This user guide is for product #101SVE6*6.

GAMATRONIC
Our Power, Your Confidence

CENTRIC UPS SYSTEM

3x480 VAC

USER GUIDE

for the 120 kW and 240* kW models

* 240 kW model to be launched.

Release 1.7, November 2015

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STANDARDS AND CONVENTIONS

- This user manual contains diagrams which include images of the display screen of the UPS. Unless otherwise indicated, the readings shown in the screen images are only illustrative, and are not intended to match the readings on a specific system in a particular environment.
- Operation and control of the **Centric** UPS is accomplished through a touch-sensitive LCD display screen. In this manual, when explaining how to navigate the control software via the touch-sensitive screen, the terms "tap", "press", "choose", and "select" may be used interchangeably to indicate selection of a screen option.

1. SAFETY PRECAUTIONS

The PowerPlus UPS system is designed for industrial applications and harsh environments. Nevertheless the PowerPlus should be handled with care, according to the following guidelines.

WARNING! HIGH TOUCH CURRENT!
EARTH CONNECTION ESSENTIAL BEFORE CONNECTING SUPPLY.

1.1 Do's

- Read this manual carefully before starting installation and operation of the UPS.
- Review the safety precautions described below to avoid injury to users and damage to the equipment.
- **This UPS is intended for installation in a temperature-controlled, indoor area that is free from conductive contaminants.**
- All power connections must be completed by a **licensed electrician who is experienced in wiring this type of equipment,** and who is **familiar with the local electrical codes and regulations. Improper wiring may cause injury to personnel, or death,** or damage to the equipment**.**
- Ensure all power is disconnected before performing installation or maintenance.
- Leave at least 20 cm of clearance space between the ventilation openings of the UPS and other objects or walls.
- The UPS must be well grounded to the building's grounding system with a conductor that has a current carrying capacity that matches the rating of the UPS.
- Battery installation, battery maintenance, and battery replacement shall be performed only by authorized service personnel.
- Pay attention to all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the UPS.
- Keep the surroundings clean, uncluttered and free from excess moisture.
- Keep the operating environment within the parameters stated in this document.
- Allow only qualified technicians to service the UPS. There are no user-serviceable components. **Do not try to repair it yourself!**
- Use the UPS only for its intended purpose.
- The batteries should preferably be installed next to the UPS, or as close to it as is practically possible.
- If you remove a UPS module from the Centric while the module is operating, wait five minutes before reinserting the module. This allows the module's capacitors time to discharge.
- FAST FUSES (SEMICONDUCTOR FUSES) must be used between the battery and the Centric, and on the rectifier ac input line. For example, the Ferraz Shawmut A70QS fuse.

1.2 Don'ts

- Do not open the cover of the UPS or the battery cabinets under any circumstances. All UPS panels and doors should be closed.
- Do not insert any objects through the ventilation holes.
- Do not put objects on the UPS.
- Do not move the UPS while it is operating.
- Do not use the UPS outdoors.
- Do not turn the UPS upside down during transportation.
- Do not connect or disconnect the cable to the battery cabinet before the battery circuit breaker is turned OFF.
- Do not turn ON the battery circuit breaker when the battery cabinet is disconnected from the UPS.
- Do not install the UPS next to gas or electrical heaters. A restricted location is recommended in order to prevent access by unauthorized personnel.
- If you remove a UPS module from the Centric while the module is operating, do not reinsert the module immediately. Wait five minutes.

WARNING - RISK OF LETHAL ELECTRIC SHOCK:

This UPS receives power from more than one source! Disconnection of all ac sources, and of the dc source, is required to de-energize this unit before servicing.

WARNING - RISK OF LETHAL ELECTRIC SHOCK:

Do not touch uninsulated battery terminals.

RECYCLING INFORMATION

CAUTION

Do not discard waste electrical or electronic equipment (WEEE) or used batteries in the trash. For proper disposal, contact your local recycling or hazardous waste center.

2. INTRODUCTION TO THE CENTRIC 480

In general, an Uninterruptible Power Supply (UPS) provides backup power for use when the utility ac electric power mains fail or drop to an unacceptable voltage level. **Centric** does this and much more.

Centric protects your data and equipment and minimize downtime and other adverse effects normally incurred by power irregularities and failures.

Voltage surges, spikes and sags are inherent in commercial utility power. Over time, these irregularities shorten the life of equipment and components. **Centric** continually eliminates power irregularities, thus helping to extend the life of your equipment, even through normal use when the input power is constant and continuous.

Centric requires very little attention or intervention during normal operation; however, you should read and understand the procedures described in this manual to ensure trouble-free operation.

Centric employs active current balancing between its power modules, and delivers overall electrical efficiency of up to 96 %, up to 98 % in backup mode.

2.1 System structure

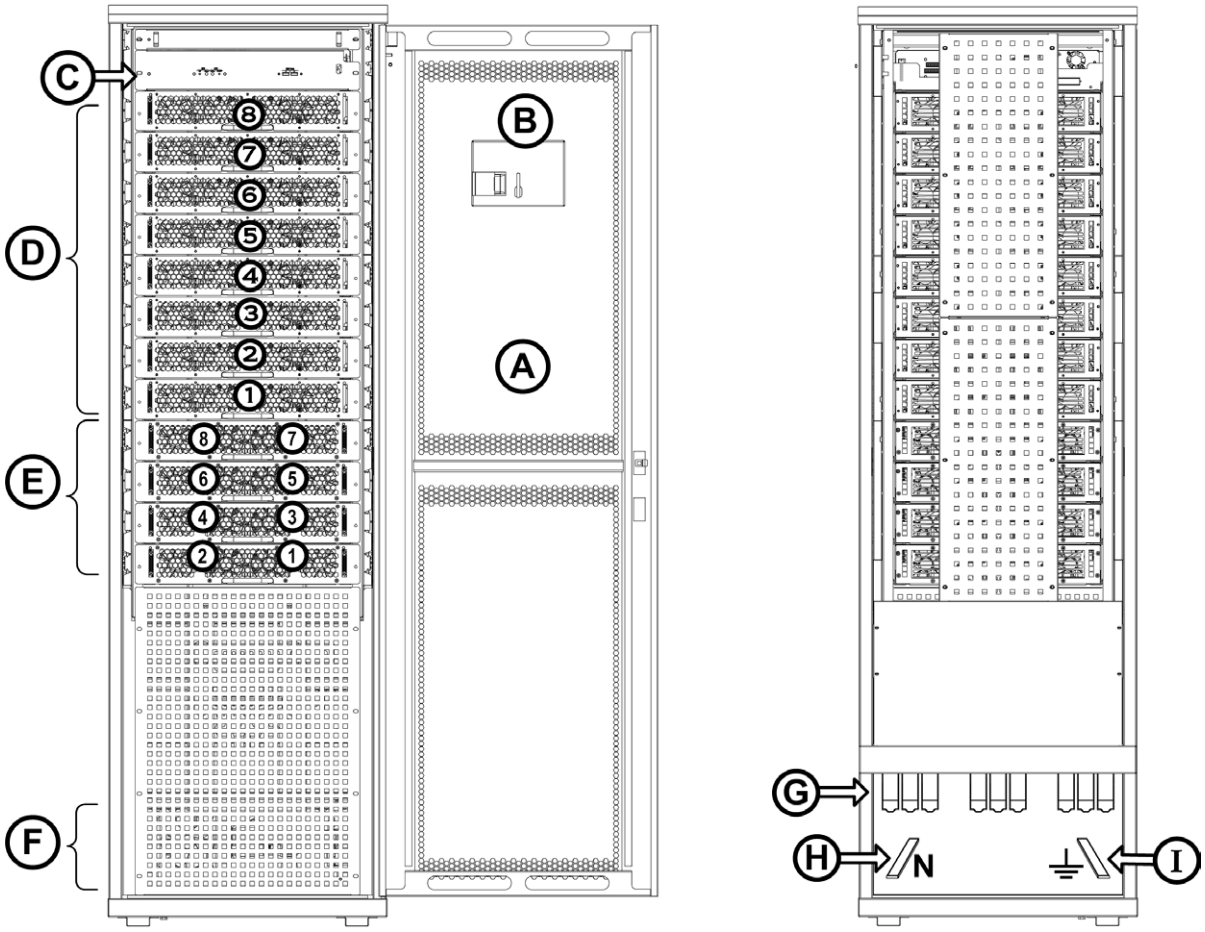
The Centric 3x480 Vac is available in two models:

- 240 kVA/kW – holds up to eight UPS modules
- 120 kVA/kW – holds up to four UPS modules

Each UPS module has an output capacity of 30 kVA / 30 kW.

In addition to the UPS modules, each Centric unit also includes:

- a system controller
- a static switch module
- an LCD control panel
- dc-to-dc voltage converter modules – one for every two UPS modules



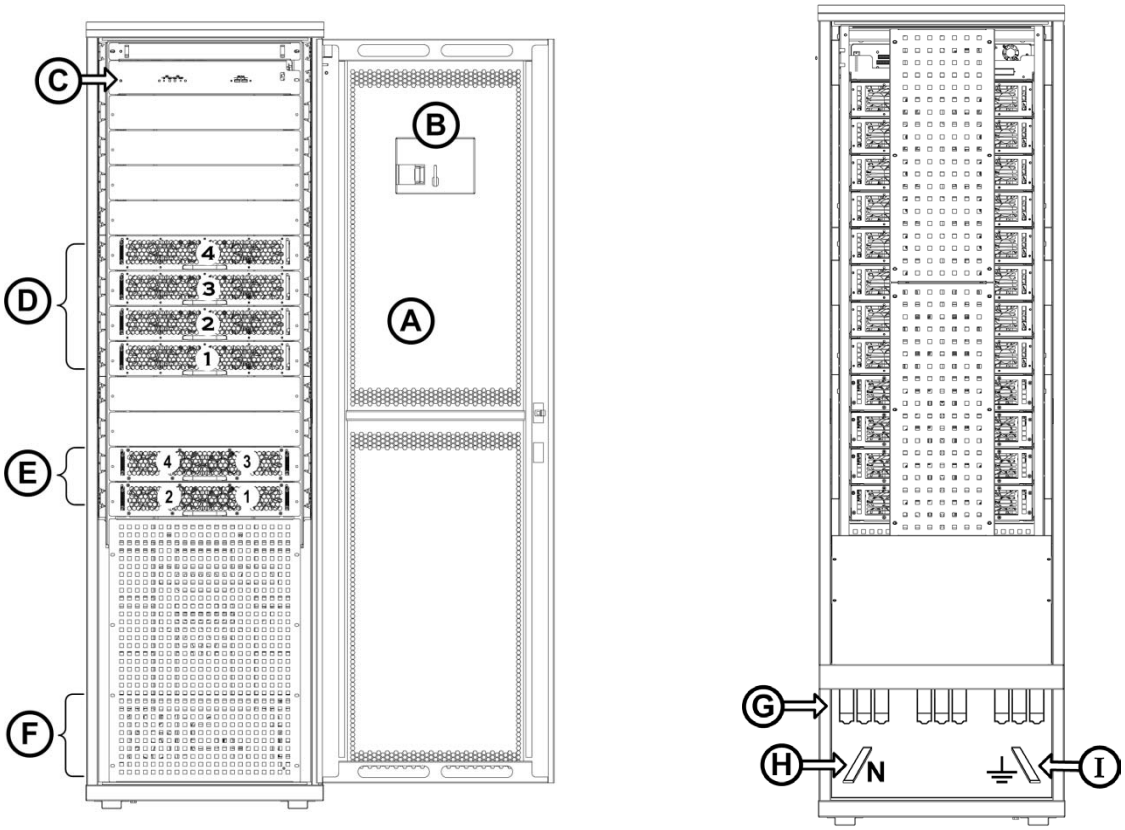
240 kW model, front view

240 kW model, rear view

Figure 1: Major components of the Centric 3x480 Vac (240 kW model)

Table 1: Key to Figure 1

ITEM	DESCRIPTION
A	The UPS cabinet's front door
B	Back side of the LCD panel.
C	System controller
D	Shelves for up to 8 UPS modules. Each UPS module supplies 30 kW. The lowest UPS shelf is UPS shelf 1, the next shelf up is shelf 2, and so on.
E	Shelves for up to 4 dc-dc converter modules. The dc-dc modules convert the battery voltage of 270 V to 400 V for the UPS modules. Each dc-dc module contains 2 converter blocks. The lowest dc-dc shelf is shelf 1; the next shelf up is dc-dc shelf 2, and so on. Dc-dc shelf 1 supplies dc power to UPS shelves 1 and 2. Dc-dc shelf 2 supplies power to UPS shelves 3 and 4, and so on up to dc-dc shelf 4.
F	The static switch is located at this level, inside the UPS. It is not visible from the outside.
G	Main ac terminals. See the *Centric 3x480 Installation Guide* for details.
H	Neutral bus bar.
I	Protective Earth Ground bus bar



120 kW model, front view 120 kW model, rear view

Figure 2: Major components of the Centric 3x480 Vac (120 kW model)

Table 2: Key to Figure 2

ITEM	DESCRIPTION
A	The UPS cabinet's front door
B	Back side of the LCD panel.
C	System controller
D	Shelves for up to 4 UPS modules. Each UPS module supplies 30 kW. The lowest UPS shelf is UPS shelf 1, the next shelf up is shelf 2, and so on.
E	Shelves for up to 2 dc-dc converter modules. The dc-dc modules convert the battery voltage of about 250 Vdc to 400 Vdc for the UPS modules. Each dc-dc module contains 2 dc-to-dc converter blocks. The lowest dc-dc shelf is shelf 1; the next shelf up is dc-dc shelf 2, and so on. Dc-dc shelf 1 supplies dc power to UPS shelves 1 and 2. Dc-dc shelf 2 supplies power to UPS shelves 3 and 4, and so on up to dc-dc shelf 4.
F	The static switch is located at this level, inside the UPS. It is not visible from the outside.
G	Main ac terminals.
H	Neutral bus bar.
I	Protective Earth Ground bus bar

2.2 LCD Control Panel

The LCD control panel (Figure 3) is the user's main interface with the **Centric**. The LCD panel is touch-sensitive – the user navigates through the system screens by pressing lightly on the various icons. On all screens other than the main menu screen, the current navigation path is displayed in the upper-left corner of the screen (Figure 4), enabling you to easily understand where you are within the control system menus. The extensive capabilities of the user interface are described in detail in chapter 7 "Centric menu functions in detail".

