compared with double conversion.

NOTE: When changes to ECO mode settings are made on one UPS in a parallel system, the settings are shared to all UPSs in the parallel system.

OFF Mode

The UPS system is not supplying the load with power. The batteries are charged and the display is on.

Frequency Converter Mode

In frequency converter mode the UPS is able to convert the frequency of the input source to a different frequency on the UPS output.

NOTE: Frequency converter mode must be configured by Schneider Electric during service configuration.

The possible input/output frequencies are 50/50 Hz, 50/60 Hz, 60/50 Hz and 60/60 Hz. This is set under output frequency.

When the UPS is configured as frequency converter static bypass is not available:

- Transfer to static bypass is disabled
- Alarms and events related to the static bypass switch and the bypass source are disabled (not shown)
- References to the static bypass switch and the MBB are removed from the mimic diagram in the display and UPS Tuner
- Guided sequences are changed to support startup and shutdown of the UPS with no bypass available

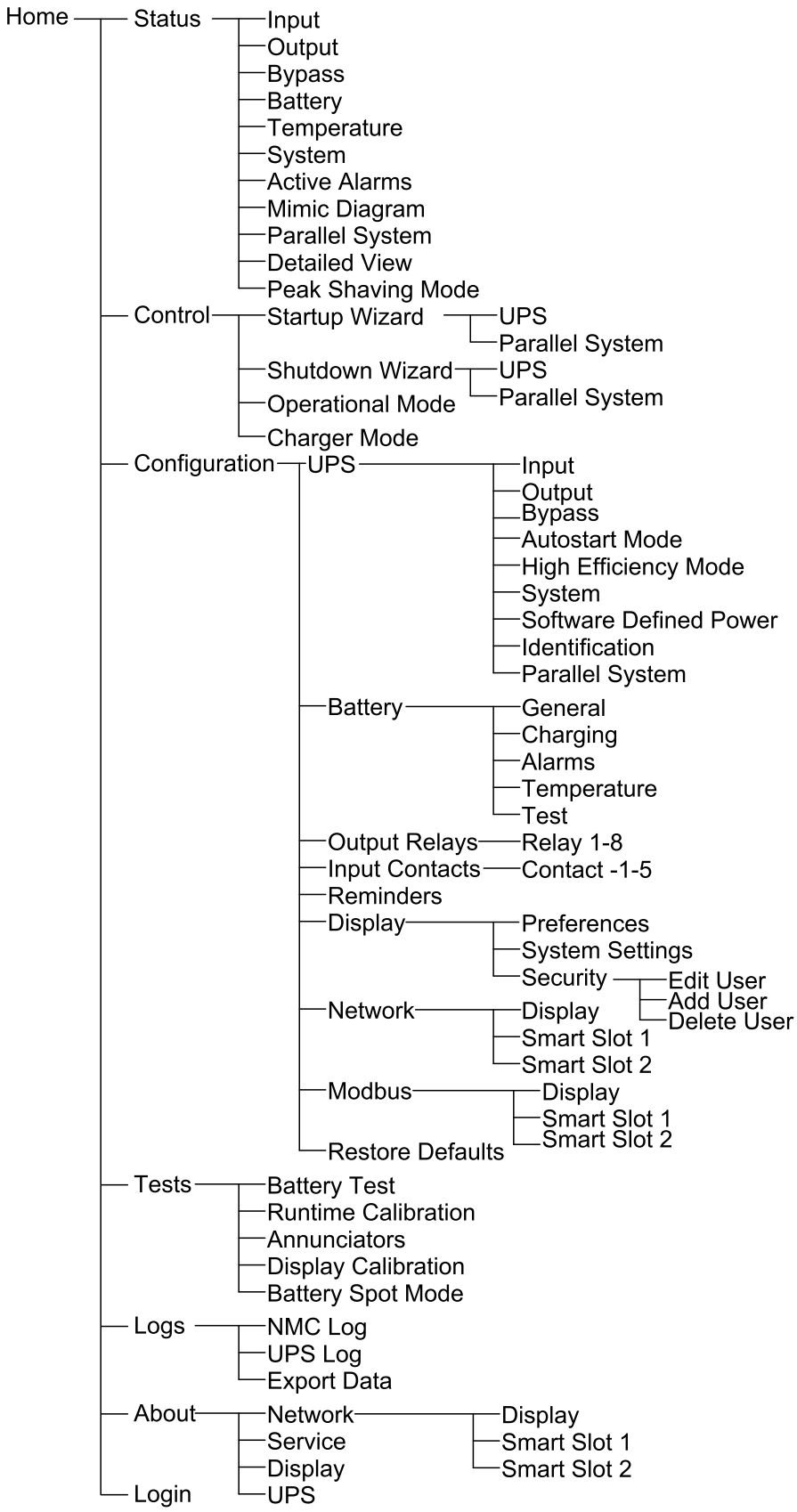
It is possible to run battery self-test and battery runtime calibration even when there is no bypass available.

NOTE: In frequency converter mode the capacitor lifetime is reduced by 40%.

UPS Display

UPS Display Menu Tree

NOTE: The display menu tree is dependent on your system configuration. All screens might not be available on your UPS.



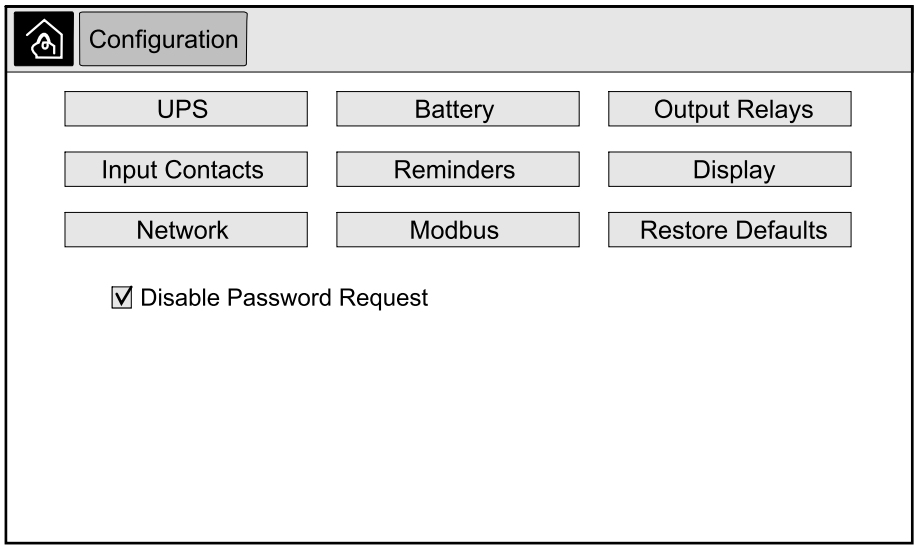
Configuration from the UPS Display

Disable Password Request

1. From the home screen on the display select **Configuration**.

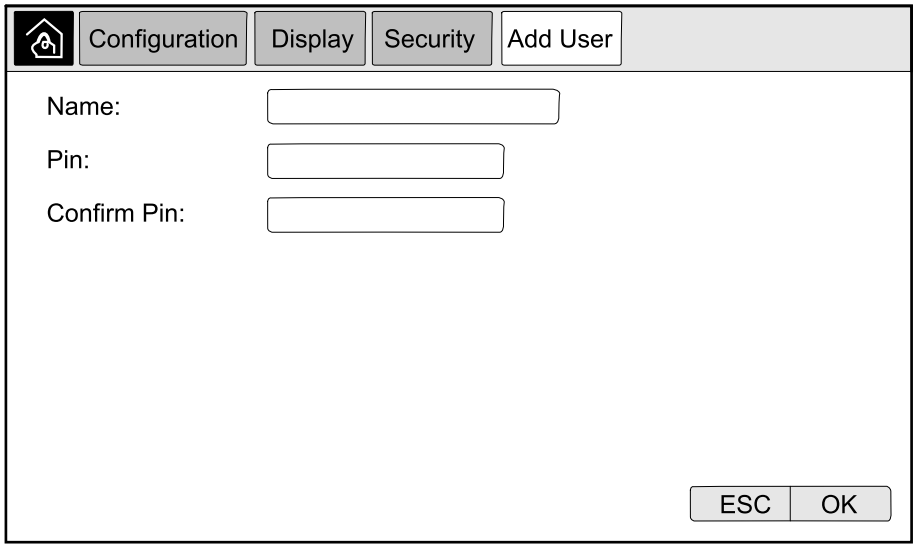
2. Select **Disable Password Request**.

   NOTE: When **Disable Password Request** has been enabled, it is no longer required to enter the password when configuring or operating the UPS. However when changing this setting, the password is required.



Add a New User or Edit an Existing User

1. From the home screen on the display select **Configuration > Display > Security**.
2. Select **Add User** to add a new user or select **Edit User** to edit an existing user of the system.



3. In the **Name** field, type in the name of the user. Complete with **Enter**.
4. In the **Pin** field, type in a pin code for the user. Complete with **Enter**.
5. In the **Confirm Pin** field, retype the pin code of the user. Complete with **Enter**.
6. Tap **OK** to save your settings.

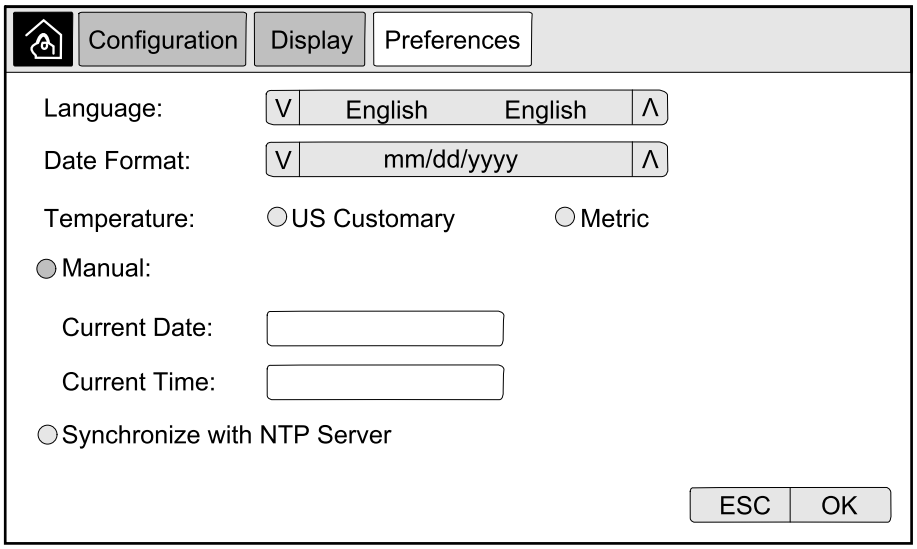
Delete a User

1. From the home screen on the display select **Configuration > Display > Security > Delete User**.

2. Browse to the user that you wish to delete using the up and down arrows and tap **OK**.
3. Tap **Yes** to confirm deletion of an existing user of the system.

Configure the Display Preferences

1. From the home screen on the display select **Configuration > Display > Preferences**.

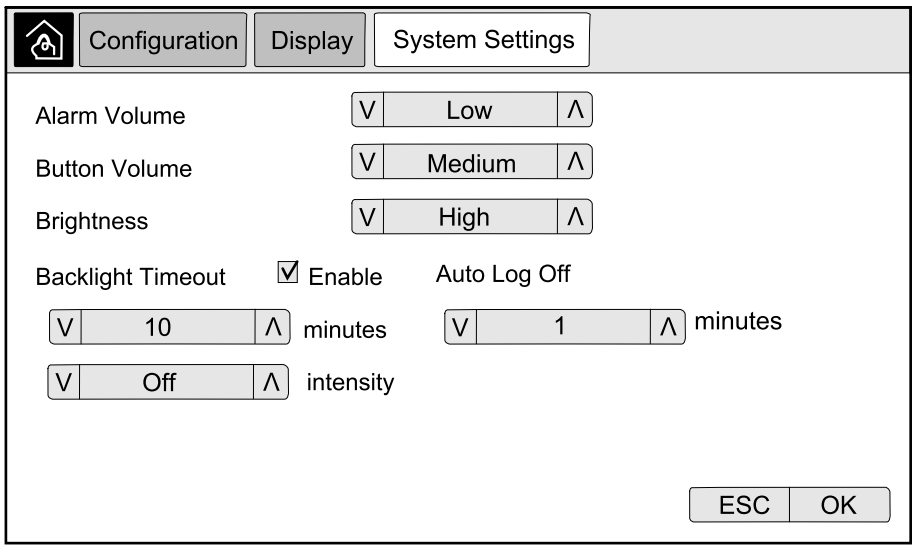


2. Select the preferred language using the up and down arrows.
3. Select the preferred date format using the up and down arrows.
4. Select the preferred temperature units: **US Customary** (°Fahrenheit) or **Metric** (°Celsius).
5. Set the current date and time using one of the below two methods:
   - Set the date and time manually on the display by selecting **Manual** and typing the actual date and time and completing with **Enter**.
   - Set the date and time automatically by selecting **Synchronize with NTP server** (Network Time Protocol server).

     NOTE: NTP server settings can be configured in the network management interface via the Web, command line, or config file.
6. Tap **OK** to save your settings.

Configure the Display Settings

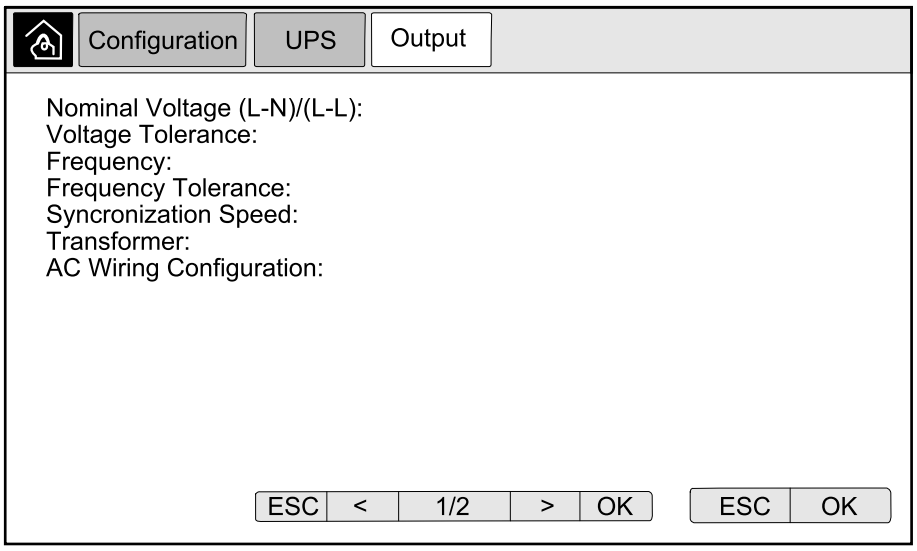
1. From the home screen on the display select **Configuration > Display > System Settings**.



2. Set the **Alarm Volume**. Choose between: **Off**, **Low**, **Medium**, and **High**.
3. Set the **Button Volume**. Choose between: **Off**, **Low**, **Medium**, and **High**.
4. Set the **Brightness** of the display. Choose between: **Low**, **Medium**, and **High**.
5. Enable or disable **Backlight Timeout**. If you wish to enable backlight timeout, set the time limit in minutes for enabling backlight timeout. Choose between: **60**, **30**, **10**, **5**, and **1**.
6. Set the intensity of the backlight. Choose between: **Off**, **Very Low**, **Low**, and **Medium**.
7. Set the time limit in minutes for automatic log off. Choose between: **60**, **30**, **10**, **5**, and **1**.
8. Tap **OK** to save your settings.

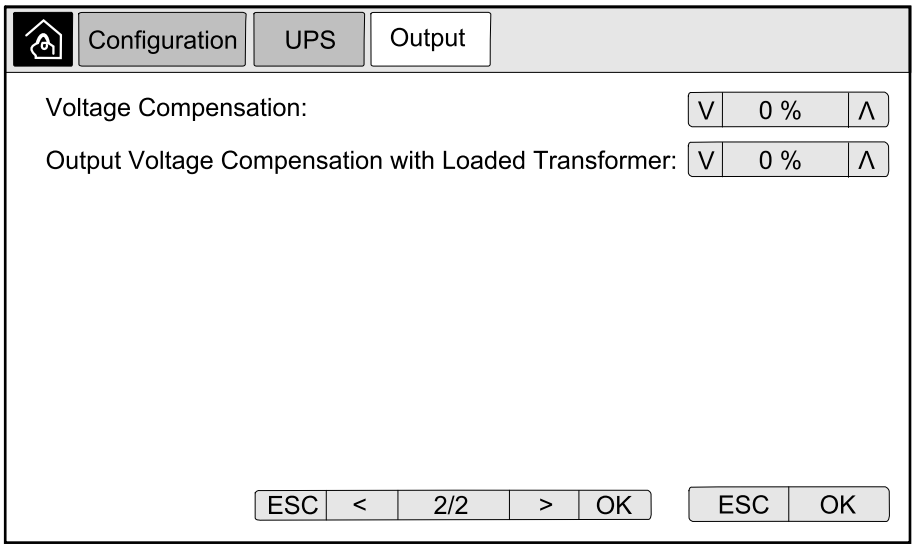
Configure the UPS Output Voltage Compensation

1. From the home screen on the display select **Configuration > UPS > Output**.
2. Tap arrow to the right to go to the next output configuration screen.



3. Under **Voltage Compensation** select the preferred voltage compensation for your system. Choose between **–3%**, **–2%**, **–1%**, **0%**, **1%**, **2%**, or **3%**.

   NOTE: This setting is shared between all UPSs in a parallel system.



4. Under **Output Voltage Compensation with Loaded Transformer** select the preferred output voltage compensation to compensate for load dependent transformer voltage drop. Choose between **0%**, **1%**, **2%**, or **3%**.

   NOTE: This setting must be identical for all UPSs in a parallel system.

   NOTE: When this setting is set to 0%, the output transformer voltage compensation is disabled.

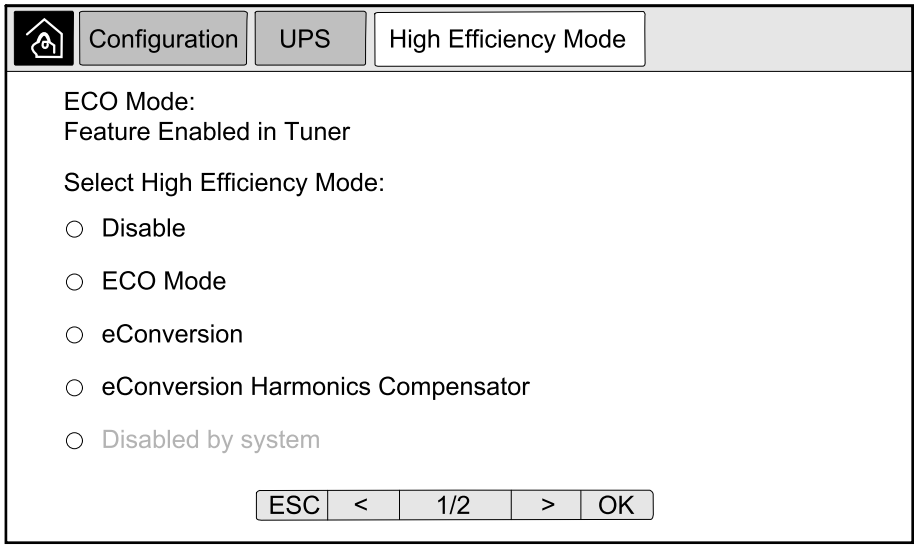
5. Tap **OK** to confirm your setting.