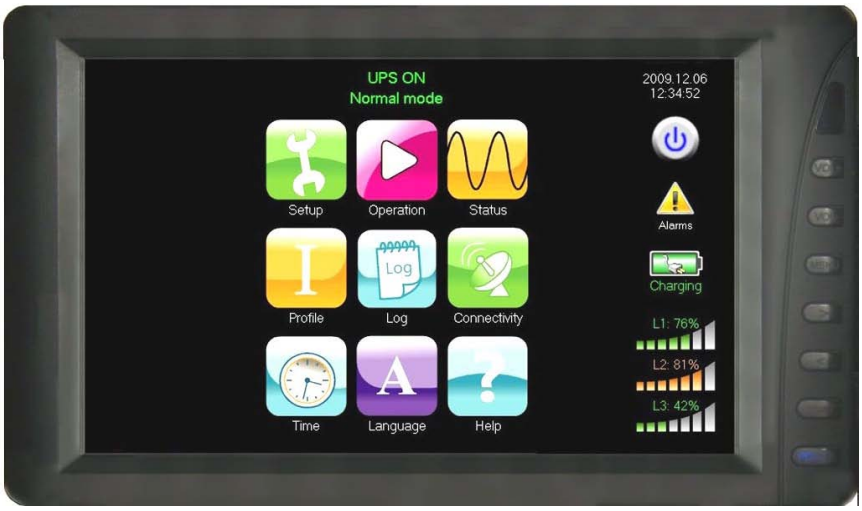


Figure 3: System control panel, displaying the main menu

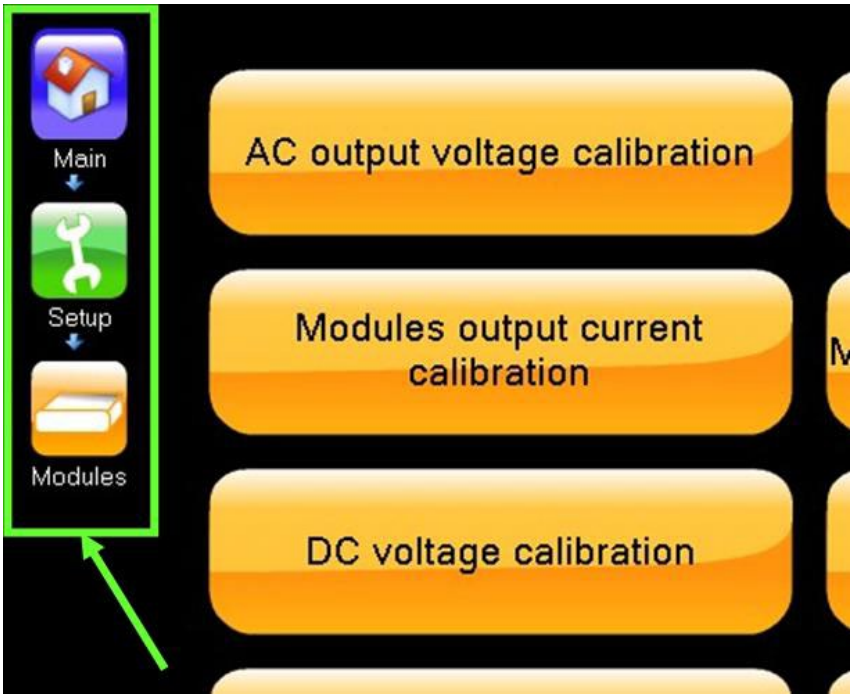


Figure 4: System control panel, with current navigation path

2.3 System controller

The **Centric** system controller has three purposes:

- Controls and monitors the operation of the **Centric** according to the user's commands.
- Collects and summarizes data from all sections of the UPS.
- Manages communication with external computers for data transfer and operation.

The **Centric** can operate without the system controller but with reduced functionality.

2.4 UPS module (30 kVA / 30 kW)

The UPS module is the core of the **Centric**, which consists of from one to eight identical internal modules operating in parallel. The number of UPS modules installed in the cabinet is fixed at the time of manufacture and depends on the user's capacity requirements.

Each UPS module includes a 3-phase charger with PFC (power factor correction) and a 3-phase PWM (pulse-width modulation) inverter connected to batteries by a classic dc link.

2.5 Static switch module

The centralized, electronic static switch enables an automatic transfer of the load from the output of the inverters to an alternate source – the ac mains, for example – when the inverter is unable to supply sufficient power to the load (for example, in the event of an overload, or an inverter failure). The static switch transfers high currents at very high speed; a typical transfer time is less than 3 ms.

2.6 Battery

The **Centric** battery bank provides backup power to the UPS and its load devices in the event that the utility ac input fails. The batteries are housed in an external cabinet adjacent to the **Centric**. The batteries are charged by the rectifier that supplies both the inverter and the battery charger.

The Centric supports the use of standard lead-acid batteries, and also lithium-ion batteries. **If you plan to use lithium-ion batteries, consult with your dealer** to be sure that the battery setup parameter values are appropriate for the batteries you will be using.

The battery cabinet should be installed as close to the UPS as is practically possible.

Fast-acting fuses (semiconductor fuses) must be used between the battery and the UPS.

Protect the batteries from moisture, dampness, and foreign substances.

The temperature of the battery's surroundings influences the batteries' useful lifetime.

Table 3: Battery lifetime vs. environmental temperature as per Eurobat

ENVIRONMENTAL TEMPERATURE	ACHIEVABLE PERCENTAGE OF BATTERY'S RATED LIFETIME
20 °C	100 %
30 °C	50 %
40 °C	20 %

2.7 Dc-to-dc voltage converter modules

The dc-to-dc converter modules are located below the UPS modules (see Figure 1 or Figure 2). Each dc-dc converter module contains two dc-to-dc converter blocks. Each converter block is dedicated to a single UPS module. For every two UPS modules there is one dc-to-dc voltage converter module.

The dc-dc converter modules and the UPS modules, and the relation between them, can be seen in Figure 1 (240 kVA model) and Figure 2 (120 kW model).

The lowest dc-dc shelf is shelf 1; the next shelf up is dc-dc shelf 2, and so on. Dc-dc shelf 1 supplies dc power to UPS shelves 1 and 2. Dc-dc shelf 2 supplies power to UPS shelves 3 and 4, and so on up to dc-dc shelf 4. Therefore, if you are operating a Centric 3x480 Vac system with less than its full complement of modules, it is recommended that the UPS modules and the dc-dc modules be installed beginning from the lowest shelf and moving upwards.

No harm is done if there are more dc-to-dc converter blocks than modules. The extra dc-dc blocks (that is, those without a corresponding UPS module in place) will simply enter “sleep” mode.

If a UPS module doesn’t have a corresponding dc-dc block the UPS modules will still function normally, except that in battery mode there will not be any dc current supplied to that module. There is no common dc bus between the UPS modules.

2.7.1 What the dc-dc converters do

The dc-dc modules convert the battery voltage of 540 Vdc to the 840 Vdc required by the UPS modules.

The dc-dc modules make it possible to supply the UPS modules with 840 Vdc using fewer batteries than would otherwise be required. The Centric 3x480 Vac system requires a total of 40 12-volt batteries. Without the dc-dc modules, at least 70 12-volt batteries would be required in order to supply 840 volts to the UPS modules. So the use of dc-dc voltage conversion modules enable the user to save on battery costs.

The dc-dc modules also increase safety by reducing the total battery voltage to which the technician is potentially exposed when replacing batteries.

The dc-to-dc modules extend battery life by charging the batteries with minimal ripple current, and by reducing the effects of varying load types (active vs. reactive loads) on the charging process.

2.8 Emergency Power Off – EPO (manual)

An external Emergency Power Off (EPO) switch may be installed on the **Centric** by the customer. The EPO switch is used to cut power to the load in emergency situations. Refer to the section "Emergency Power Off" in the *Centric Installation Guide* for further information.

2.8.1 EPO indication

Any of the output dry contacts can be assigned to indicate when the EPO switch has been activated. The output dry contact can be used to trigger an external circuit if desired, such as a lamp or an audible alarm.

2.8.2 Battery trip coil dry contact

The Centric's battery trip coil terminals are intended to be connected to the trip coil of the battery circuit breaker. When this is done and the EPO switch is activated, the **Centric** sends a voltage pulse to the battery circuit breaker trip coil, causing the battery circuit breaker to turn OFF. The battery circuit breaker trip coil is rated for a maximum of 250 Vac, 12 A.

Use of the battery trip coil means that not only will use of the EPO switch cut all ac output from the UPS, it will also turn off the battery circuit breaker. Refer to the section "Battery trip coil" in the *Centric Installation Guide* for further information.

2.8.2.1 RESTARTING THE UPS AFTER EPO

After the emergency situation that prompted use of the EPO switch has been resolved, the UPS can be restarted as follows:

1. Reset the EPO switch.
2. Switch off the following circuit breakers: ac input, bypass ac input, battery.
3. Switch on these circuit breakers: ac input, bypass ac input.
   Do not switch on the battery circuit breaker at this time.
4. Switch on the UPS ("Operation > Turn on/off > System on > OK").
5. Wait until the green LED on the left of the front panel of each UPS module is lit green.
   Then switch on the battery circuit breaker.
   (Note: the battery circuit breaker is not located on the UPS. It is either on the battery box or on the cables connecting the battery box to the UPS.
6. The UPS is now ready for use.

3. OPERATING MODES

The **Centric** UPS functions to supply ac electrical power to your load.

The **Centric** has three possible modes of operation:

- Normal mode.
- Battery mode.
- Bypass mode.

3.1 Normal mode

The UPS is almost always in normal operation mode. The load receives its power from the inverters that supply stabilized voltage, protected from spikes and irregularities in the ac input. The rectifier feeds the inverter, and also feeds the charger which supplies dc power to the battery charger.

3.2 Battery mode

During battery operation, the load continues to receive power from the inverters, but the dc input to the inverter is taken from the batteries, instead of from the rectifier.

The duration of the battery operation is determined by the load demand and the battery capacity.

3.3 Bypass mode

During bypass operation, the load receives power directly from the bypass ac input via the static switch.

Whenever the inverters cannot provide power to the load, either due to an overload or a short-circuit in the load, the load is automatically moved to the bypass ac input. The load is automatically returned to the inverter when the problem has been corrected.

4. USER INTERFACE

This section describes the buttons and indicators used to operate the **Centric**.

4.1 Control panel

The LCD control panel (Figure 3) is the user's main interface with the **Centric**. The LCD panel is touch-sensitive – the user navigates through the system screens by pressing lightly on the various icons. On all screens other than the main menu screen, the current navigation path is displayed in the upper-left corner of the screen (Figure 4), enabling you to easily understand where you are within the control system menus.

The navigation path in the upper-left corner of the screen is also used to navigate backwards – to return to a previous screen or to the main menu.

The extensive capabilities of the user interface are described in detail in chapter 7 "Centric menu functions in detail".

Figure 5: The control panel

The LCD control panel is attached to the front of the UPS and is active when the UPS is connected to ac power and also when the UPS is operating in battery mode.

There is a physical power on/off button on the control panel that controls the power supply to the screen. If the UPS is connected to ac power or operating in battery mode and the display screen is blank, ensure that the display unit itself has been powered on.

The display unit is mounted on a holder and can be removed from that holder if necessary. The angle of the display screen can be adjusted.

4.1.1 Calibrating the touch screen

It may occasionally be necessary to calibrate the touch-screen, so that the pressure sensitive spots on the screen accurately overlay the icons. It is recommended to calibrate the touch-screen the first time you use it. The touch-screen can be recalibrated at any time, if needed.

To calibrate the touch screen, press and hold your finger on any location on the screen (preferably not on an icon) for 10 seconds and then release your finger. The software then prompts you to press on four specific locations on the screen, in series. Upon completing this process, the touch screen has been calibrated.

4.2 Buttons and LEDs on the system controller

On the system controller, to the left of the LCD touch screen are two buttons, and two LEDs. These are described below.

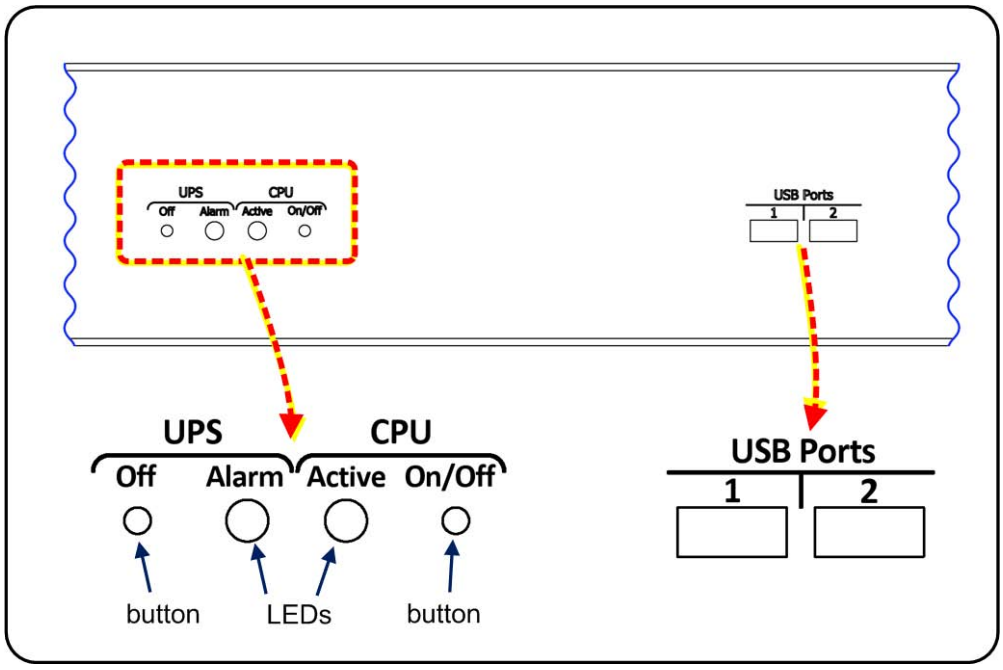


Figure 6: The Centric's top front panel

4.2.1 "UPS off" button

Pressing the 'UPS off" button for ten seconds turns the Centric OFF.

This button is intended for use only when the LCD screen is not functional. Under normal circumstances the on/off button icon in the upper right corner of the touch screen should be used to switch off the UPS.

Note: disabling the controller self-shutdown function (watchdog function) also disables the "UPS OFF" button. See section 7.2.1.6.3 for more information.

4.2.2 "Alarm" LED

The "Alarm" LED lights when there is an alarm situation present. This LED is the physical counterpart of the software generated triangular "alarm" indicator on the LCD panel's main screen.

The Alarm LED has 3 possible states:

Off (unlit)	There are no active system alarms.
Blinking red	There are one or more active alarms of status "Warning" or "Error". To see a list of the active alarms, press the alarm icon on the main screen. The icon will be either • a red circle with an "x" in the middle (when the most serious active alarm is of "error" status) or • a yellow triangle with an exclamation point inside, when the most serious active alarm is of "warning" status.
Solid red	There are active alarms, but you have listed them already on the LCD screen. When a fresh alarm occurs, the Alarm LED will start blinking again.

For more information on system alarms, see "Alarm indicator" in Table 6, and refer to chapter 10 "Troubleshooting"".

4.2.3 "CPU active" LED

The "CPU active" LED is normally a solid green. If this LED is not lit (a very rare occurrence), the CPU has stopped operating. Using the "CPU On/Off" button may resolve the problem. See section 4.2.4.

4.2.4 "CPU On/Off" button

Pressing the "CPU On/Off" button switches the UPS's main computer (the CPU) off or on. This is for use only in the rare instance that the LCD touch screen freezes up or the system otherwise ceases to respond to commands. In such a case, switching the CPU off and then on again may resolve the problem.

The Centric will continue to operate as normal even when the computer is turned off, although obviously there will be reduced functionality.

5. CENTRIC CONTROL SYSTEM

The **Centric** control system provides the user complete control over the UPS and its operating parameters. This chapter describes basic, most frequently-used functions.

5.1 The main screen (main menu)

The main menu is the user's starting point for most operations. Figure 7 illustrates the main screen and Table 4 explains the main screen's features.

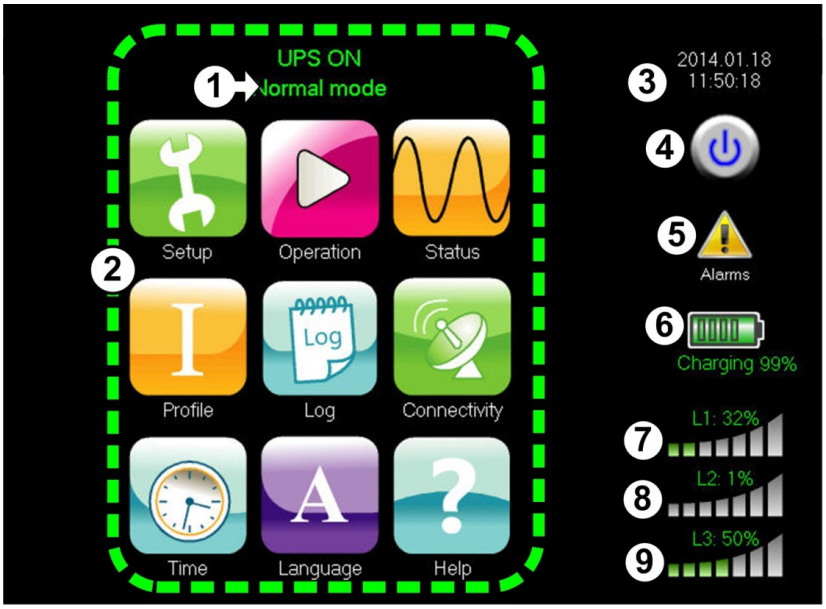


Figure 7: The main screen and its features

Table 4: Features of the main screen

ITEM	DESCRIPTION
1	**The operational status (ON/OFF) and current mode (Normal [inverter] mode / bypass mode / battery mode)**
2	**Menu options:** pressing these icons provide access to the main submenus.
3	**Current date and time.**
4	**UPS soft on/off button:** Pressing this icon displays the UPS ON/OFF screen, which enables the user to turn the UPS on and off.
5	**Alarm indicator** (see Table 10**):** • When there is one or more active alarms of “error” status (the most serious status), a red circle with a white “x” inside is displayed. • When there is one or more active alarms of “warning” status (and no alarms of “error” status), a yellow triangle with an exclamation point inside is displayed. • When there are informational messages but no messages of “error” or “warning” status, an “I” in a blue circle is displayed • When there are no active alarms or informational messages, this area of the main screen is blank. Pressing this icon displays the Active Alarm screen.
6	**Battery indicator:** Indicates the status of the battery: charging or discharging. Pressing on this icon displays the Battery Status screen.
7, 8, 9	**Load indicators:** Indicates the approximate load level on each output phase. With no load, all the vertical bars are white. As load increases, the vertical bars change color, from left to right.

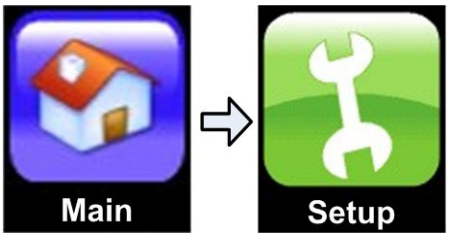
On all screens other than the main menu screen, the current navigation path is displayed in the upper-left corner of the screen (see Figure 4), making it easy to understand where you are located within the control system menus.

The navigation path in the upper-left corner of the screen is also used to navigate backwards – to return to a previous screen or to the main menu. Pressing any of the screen icons in the navigation path moves you to that screen.

5.2 Main Menu highlights

This section provides a brief overview of the Main Menu options, highlighting the most frequently used options. (Chapter 7 provides an in-depth look at all of the options.)

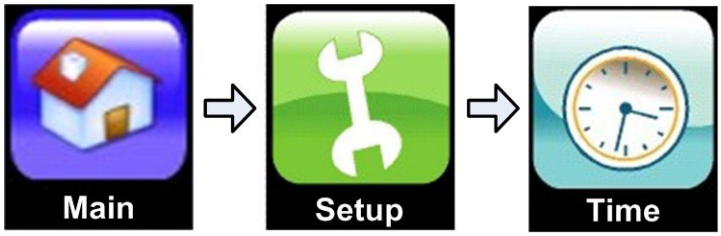
5.2.1 Setup



The Setup menu option contains a wide range of functions for setting the operating parameters of the system. Most of these functions are of interest only to the service technician, but there are a few that may be of interest to the non-technical user.

For a full description of all of the Setup menu functions, see Chapter 0".

5.2.1.1 TIME



The Time function under the Setup option is used to set the system date and time.
See section 7.2.7.7 for details.

5.2.1.2 DRY CONTACTS

The Dry Contact function under the Setup option assigns alarm conditions to the output dry contacts. When the specified alarm occurs, the contact closes. The output dry contacts can be used to trigger external devices. See section 7.2.10 for details.

5.2.2 Operation

The Operation option on the Main Menu is used to turn the UPS on or off.

(For a full description of all of the Operation menu functions, see section 7.3.)

5.2.2.1 TURNING THE UPS ON (FOLLOWING NORMAL SHUTDOWN)

To turn the UPS on:

1. **Verify that the battery circuit breaker is in the OFF position.**
   (The battery circuit breaker is not located on the UPS. It is either on the battery box or on the cables between the battery box and the UPS.)
2. On the Main Menu, tap the **Operation** button. The Operation submenu appears.

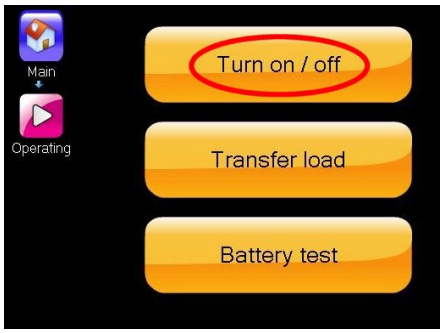


Figure 8: The Operation submenu

3. Tap the top button labeled "**Turn on / off**" on the Operation submenu.
   Another menu appears (Figure 9).
4. Tap the "System on" button.

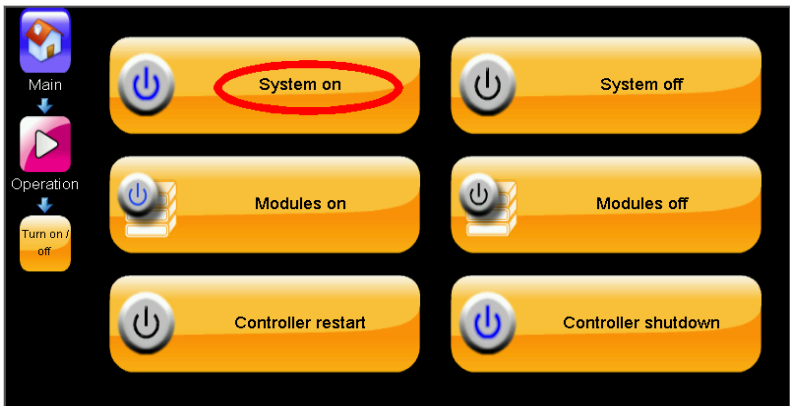


Figure 9: The "Turn off / on" submenu

5. The system requests confirmation.

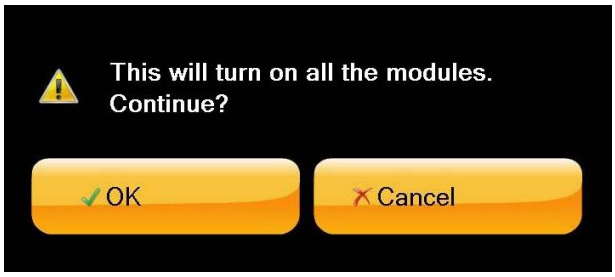


Figure 10: The system requests confirmation

6. Choose "OK". The UPS takes about two minutes to perform a self-check routine, and to bring the internal dc voltage up to 860 V, after which it is ready to supply power to the load.
7. Switch ON the battery circuit breaker.

5.2.2.2 TURNING THE UPS OFF

To turn the UPS off:

1. On the Main Menu, tap the Operation button.
2. Tap the top button labeled "Turn on / off" on the Operation submenu. Another menu appears (Figure 11).
3. Tap the "System off" button.