Configure High Efficiency Mode

NOTE: ECO Mode must be enabled by Schneider Electric during service configuration to make this selection available.

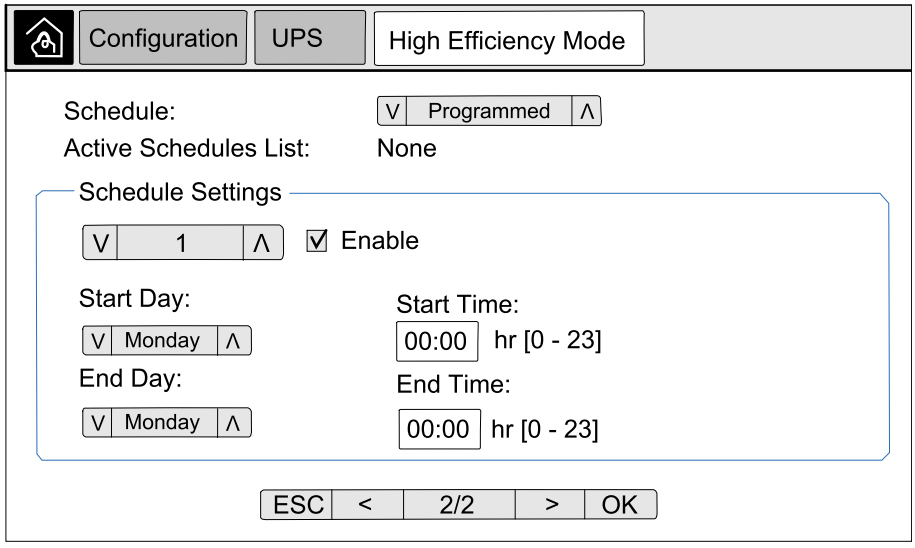
The UPS returns to high efficiency mode after 10 seconds under normal operating conditions. If an unstable mains forces the UPS to exit high efficiency mode more than one to ten times (this setting must be configured by Schneider Electric) within 24 hours, the UPS will disable high efficiency mode. An informational alarm will be generated, and **Disabled by system** will be shown on the screen **Configuration > UPS > High Efficiency Mode**. High efficiency must then be manually reactivated.

1. From the home screen on the display select **Configuration > UPS > High Efficiency Mode** and configure the following settings:



   a. **Select High Efficiency Mode**: Choose between **Disable**, **ECO Mode**, **eConversion**, and **eConversion Harmonics Compensator**.

2. Tap **>** and configure the schedule settings:



   a. **Schedule**: Select when the system should enter the selected eConversion or ECO mode. Choose between **Always**, **Programmed** and **Never**.

   b. **Active Schedules List**: If you chose **Programmed** above, select **Enable** and set the time and date for when the system should enter the selected eConversion or ECO mode.

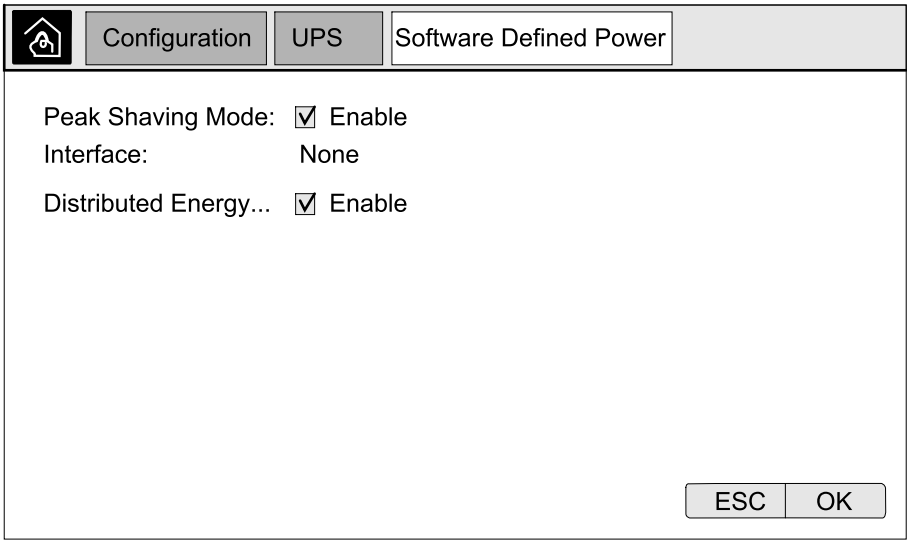
3. Tap **OK** to confirm your settings.

Enable Peak Shaving Mode

Peak Shaving Mode allows the UPS to reduce peak power consumed from the utility/mains supply.

NOTE: Peak shaving mode must be enabled locally by Schneider Electric during service configuration to make this selection available, but it must be controlled via a remote software application. Contact Schneider Electric for more details.

1. From the home screen on the display select **Configuration > UPS > Software Defined Power**.
2. For **Peak Shaving Mode** select **Enable**.



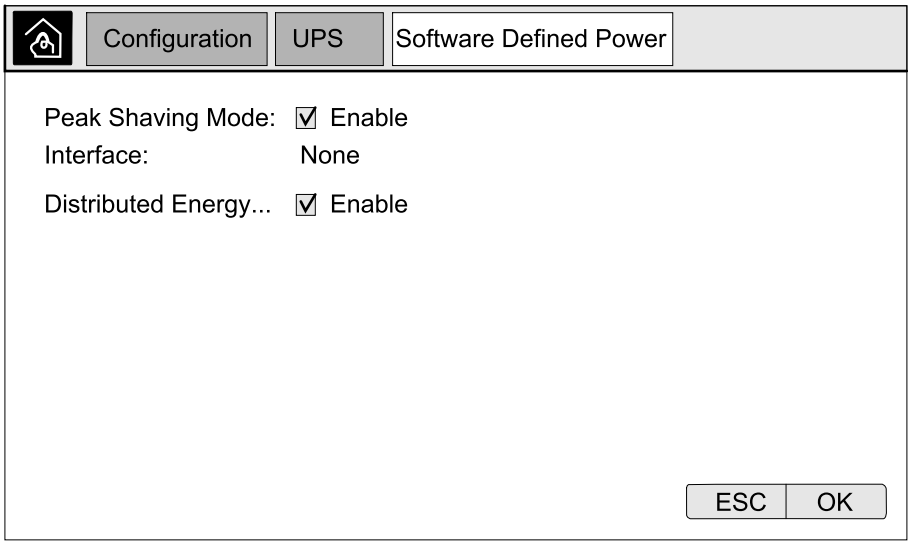
3. Tap **OK** to confirm your settings.

Configure Distributed Energy Reserve

Software Defined Power must be enabled before the feature **Distributed Energy Reserve** can be used. **Software Defined Power** must be enabled by Schneider Electric.

NOTE: Distributed Energy Reserve must be enabled locally by Schneider Electric during service configuration to make this selection available, but it must be controlled via an external controller that monitors the grid frequency. In the event of a sudden decrease in grid frequency, the UPS can be commanded remotely via a dedicated input contact to transfer to **Distributed Energy Reserve** mode. Contact Schneider Electric for more details.

1. Configure an input contact for **Distributed Energy Reserve**, see Configure the Input Contacts, page 33.
2. From the home screen on the display select **Configuration > UPS > Software Defined Power**.

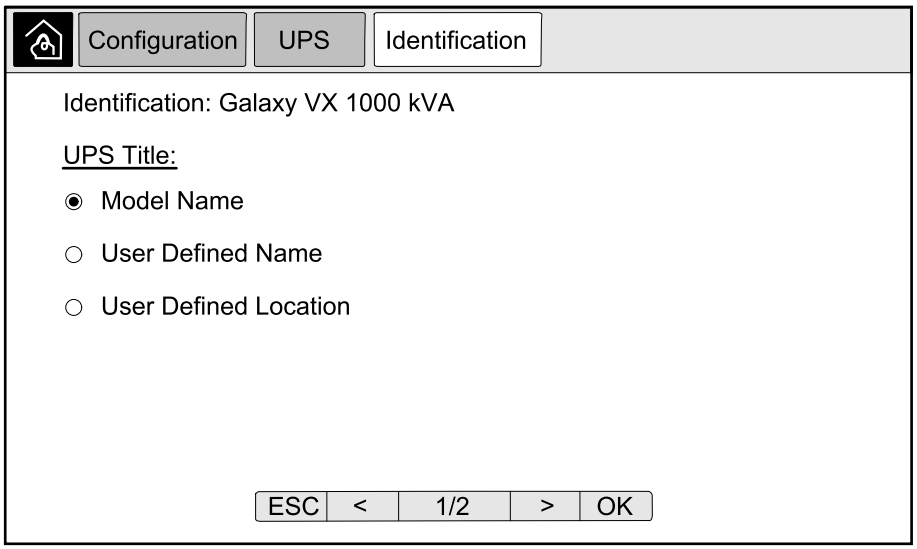


3. Set **Distributed Energy Reserve** to **Enable** or **Disable**. When the feature **Distributed Energy Reserve** is set to **Enable**, the UPS delivers power back to the grid for a short period (up to 30 seconds) to stabilize the frequency (Hz) of the grid, when activated by a signal from the dedicated input contact. When the feature **Distributed Energy Reserve** is set to **Disable**, the UPS will transfer to forced battery operation, when activated by a signal from the dedicated input contact, but will not deliver power back to the grid.
4. Tap **OK** to confirm your settings.

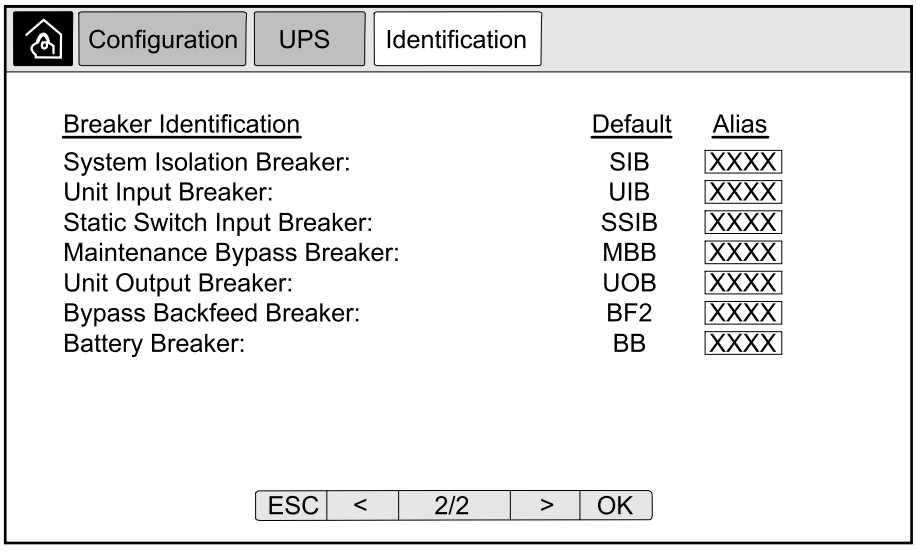
Set the UPS Identification

NOTE: User Defined Name and **User Defined Location** must be configured via the network management interface. For more information see Access a Configured Network Management Interface, page 55.

1. From the home screen on the display select **Configuration > UPS > Identification**.
2. Select to have the UPS identified via **Model Name**, **User Defined Name** or **User Defined Location**.



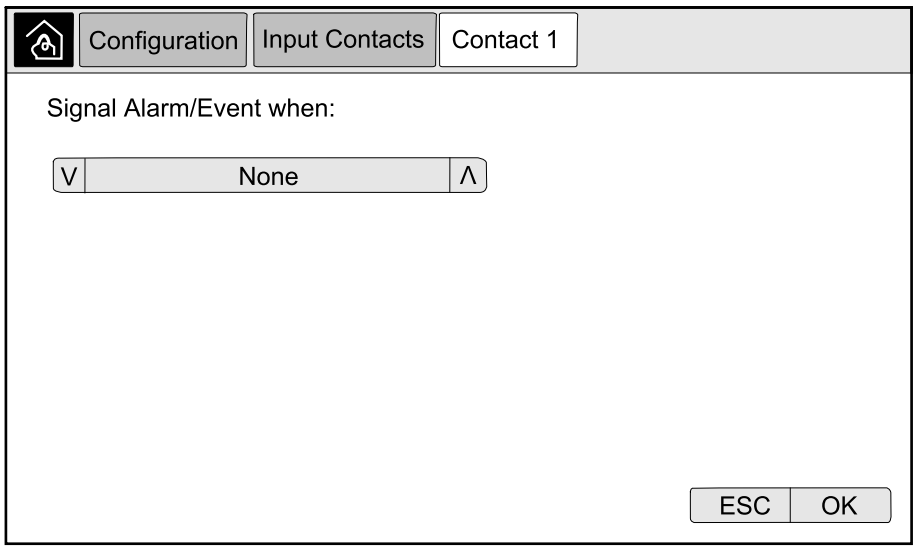
3. Tap arrow to the right to go to the next configuration screen.
4. Tap the text box and type a name for the individual breakers or keep the default settings. The alias is limited to four characters.



5. Tap **OK** to confirm your settings.

Configure the Input Contacts

1. On the display select **Configuration > Input Contacts** and select the input contact that you wish to configure.



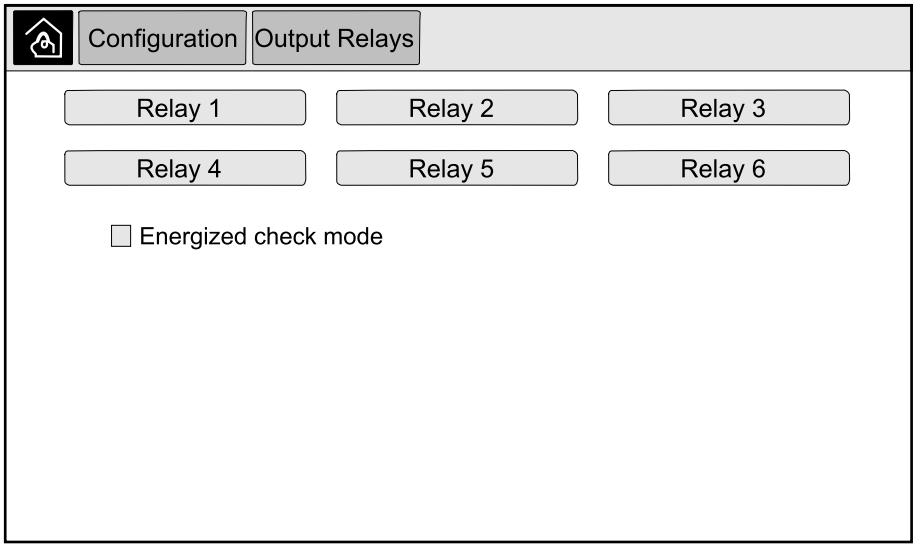
2. Choose between the below options:

Custom Input 1: General purpose input.	**External Battery Monitoring Detected Fault**: Input to indicate that the external battery monitor has detected a fault.
Custom Input 2: General purpose input.	**Battery Room Ventilation Inoperable**: Input to indicate that the battery room ventilation is inoperable. When the input is active, the battery charger will turn off.
Ground fault: Input to indicate that a ground fault is present.	**Supplied By Genset**: Input to indicate that the UPS is running on generator. The battery charge current will be reduced to the value set by Schneider Electric during start-up.
Inhibit Transfer from Static Bypass: When this input is active, and the system enters requested static bypass or forced static bypass, the system will be locked in static bypass as long as the input is active.	**External energy storage: minor alarm**: Input to indicate that the external energy storage monitor reports a minor alarm.
External energy storage: major alarm: Input to indicate that the external energy storage monitor reports a major alarm.	**Force the Charger to Turn Off**: Input that forces the charger to turn off.
Flywheel inoperable: Input to indicate that the flywheel is inoperable.	**Disable High Efficiency Mode**: Input to disable the use of high efficiency mode
Request bypass operation: Input that will transfer the UPS into requested static bypass operation if the conditions for a transfer are met.	**Force battery operation**: Input that will force a transfer to battery operation.
Distributed Energy Reserve: Input that will activate **Distributed Energy Reserve** mode.	**DC ground fault present**: Input that will activate the alarms for DC ground fault.
Command the UPS to inhibit bypass transfer: Input that will inhibit the UPS from transferring to bypass operation.	

3. Tap **OK** to save your settings.

Configure the Output Relays

1. On the display select **Configuration > Output Relays**.
2. Select to enable or disable **Energized check mode**.
   – When **Energized check mode** is enabled the output relays are ON. If a signal is received or the power supply to the relay is lost, the circuit will open and the relay will be deactivated.
   – When **Energized check mode** is disabled the output relays are OFF. If a signal is received, the circuit will close and the relay will be activated.



3. Select the output relay that you wish to configure.

4. Select the function that you wish to use the specific output relay for from the list below:

Common Alarm: The output is triggered when any alarm is present.	**Normal Operation**: The output is triggered when the UPS is running in normal operation.
Battery Operation[2]: The output is triggered when the UPS is running in battery operation.	**Maintenance Bypass**[3]: The output is triggered when the UPS is running in maintenance bypass operation.
Static Bypass[2]: The output is triggered when the UPS is running in forced static bypass operation or requested static bypass operation.	**High Efficiency Mode**: The output is triggered when the UPS is running in eConversion or ECO mode.
Output Overload: The input is triggered when there is an overload condition.	**Fan Inoperable**: The output is triggered when one or more fans are inoperable.
Battery is not Working Correctly[2]: The output is triggered when the batteries are not working correctly.	**Battery Disconnected**[2]: The output is triggered when the batteries have been disconnected or the battery breaker(s) are open.
Battery Voltage Low[2]: The output is triggered when the battery voltage is below the threshold.	**Input Out of Tolerance**: The output is triggered when the input is out of tolerance.
Bypass Out of Tolerance[3]: The output is triggered when the bypass is out of tolerance.	**UPS Warning**: The output is triggered when a warning alarm is present.
UPS Critical: The output is triggered when a critical alarm is present.	**Parallel Redundancy Lost**: The output is triggered when the specified redundancy has been lost.
External Fault: The output is triggered when a fault external to the UPS is present.	**UPS Maintenance Mode**: The output is triggered when the unit output breaker (UOB) is open.
System Warning: The output is triggered when a warning alarm is present in a parallel system.	**System Critical**: The output is triggered when a critical alarm is present in a parallel system.
System Common Alarm: The output is triggered when any alarm is present in a parallel system.	**Emergency power off activated**: The output is triggered when the EPO has been activated.
Transfer to static bypass disabled	**UPS informational alarm**: The output is triggered when an information alarm is present.
System informational alarm: The output is triggered when an information alarm is present in a parallel system.	