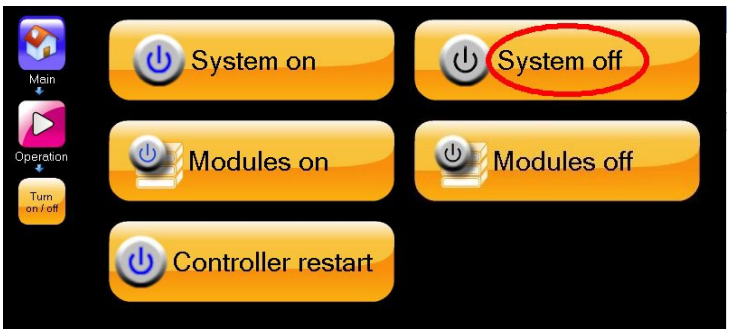


Figure 11: The "Turn off / on" submenu

4. The system requests confirmation.

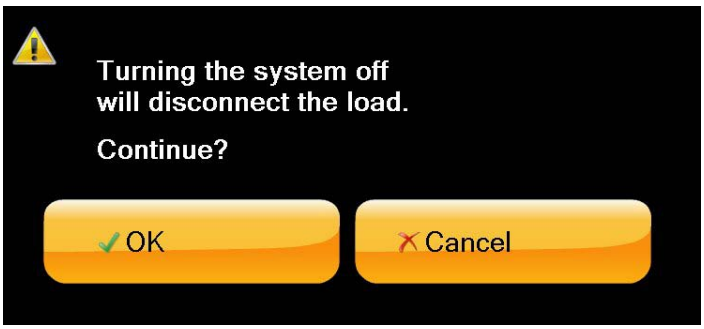
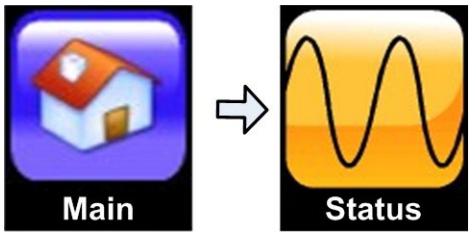


Figure 12: The system requests confirmation

5. Choose "OK". The UPS is then turned off.

5.2.3 Status



Selecting the Status option on the Main Menu displays a diagram that summarizes the overall state of the UPS.

In the diagram, shown in Figure 13, the highlighted (yellow) line indicates the present power flow through the UPS.A yellow triangle with an exclamation point inside indicates an alarm condition related to the UPS component where the triangle is located. Clicking on the component will provide more detailed information about the problem.

Clicking on the various parts of the diagram reveals more detailed information, including present voltage and current readings.

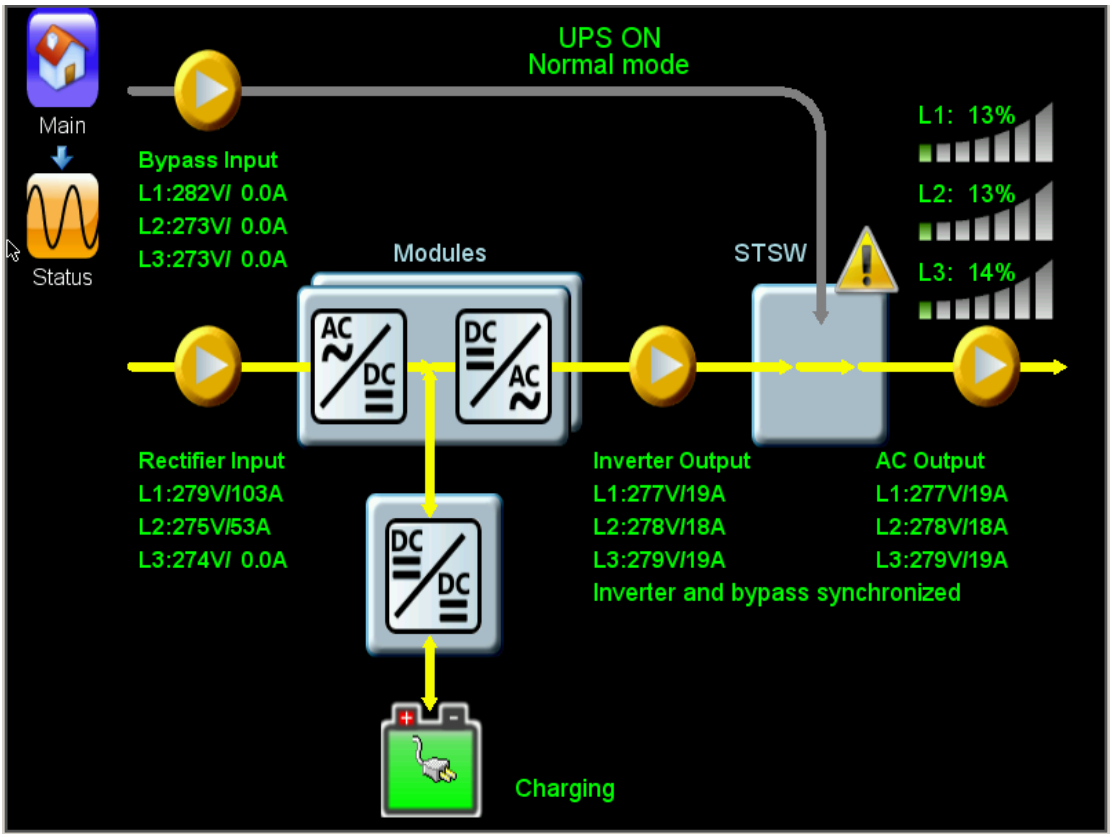


Figure 13: The Status screen

For a full description of the Status option, see section 7.4.

5.2.4 Profile

Selecting the Profile icon on the Main Menu lets you view various system parameters as defined by the factory or by your system technician.

Parameters for the overall system and for the battery, static switch, alarms, and hardware and software versions can be viewed.

For a full description of the Profile option, see section 7.5.

5.2.5 Log

Tap the Log icon on the Main Menu to see the system log. The system log lists all of the important system events that have occurred since the last time you initialized the log. Events listed include system power-up and power-down and the start and end of all alarm conditions.

For a full description of the Log option, see section 7.6.

5.2.6 Time

Tap on the Time icon on the Main Menu to see the system time, the time zone setting (relates to when daylight savings time goes into effect), and the accumulated operational time.

Section 7.8 provides more information on the Time function on the Main Menu.

5.2.7 Help

Tap on the Help icon on the Main Menu to access reference information on the UPS, including operating instructions.

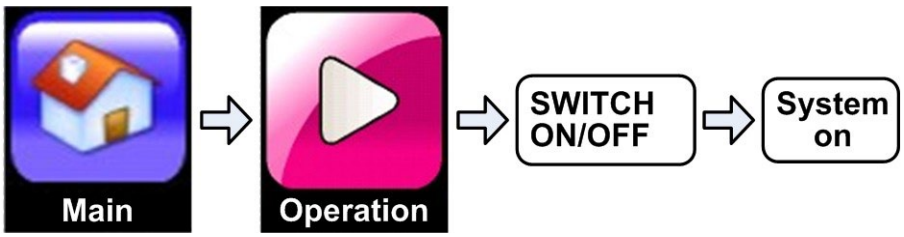
5.3 Operating the system

The "Operation" option on the system main menu is used to:

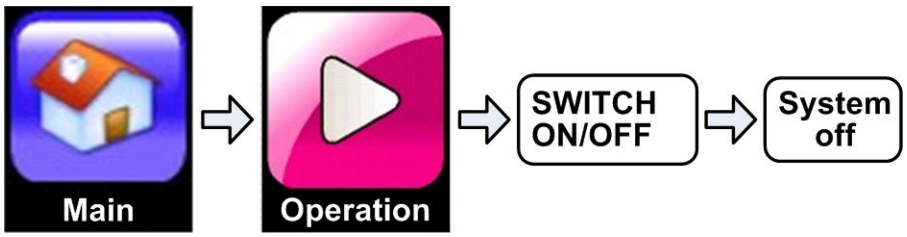
- Turn the **Centric** ON (System on).
- Turn the **Centric** OFF (System off).
- Turn the power modules OFF.
- Turn the power modules ON.
- Transfer the load from the inverter to bypass power.
- Transfer the load from bypass power to the inverter.

5.3.1 Turning the UPS ON

1. Verify that the battery circuit breaker is in the OFF position.



5.3.2 Turning the UPS OFF



5.3.3 Transferring the load to bypass

During normal operation, the load is supplied with power from the **inverter**. The inverter voltage is controlled and regulated to protect the load from any aberrations in the local ac power. When the load is on the inverter, battery backup is always ready to ensure a continuous power supply even in the event of a local ac power failure.

Transferring the load to **bypass** takes the load off the regulated voltage of the inverter and supplies the load with power directly from the local ac mains. In bypass mode, no power conditioning is in effect, and in the event of an ac mains failure there is no battery backup to supply the load. Transfer to bypass can occur automatically, when the controller detects a malfunction in the inverter or a short-circuit in the load. Transfer to bypass can also be accomplished manually.

To manually transfer the load from the inverter to the bypass power:

Main Menu > Operation > Transfer load > Transfer Load to Bypass > OK

5.3.4 Transferring the load to the inverter

To transfer the load from bypass power to inverter power:

Main Menu > Operation > Transfer load > Transfer Load to Bypass > OK

See section 5.3.3 above for an explanation of the difference between inverter mode and bypass mode.

6. CENTRIC START-UP

6.1 Normal (not first-time) start-up

This section describes the start-up procedures for the operator after a shutdown of the Centric. A shutdown could occur due to battery exhaustion following an extended power outage, or due to a manual shutdown by a technician prior to maintenance on the Centric.

After a normal **Centric** shutdown the main menu screen indicates a status of "UPS OFF" and "No output":

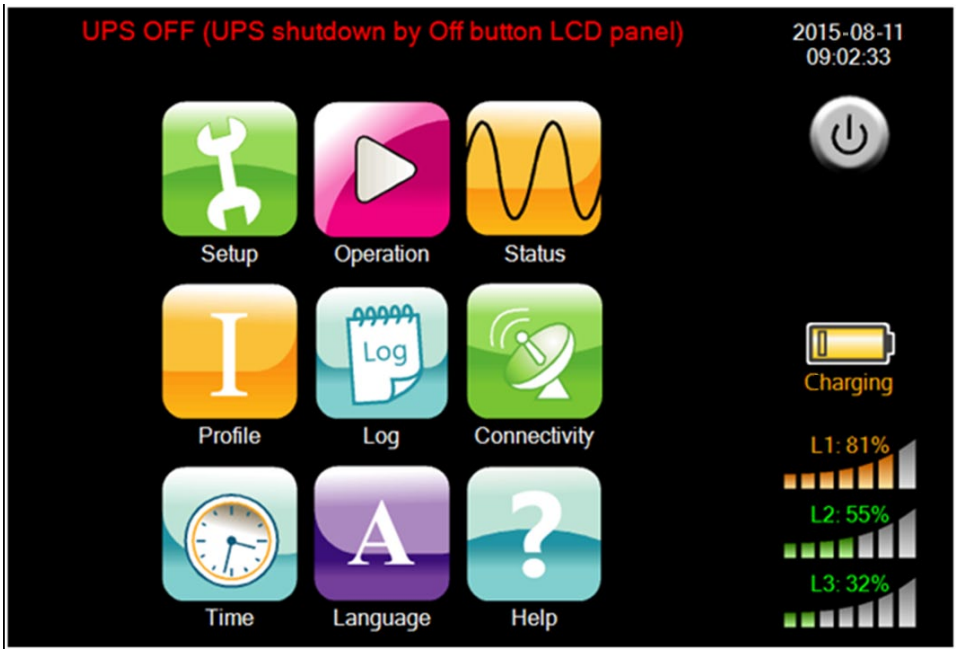


Figure 14: Main menu, UPS off, normal mode

1. From the main menu, choose Operation > Turn OFF/ON > System ON
   - OR -
   Press the ON/OFF button in the upper right corner of the main screen and then choose "System ON".

2. Wait about 2 minutes for the **Centric** to start up.

   While waiting, you can press the  status icon to see a display of the system status. The status description at the top of the screen should become "UPS ON, Normal mode"

   If instead of the status description being "UPS ON, Normal mode" it remains "UPS ON, Bypass mode", there may be a problem with the rectifier voltage. You can see the input voltage readings on the status screen. If the readings are not within acceptable limits, verify that the external circuit breaker for the rectifier input voltage is ON, and that the rectifier input voltage is connected properly to the UPS terminals.

3. Connect the load and observe the results on the  status display.
4. Observe that the output voltage numbers and the bar graph now indicate the presence of the load (if any) and the load's relative power consumption.

Centric start-up is now complete.

6.2 Centric total shutdown (no ac output)

1. Switch OFF the load device(s).
2. From the main menu choose Operation > Turn ON/OFF > System OFF.
3. The control screen will show a status of "UPS OFF, No output".

7. CENTRIC MENU FUNCTIONS IN DETAIL

This chapter describes the functions available through the **Centric** Main Menu and its submenus.

The menus of the **Centric** are logically organized by function, to make it easy to find what you are looking for. The structure of this chapter mirrors the menu structure.

When a screen is referred to in this chapter, it is frequently referred to by its full navigation path, to make it clear which screen is being referred to. For example, the System screen that is accessed from the "Setup" option on the Main Menu is referred to as the "Setup > System" screen.

Figure 15: Centric main menu

7.1 Password requirements

As you navigate through the user interface you may notice that on certain sub-menus some of the functions are marked with a little key-shaped icon (see Figure 16). These functions may require you to enter a password. If you do not have the appropriate password it can be obtained from your distributor or sales agent.

Figure 16: "Key" icon on function button

7.2 SETUP menu

The Setup menu functions enable you to set values for most of the parameters that govern the operation of the **Centric** UPS.

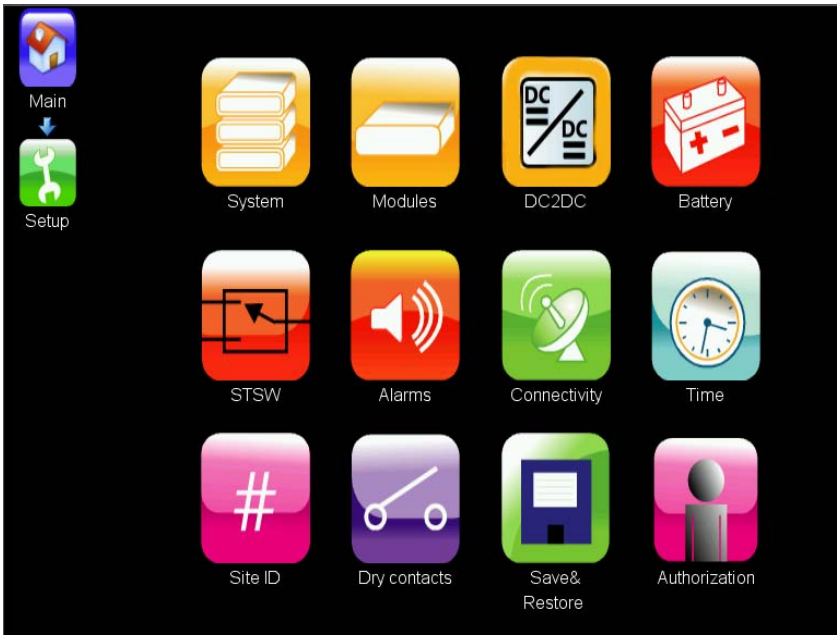


Figure 17: "Setup" menu

7.2.1 Setup > SYSTEM

The "Setup > System" submenu is used to inform the UPS of its operating environment in regards to the following parameters:

- Nominal input and output values of the UPS.
- Total number of modules and how many of them are redundant.
- Number of battery strings.
- Output power capacity.
- If the UPS is being operated in parallel with one or more additional UPSs.
- On what conditions should the UPS be shutdown when in battery mode, and should the UPS be automatically restarted when the ac mains power returns.
- Interval between automatic tests of the controller battery.
- Testing the remote monitoring panel.
- List any maintenance-related alarms.

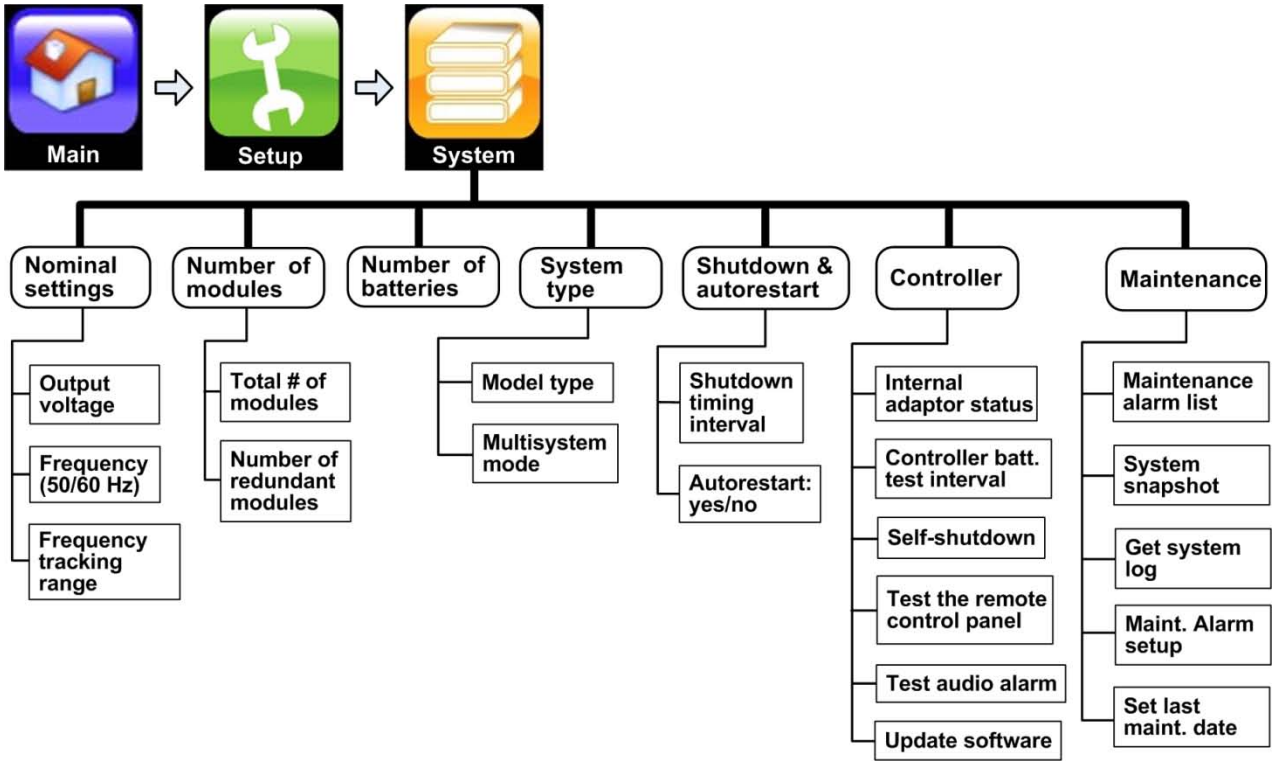


Figure 18: "Setup > SYSTEM" options

7.2.1.1 SETUP > SYSTEM > NOMINAL SETTINGS

- **Nominal system output voltage:** you can modify the nominal output voltage to any of the values listed on the screen, but first you must turn off the UPS by means of the ON/OFF button on the main menu screen. Obviously, you should not change the output voltage unless you are sure that the new value is appropriate for the load devices. An inappropriate output voltage can cause permanent damage to the load devices.
- **Nominal system frequency:** the output frequency of the UPS can be set to either 50 Hz or 60 Hz. Before modifying the UPS nominal frequency, the UPS must be turned off by means of the ON/OFF button on the main menu screen. Obviously, the nominal system frequency chosen should be the same as the nominal frequency of the rectifier input and bypass voltage.
- **Frequency tracking range:** The inverter frequency is normally governed by the frequency of the bypass voltage, which will be a nominal 50 or 60 Hz. There may be natural fluctuations in the bypass frequency. The frequency tracking range lets you determine how far away from the nominal frequency the inverter will follow the bypass frequency. When the bypass frequency fluctuation exceeds the frequency tracking range, the inverter stops following the bypass frequency and begins instead to determine its frequency by means of the UPS's internal clock.

For example, the bypass frequency is a nominal 50 Hz, and you have set the frequency tracking range to be ±2 Hz. In this case, as long as the bypass frequency remains within the range of 48–52 Hz, the inverter frequency will mirror it. When the bypass frequency passes these boundaries, the inverter frequency ceases to be determined by the bypass frequency and comes under the control of the UPS's internal clock (this is called "free-running mode"). When the bypass frequency returns to the range of 48–52 Hz, free-running mode ceases and the inverter frequency again comes under the control of the bypass frequency.

7.2.1.2 SETUP > SYSTEM > NUMBER OF MODULES

This function is used to inform the **Centric** of:

- the total number of UPS modules to be used,
- how many of the UPS modules will provide redundancy, and
- the total number of dc-to-dc converter modules.

Number of UPS modules:
must be less than or equal to the number of modules currently in-place in the UPS.

Number of modules for redundancy:
Of the total number of UPS modules, you must indicate the number of modules that are intended to provide redundancy.

Number of dc-to-dc converter blocks:
Each dc-to-dc **converter module** contains two **converter blocks**.

Each UPS module requires one converter **block**. So, the ideal number of dc-to-dc converter blocks is the same as the number of UPS modules to be used. The Centric does not verify that the number of **dc-to-dc blocks** matches the number of **UPS modules**. No harm is done if the number of dc-to-dc converter blocks installed is greater than the number of UPS modules.

Note: If the number of dc-to-dc blocks is less than the number of UPS modules, the UPS modules which have no corresponding dc-dc block will not have backup power when the UPS goes into battery mode.

Section 2.7 has more information about the dc-to-dc converter modules.

7.2.1.2.1 REDUNDANCY

"Redundant" modules are those above and beyond the minimum number of modules required to supply the maximum expected UPS load. Each **Centric** module can supply 10 kVA / 10 kW. So, for example, if the maximum expected load is 50 kVA, and there are six power modules installed, one of them can be designated for redundancy. In the event one of the six modules fails, the redundant module ensures that the UPS will continue to be able to accommodate the maximum expected load.

When all modules are operating normally, the redundant modules participate in the load sharing.

A redundant module is one in excess of the minimum number of modules required to meet the UPS's maximum expected load. If any module fails, the presence of the "extra" or redundant module(s) guarantees that the maximum expected load can still be supported. The number of redundant modules can be zero or greater, depending on the maximum expected load and the number of available module shelves.

When all modules are operating normally, the redundant modules share the load equally with the rest of the modules.

Defining a redundancy of one or more modules affects the UPS's perception of its maximum output capability. The redundant module(s) is not taken into account in calculating the UPS's maximum output capability.

As an example, say we have a UPS system with five module shelves that can hold modules of 10 kW. The maximum expected load is 35 kW. Four modules (40 kW) are required to supply the maximum expected load. A fifth module can be installed and a redundancy of one module declared, giving the UPS a total capacity of 40 kW. If any one of the five modules fails, the UPS will still be able to supply power for the maximum expected load. If all of the modules are operating normally, and the load unexpectedly increases to 45 kW, the system will indicated an overload condition, because the redundant module is not taken into account in calculating the UPS's maximum output capability.

Redundancy is not a property of any particular module. Redundancy is simply the presence of one or more modules in excess of the number of modules required to meet the maximum expected load.

Note: When modules are added to the system or removed from the system, the value of total number of modules must be adjusted. You may or may not at that time also want to change the number of redundant modules.

7.2.1.3 SETUP > SYSTEM > NUMBER OF BATTERIES

Specify the number of battery strings connected to the UPS. You can specify 1, 2, or 3 battery strings. The **Centric** requires you to enter a password to change this setting.

(Note: A "battery string" or "battery set" is the basic number of batteries required to provide standard backup capabilities. For the Centric, this is 60 x 12 V batteries. A battery string may be housed in one or more battery cabinets. For extended backup time, multiple battery sets can be attached to the Centric.)

7.2.1.4 SETUP > SYSTEM > SYSTEM TYPE

Model type: Indicate the maximum output power of your system. Here, assume no redundant modules, so that all modules are considered when calculating the maximum potential system output..

Multi-system mode: Indicate that the UPS will be operating in parallel configuration (multi-system mode). A password may be required to modify this setting. If you do not have the appropriate password, contact your distributor or sales agent.

7.2.1.5 SETUP > SYSTEM > SHUTDOWN AND AUTORESTART

Use this option to specify the behaviour of the UPS during a failure of the ac mains power.

- You can set a specific limit to the duration of battery mode, after which time the UPS will automatically turn itself off.
- You can instruct the UPS to continue to supply backup power until the battery voltage descends to the predefined level at which the UPS will turn itself off.

In this screen, you also specify if the UPS should automatically turn itself back on when the ac mains power returns following a power failure, or if it should remain off.

7.2.1.6 SETUP > SYSTEM > CONTROLLER

This submenu contains functions related to the system controller.

7.2.1.6.1 INTERNAL ADAPTOR STATUS

For use by technician. Displays the data being passed to and from the adaptor card, PC710A, part of the controller module.

7.2.1.6.2 CONTROLLER BATTERY

This option displays a submenu with functions related to the controller's own internal battery.
Use this submenu to:

- Define the time interval between automatic tests of the controller battery.
  Default value is one week.
- Enable/disable automatic testing of the controller battery. ("Enable" is recommended for most circumstances.)
- Start a test of the controller battery manually. This function can be performed at any time.

7.2.1.6.3 SELF-SHUTDOWN ("WATCHDOG FUNCTION")

Enables / disables the controller self-shutdown function, also known as the watchdog function.

"Enable" is recommended for most circumstances. Additional information on the watchdog function is provided below.