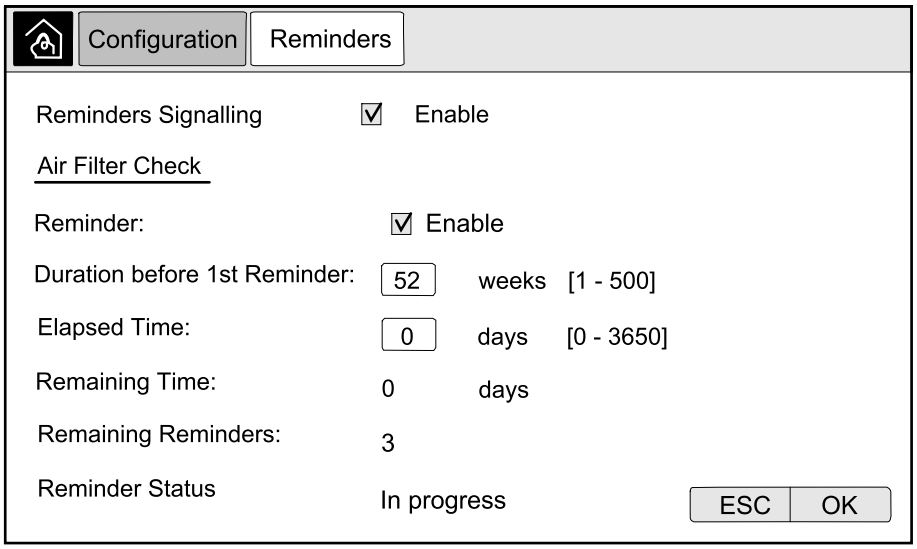
5. Set the delay in seconds for the specific output to activate. Select a value between 0 and 60 seconds.
6. Tap **OK** to save your settings.

2. Not available when operating as a frequency converter without batteries.
3. Not available when operating as a frequency converter.

Configure Reminder Settings

When the air filters have been replaced, the reminders settings must be updated.

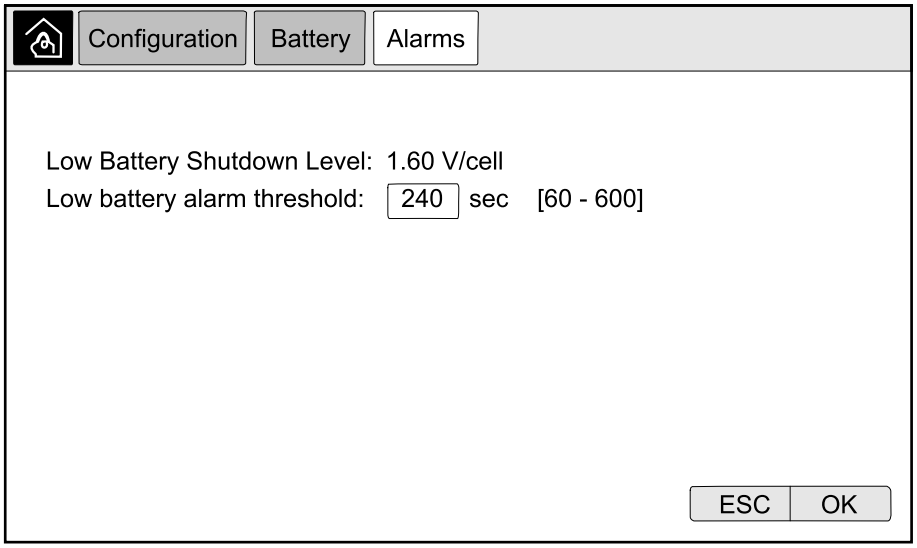
1. From the home screen on the display select **Configuration > Reminders**.



2. Configure the following settings:
   a. **Reminders Signalling**: Select **Enable** to enable the display of all reminders.
   b. **Reminder**: Select **Enable** to enable the display of reminders for air filter replacement.
   c. **Duration before 1st Reminder**: Set the time in weeks before the first reminder is shown.
   d. **Elapsed Time**: Manually set the number of days that the air filters have been used.
3. Tap **OK** to confirm your settings.

Configure Battery Alarm Threshold

1. From the home screen on the display select **Configuration > Battery > Alarms**.

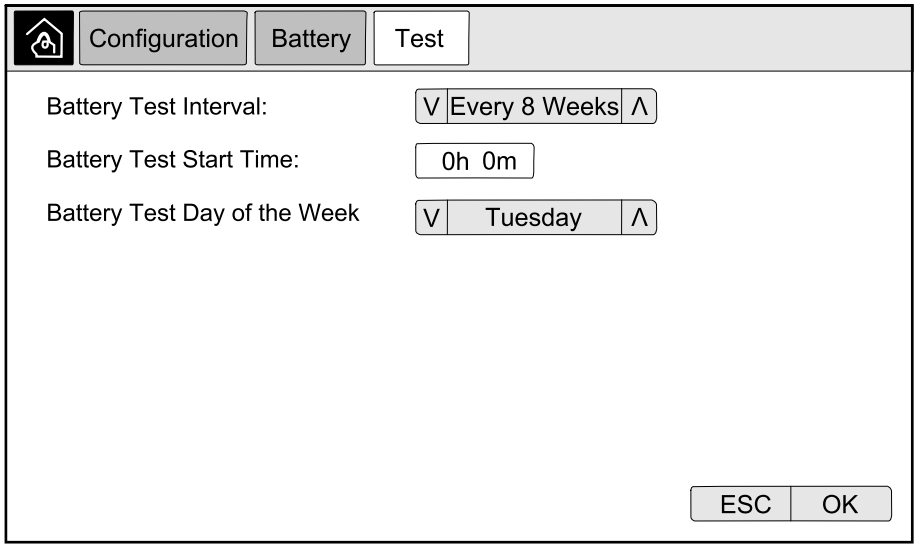


2. Select your preferred battery alarm threshold in seconds. Select a value between 60 and 6000 seconds and complete with **Enter**.

3. Tap **OK** to confirm your setting.

Configure Automatic Battery Test

1. From the home screen on the display select **Configuration > Battery > Test**.



2. Set your preferred settings for the automatic battery test:
   a. **Battery Test Interval**: Select your preferred interval for battery tests. Choose between: **Never**, **Every 52 Weeks**, **Every 26 Weeks**, **Every 12 Weeks**, **Every 8 Weeks**, **Every 4 weeks**, **Every 2 Weeks**, or **Once a Week**.

      NOTE: If you run battery tests too frequently it can reduce the lifetime of the batteries.

   b. **Battery Test Start Time**: Select the time of the day in 24 hour format that the test should take place and complete with **Enter**.

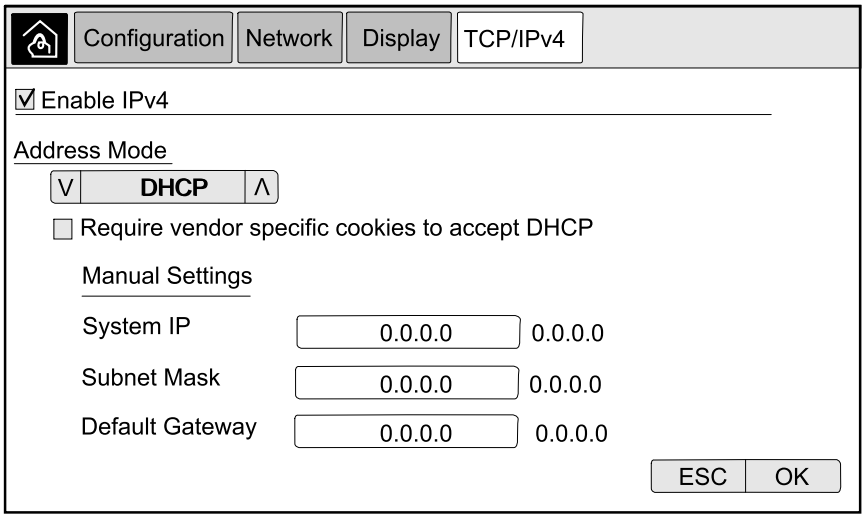
   c. **Battery Test Day of the Week**: Select the day of the week that the test should take place and complete with **Enter**.

3. When all settings have been completed, tap **OK** to confirm your settings.

Configure the Network

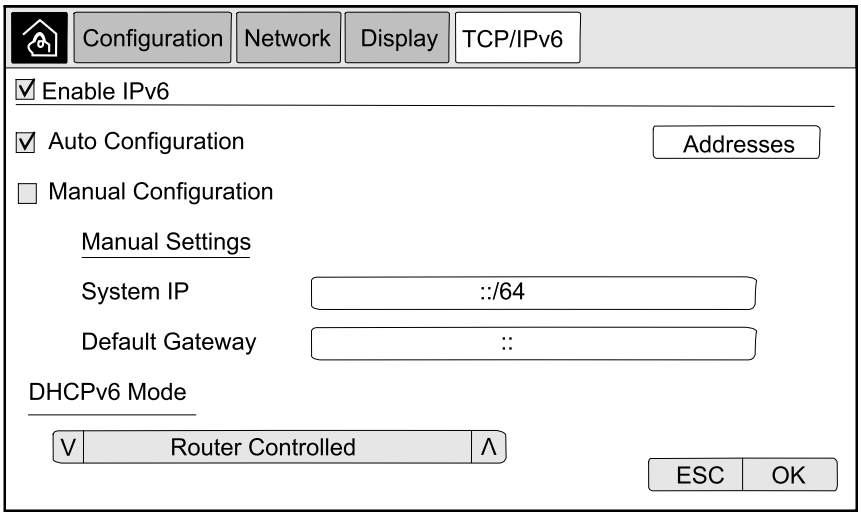
The network can be configured for the display and for the cards in Smart Slot 1 and Smart Slot 2.

1. From the home screen on the display select **Configuration > Network** and select either **Display**, **Smart Slot 1**, or **Smart Slot 2** if present.
2. Configure the following settings:
   a. **TCP/IPv4**: **Enable IPv4** (if applicable), and select the **Address Mode** (**Manual**, **DCHP**, or **BOOTP**).



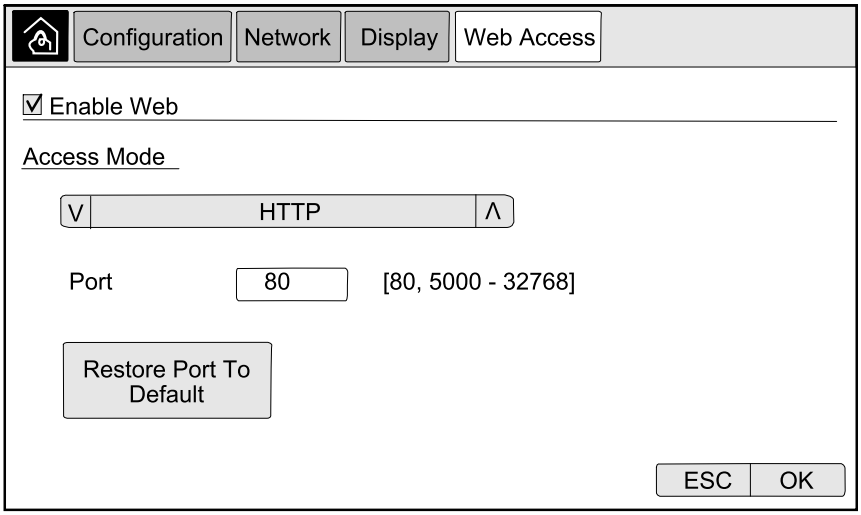
b. **TCP/IPv6**: **Enable IPv6** (if applicable), select **Auto Configuration** or **Manual Configuration**, and select the **DHCPv6 Mode** (**Router controlled**, **Non-Address Information Only**, **Never**, or **Address and Other Information**).

NOTE: Tap **Addresses** to see all valid IPv6 addresses.



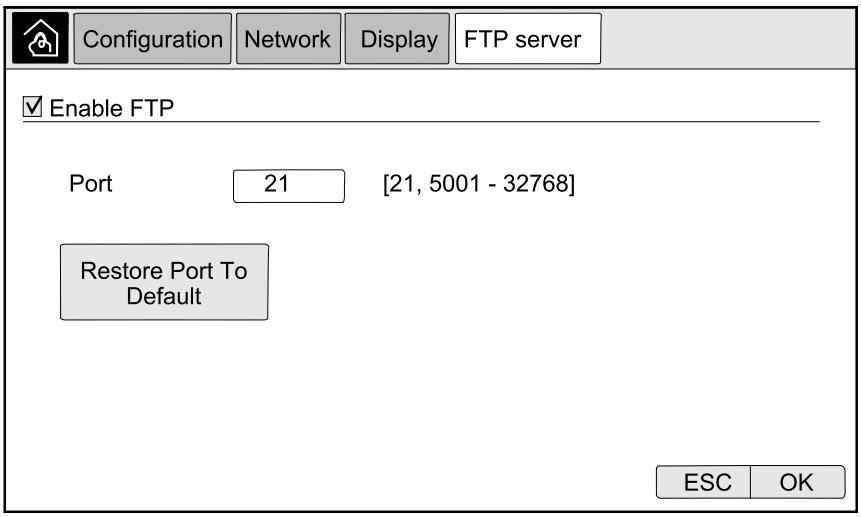
c. **Web Access**: **Enable Web** (if applicable) and select the **Access Mode** (**HTTP** or **HTTPS**).

NOTE: Not available for Smart Slots.



d. **FTP server**: **Enable FTP** (if applicable).

NOTE: Not available for Smart Slots.

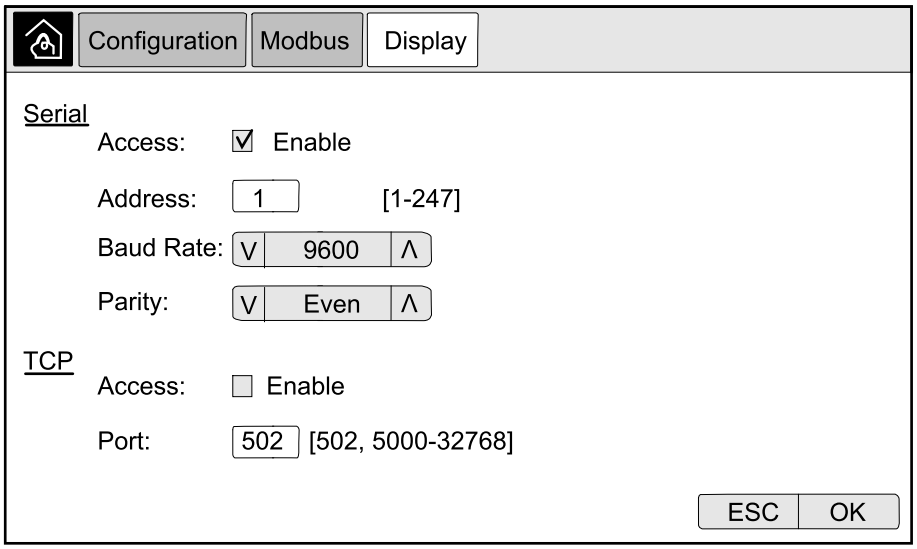


Configure the Modbus

The modbus can be configured for the display and for the cards in Smart Slot 1 and Smart Slot 2.

NOTE: Only the display and optional Network Management Card AP9635 can be used for serial modbus.

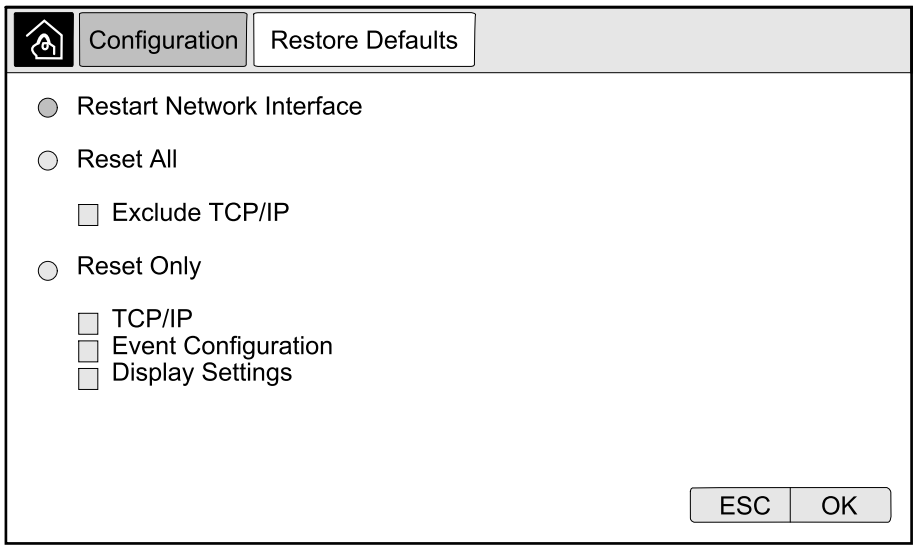
1. From the home screen on the display select **Configuration > Modbus** and select either **Display**, **Smart Slot 1**, or **Smart Slot 2**.
2. Configure the modbus by enabling **Serial** or **TCP** access, and adding the needed values.



3. Tap **OK** to confirm your settings.

Restore Default Configuration

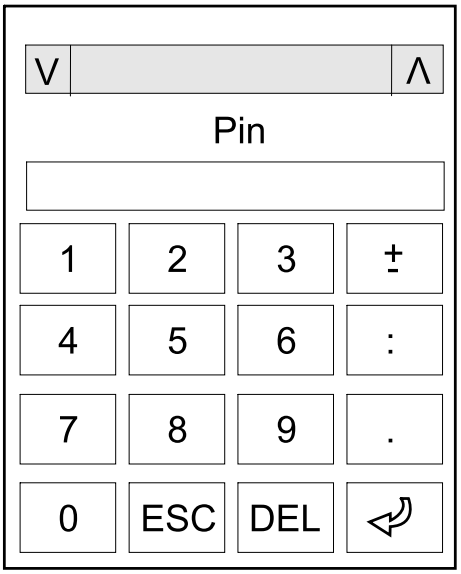
1. From the home screen on the display select **Configuration > Restore Defaults**.



2. Select one of the below options:
   - **Restart Network Interface**: Select this option to restart network interface.
   - **Reset All**: Select this option to reset all settings to default. You can select to leave out the TCP/IP settings from the reset procedure.
   - **Reset Only**: Select this option if you only wish to reset parts of the settings to default values. You can select to reset the following settings: **TCP/IP**, **Event Configuration**, and **Display Settings**.
3. When you have made your selection, tap **OK** to reset the selected settings to default.

Operation Procedures from the UPS Display

Access Password-Protected Screens



1. When prompted for the password, select your username.
2. Type in the pin code for your username.

   NOTE: The default pin code is 1234.
3. Change the password. For more information see .

View the System Status Information

NOTE: The display does not show real time data, and a comparison between the display and an external power analyzer will not show the same data. Please allow for a tolerance of ± 1% for voltages, ± 3% for power, and ± 3% for currents.

1. From the home screen on the display select **Status**.

2. Select the area for which you wish to see the status. Choose between:

Input

Voltage (phase-to-neutral)[4]	The present phase-to-neutral input voltage in volts (V).
Current	The present input current from the AC utility power source per phase in amperes (A).
Maximum RMS Current	The maximum current for the latest 30 days.
Apparent Power	The present apparent power input for each phase in kVA. Apparent power is the product of RMS (root mean square) volts and RMS amperes.
Active Power	The present active power (or real power) input for each phase in kilowatts (kW). Active power is the portion of power flow that, averaged over a complete cycle of the AC waveform, results in net transfer of energy in one direction.
Power Factor	The ratio of the active power to apparent power.
Voltage (phase-to-phase)	The present phase-to-phase input voltage.
Total Apparent Power	The present total apparent power input (for all three phases) in kVA.
Total Active Power	The present total active power input (for all three phases) in kW.
Frequency	The present input frequency in hertz (Hz).
Energy	The total energy consumption since the time of installation or since the number was reset.

Output

Voltage (phase-to-neutral)[4]	The phase-to-neutral output voltage at the inverter in volts (V).
Current	The present output current for each phase in amperes (A).
Maximum RMS Current	The maximum current for the latest 30 days.
Apparent Power	The present apparent power output for each phase in kVA. Apparent power is the product of RMS (root mean square) volts and RMS amperes.
Active Power	The present active power (or real power) output for each phase in kilowatts (kW). Active power is the portion of power flow that, averaged over a complete cycle of the AC waveform, results in net transfer of energy in one direction.
Power Factor	The present output power factor for each phase. Power factor is the ratio of active power to apparent power.
Current Crest Factor	The present output crest factor for each phase. The output crest factor is the ratio of the peak value of the output current to the RMS (root mean square) value.
Current THD	The THD (total harmonic distortion) for each phase, as a percentage, for the present output current.
Voltage (phase-to-phase)	The phase-to-phase output voltage at the inverter in volts (V).
Total Apparent Power	The present apparent power output for each phase in thousands of Volt-Amps (kVA). Apparent power is the product of RMS (root mean square) volts and RMS amperes.
Total Active Power	The present total active output power (for all three phases) in kilowatts (kW).
Load	The percentage of the UPS capacity presently used across all phases. The load percentage for the highest phase load is displayed.
Neutral Current[4]	The present output neutral current in amperes (A).
Frequency	The present output frequency in hertz (Hz).
Inverter Status	The general condition of the inverter.
PFC Status	The general condition of the PFC.
Energy	The total energy supplied since the time of installation or since the value was reset.

Bypass

Voltage (phase-to-neutral)[4]	The present phase-to-neutral bypass voltage (V).
Current	The present bypass current for each phase, in amperes (A).

4. Only applicable in systems with neutral connection.

Bypass (Continued)

Maximum RMS Current	The maximum current for the latest 30 days.
Apparent Power	The present apparent bypass power for each phase in kVA. Apparent power is the product of RMS (root mean square) volts and RMS amperes.
Active Power	The present active bypass power for each phase in kilowatts (kW). Active power is the time average of the instantaneous product of voltage and current.
Power Factor	The present bypass power factor for each phase. Power factor is the ratio of active power to apparent power.
Voltage (phase-to-phase)	The present phase-to-phase bypass voltage (V).
Total Apparent Power	The present total apparent bypass power (for all three phases) in thousands of Volt-Amps (kVA).
Total Active Power	The present total active bypass power (for all three phases) in kilowatts (kW).
Frequency	The present bypass frequency in hertz (Hz).

Battery

Voltage	The present battery voltage.
Current	The present battery current in amperes (A). A positive current indicates that the battery is charging; a negative current indicates that the battery is discharging.
Power	The present DC power being drawn from the battery, in kilowatts (kW).
Estimated Charge Level	The present battery charge, as a percentage of full charge capacity.
Estimated Charge Time	The estimated time, in minutes, until the batteries reach 100% charge.
Runtime Remaining	The amount of time in hours and minutes before the batteries reach the low-voltage shutdown level.
Charger Mode	The operation mode of the charger (Off, Float, Boost, Equalization, Cyclic, Test).
Battery Status	The general condition of the battery.
Charger Status	The general condition of the charger.
Total Battery Capacity	The total capacity available from the available batteries.
Temperature	The highest battery temperature from the connected temperature sensors.

Temperature

Ambient Temperature	Ambient temperature in degrees Celsius or Fahrenheit for the I/O cabinet and each power cabinet.

System

Output Voltage	The phase-to-phase output voltage at the inverter in volts (V).
Output Current	The present output current for each phase in amperes (A).
Output Frequency	The present output frequency in hertz (Hz).
Runtime Remaining	The amount of time in hours and minutes before the batteries reach the low-voltage shutdown level.
System Time	The time of the UPS system.
UPS Operation Mode	The operation mode of the operated UPS.
System Operation Mode	The operation mode of the complete UPS system.
Total Output Power	The apparent and active power (or real power) output for each phase.

System (Continued)

Overload Timer[5]	The time in seconds before the UPS changes to forced static bypass due to an overload condition on the system. **NOTE:** The system can be in an overload condition even though the **Total Output Power** is below 100% if the load is not equally shared between the three phases.
Output Power	The phase-to-phase apparent and active power (or real power) output for each phase.

Parallel System

Input Current	The present phase-to-phase input current in amperes (A).
Output Current	The present phase-to-phase output current in amperes (A).
Bypass Current	The present phase-to-phase bypass current in amperes (A).
Parallel UPS Number	The parallel UPS number of the operated UPS.
Parallel system redundancy	The redundancy for the parallel system.
Number of Parallel Units	The total number of UPSs in the parallel system.
Parallel Units	The numbers of all UPSs in the parallel system.
Output Total Apparent Power	The present total apparent output power (for all three phases) in thousands of Volt-Amps (kVA).
Output Total Load	The percentage of the UPS system capacity presently used across all phases. The load percentage for the highest phase load is displayed.

Active Alarms

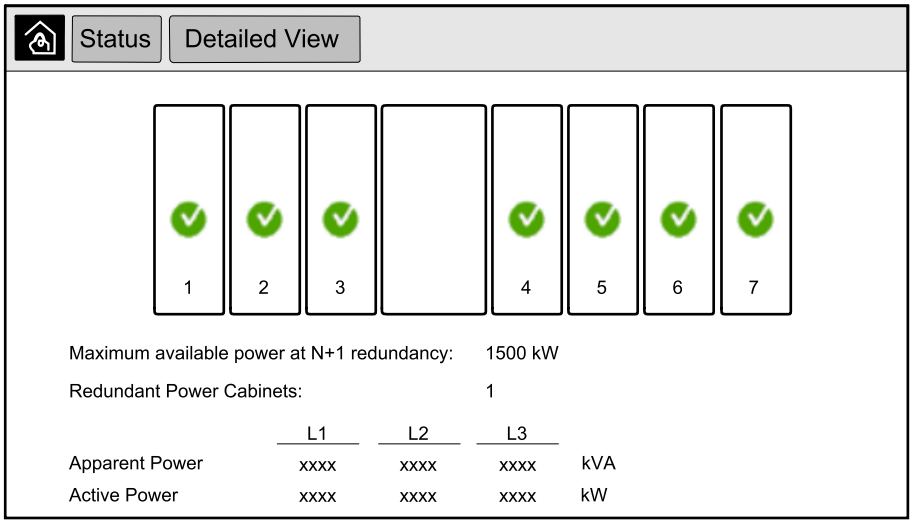
Active Alarms	For more information on active alarms, go to View the Active Alarms, page 62.

Mimic Diagram

Mimic Diagram	The mimic diagram shows the current status of the main parts of the UPS system: power sources, converters, bypass static switch and breakers, and it shows the power flow through the system.

Detailed View

Detailed view	The detailed view shows the system with a status icon on each individual power cabinet and the actual number of redundant power cabinets. The detailed view also shows the apparent power and active power per phase.



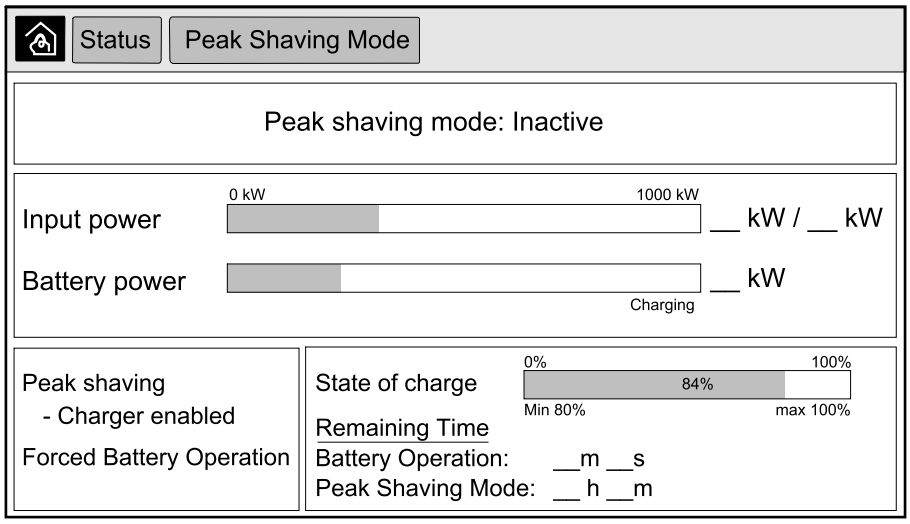
5. The overload timer is only visible when it is active.

Symbols on the Detailed View Screen

	Indicates that the power cabinet is operational and working correctly
	Indicates that there is an informational alarm.
	Indicates that the power cabinet redundancy has been lost and/or an alarm of severity level **Warning** is present in the power cabinet. The power cabinet is still operational.
	Indicates that the power cabinet is inoperable due to a critical event. The customer alarm **Power cabinet inoperable** is also displayed.

Peak Shaving Mode

Peak shaving mode	The status of the peak shaving mode — **Active** or **Inactive**
Input power	The present input power (kW).
Battery power	The present battery power (kW). The bar is green when the batteries are charging and yellow when the batteries are discharging.
Peak shaving	Indicates if the charger is **enabled** or **disabled** and if forced battery operation is **enabled** or **disabled**.
State of charge	The current charge status of the batteries.
Remaining time	The remaining time in battery operation and peak shaving mode.



3. Tap the home button to exit the screens and return to the home screen.

Start Up Single System from Maintenance Bypass Operation

Use this procedure to start up a single system from maintenance bypass operation with the load supplied through the MBB and all other breakers open.

NOTE: Only operate a breaker when the associated breaker LED is green.

1. Close the unit input breaker UIB.

   This will power up the display interface after approximately 30 seconds.

2. From the home screen on the display, select **Control > Startup Wizard**. Select **Startup from Maintenance Bypass** and follow the steps which appear on the screen.

   The following is a generic start-up procedure. Always follow the steps of the **Startup Wizard** which are specific to your system.

3. Close the static switch input breaker SSIB.

4. Close the backfeed protection switch (BF2) (if present), if it is open.

5. Close the battery breakers in your specific battery solution.

6. Initiate transfer to static bypass by tapping the **Transfer Load to static bypass** button on the display interface.

   In systems with kirk-keys, the key is released from the solenoid key release unit.

   If the UPS system does not transfer to requested static bypass, go to **Status > Active Alarms** to see if there are active alarms that prevent the UPS system from transferring to static bypass.

7. In systems with kirk-keys, insert the key in the lock on the unit output breaker UOB and turn to unlock.

8. Close the unit output breaker UOB.

9. Open the maintenance bypass breaker MBB.

   The system automatically transfers to normal operation.

10. In systems with kirk-keys, turn the key in the lock of the maintenance bypass breaker MBB to lock open.

    The key is released.

11. In systems with kirk-keys, insert the key in the solenoid key release unit and turn to capture the key.

Shut Down Single System from Normal to Maintenance Bypass Operation

Use this procedure to shut down a single system to maintenance bypass operation with the load supplied through the MBB.

NOTE: Only operate a breaker when the associated breaker LED is green.

1. From the home screen on the display, select **Control > Shutdown Wizard**. Select **Shutdown ending in Maintenance Bypass** and follow the steps which appear on the screen.

   NOTE: The following is a generic shutdown procedure. Always follow the steps of the **Shutdown Wizard** which are specific to your system.

2. Initiate transfer to static bypass by tapping the **Transfer Load to static bypass** button on the display interface.

   In systems with kirk-keys, the key is released from the solenoid key release unit.

   If the UPS system does not transfer to requested static bypass, go to **Status > Active Alarms** to see if there are active alarms that prevent the UPS system from transferring to static bypass.

3. In systems with kirk-keys, insert the key in the lock on the maintenance bypass breaker MBB and turn to unlock.

4. Close the maintenance bypass breaker MBB.

   In systems with kirk-keys, the key is held in the lock.

5. Open the unit output breaker UOB.

6. In systems with kirk-keys, turn the key in the lock on the unit output breaker UOB to lock open.

   The key is released.

7. In systems with kirk-keys, insert the key in the solenoid key release unit and turn to capture the key.

8. Open the static switch input breaker SSIB.

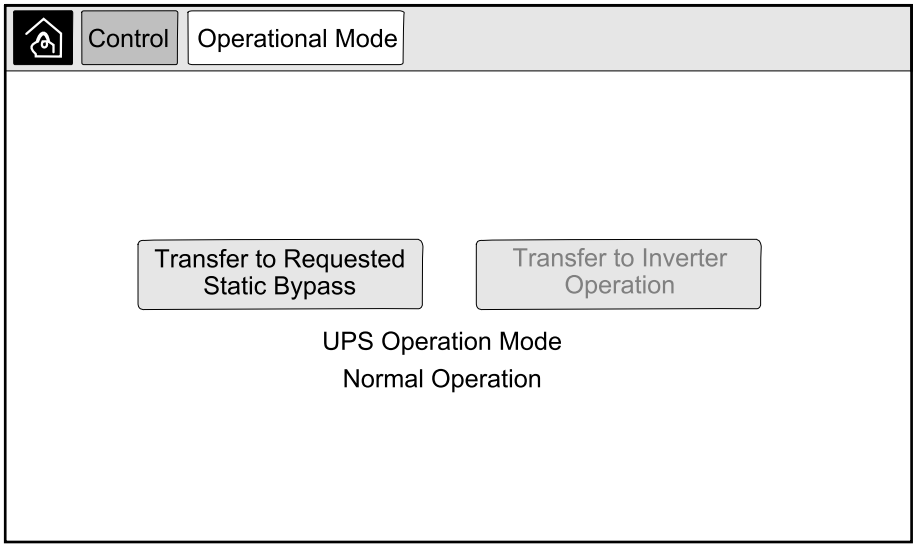
9. Initiate transfer to forced static bypass by tapping the Inverter OFF button on the front of the UPS system.

10. Open the battery breakers in your specific battery solution.

11. Open the unit input breaker UIB.

Transfer UPS from Normal to Requested Static Bypass Operation

1. From the home screen on the display select **Control > Operational Mode**.



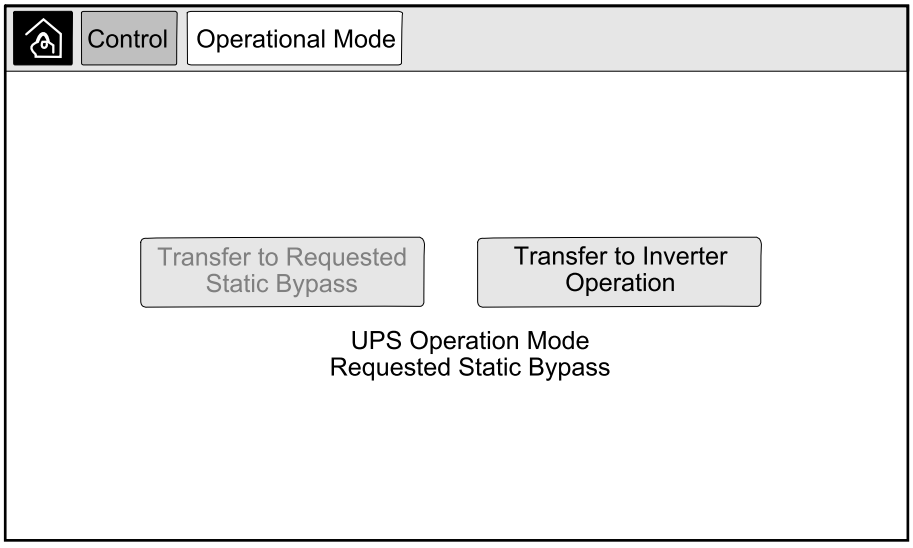
2. Tap the **Transfer to Requested Static Bypass** button.

   NOTE: If the conditions for performing a transfer are not met, the button will be grayed out.

3. Verify that the **UPS Operation Mode** changes to **Requested Static Bypass**.

Transfer UPS from Requested Static Bypass Operation to Normal Operation

1. From the home screen on the display select **Control > Operational Mode**.



2. Tap the **Transfer to Inverter Operation** button.

   NOTE: If the conditions for performing a transfer are not met, the button will be grayed out.

3. Verify that the **UPS Operation Mode** changes to **Normal Operation**.

Start Up Parallel System from Maintenance Bypass Operation

Use this procedure to start up a parallel system from maintenance bypass operation with the load supplied through the MBB and all other breakers open.

NOTE: Only operate a breaker when the associated breaker LED is green.

1. Close the unit input breaker UIB.

   This will power up the display interface after approximately 30 seconds.

2. From the home screen on the display, select **Control > Startup Wizard**. Select **Startup from Maintenance Bypass** and follow the steps which appear on the screen.

   NOTE: The following is a generic start-up procedure. Always follow the steps of the **Startup Wizard** which are specific to your system.

3. Close the static switch input breaker SSIB.
4. Close the backfeed protection switch (BF2) (if present), if it is open.
5. Close the battery breakers in your specific battery solution.
6. Initiate transfer to static bypass by tapping the **Transfer Load to static bypass** button on the display interface.

   In systems with kirk-keys, the key is released from the solenoid key release unit.