Note: disabling the controller self-shutdown function (watchdog function) also disables the "UPS OFF" button on the left side of the upper front panel of the UPS, described in section 4.2.1.
If the self-shutdown function is disabled *and* the LCD display screen happens to become disabled, the question of how to switch off the UPS becomes a problem.

7.2.1.6.3.1 Watchdog function – general explanation

The watchdog function (performed by PC710A, the adaptor card) comes into play in the rare instance that a problem occurs with communication between PC710A and the controller's computer. The watchdog's purpose is to evaluate the symptoms of the problem and to try to recover normal communication between PC710A and the controller's computer.

If the watchdog ultimately fails to recover normal operation of the controller computer, the UPS continues to operate, although with reduced functionality. Basic ON/OFF capability is still available as described in section 4.2.1 '"UPS off" button.

Table 5: Watchdog status and the state of the "CPU Active" LED

STATE OF "CPU ACTIVE" LED	STATE OF CPU	TROUBLESHOOTING SUGGESTIONS
Steady GREEN	There is normal communication between the adaptor card PC710A and the computer.	In this case, the state of the LED on the computer motherboard (internal) has no special significance.
Blinking GREEN	There is no communication between PC710A and the computer.	The LED on the computer motherboard (internal) indicates that the computer is operating. One of the following conditions may be interfering with communication: • The computer may be starting up. • The computer may have hung (frozen or looping). • There may be a problem with the computer's serial port. • There may be a problem with the cable between PC710A and the computer. • Card PC710A may be faulty.
Blinking RED	The computer is in the process of restarting, following programmatic activation of the of the power button (PW_BN).	Same as for "Blinking GREEN" above.
Steady RED	Activation of the power button (PW_BN) failed to invoke an orderly shutdown of the computer, so a reset of the computer has been effected via the computer's reset button (RST_SW).	Same as for "Blinking GREEN" above, plus the following: • The wiring between PC710A and the power button (PW_BN) may be faulty, leaving PC710A no choice but to use the reset button (RST_SW).
OFF	There is no communication between PC710A and the computer, and the LED on the computer motherboard (internal) is OFF.	There may be a problem with the input power for the computer motherboard – either the power itself or the cable.

7.2.1.6.4 REMOTE MONITORING PANEL

This function performs an LED test of the remote monitoring panel, if one is attached to the system.
Tap the Start button to begin the LED test. Tap the Stop button to end the LED test.
If the Stop button is not pressed, the LED test will end by itself automatically after two minutes.

For information about the connection and use of the remote monitoring panel, see the *Centric 3x480 UPS Installation Guide*.

7.2.1.6.5 AUDIO TEST

Tests the audible alarm.

7.2.1.6.6 UPDATE

For technician's use only. Updates the controller software.

7.2.1.6.7 SCREEN SAVER SETUP

Enables/disables the LCD panel's screen saver.

7.2.1.6.8 START/STOP DEBUG

For technician's use only.

7.2.1.7 SETUP > SYSTEM > MAINTENANCE

This option has a number of sub-options. Some are related to system maintenance and some to the system log.

7.2.1.7.1 MAINTENANCE ALARM LIST

Displays pending alarms related to system maintenance. The purpose of these alarms is to ensure that the UPS receives appropriate preventive maintenance.

7.2.1.7.2 SYSTEM SNAPSHOT

Takes a real-time statistical snapshot of system parameters and measurements and saves it to a flash drive. Before taking the snapshot, insert a writable flash drive into one of the USB ports on the front right of the system controller. The snapshot data is saved as an html file in a report-style format including descriptive field names.

7.2.1.7.3 GET SYSTEM LOG

Copies the system log to a flash drive or other USB device. Before executing this command, insert a writable flash drive into one of the USB ports on the front right of the system controller. The log data is saved as an html file in a report-style format including descriptive field names.

If you want the log file data to be saved as a csv (comma-separated variables) file, go to the main screen and use the “Log > Export csv” command.

7.2.1.7.4 MAINTENANCE ALARM SETUP

This option is available only to a technician.

7.2.1.7.5 SET LAST MAINTENANCE DATE

The technician uses this function to record the date of the most recent preventive maintenance session.

7.2.2 Setup > MODULES

The Setup > Modules menu is where the parameters for individual modules can be adjusted. The functions here enable "fine-tuning" of the module output.

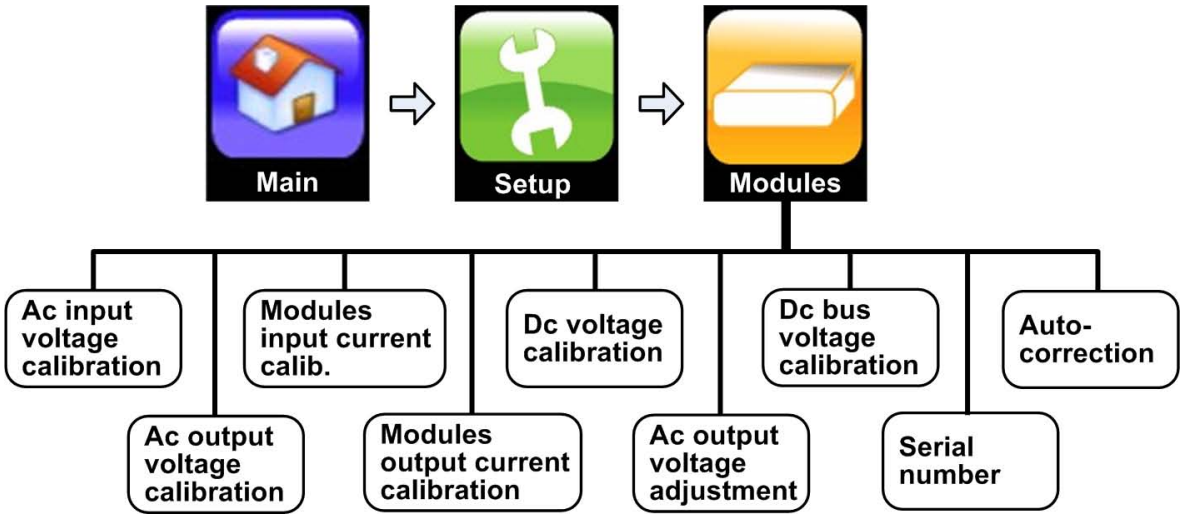


Figure 19: "Setup > Modules" options

7.2.2.1 AC INPUT VOLTAGE CALIBRATION

Use this function if it becomes necessary to recalibrate the voltage readings of any of the UPS's input phases. Note that this does not refer to the input reading of a particular module but rather to the input of all modules together.

To perform the calibration, for each input phase use a voltmeter to measure between the phase and midpoint. Enter the measured values into this screen and press "confirm". Calibration of the input ac voltage reading should be performed only under conditions where the input and output voltages are stable and not subject to fluctuation.

7.2.2.2 AC OUTPUT VOLTAGE CALIBRATION

Use this function if it becomes necessary to recalibrate the voltage readings of any of the UPS's output phases. Note that this does not refer to the output reading of a particular module but rather to the output of all modules together.

To perform the calibration, for each output phase use a voltmeter to measure between the phase and midpoint. Enter the measured values into this screen and press "confirm". Calibration should be performed only under conditions where the input and output voltages are stable and not subject to fluctuation.

7.2.2.3 MODULES INPUT CURRENT CALIBRATION

Use this function if it necessary to recalibrate the current (ampere) readings of any of the UPS's input phases. This calibration should be performed on each module, one module at a time, until all modules have been calibrated. (The value you enter is sent to all modules, so input current calibration must be performed on one module at a time, with all of the other modules turned off.) To turn modules OFF, see section 7.3.1.3 "Operation > Switch on/off > MODULES OFF".

To perform the calibration, measure the current on the input phase with an ammeter, then enter the measured value into this screen and press "confirm". Only the values that you modified (indicated by a change in colour of the numbers from white to orange) are sent to the module.

For your reference, the present UPS-measured values are displayed on the right side of the screen.

Calibration should be performed only under conditions where the input and output current are stable and not subject to fluctuation.

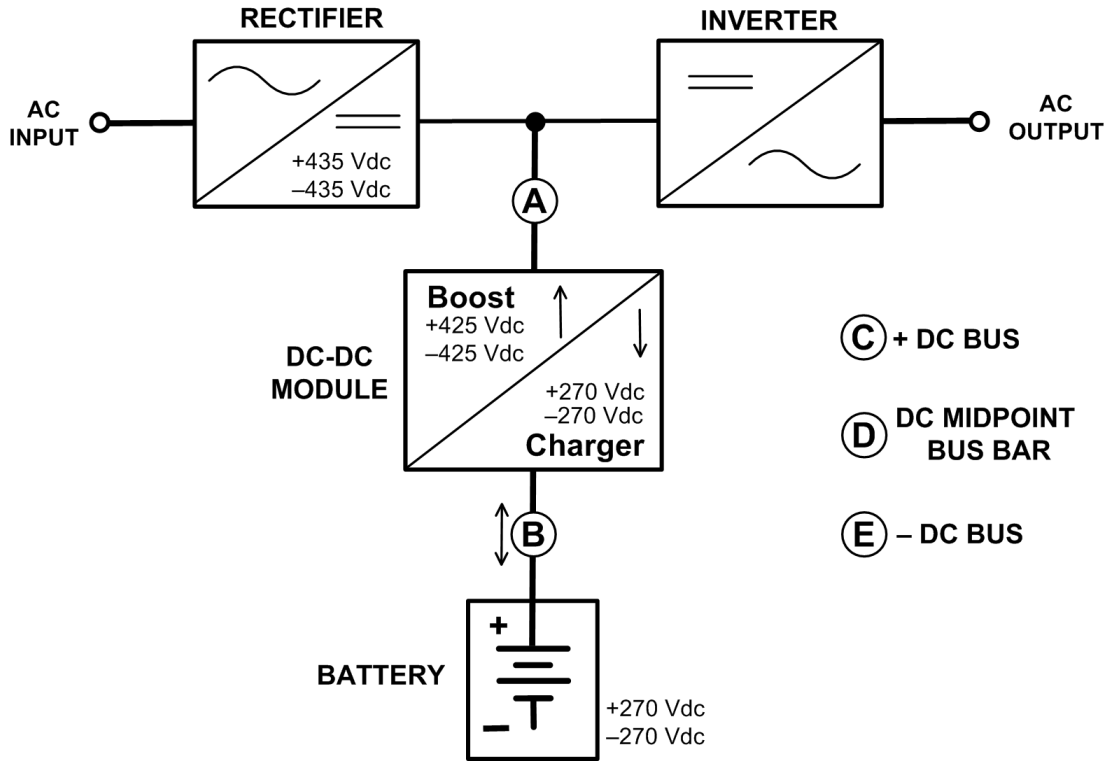


Figure 20: Measurement point for calibration and adjustment of voltages and currents

7.2.2.4 MODULES OUTPUT CURRENT CALIBRATION

Use this function if it becomes necessary to recalibrate the current (ampere) readings of one of the UPS's output phases. (Note: a password may be required to complete this function.)

Output current calibration must be performed on each module, one module at a time, with all of the other modules turned off. (To turn modules OFF, see section 7.3.1.3 "Operation > Switch on/off > MODULES OFF".) Start from the bottom-most module and work your way up.

Note:

- Modules output current calibration should be performed only if necessary, not casually.
- Modules output current calibration should be performed only under conditions where the input and output current are stable and not subject to fluctuation.
- Calibration is best performed when the system is under relatively high load (70+ %).

To perform the calibration:

1. Switch off all modules except for the bottom-most module.
2. Measure the current of the output phase with an ammeter, then enter the measured value into this screen and press "confirm". When you press "confirm", only the values that you have modified (indicated by a change in colour of the numbers from white to orange) are sent to the module.

   For your reference, the present UPS-measured values are displayed on the right side of the screen.
3. Switch OFF the module just calibrated and switch ON the module above it.
4. Perform steps 2 and 3 until all modules have been calibrated.
5. Switch ON all modules.

7.2.2.5 DC VOLTAGE CALIBRATION

This function is used to correct any inaccuracy in each module's measurement of its internal dc voltage. (Note: a password may be required to complete this function.) Each module's readings are calibrated before the UPS leaves the factory, but over time or due to environmental factors the Centric's dc measurements may drift slightly.

Calibration of the dc voltage should be performed only under conditions where the UPS's input and output currents and voltages are stable and not subject to fluctuation.

Dc voltage calibration must be performed on one module at a time, with all of the other modules turned off. (To turn modules OFF, see section 7.3.1.3 "Operation > Switch on/off > MODULES OFF".) The reason for this is that the updated values you enter get sent to all modules that are in the "ON" state, and you only want them to affect the module being calibrated.

The readings for the positive and negative components of the module's dc voltage are calibrated separately (but on the same screen), and can be increased or decreased separately.

To detect and correct any inaccuracy in the Centric's display of the battery voltage:

1. Turn off all but one module ("Main > Operation > Turn on/off"). We suggest you calibrate the modules starting with the bottom-most module and working your way up.
2. On the rear side of the UPS, measure the voltage between the negative ("– " dc bus and midpoint bus bar. **See Figure 22**. You would expect the value to be around 435 Vdc, ± 10 V.
3. Compare your measured value to the number to the right of the screen, which is the Centric's measurement. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "negative dc voltage" (see Figure 25).
4. Next, measure the voltage between the positive ("+") dc bus bar and the "N" dc bus bar. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "battery positive dc voltage".
5. Press the Confirm button to apply the corrected measurements.
6. Switch OFF the module just calibrated and switch ON the next module above it.
7. Perform steps 2 through 6 until all modules have been calibrated.

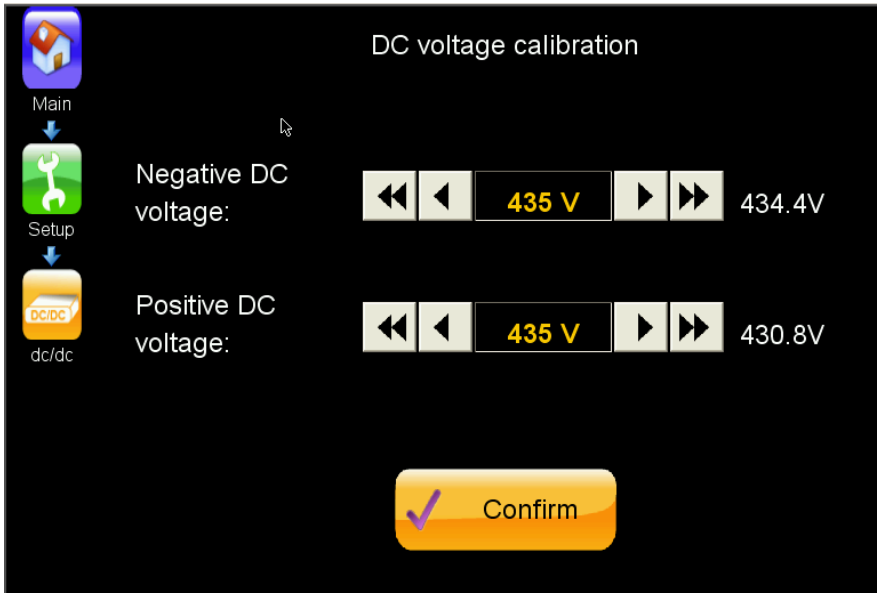


Figure 21: Dc voltage calibration

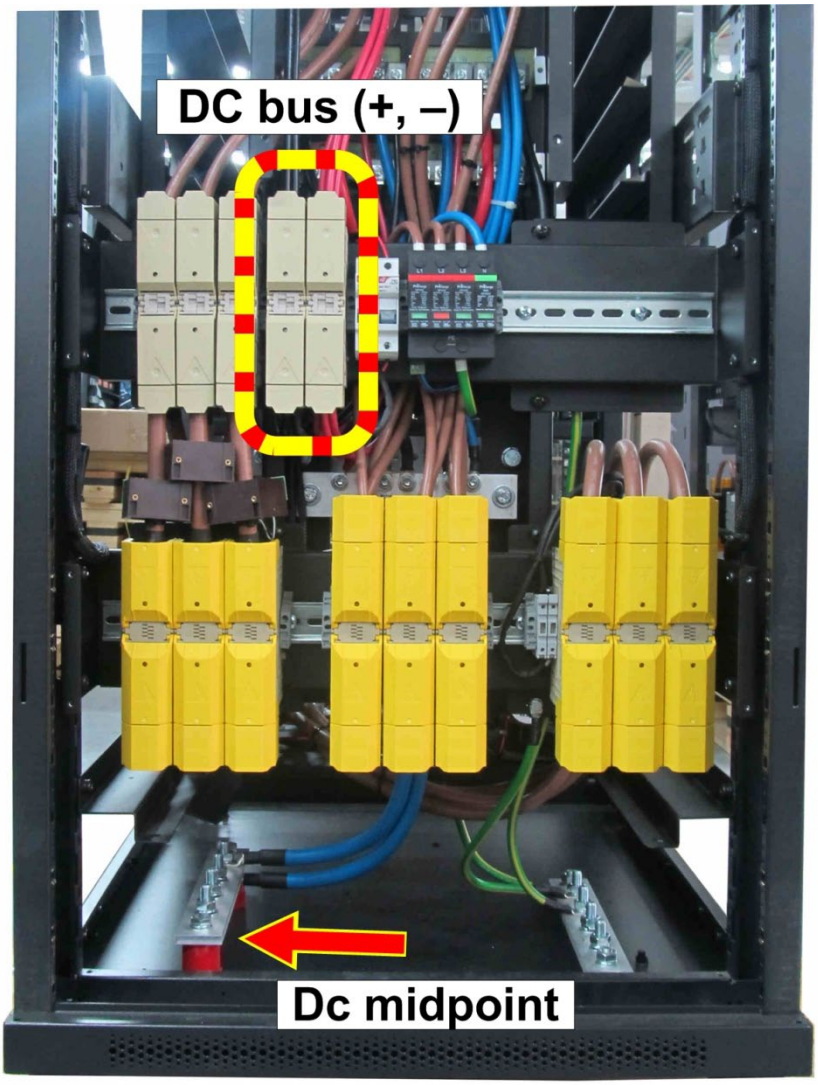


Figure 22: Measure the module's dc voltage between the dc bus and midpoint

7.2.2.6 AC OUTPUT VOLTAGE ADJ.

Use this function to modify the voltages of the individual output phases of a specific power module. The phase voltage can be adjusted upward or downward by up to 15 V.

7.2.2.7 DC BUS VOLTAGE CALIBRATION

This function is used to correct any inaccuracy in each module's measurement of its internal dc voltage. (Note: a password may be required to complete this function.) The Centric's readings are calibrated before the UPS leaves the factory, but over time or due to environmental factors the Centric's dc measurements may drift slightly.

Calibration of the dc voltage should be performed only under conditions where the UPS's input and output currents and voltages are stable and not subject to fluctuation.

Dc voltage calibration must be performed on one module at a time, with all of the other modules turned off. (To turn modules OFF, see section 7.3.1.3 "Operation > Switch on/off > MODULES OFF".)

The readings for the positive and negative components of the module's dc voltage are calibrated separately (but on the same screen), and can be increased or decreased separately.

To detect and correct any inaccuracy in the Centric's display of the dc bus voltage:

1. Turn off all but one module ("Main > Operation > Turn on/off"). We suggest you calibrate the modules starting with the bottom-most module and working your way up.

2. On the rear side of the UPS, measure the voltage between the negative ("– " dc bus and midpoint bus bar. **See Figure 22**. You would expect the value to be around 435 Vdc, ± 10 V.
3. Compare your measured value to the number to the right of the screen, which is the Centric's measurement. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "negative dc voltage" (see Figure 25).
4. Next, measure the voltage between the positive ("+") dc bus and the "midpoint" bus bar. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "battery positive dc voltage".
5. Press the Confirm button to apply the corrected measurements.
6. Switch OFF the module just calibrated and switch ON the next module above it.
7. Perform steps 2 through 6 until all modules have been calibrated.

7.2.2.8 SERIAL NUMBER

This function enables you to record the serial number of each UPS power module in memory, for easy reference.

7.2.2.9 AUTO-CORRECTION

When the average output voltage of the UPS modules is above or below what it should be, the controller performs auto-correction, which consists of raising or lowering the output of all modules by an equal number of volts until the average output voltage is what it should be.

Auto-correction is enabled by default; this is the recommended setting for most situations.

7.2.3 Setup > DC-DC

The Setup >DC-DC menu provides access to parameters related to the dc-to-dc conversion modules. Most of these parameters are for calibrating the Centric's readings of the several dc voltages related to the conversion function.

Remember that the dc-to-dc conversion modules boost the battery voltage to provide the UPS modules the high voltage they require. The dc-dc modules convert the battery voltage of 540 Vdc to 870 Vdc required by the UPS modules. The dc-to-dc modules also step down the dc output voltage from the rectifier to a voltage more suitable for charging the batteries.

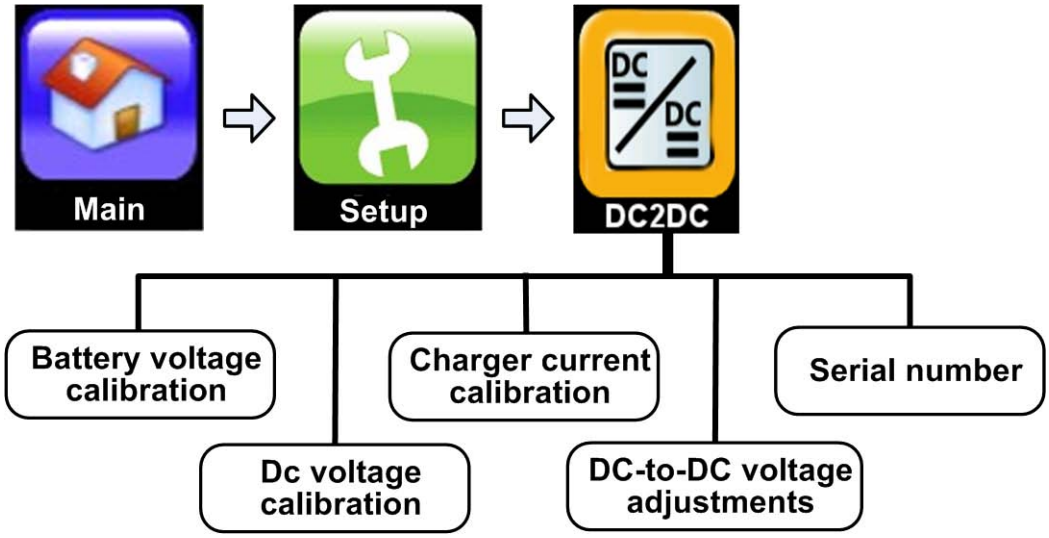


Figure 23: "Setup > DC-to-DC" options

7.2.3.1 BATTERY VOLTAGE CALIBRATION

This function is used to correct any inaccuracy in the Centric's reading of the battery voltage. (Note: a password may be requested to complete this function.)

The Centric's readings are calibrated before the UPS leaves the factory, but over time or due to environmental factors the Centric's dc measurements may drift slightly.

Keep in mind that in this screen (and in most screens related to dc voltage) the Centric displays the battery voltage in two parts: a negative half and a positive half. For example, if the battery was charged to the ideal level of 540 Vdc, and the Centric's measurement was perfectly calibrated, the battery voltage reading would be displayed as 270 Vdc negative and 270 Vdc positive.

To detect and correct any inaccuracy in the Centric's display of the battery voltage:

1. Measure the actual battery voltage with a calibrated voltmeter. There are labeled battery dc bus bars inside the UPS. Carefully, observing all safety precautions, measure the voltage between the negative ("–") battery bus bar (Figure 24) and the midpoint bus (Figure 22).
2. Compare your measured value to the number to the right of the screen, which is the Centric's measurement. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "battery negative dc voltage" (see Figure 25).
3. Next, measure the voltage between the positive ("+") battery bus bar (Figure 24) and the midpoint bus (Figure 22). If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "battery positive dc voltage".
4. Press the Confirm button to apply the corrected positive voltage measurements.