   If the UPS system does not transfer to static bypass, go to **Status > Active Alarms** to see if there are active alarms that prevent the UPS system from transferring to static bypass.

7. Close the unit output breaker UOB.
8. Repeat steps 1 to 7 for the remaining UPS units in the parallel system before continuing.
9. In systems with kirk-keys, insert the key from the solenoid key release unit in the lock on the system isolation breaker SIB and turn to unlock.
10. Close the system isolation breaker SIB.
11. Open the maintenance bypass breaker MBB.

    The system automatically transfers to normal operation.

12. In systems with kirk-keys, turn the key in the lock of the maintenance bypass breaker MBB to lock open.

    The key is released.

13. In systems with kirk-keys, insert the key in the solenoid key release unit and turn to capture the key.

Shut Down Parallel System from Normal to Maintenance Bypass Operation

Use this procedure to shut down a parallel system to maintenance bypass operation with the load supplied through the MBB.

NOTE: Only operate a breaker when the associated breaker LED is green.

1. From the home screen on the display, select **Control > Shutdown Wizard**. Select **Shutdown ending in Maintenance Bypass** and follow the steps which appear on the screen.

   NOTE: The following is a generic shutdown procedure. Always follow the steps of the **Shutdown Wizard** which are specific to your system.

2. Initiate transfer to static bypass by tapping the **Transfer Load to static bypass** button on the display interface.

   In systems with kirk-keys, the key is released from the solenoid key release unit in the system bypass cabinet.

   If the UPS system does not transfer to requested static bypass, go to **Status > Active Alarms** to see if there are active alarms that prevent the UPS system from transferring to static bypass.

3. Close the maintenance bypass breaker MBB.

   In systems with kirk-keys, the key is held in the lock.

4. Open the system isolation breaker SIB.

5. In systems with kirk-keys, turn the key in the lock on the system isolation breaker SIB to lock open.

   The key is released.

6. In systems with kirk-keys, insert the key in the solenoid key release unit and turn to capture the key.

7. Perform the following steps for each UPS unit in the parallel system:

   a. Open the unit output breaker UOB.

   b. Open the static switch input breaker SSIB.

   c. Initiate transfer to forced static bypass by tapping the Inverter OFF button on the front of the UPS system.

   d. Open the battery breakers in your specific battery solution.

   e. Open the unit input breaker UIB.

Start Up and Add UPS to a Running Parallel System

Use this procedure to start up a UPS and add it to a running parallel system.

NOTE: Only operate a breaker when the associated breaker LED is green.

1. Close the unit input breaker UIB.

   This will power up the display interface after approximately 30 seconds.

2. From the home screen on the display, select **Control > Startup Wizard**. Select **Startup UPS into a parallel system** and follow the steps which appear on the screen.

   NOTE: The following is a generic start-up procedure. Always follow the steps of the Startup Wizard which are specific to your system.

3. Close the static switch input breaker SSIB.
4. Close the backfeed protection switch (BF2) (if present), if it is open.
5. Close the battery breakers in your specific battery solution.
6. Close the unit output breaker UOB.
7. Turn the inverter on by tapping the Inverter ON button on the front of the UPS.

Isolate this Single UPS from the Parallel System

Use this procedure to shut down one UPS in a running parallel system.

NOTE: Before initiating this procedure, ensure that the remaining UPS units can supply the load.

NOTE: Only operate a breaker when the associated breaker LED is green.

1. From the home screen on the display, select **Control > Shutdown Wizard**. Select **Shut down UPS in a parallel system** and follow the steps which appear on the screen.

   NOTE: The following is a generic shutdown procedure. Always follow the steps of the Shutdown Wizard which are specific to your system.

2. Turn off the UPS by pressing the Inverter OFF key on the front of the UPS.
3. Open the unit output breaker UOB.
4. Open the static switch input breaker SSIB.
5. Open the battery breakers in your specific battery solution.
6. Open the unit input breaker UIB.

Start-Up System Operating as Frequency Converters

Use this procedure to start up a single system, a parallel system working as frequency converters, or to start up a single frequency converter and add it into a running parallel system working as frequency converters.

NOTE: Only operate a breaker when the associated breaker LED is green.

1. Close the unit input breaker UIB.

   This will power up the display interface after approximately 30 seconds.

2. From the home screen on the display, select **Control > Startup Wizard**. Select **Startup from Off Operation** and follow the steps which appear on the screen.

   NOTE: The following is a generic startup procedure. Always follow the steps of the **Startup Wizard** which are specific to your system.

3. Close the battery breakers (if present).
4. Close the unit output breaker UOB.
5. Close the system isolation breaker SIB.
6. Tap **Turn Inverter On** on the display interface.

Shut Down System Operating as Frequency Converters

Use this procedure to shut down a single system, a parallel system operating as frequency converters.

NOTE: Only operate a breaker when the associated breaker LED is green.

1. From the home screen on the display, select **Control > Shutdown Wizard**. Select **Shutdown ending in Off Operation** and follow the steps which appear on the screen.

   NOTE: The following is a generic shutdown procedure. Always follow the steps of the **Shutdown Wizard** which are specific to your system.

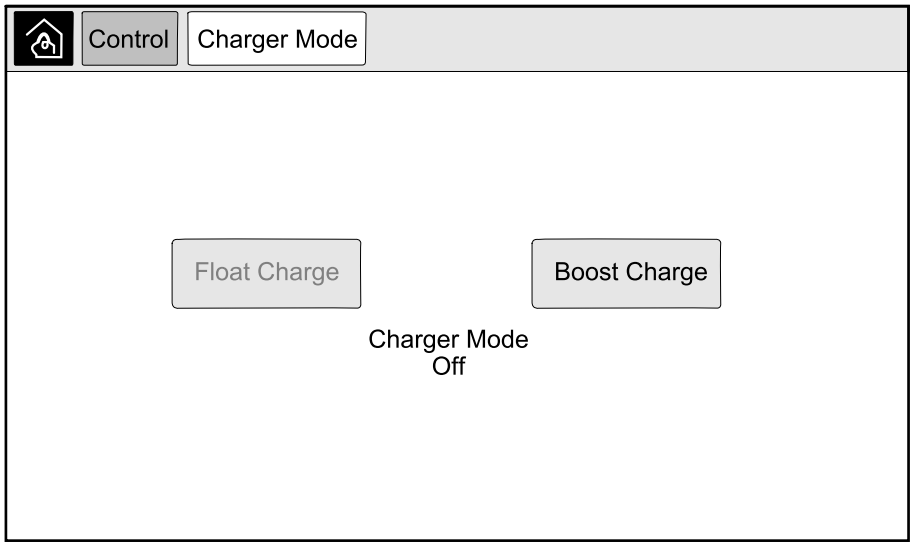
2. Open the unit output breaker UOB.
3. Open battery breakers (if present).
4. Open the unit input breaker UIB.
5. Repeat steps 1 to 4 on each Galaxy VX in the parallel system.
6. Open the system isolation breaker (if present).

Start a Boost Charge of the Batteries

Boost charge gives the possibility of doing a fast recharge of a discharged battery.

NOTE: Boost charge must be enabled by Schneider Electric during start-up for this option to be available.

1. From the home screen on the display select **Control > Charger Mode**.



2. Select **Boost Charge** to initiate a single boost charge of the batteries.

   The UPS system starts boost charging the batteries.

   To stop the boost charge and go back to float charge, select **Float Charge**.

Access a Configured Network Management Interface

The below procedure describes how to access the network management interface from a web interface. It is also possible to use the following interfaces:

- Telnet and SSH
- SNMP
- FTP
- SCP

NOTE: Ensure that only one network management interface in the entire system is set to synchronize time.

Use Microsoft Internet Explorer® 7.x or higher on Windows operating systems only or Mozilla® Firefox® 3.0.6 or higher on all operating systems to access the web interface of the network management interface. Other commonly available browsers may work but have not been fully tested.

You can use either of the following protocols when you use the web interface:

- The HTTP protocol, which provides authentication by user name and Pin but no encryption.
- The HTTPS protocol, which provides extra security through Secure Socket Layer (SSL); encrypts user names, Pin, and data being transmitted; and authenticates Network Management Cards by means of digital certificates.

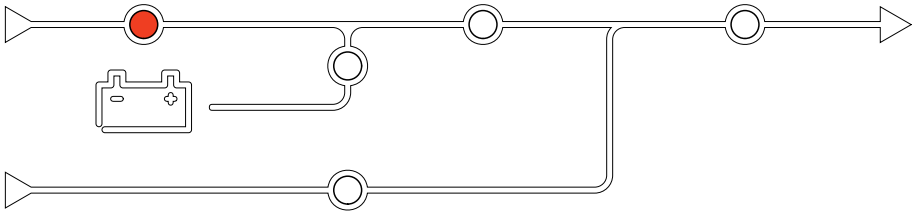
1. Access the network management interface by its IP address (or its DNS name, if a DNS name is configured).
2. Enter the user name and password.
3. To enable or disable the HTTP or HTTPS protocol, use the **Network** menu on the **Administration** tab, and select the **Access** option under the **Web** heading on the left navigation menu.

Troubleshooting from the UPS

Troubleshooting via the Mimic Diagram LEDs

The mimic diagram shows the status of the main functions and the energy flow supplying the load. The different LEDs are either green, red or turned off depending on the status of the system functions. In this section it is listed what a red LED on the mimic diagram is indicating to help troubleshooting.

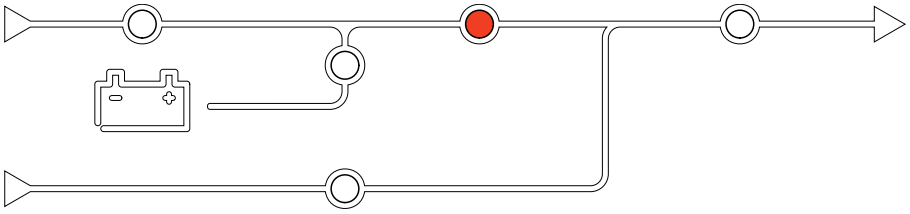
Input LED



If the input LED is red, it can be caused by the following:

- UIB is open
- Input out of tolerance (waveform-, voltage-, or frequency out of tolerance)

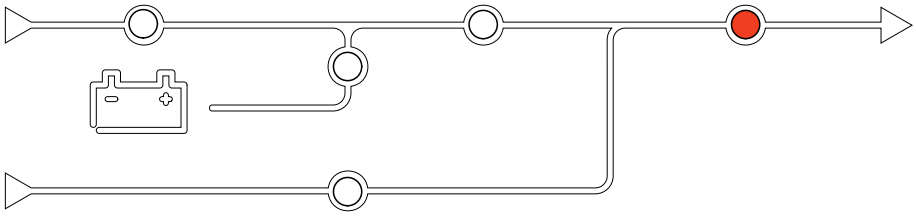
Inverter LED



If the inverter LED is red, it can be caused by the following:

- Inverter inoperable

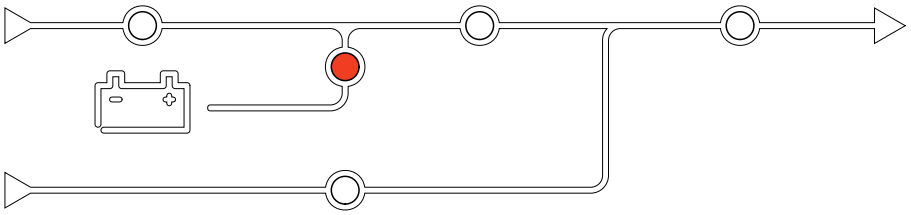
Load LED



If the load LED is red, it can be caused by the following:

- UOB is open
- SIB is open
- Output voltage out of tolerance

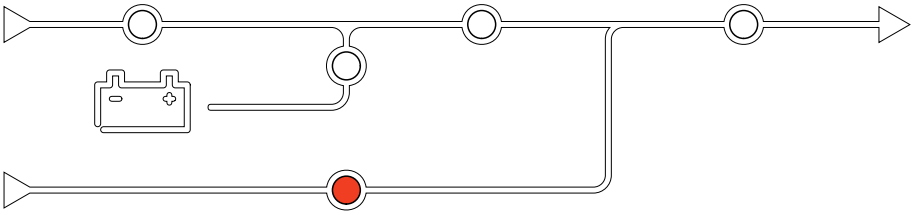
Battery LED



If the Battery LED is red, it can be caused by the following:

- Critical battery alarm active
- Charger inoperable
- Battery breaker disconnected

Bypass LED



If the bypass LED is red, it can be caused by the following:

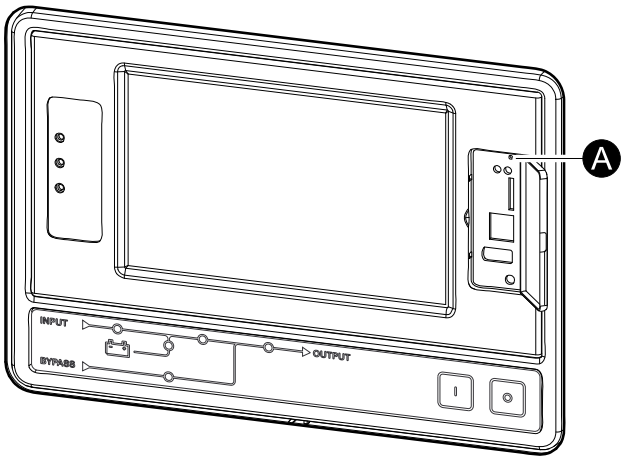
- SSIB is open
- Static bypass switch inoperable
- Bypass out of tolerance
- BF2 (if present) is open

Reboot the Display

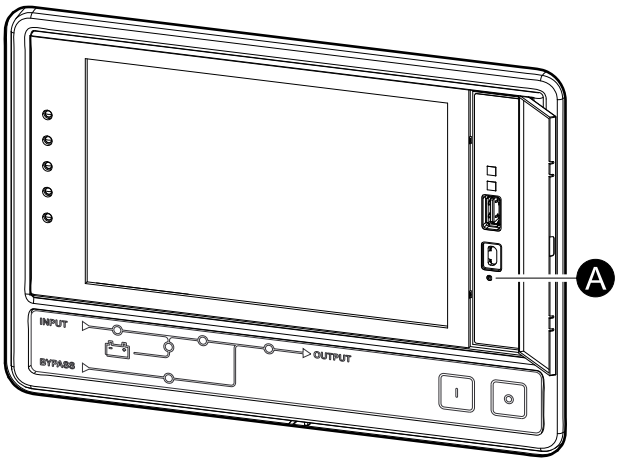
NOTE: A reboot of the display does not impact the settings made.

1. Open the shutter door on the front right side of the display.
2. Press the reboot button (A) with a pointed object like a pen or a paper clip.

Display Model 1



Display Model 2



The display is rebooted.

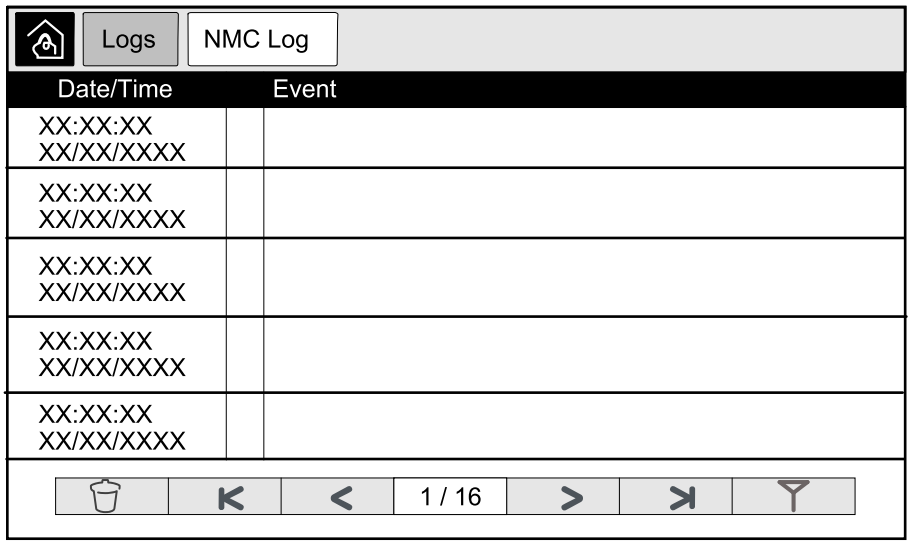
Logs

There are two types of logs:

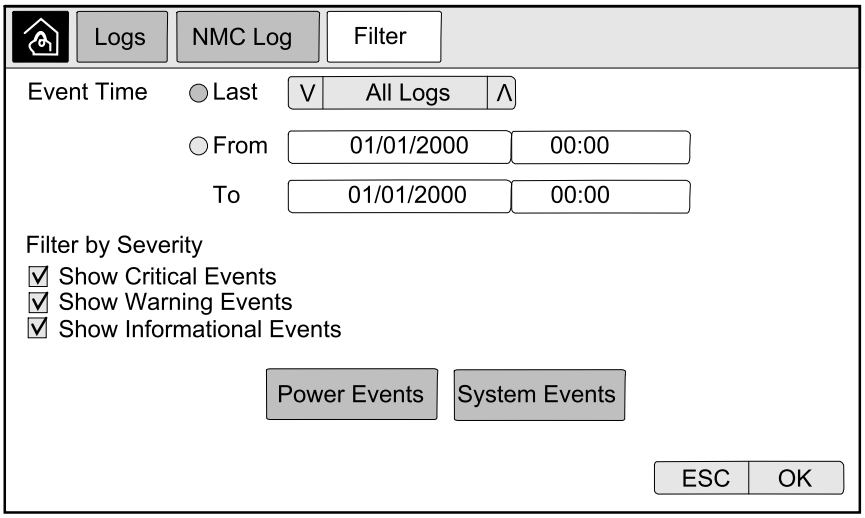
- NMC Log: Contains information about the display and network activities.
- UPS Log: Contains information about the system status and operation modes.

View the NMC Log

1. From the home screen on the display select **Logs > NMC Log**.
2. You can browse through the list of the events using the arrows.



3. You can now perform the following operations in the event log:
   a. Tap the filter button to filter the events. Different filter settings are available, including:



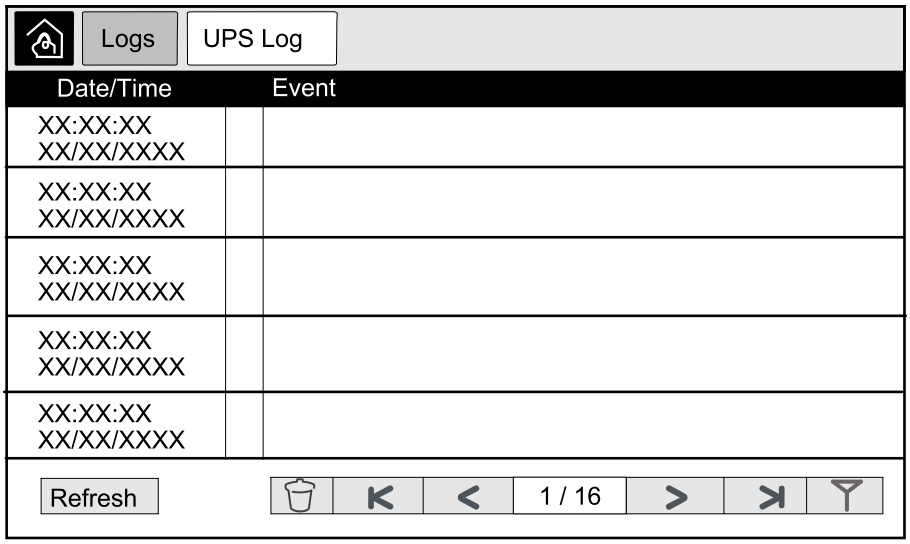
   Filters for **Power Events**: **Communication**, **Device**, **Output**, **Input**, **Battery**, **UPS Operation Mode**, **Parallel System**, **Reminders**, **Switchgear**, and/or **RFC 1628 MIB**.

   Filters for **System Events**: **Mass Configuration** and/or **Security**.

   b. Tap the recycle bin button to clear the event log and select **Yes** to confirm.
4. Tap the home button to exit the log.

View the UPS Log

1. From the home screen on the display select **Logs > UPS Log**.



2. You can now browse through the list of the UPS events using the arrows.
3. You can perform the following operations in the UPS log:
   a. Tap the filter button to filter the events. Different filter settings are available, including:

      Filters for **Power Events**: **Communication**, **Device**, **Output**, **Input**, **Battery**, **UPS Operation Mode**, **Parallel System**, **Reminders**, **Switchgear**, and/or **RFC 1628 MIB**.

      Filters for **System events**: **Mass Configuration** and/or **Security**.

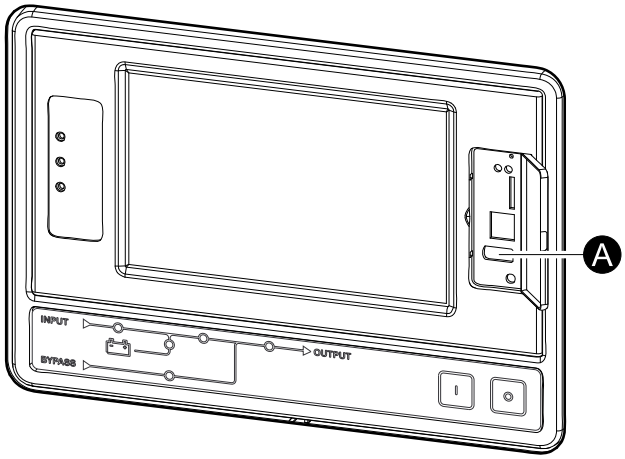
   b. Tap the recycle bin button to clear the UPS log and select **Yes** to confirm.
4. Tap the home button to exit the log.

Export Data from Logs

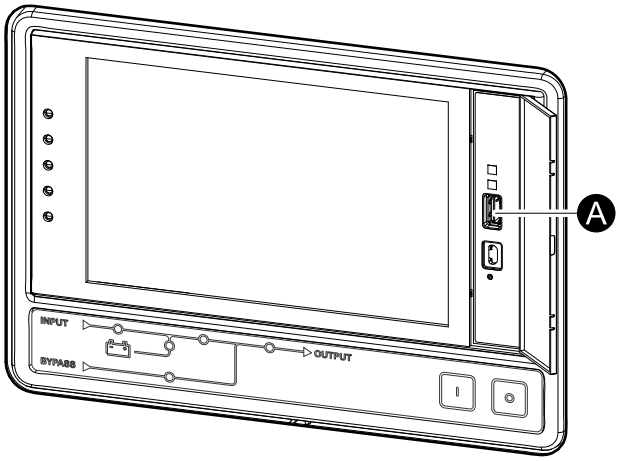
The exported log can only be used by Schneider Electric customer support for analysis.

1. From the home screen on the display select **Logs > Export Data**.
2. Insert a USB device in the USB port (A) located on the front of the display.

Display Model 1



Display Model 2



3. Tap the **Start Data Export** button.

   When the download is complete, the following message will be shown on the screen: **Data Exported Successfully. Remove USB device**.
4. Remove the USB device and tap the home button to exit the screen.
5. The exported data on the USB device can now be sent to Schneider Electric support for analyzing.

View the Active Alarms

When there is an active alarm in the system, a symbol indicating the alarm level is shown in the top right corner of the screen and the buzzer is active.

1. From the home screen on the display select **Status > Active Alarms**. Tapping the display will also silence the buzzer temporarily without login. By logging in and tapping the display, the buzzer will be silenced permanently.
2. You can now browse through the list of active alarms using the left and right arrows.
3. Tap the **Refresh** button to update the list with the latest active alarms.

Alarm Levels

There are three alarm levels:

- Critical: Take immediate action and call Schneider Electric.
- Warning: The load remains supported, but action must be taken. Call Schneider Electric.
- Informational: No immediate action required. Check the cause of the alarm as soon as possible.

Alarm Messages

Alarm/ Event	Severity	Display Text	Description	Corrective Action Text
Alarm	Warning	**Abnormal state at input contact zone A**	An abnormal state exists for integrated Environmental Monitor input contact zone A.	Please check the environment
Alarm	Warning	**Abnormal state at input contact zone B**	An abnormal state exists for integrated Environmental Monitor input contact zone B.	Please check the environment
Alarm	Warning	**Air Filter technical check recommended**	The air filters need to be checked as preventive maintenance is recommended.	The Air Filters may need to be replaced.
Alarm	Warning	**Ambient temperature high**	Ambient temperature is high.	
Alarm	Warning	**Ambient temperature out of tolerance**	The ambient temperature out of tolerance.	
Alarm	Warning	**Batteries are discharging**	The load is drawing more power than the UPS can draw from the input, causing the UPS to draw power from the batteries.	
Alarm	Warning	**Battery breaker BB1 open**	Battery breaker BB1 is open.	
Alarm	Warning	**Battery breaker BB2 open**	Battery breaker BB2 is open.	
Alarm	Warning	**Battery breaker BB3 open**	Battery breaker BB3 open.	
Alarm	Warning	**Battery breaker BB4 open**	Battery breaker BB4 open.	
Alarm	Warning	**Battery capacity is below minimum acceptable level**	The battery capacity is below the minimum acceptable value according to UPS power rating. Risk of battery damage.	Change battery configuration and/ or add larger capacity battery
Event	Informational	**Battery breakers tripped**	To prevent the batteries deep discharging, the battery breakers have been tripped by the system.	Close the battery breakers manually.
Alarm	Warning	**Battery condition is poor**	Battery capacity is lower than 50%.	Batteries should be replaced.
Alarm	Warning	**Battery condition is weak**	Battery capacity is between 50% to 75%.	
Alarm	Warning	**Battery is below minimum acceptable runtime**	The battery runtime is below configured minimum acceptable value.	

Alarm/ Event	Severity	Display Text	Description	Corrective Action Text
Alarm	Critical	**Battery is not working correctly**	A battery is not working correctly.	Please contact Schneider Electric.
Alarm	Warning	**Battery room ventilation inoperable**	Input relay indicates that the battery room ventilation is not working correctly.	
Alarm	Warning	**Bypass backfeed breaker (BF2) open**	Bypass backfeed breaker (BF2) is open, and the UPS is prevented from running in normal operation.	
Alarm	Warning	**Breaker MBB closed**	Maintenance bypass breaker MBB is closed, feeding the load with unprotected power from bypass.	
Alarm	Warning	**Breaker SIB open**	System isolation breaker SIB is open, and system cannot feed the load.	
Alarm	Warning	**Breaker SSIB open**	Bypass static switch input breaker SSIB is open, making static bypass operation unavailable.	
Alarm	Warning	**Breaker UIB open**	Unit input breaker UIB is open, and the UPS is prevented from running in normal operation.	
Alarm	Warning	**Breaker UOB open**	Unit output breaker UOB is open, and UPS cannot feed the load.	
Alarm	Warning	**Bypass frequency out of tolerance**	Bypass input frequency is out of tolerance.	Check bypass input frequency and bypass input frequency setting.
Alarm	Warning	**Bypass phase missing**	Bypass input is missing a phase.	Check bypass input. Please contact Schneider Electric.
Alarm	Warning	**Bypass phase sequence incorrect**	The phase rotation on bypass input is incorrect.	Check bypass input. Please contact Schneider Electric.
Alarm	Warning	**Bypass voltage out of tolerance**	Bypass input voltage is out of tolerance and UPS is prevented from going into requested bypass mode.	
Alarm	Warning	**Charge power is reduced**	The battery charge power has been reduced.	The input for this functionality was activated, or the input current has reached the maximum limit. Please contact Schneider Electric.
Alarm	Warning	**Communication cable termination missing or damaged**	One or more communication cable terminators is/are missing or damaged.	
Alarm	Warning	**Confirm redundancy lost and/or transfer to Forced Static Bypass**	Off button has been pushed and user must confirm that the redundancy will be lost and/or system will transfer to Forced Static Bypass.	
Alarm	Warning	**Confirm Turn Load Off**	Off button has been pushed while inverter is on and with no bypass available. User must confirm that the UPS turns off the power to the load.	Confirm turn off either via display or by pushing the off button again.
Alarm	Informational	**Customer Input 1 activated**	Customer input relay 1 is activated.	
Alarm	Informational	**Customer Input 2 activated**	Customer input relay 2 is activated.	
Alarm	Warning	**Delayed transfer from battery to normal operation**	The delayed transfer from battery to normal operation is active.	
Alarm	Warning	**Display communication is lost**	Main Controller is unable to communicate with the display.	Please contact Schneider Electric.
Alarm	Warning	**Display firmware incompatibility detected**	The firmware of the display is detected as incompatible with the rest of the system.	Perform a firmware update.
Alarm	Critical	**EPO Switch Activated**	An emergency power off (EPO) switch is activated.	Deactivate the Emergency Power Off switch.

Alarm/ Event	Severity	Display Text	Description	Corrective Action Text
Alarm	Warning	**External battery monitoring detected fault**	Input relay indicates external battery monitoring detected fault	
Alarm	Critical	**External charger off command: activated**	Input relay for charger off is activated.	Please contact Schneider Electric.
Alarm	Critical	**External energy storage monitoring: major alarm**	Input relay indicates external energy storage monitoring has detected a major alarm.	Please contact Schneider Electric.
Alarm	Warning	**External energy storage monitoring: minor alarm**	Input relay indicates external energy storage monitoring has detected a minor alarm	Please contact Schneider Electric.
Alarm	Warning	**External sync frequency out of tolerance**	External sync frequency is out of tolerance.	Check external sync frequency.
Alarm	Warning	**External sync phase missing**	External sync is missing a phase.	Check External sync.
Alarm	Warning	**External sync phase sequence incorrect**	The phase rotation on external sync is incorrect.	Please contact Schneider Electric.
Alarm	Warning	**External sync temporarily disabled**	External sync has been temporarily disabled because UPS cannot lock and syncronize to the external sync source.	Check external sync
Alarm	Warning	**External sync voltage out of tolerance**	External sync voltage is out of tolerance and UPS is prevented from going into external sync mode.	
Alarm	Critical	**Fan inoperable**	UPS has one or more inoperable fans. Fan redundancy is lost.	
Alarm	Critical	**Firmware update - Incorrect UPS operation mode**	The UPS is no longer in the correct operation mode during firmware update. Risk of load drop.	Transfer UPS to maintenance bypass.
Alarm	Warning	**Firmware versions in parallel UPS units are not identical**	The firmware versions in parallel UPS units are not identical.	Firmware update all UPS units in the parallel system to the same version
Alarm	Critical	**Flywheel inoperable**	Input relay indicates that the flywheel is not working correctly.	
Alarm	Informational	**Forced battery operation activated**	Forced battery operation has been activated by user.	
Alarm	Critical	**General parallel system event**	The parallel system is not configured correctly or is not working correctly.	Please contact Schneider Electric.
Alarm	Informational	**Genset is supplying the UPS**	Input relay indicates that a genset is supplying the UPS.	
Alarm	Warning	**Ground fault detected**	Input relay indicates that a ground fault has been detected.	Please contact Schneider Electric.
Alarm	Warning	**High Battery Temperature Level**	The battery temperature is above the Alarm setting.	Check the battery temperature. A high temperature may decrease the battery lifetime.
Alarm	Informational	**High Efficiency Mode disabled**	High efficiency mode is disabled from an input relay.	
Alarm	Informational	**High efficiency mode has been disabled by the system**	High Efficiency Mode is disabled by the system as the maximum number of transitions has been exceeded.	Enable high efficiency mode again, or disable it permanently.
Alarm	Informational	**High efficiency mode is disabled due to bypass UTHD is above configured limit**	High efficiency mode is disabled due to bypass UTHD is above configured limit.	
Alarm	Warning	**High humidity threshold violation at remote sensor**	A high humidity threshold violation exists for integrated Environmental Monitor sensor.	Please check the environment.
Alarm	Warning	**High temperature threshold violation at remote sensor**	A high temperature threshold violation exists for integrated Environmental Monitor sensor.	Please check the environment.

Alarm/ Event	Severity	Display Text	Description	Corrective Action Text
Alarm	Warning	**Incorrect UPS configuration detected**	Incorrect UPS configuration detected.	
Alarm	Warning	**Input frequency out of tolerance**	Mains input frequency is out of tolerance.	Check input frequency and input frequency setting.
Alarm	Warning	**Input phase missing**	Input is missing a phase.	Check input. Please contact Schneider Electric.
Alarm	Warning	**Input phase sequence incorrect**	The phase rotation on input is incorrect.	Check input. Please contact Schneider Electric.
Alarm	Warning	**Input voltage out of tolerance**	Mains input voltage is out of tolerance.	
Alarm	Warning	**Inverter is Off due to a request by the user**	The inverter is off due to a request by the user.	
Alarm	Warning	**Inverter output is not in phase with bypass input**	The UPS inverter output is not in phase with the bypass input.	
Alarm	Warning	**Li-Ion AC Supply Breaker BMS: B1/BMS:B2 open**	One or both Li-Ion BMS AC Supply Breakers are open.	
Alarm	Warning	**Lost communication to remote sensor**	Lost the local network management interface-to-integrated Environmental Monitor.	Please check the environment.
Alarm	Warning	**Lost parallel redundancy**	The load exceeds limit for an N+x UPS in redundancy (x is the configurable parallel redundancy).	Reduce the load on the system.
Alarm	Warning	**Low Battery Temperature Level**	The battery temperature is below the Alarm setting.	
Alarm	Warning	**Low humidity threshold violation at remote sensor**	A low humidity threshold violation exists for integrated Environmental Monitor sensor.	Please check the environment.
Alarm	Warning	**Low temperature threshold violation at remote sensor**	A low temperature threshold violation exists for integrated Environmental Monitor sensor.	Please check the environment.
Alarm	Warning	**Magelis 10 inch display firmware incompatibility detected**	The firmware of the Magelis 10 inch display is detected as incompatible with the rest of the system.	Perform a firmware update.
Alarm	Warning	**Maintenance bypass breaker (MBB) closed**	Maintenance bypass breaker (MBB) is closed, feeding the load with unprotected power from bypass.	
Alarm	Warning	**Maximum humidity threshold violation at remote sensor**	A maximum humidity threshold violation exists for integrated Environmental Monitor sensor.	Please check the environment.
Alarm	Warning	**Maximum temperature threshold violation at remote sensor**	A maximum temperature threshold violation exists for integrated Environmental Monitor sensor.	Please check the environment.
Alarm	Informational	**Mega Tie is activated**	Dry contact input indicates that Mega Tie is activated.	
Alarm	Warning	**Minimum humidity threshold violation at remote sensor**	A minimum humidity threshold violation exists for integrated Environmental Monitor sensor.	Please check the environment.
Alarm	Warning	**Minimum temperature threshold violation at remote sensor**	A minimum temperature threshold violation exists for integrated Environmental Monitor sensor.	Please check the environment.
Alarm	Warning	**Modular battery breaker open**	Modular battery breaker is open.	
Alarm	Warning	**Modular battery cabinet is not working correctly**	Modular battery cabinet is not working correctly.	Check battery cabinet. Please contact Schneider Electric.
Alarm	Warning	**NMC 1 firmware incompatibility detected**	The firmware of the NMC in Smart Slot 1 is detected as incompatible with the rest of the system.	Perform a firmware update.

Alarm/ Event	Severity	Display Text	Description	Corrective Action Text
Alarm	Warning	**NMC 2 firmware incompatibility detected**	The firmware of the NMC in Smart Slot 2 is detected as incompatible with the rest of the system.	Perform a firmware update.
Alarm	Warning	**Not enough UPS units ready to turn on inverter**	One or more parallel UPS units have been requested to turn on inverter, but not enough UPS units are ready for system to enter inverter on operation.	Turn on inverter of more UPS units and/or check the setting "Minimum Number of UPS Required to Supply Load".
Alarm	Warning	**Output frequency out of tolerance**	Output frequency is out of tolerance.	Check output frequency and output frequency setting.
Alarm	Warning	**Output voltage out of tolerance**	The output voltage is out of tolerance.	
Alarm	Warning	**Overload on installation**	The load exceeds 100% of rated installation capacity.	Reduce load on system.
Alarm	Warning	**Overload on UPS due to high ambient temperature**	The load exceeds the rated capacity when running with high ambient temperature.	Reduce load on system or ambient temperature.
Alarm	Warning	**Overload on UPS present. Load below continuous overload threshold**	Reduce load on system or check for output short circuit.	The load exceeds 100% of rated capacity. Load is below the Continuous Overload threshold.
Alarm	Warning	**Overload or short circuit on UPS**	Reduce load on system or check for output short circuit.	The load exceeds 100% of rated capacity or there is a short circuit on the output.
Alarm	Warning	**Parallel communication lost on PBUS cable 1**	PBUS cable 1 may be damaged.	Replace parallel Cable 1.
Alarm	Warning	**Parallel communication lost on PBUS cable 2**	PBUS cable 2 may be damaged.	Replace parallel Cable 2.
Alarm	Warning	**Parallel mixed operation mode**	One or more parallel UPS units are operating in battery operation, while others are operating in normal operation.	
Alarm	Warning	**Parallel unit not present**	Main Controller is unable to communicate with parallel UPS X. The UPS might have been powered down or communication cables may be damaged.	
Alarm	Warning	**Power cabinet inoperable**	Power cabinet is inoperable.	Please contact Schneider Electric.
Alarm	Warning	**Power cabinet mixed operation mode**	One or more power cabinets are operating in battery operation, while others are operating in normal operation.	
Alarm	Warning	**Power cabinet redundancy lost**	The configured power cabinet redundancy is lost, either because the output load is too high, or because there are not enough power cabinets available.	Reduce the load on the system.
Alarm	Critical	**Power cabinet surveillance internal event detected**	Power Cabinet Surveillance detected an internal event.	Please contact Schneider Electric.
Alarm	Warning	**Requested Bypass command from input contact activated**	Requested Bypass command from input contact activated.	
Alarm	Critical	**Restricted air flow**	Restricted air flow.	This could be caused by a clogged air filter or other obstacle blocking air flow.
Alarm	Warning	**RTC backup battery is discharged**	The RTC backup battery is discharged or the time is not set correctly.	
Alarm	Critical	**Self-test - Did not pass**	Self-test did not complete correctly.	Check event log and active alarms for more details.
Alarm	Warning	**Startup recommended**	The product has been running overtime without startup.	Please contact Schneider Electric for secure startup.

Alarm/ Event	Severity	Display Text	Description	Corrective Action Text
Alarm	Critical	**Static bypass switch inoperable**	Static bypass switch is inoperable. UPS is prevented from going into static bypass operation.	Please contact Schneider Electric.
Alarm	Warning	**Static bypass switch warning**	The static bypass switch needs a technical check but is still fully operational.	Please contact Schneider Electric.
Alarm	Critical	**Surveillance detected fault**	Surveillance detected fault.	Please contact Schneider Electric.
Alarm	Warning	**Synchronization unavailable - system is freerunning**	The UPS is unable to synchronize to the bypass input, external source or parallel system.	
Alarm	Warning	**System isolation breaker (SIB) open**	System isolation breaker (SIB) is open, and system cannot feed the load.	
Alarm	Critical	**System locked in bypass operation**	The system is locked in bypass operation.	The system has toggled between inverter operation and bypass operation more than 10 times within 1 minute. Please activate on button to transfer back to normal operation.
Alarm	Critical	**System operation mode - Forced Static Bypass**	The system is in bypass in response to a critical event or an inverter off request.	
Alarm	Warning	**System operation mode - Maintenance Bypass**	The system load is supplied through Maintenance Bypass Breaker (MBB).	
Alarm	Critical	**System operation mode - Off**	The system output power is turned off.	
Alarm	Warning	**System operation mode - Requested Static Bypass**	The system is in bypass in response to the UPS front-panel or a user-initiated software command, typically for maintenance.	
Alarm	Critical	**System operation mode - Static Bypass Standby**	The system is in static bypass standby operation in response to a critical event or an inverter off request.	
Alarm	Warning	**Technical Check recommended**	The product and its batteries need to be checked as preventive maintenance is recommended.	Please contact Schneider Electric.
Alarm	Warning	**Transfer from battery to normal operation delay activated**	Input relay indicates that the transfer from battery to normal operation delay is activated.	
Alarm	Warning	**Unit input breaker (UIB) open**	Unit input breaker (UIB) is open, and the UPS is prevented from running in normal operation	
Alarm	Warning	**Unit output breaker (UOB) aux wiring not correct**	Unit output breaker (UOB) aux wiring is not correct.	Please check UOB aux wiring. Both circuits must connect to a normally open switch.
Alarm	Warning	**Unit output breaker (UOB) open**	Unit output breaker (UOB) is open, and UPS cannot feed the load.	
Alarm	Warning	**UPS locked in static bypass mode is activated**	Input relay for UPS locked in static bypass mode is activated.	
Alarm	Critical	**UPS configuration incorrect**	UPS is configured incorrectly.	Please contact Schneider Electric.
Alarm	Warning	**UPS operation mode - Battery**	On battery power in response to an input power problem.	
Alarm	Informational	**UPS operation mode - Battery Test**	On battery power in response to a test of the performance of the batteries.	
Alarm	Critical	**UPS operation mode - Forced Static Bypass**	The UPS is in bypass in response to a critical event or an inverter off request.	

Alarm/ Event	Severity	Display Text	Description	Corrective Action Text
Alarm	Informational	**UPS operation mode - Initialize**	The UPS is initializing.	
Alarm	Informational	**UPS operation mode - Inverter Standby**	The UPS is ready to enter battery operation but awaits permission from the system. UPS output is off.	
Alarm	Warning	**UPS operation mode - Maintenance Bypass**	The UPS load is supplied through Maintenance Bypass Breaker (MBB).	
Alarm	Critical	**UPS operation mode - Off**	The output power is turned off.	
Alarm	Warning	**UPS operation mode - Requested Static Bypass**	The UPS is in bypass in response to the UPS front-panel or a user-initiated software command, typically for maintenance.	
Alarm	Warning	**UPS operation mode - Static Bypass Standby**	The UPS is ready to enter static bypass but awaits permission from the system. UPS output is off.	
Alarm	Critical	**UPS settings reset to default**	Unit settings has been reset to default. The UPS is locked in off operation until settings are confirmed.	Please contact Schneider Electric.
Alarm	Warning	**Warranty expiring soon**	The product is reaching the end of warranty.	Please contact Schneider Electric.

Tests

The UPS system can perform the following tests to ensure correct performance of the system:

- **Battery Test**
- **Runtime Calibration**
- **Battery SPoT Mode**
- **Annunciators**
- **Display Calibration**

Perform a Battery Test

Prerequisites:

- The batteries must be more than 50% charged.
- The runtime available must be more than 4 minutes.
- The operation mode must be normal operation, eConversion, or ECO mode.
- The system operation mode must be normal, eConversion, or ECO mode.

This feature performs a number of tests on the batteries, such as fuse-blown check, weak battery detection. The test will discharge the battery, and use about 10% of the total capacity. Meaning if you have 10 minutes of runtime, the test will run for 1 minute. The **Battery Test** can be set up to run automatically in different time intervals (from weekly and up to once a year).

1. From the home screen on the display select **Tests > Battery Test**.
2. Tap the **Start Battery Self-Test** button.

   NOTE: If you wish to manually stop the battery self-test, tap the **Abort Battery Self-Test** button.

Perform a Runtime Calibration

This feature is used for calibrating the estimated remaining battery runtime value. In this test the UPS transfers to battery operation and the batteries are discharged to the low DC warning level. Based on the elapsed time and information about the load, the battery capacity can be calculated and the estimated runtime calibrated.

Schneider Electric recommends performing battery runtime calibration at start-up, when batteries are replaced, or when changes are made to the battery cabinets.

NOTICE

RISK OF EQUIPMENT DAMAGE

- During a runtime calibration the batteries will be at a very low level and therefore not capable of supporting your system load in case of a input power failure.
- Batteries will be discharged to 10% capacity and this will result in a low battery runtime after the calibration.
- Repeated battery testing or calibration can affect the lifetime of the battery.

Failure to follow these instructions can result in equipment damage.

Prerequisites:

- Batteries must be 100% charged.
- The load percentage must be at least 10% and must not change more than 20% during test.
- The bypass supply must be available.
- The operation mode must be normal operation, eConversion, or ECO mode.

- The system operation mode must be inverter, eConversion, or ECO mode.

1. From the home screen on the display select **Tests > Runtime Calibration**.
2. Tap the **Start Runtime Calibration** button.

   NOTE: If you wish to manually stop the runtime calibration, tap the **Abort Runtime Calibration** button.

Perform a Battery SPoT Mode Test

NOTE: Battery SPoT Mode test is only legal in some countries/areas. Please refer to local/national legislation.

Prerequisites:

- The unit output breaker UOB must be open
- The UPS operation mode must be requested static bypass
- The battery breaker(s) BB must be closed
- There must be no detected surveillance faults
- The static switch input breaker SSIB must be closed
- The output voltage and frequency must be within predefined limits

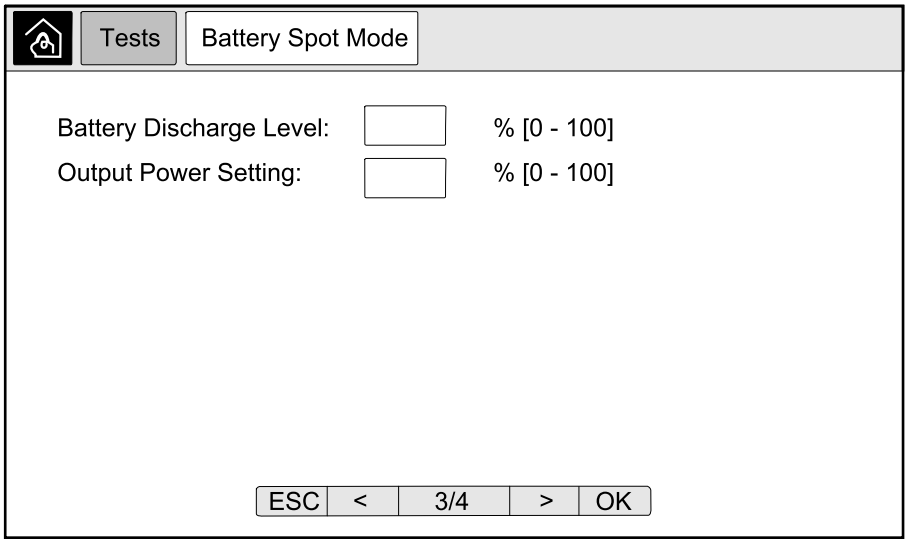
This feature performs a battery discharge test without the need for a load bank. During the battery SPoT mode test, the inverter is turned ON while the UPS is in requested static bypass. During the test, the UPS performs a battery runtime calibration test and adjusts the estimated runtime accordingly.

The output power can be manually adjusted from 0 to 100% load to be as closed as possible to the operating conditions.

The battery SPoT mode test stops when the battery voltage has reached its shutdown level, or when the predefined discharge level has been reached.

NOTE: Battery SPoT Mode must be enabled by Schneider Electric during service configuration to make battery SPoT mode available.

1. From the home screen on the display select **Tests > Battery SPoT Mode**.
2. Go through the **Battery SPoT Mode** screens and verify that the prerequisites for performing a test is met.
3. Set the battery discharge level and the output power level.



4. Tap the **Start Battery SPoT Mode** button.

   NOTE: If you wish to manually stop the battery SPoT mode test, tap the **Abort Battery SPoT Mode** button.

Perform an Annunciators Test

1. From the home screen on the display select **Tests > Annunciators**.
2. Tap the **Start** button to initiate the test.

   During the annunciators test the LEDs on the display and the mimic diagram and the audible alarm are tested.

Calibrate the Display

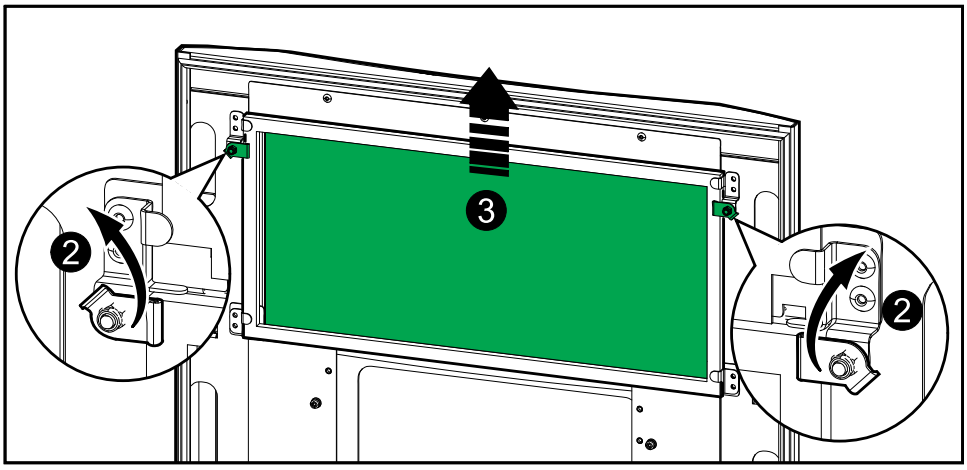
From the home screen on the display select **Tests > Display Calibration** and then select the calibration you want to perform.

- **Calibrate**: Tests and adjusts the touch screen target sensitivity.
- **Calibration Check**: Checks the calibration adjustments.

Maintenance

Replace the Top Filter

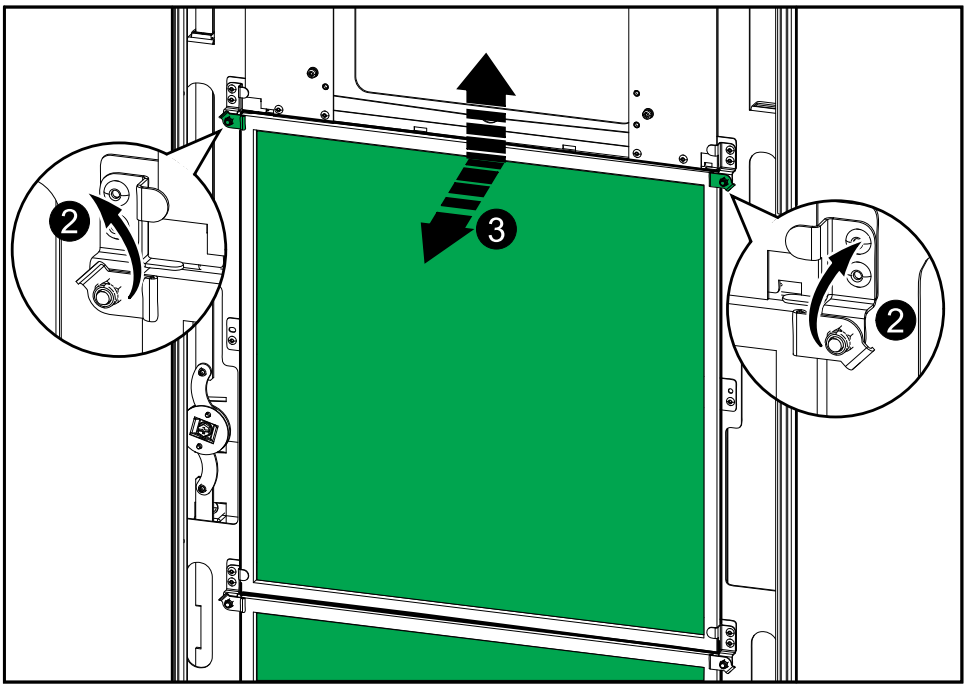
Rear View of the Front Door



1. Open the front door of the cabinet.
2. Turn the filter locks to release the filter.
3. Lift up the filter.
4. Take the replacement filter from the installation kit and install the new filter.
5. Turn the filter locks to fasten the filter.

Replace the Three Bottom Filters

Rear View of the Front Door



1. Open the front door of the cabinet.
2. Turn the filter locks to release the filters.
3. Tilt the filters out and lift them up.
4. Take the replacement filters from the installation kit and install the new filters.
5. Turn the filter locks to fasten the filters.

Troubleshooting

Determine if you need a Replacement Part

To determine if you need a replacement part, contact Schneider Electric and follow the procedure below so that the representative can assist you promptly:

1. In the event of an alarm condition, scroll through the alarm lists, record the information, and provide it to the representative.
2. Write down the serial number of the unit so that you will have it easily accessible when you contact Schneider Electric.
3. If possible, call Schneider Electric from a telephone that is within reach of the display so that you can gather and report additional information to the representative.
4. Be prepared to provide a detailed description of the problem. A representative will help you solve the problem over the telephone, if possible, or will assign a return material authorization (RMA) number to you. If a module is returned to Schneider Electric, this RMA number must be clearly printed on the outside of the package.
5. If the unit is within the warranty period and has been started up by Schneider Electric, repairs or replacements will be performed free of charge. If it is not within the warranty period, there will be a charge.

6. If the unit is covered by a Schneider Electric service contract, have the contract available to provide information to the representative.

Find the Serial Numbers

NOTE: If the display is not available, the serial number can also be found on a label in each specific cabinet.

1. From the home screen on the display interface select **About > UPS**.
2. On the first page note down the serial number of the I/O cabinet and have it ready for customer support.
3. Press the arrow to go to the next page and note down the serial numbers of the power cabinets and have them ready for customer support.

Return Parts to Schneider Electric

To return an inoperable part to Schneider Electric, contact Schneider Electric customer support to obtain an RMA number.

Pack the part in the original shipping materials, and return it by insured, prepaid carrier. The customer support representative will provide the destination address. If you no longer have the original shipping materials, ask the representative about obtaining a new set.

- Pack the part properly to avoid damage in transit. Never use styrofoam beads or other loose packaging materials when shipping a part. The part may settle in transit and become damaged.
- Enclose a letter in the package with your name, RMA number, address, a copy of the sales receipt, description of the problem, a phone number, and a confirmation for payment (if necessary).

  NOTE: Damages sustained in transit are not covered under warranty.

Galaxy Lithium-ion Battery Cabinet Operation

Operation Procedures

Shut Down the Battery Solution

NOTE: This procedure is only for a short temporary shutdown of the battery solution. If the battery solution should remain shut down for a longer period, please contact Schneider Electric.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

The battery cabinet contains an internal energy source. Hazardous voltage is still present after the battery breaker has been opened.

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

1. Manually set the battery breaker of each individual battery cabinet to the OFF (open) position to disconnect the battery power from the UPS.

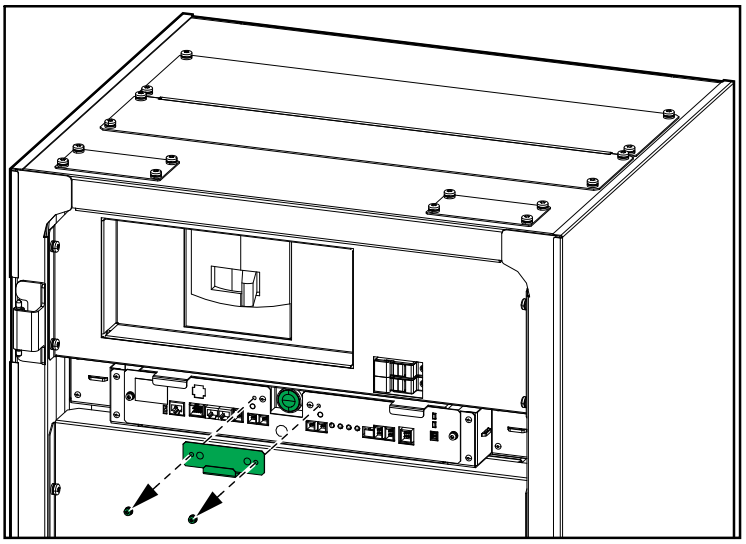
   NOTE: The system BMS and rack BMS will still be operating.

2. Battery cabinet EPO cables should be connected to the system EPO. Shut down the system EPO to disconnect the UPS and all battery cabinets in emergency.

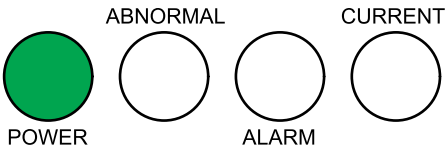
   NOTE: E-stop manual switch device should be installed in the energy storage system. Rating for the E-stop manual switch: voltage minimum rated for 24 VAC or 24 VDC, current rating minimum rated for 0.5 A.

Restart the Battery Solution

1. Perform the following steps on all battery cabinets in the battery solution.
   a. Remove the cover in front of the start-up button and push the start-up button.



   - The PSU2 LED and the POWER LED will turn on.
   - The ABNORMAL and ALARM LEDs should remain off.



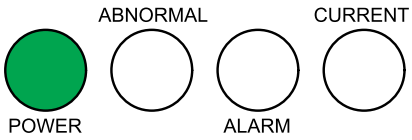
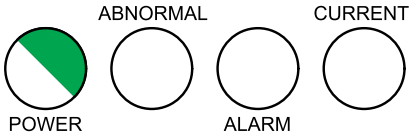
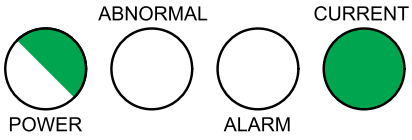
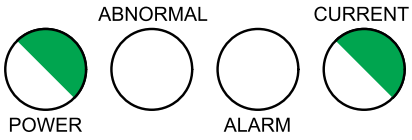
   b. Reinstall the cover in front of the start-up button.
   c. Set the battery breaker to the ON (closed) position.

Monitor the Battery System

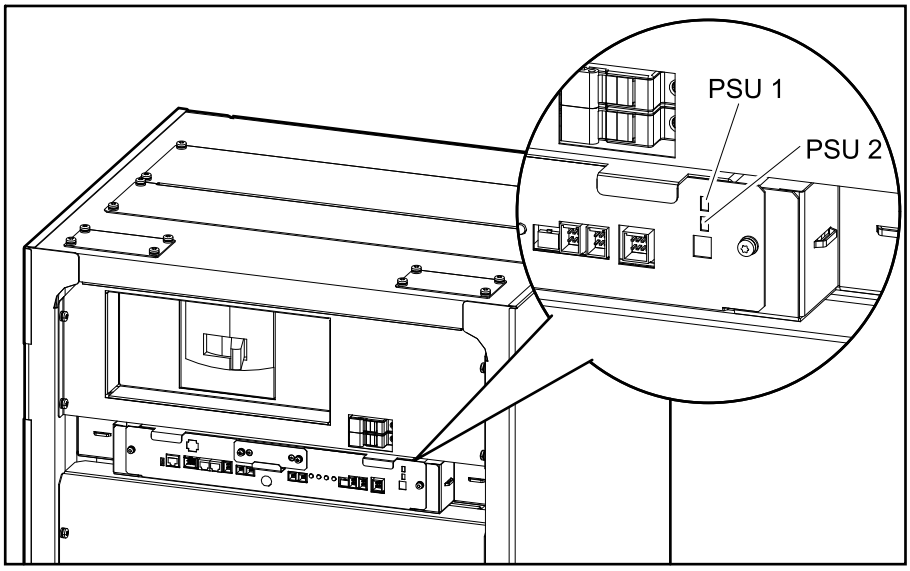
NOTE: Schneider Electric uses the battery system monitoring software ITE/DCE to monitor the performance of the battery system. Please contact Schneider Electric application engineering team to obtain its installation instructions and operation instructions.

Troubleshooting

Status LEDs

LED	Battery Status	Description
	Normal	The battery breaker is in the OFF (open) position.
	Normal	The battery breaker is in the ON (closed) position.
	Normal	The batteries are being discharged.
	Normal	The batteries are being recharged.
	Major alarm	The battery breaker has tripped and is in the OFF (open) position.
	Minor alarm	The battery breaker is in the ON (closed) position.

PSU LEDs



- When the LED is green, the PSU is powered ON.
- When the LED is OFF, the PSU is powered OFF or inoperable.

Alarm List

Protection Protocols

Protection Protocol for Battery Cabinet with 17 Battery Modules

No	Item	Level	Set condition	Software set time (sec)	Battery breaker status[6]	Release condition	Time (sec)	Battery breaker status
1	Over voltage protection - cell	Major	Max cell ≥ 4.28 V	5	OFF	Max cell <4.25 V and press the reset switch	5	ON
2	Under voltage protection - cell	Major	Min cell ≤ 2.5 V	3	OFF	Min cell > 2.70 V and press the reset switch	3	ON
3	Over voltage protection - cabinet	Major	Cabinet voltage ≥ 582.08 V	5	OFF	Cabinet voltage < 578 V and press the reset switch	5	ON
4	Under voltage protection - cabinet	Major	Cabinet voltage ≤ 340 V	3	OFF	Cabinet voltage > 367.2 V and press the reset switch	3	ON
5	Rack cell voltage imbalance	Major	△Vcell ≥ 500 mV	5	OFF	△Vcell ≥ 50 mV	5	ON
6	Module cell voltage imbalance	Major	△Vcell ≥ 90 mV	5	OFF	△Vcell ≥ 30 mV	5	ON
7	Voltage sensing error (cabinet)	Minor	|Cabinet V - cell sum V| ≥ 40.8 V	10	ON	|Cabinet V - cell sum V| < 20.4 V and press the reset switch	3	ON
8	Voltage sensing error (module)	Minor	|Module V - cell sum V| ≥ 190 mV	5	ON	|Module V - cell sum V| < 190 mV and press the reset switch	3	ON
9	Over temperature protection	Major	Max temp ≥ 75 °C (167 °F)	3	OFF	Max temp < 65 °C (149 °F) and press the reset switch	3	ON
10	Under temperature protection	Minor	Min temp ≤ 0 °C (32 °F)	3	ON	Min temp > 5 °C (41 °F) and press the reset switch	3	ON
11	Temperature imbalance	Major	Max cell T - min cell T ≥ 40 ℃ (104 °F)	30	OFF	Max cell T - min cell T < 20 °C (68 °F) and press the reset switch	3	ON
12	Over current protection (charge)	Major	Level2 current ≥ 250 A	2	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level1 current ≥ 200 A	60	OFF	|Current| < 10 A and press the reset switch	3	ON
13	Over current protection (discharge)	Major	Level4 |current| ≥ 600 A	1	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level3 |current| ≥ 540 A	10	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level2 |current| ≥ 495 A	30	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level1 |current| ≥ 470 A	60	OFF	|Current| < 10 A and press the reset switch	3	ON
14	Communication lost (module ↔ cabinet)	Major	No communication	30	OFF	Communication reestablished and press the reset switch	-	ON
15	Communication lost (cabinet ↔ system)	Minor	No communication	30	ON	Communication reestablished and press the reset switch	-	ON
16	SW failure - battery breaker	Minor	Battery breaker OFF and |current| ≥ 2.4 A	3	ON	(Battery breaker OFF and (|current| < 2.4 A) and press the reset switch	-	ON

6. The battery breaker status will switch from ON to OFF within three seconds after the software set time.

Protection Protocol for Battery Cabinet with 17 Battery Modules (Continued)

No	Item	Lev-el	Set condition	Software set time (sec)	Battery breaker status[7]	Release condition	Time (sec)	Battery breaker status
17	SW sensor failure - battery breaker	Minor	Battery breaker contact ON = battery breaker trip ON	3	ON	(Battery breaker contact ≠ battery breaker trip) and press the reset switch	-	ON
18	Current sensing error	Minor	No communication with Current IC	3	ON	Communication with current IC OK	-	ON
19	Fuse failure	Minor	Fuse blown	10	ON	Fuse ON and press the reset switch	-	ON

7. The battery breaker status will switch from ON to OFF within three seconds after the software set time.

Protection Protocol for Battery Cabinet with 16 Battery Modules

No	Item	Level	Set condition	Software set time (sec)	Battery breaker status[8]	Release condition	Time (sec)	Battery breaker status
1	Over voltage protection - cell	Major	Max cell ≥ 4.28 V	5	OFF	Max cell < 4.25 V and press the reset switch	5	ON
2	Under voltage protection - cell	Major	Min cell ≤ 2.5 V	3	OFF	Min cell > 2.70 V and press the reset switch	3	ON
3	Over voltage protection - cabinet	Major	Cabinet voltage ≥ 547.84 V	5	OFF	Cabinet voltage < 544 V and press the reset switch	5	ON
4	Under voltage protection - cabinet	Major	Cabinet voltage ≤ 320 V	3	OFF	Cabinet voltage > 345.6 V and press the reset switch	3	ON
5	Rack cell voltage imbalance	Major	△Vcell ≥ 500 mV	5	OFF	△Vcell ≥ 50 mV	5	ON
6	Module cell voltage imbalance	Major	△Vcell ≥ 90 mV	5	OFF	△Vcell ≥ 30 mV	5	ON
7	Voltage sensing error (cabinet)	Minor	|Cabinet V - cell sum V| ≥ 38.4 V	10	ON	|Cabinet V - cell sum V| < 19.2 V and press the reset switch	3	ON
8	Voltage sensing error (module)	Minor	|Module V - cell sum V| ≥ 190 mV	5	ON	|Module V - cell sum V| < 190 mV and press the reset switch	3	ON
9	Over temperature protection	Major	Max temp ≥ 75 ℃ (167 ° F)	3	OFF	Max temp < 65 °C (149 ° F)and press the reset switch	3	ON
10	Under temperature protection	Minor	Min temp ≤ 0 ℃ (32 °F)	3	ON	Min temp > 5 °C (41 °F) and press the reset switch	3	ON
11	Temperature imbalance	Major	Max cell T - min cell T ≥ 40 ℃ (104 °F)	30	OFF	Max cell T - min cell T < 20 °C (68 °F) and press the reset switch	3	ON
12	Over current protection (charge)	Major	Level2 current ≥ 250 A	2	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level1 current ≥ 200 A	60	OFF	|Current| < 10 A and press the reset switch	3	ON
13	Over current protection (discharge)	Major	Level4 |current| ≥ 600 A	1	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level3 |current| ≥ 540 A	10	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level2 |current| ≥ 495 A	30	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level1 |current| ≥ 470 A	60	OFF	|Current| < 10 A and press the reset switch	3	ON
14	Communication lost (module ↔ cabinet)	Major	No communication	30	OFF	Communication reestablished and press the reset switch	-	ON
15	Communication lost (cabinet ↔ system)	Minor	No communication	30	ON	Communication reestablished and press the reset switch	-	ON
16	SW failure - battery breaker	Minor	Battery breaker OFF and |current| ≥ 2.4 A	3	ON	(Battery breaker OFF and (|current| < 2.4 A) and press the reset switch	-	ON
17	SW sensor failure - battery breaker	Minor	Battery breaker contact ON = battery breaker trip ON	3	ON	(Battery breaker contact ≠ battery breaker trip) and press the reset switch	-	ON

8. The battery breaker status will switch from ON to OFF within three seconds after the software set time.

Protection Protocol for Battery Cabinet with 16 Battery Modules (Continued)

No	Item	Level	Set condition	Software set time (sec)	Battery breaker status[9]	Release condition	Time (sec)	Battery breaker status
18	Current sensing error	Minor	No communication with Current IC	3	ON	Communication with current IC OK	-	ON
19	Fuse failure	Minor	Fuse blown	10	ON	Fuse ON and press the reset switch	-	ON

9. The battery breaker status will switch from ON to OFF within three seconds after the software set time.

Protection Protocol for Battery Cabinet with 13 Battery Modules

No	Item	Level	Set condition	Software set time (sec)	Battery breaker status[10]	Release condition	Time (sec)	Battery breaker status
1	Over voltage protection - cell	Major	Max cell ≥ 4.28 V	5	OFF	Max cell <4.25 V and press the reset switch	5	ON
2	Under voltage protection - cell	Major	Min cell ≤ 2.5 V	3	OFF	Min cell > 2.70 V and press the reset switch	3	ON
3	Over voltage protection - cabinet	Major	Cabinet voltage ≥ 445.12 V	5	OFF	Cabinet voltage < 442 V and press the reset switch	5	ON
4	Under voltage protection - cabinet	Major	Cabinet voltage ≤ 260 V	3	OFF	Cabinet voltage > 280.8 V and press the reset switch	3	ON
5	Rack cell voltage imbalance	Major	△Vcell ≥ 500 mV	5	OFF	△Vcell ≥ 50 mV	5	ON
6	Module cell voltage imbalance	Major	△Vcell ≥ 90 mV	5	OFF	△Vcell ≥ 30 mV	5	ON
7	Voltage sensing error (cabinet)	Minor	|Cabinet V - cell sum V| ≥ 31.2 V	10	ON	|Cabinet V - cell sum V| < 15.6 V and press the reset switch	3	ON
8	Voltage sensing error (module)	Minor	|Module V - cell sum V| ≥ 190 mV	5	ON	|Module V - cell sum V| < 190 mV and press the reset switch	3	ON
9	Over temperature protection	Major	Max temp ≥ 75 °C (167 °F)	3	OFF	Max temp < 65 °C (149 °F) and press the reset switch	3	ON
10	Under temperature protection	Minor	Min temp ≤ 0 °C (32 °F)	3	ON	Min temp > 5 °C (41 °F) and press the reset switch	3	ON
11	Temperature imbalance	Major	Max cell T - min cell T ≥ 40 °C (104 °F)	30	OFF	Max cell T - min cell T < 20 °C (68 °F) and press the reset switch	3	ON
12	Over current protection (charge)	Major	Level2 current ≥ 250 A	2	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level1 current ≥ 200 A	60	OFF	|Current| < 10 A and press the reset switch	3	ON
13	Over current protection (discharge)	Major	Level4 |current| ≥ 600 A	1	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level3 |current| ≥ 540 A	10	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level2 |current| ≥ 495 A	30	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level1 |current| ≥ 470 A	60	OFF	|Current| < 10 A and press the reset switch	3	ON
14	Communication lost (module ↔ cabinet)	Major	No communication	30	OFF	Communication reestablished and press the reset switch	-	ON
15	Communication lost (cabinet ↔ system)	Minor	No communication	30	ON	Communication reestablished and press the reset switch	-	ON
16	SW failure - battery breaker	Minor	Battery breaker OFF and |current| ≥ 2.4 A	3	ON	(Battery breaker OFF and (|current| < 2.4 A) and press the reset switch	-	ON
17	SW sensor failure - battery breaker	Minor	Battery breaker contact ON = battery breaker trip ON	3	ON	(Battery breaker contact ≠ battery breaker trip) and press the reset switch	-	ON

10. The battery breaker status will switch from ON to OFF within three seconds after the software set time.

Protection Protocol for Battery Cabinet with 13 Battery Modules (Continued)

No	Item	Level	Set condition	Software set time (sec)	Battery breaker status[11]	Release condition	Time (sec)	Battery breaker status
18	Current sensing error	Minor	No communication with Current IC	3	ON	Communication with current IC OK	-	ON
19	Fuse failure	Minor	Fuse blown	10	ON	Fuse ON and press the reset switch	-	ON

11. The battery breaker status will switch from ON to OFF within three seconds after the software set time.

Protection Protocol for Battery Cabinet with 10 Battery Modules

No	Item	Level	Set condition	Software set time (sec)	Battery breaker status[12]	Release condition	Time (sec)	Battery breaker status
1	Over voltage protection - cell	Major	Max cell ≥ 4.28 V	5	OFF	Max cell <4.25 V and press the reset switch	5	ON
2	Under voltage protection - cell	Major	Min cell ≤ 2.5 V	3	OFF	Min cell > 2.70 V and press the reset switch	3	ON
3	Over voltage protection - cabinet	Major	Cabinet voltage ≥ 342.4 V	5	OFF	Cabinet voltage < 340 V and press the reset switch	5	ON
4	Under voltage protection - cabinet	Major	Cabinet voltage ≤ 200 V	3	OFF	Cabinet voltage > 216 V and press the reset switch	3	ON
5	Rack cell voltage imbalance	Major	△Vcell ≥ 500 mV	5	OFF	△Vcell ≥ 50 mV	5	ON
6	Module cell voltage imbalance	Major	△Vcell ≥ 90 mV	5	OFF	△Vcell ≥ 30 mV	5	ON
7	Voltage sensing error (cabinet)	Minor	|Cabinet V - cell sum V| ≥ 24 V	10	ON	|Cabinet V - cell sum V| < 12 V and press the reset switch	3	ON
8	Voltage sensing error (module)	Minor	|Module V - cell sum V| ≥ 190 mV	5	ON	|Module V - cell sum V| < 190 mV and press the reset switch	3	ON
9	Over temperature protection	Major	Max temp ≥ 75 °C (167 ° F)	3	OFF	Max temp < 65 °C (149 ° F) and press the reset switch	3	ON
10	Under temperature protection	Minor	Min temp ≤ 0 °C (32 °F)	3	ON	Min temp > 5 °C (41 °F) and press the reset switch	3	ON
11	Temperature imbalance	Major	Max cell T - min cell T ≥ 40 °C (104 °F)	30	OFF	Max cell T - min cell T < 20 °C (68 °F) and press the reset switch	3	ON
12	Over current protection (charge)	Major	Level2 current ≥ 250 A	2	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level1 current ≥ 200 A	60	OFF	|Current| < 10 A and press the reset switch	3	ON
13	Over current protection (discharge)	Major	Level4 |current| ≥ 600 A	1	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level3 |current| ≥ 540 A	10	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level2 |current| ≥ 495 A	30	OFF	|Current| < 10 A and press the reset switch	3	ON
		Major	Level1 |current| ≥ 470 A	60	OFF	|Current| < 10 A and press the reset switch	3	ON
14	Communication lost (module ↔ cabinet)	Major	No communication	30	OFF	Communication reestablished and press the reset switch	-	ON
15	Communication lost (cabinet ↔ system)	Minor	No communication	30	ON	Communication reestablished and press the reset switch	-	ON
16	SW failure - battery breaker	Minor	Battery breaker OFF and |current| ≥ 2.4 A	3	ON	(Battery breaker OFF and (|current| < 2.4 A) and press the reset switch	-	ON
17	SW sensor failure - battery breaker	Minor	Battery breaker contact ON = battery breaker trip ON	3	ON	(Battery breaker contact ≠ battery breaker trip) and press the reset switch	-	ON

12. The battery breaker status will switch from ON to OFF within three seconds after the software set time.

Protection Protocol for Battery Cabinet with 10 Battery Modules (Continued)

No	Item	Level	Set condition	Software set time (sec)	Battery breaker status[13]	Release condition	Time (sec)	Battery breaker status
18	Current sensing error	Minor	No communication with Current IC	3	ON	Communication with current IC OK	-	ON
19	Fuse failure	Minor	Fuse blown	10	ON	Fuse ON and press the reset switch	-	ON

13. The battery breaker status will switch from ON to OFF within three seconds after the software set time.

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

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