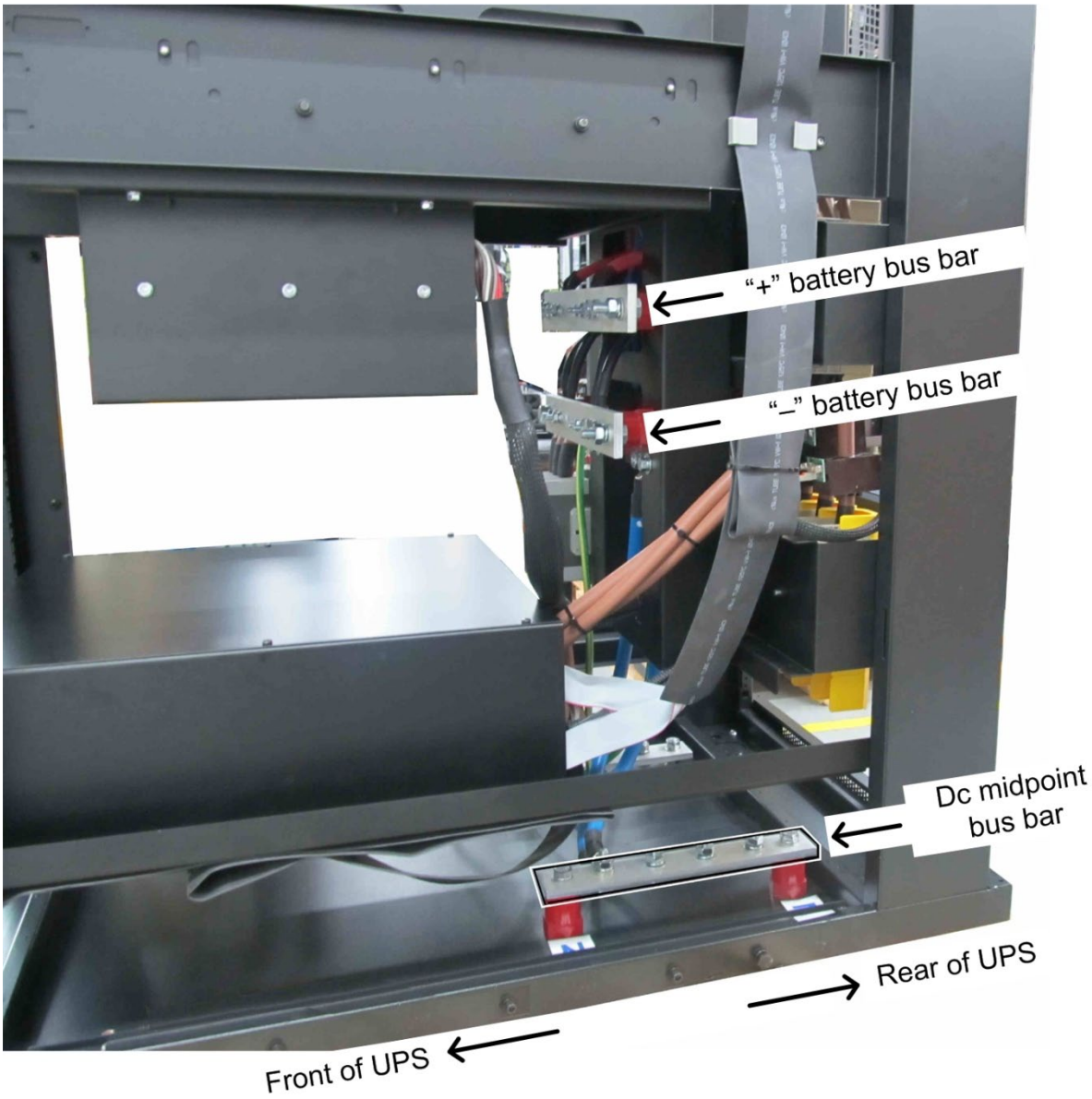


Figure 24: Battery bus bars and midpoint bus bar in Centric's underbelly

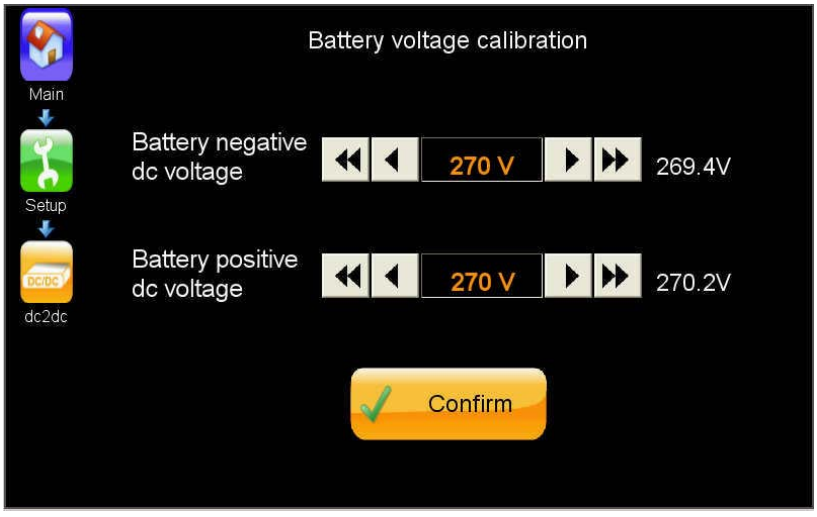


Figure 25: The "Battery voltage calibration" screen

7.2.3.2 DC VOLTAGE CALIBRATION

This function is for correcting any inaccuracy in the Centric's display of the dc voltage. (This is the output voltage of the dc-dc blocks, not the battery voltage. The rectifier's output voltage is fed to the inverter and is also used to charge the battery.)

The Centric's readings are calibrated before the UPS leaves the factory, but over time or due to environmental factors the Centric's dc measurements may drift slightly.

In this screen the Centric displays the dc voltage in two parts: a negative half and a positive half. For example, if the UPS load was perfectly stable and the Centric's measurement was perfectly calibrated, the dc voltage reading would be displayed as 435 Vdc negative and 435 Vdc positive.

Calibration of the dc-dc voltage must be done one dc block at a time. The Centric must be under low or no load during the dc output voltage calibration

(Note: a password may be required to perform this function.)

To calibrate the Centric's display of the dc voltage:

1. Turn off all dc-dc blocks except for one ("Main > Operation > Turn on/off > Dc-dc on/off"). We suggest you calibrate the dc-dc blocks starting with the bottom-most block (see Figure 26).
2. The dc bus is located on the rear of the UPS (Figure 22). Using a calibrated voltmeter, measure the actual dc voltage between the negative ("–") dc bus and the midpoint bus (Figure 22).
3. Compare your measured value to the number to the right of the screen, which is the Centric's measurement. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "negative dc voltage" (see Figure 25).
4. Next, measure the voltage between the positive ("+") dc bus and the midpoint bus bar. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "battery positive dc voltage".
5. Press the Confirm button to apply the corrected measurements.
6. Repeat the process for each dc-dc block, one block at a time, turning off all of the dc blocks except the one being calibrated.

Figure 26: Dc-dc blocks numbering sequence

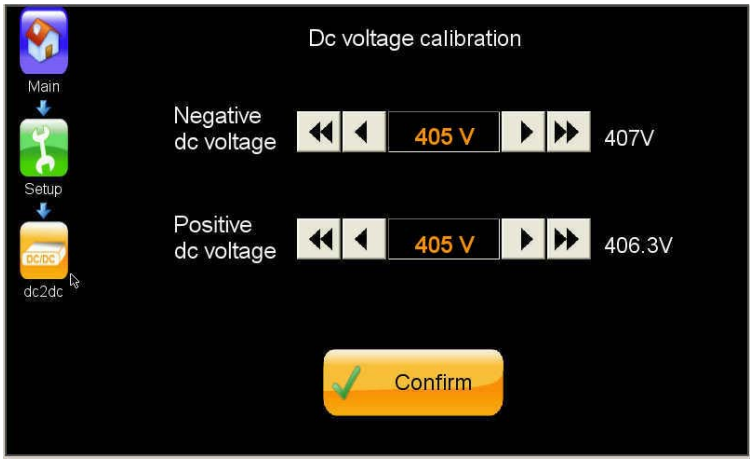


Figure 27: Dc voltage calibration screen

7.2.3.3 CHARGER CURRENT CALIBRATION

Use this function if it necessary to recalibrate the ampere readings of one of the UPS's input phases.

In order to calibrate the charging current, you have to ensure that there is charging current. This can be done by manually invoking a battery test ("Main > Operation > Battery Test > Test Battery") shortly before you perform the calibration, to lower the battery voltage below its normal level.

For your reference, the present UPS-measured values are displayed on the right side of the screen.

Calibration of the charger current should be performed when the system is under a very light load or no load.

(Note: a password may be required to perform this function.)

To calibrate the Centric's display of the charger current:

1. With the UPS in normal mode, turn of the ac input (Main > Operation > Turn ON/OFF > Modules Off > Select All > Inverter Off).
2. Turn off all dc-dc blocks except for one ("Main > Operation > Turn on/off > Dc-dc ON/OFF"). We suggest you calibrate the dc-dc blocks starting with the bottom-most block (see Figure 26).
3. The battery bus is located inside the lower part of the UPS (Figure 24). Using a calibrated ammeter, measure the actual dc current between the negative ("–") battery bus and the midpoint bus (Figure 22).
4. Compare your measured value to the number to the right of the screen, which is the Centric's measurement. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "Charger negative" (see Figure 25).
5. Next, measure the voltage between the positive ("+") dc bus and the midpoint bus bar. If your measured value differs from the Centric's measured value, enter your measured value into the field labeled "Charger positive".
6. Press the Confirm button to apply the corrected measurements.
7. Switch off the dc block you just calibrated and switch on the next-highest block (see the sequence numbers in Figure 28.
8. Repeat steps 3 through 7 until all of the dc-dc blocks have been calibrated.

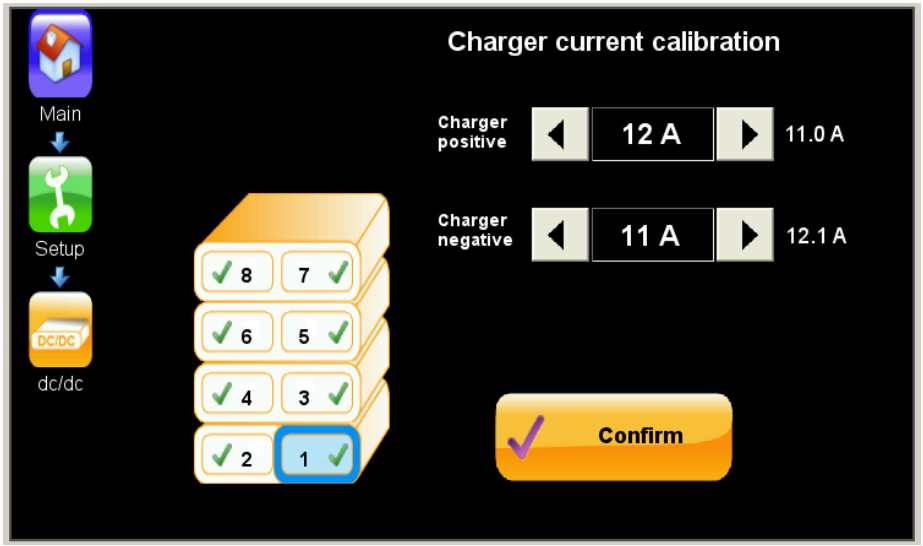


Figure 28: Charger current calibration screen

7.2.3.4 DC-TO-DC VOLTAGE ADJUSTMENTS

This function enables you to adjust the voltages out of each individual dc-dc block.
Adjustments are made to each dc/dc block separately, one block at a time.

7.2.3.4.1 ADJUSTING THE "BOOST" VOLTAGE

The fields labeled "Positive dc voltage" and "Negative dc voltage" modify the "boost" voltage, which is the voltage between the positive dc bus and the dc midpoint, and between the negative dc bus and the dc midpoint.

The ideal boost voltages are "plus" and "minus" 425 Vdc.

The voltages can be adjusted up or down by up to 1.875 volts.

Modification of the boost voltage should be done when there is no load on the UPS, and no ac input – the input circuit breakers are in the "OFF" position.

7.2.3.4.2 ADJUSTING THE BATTERY VOLTAGE (THE "BUCK" VOLTAGE)

The fields labeled "Battery positive dc" and "Battery negative dc" effect the voltage between the positive battery bus bar and the dc midpoint, and between the negative battery bus bar and the dc midpoint.

The ideal buck voltages are "plus" and "minus" 270 Vdc.

This function enables you to adjust the "buck" voltage up or down by a maximum of 1.875 volts.

Modification of the battery voltages should be made only when the battery is fully charged.

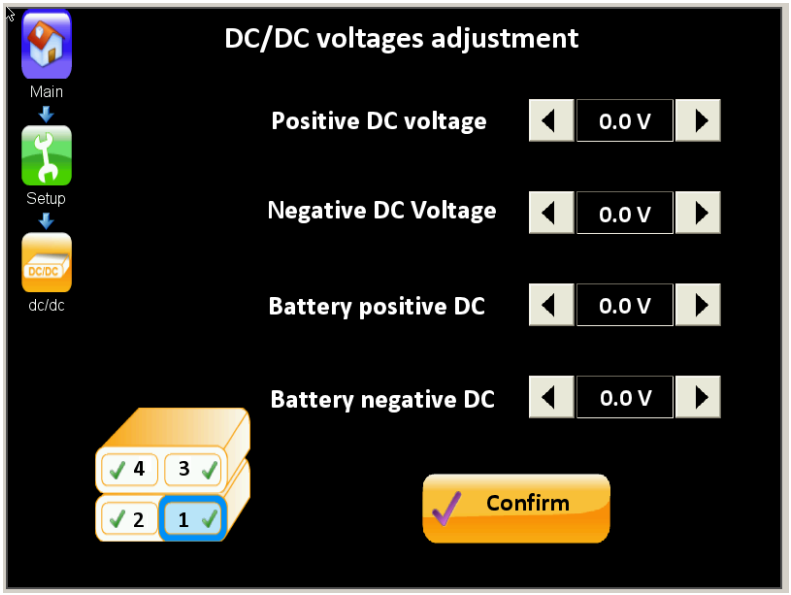


Figure 29: Dc/Dc voltages adjustment screen

7.2.3.5 SERIAL NUMBERS

Use this function to record the serial numbers of the Centric's UPS modules. The serial number can be found on a silver sticker on the exterior of each UPS module.

7.2.4 Setup > BATTERY

The Setup > BATTERY functions provide control over a number of battery parameters.

The Centric supports the use of standard lead-acid batteries, and also lithium-ion batteries. If you plan to use lithium-ion batteries, consult with your dealer to be sure that the battery setup parameter values are appropriate for the batteries you will be using.

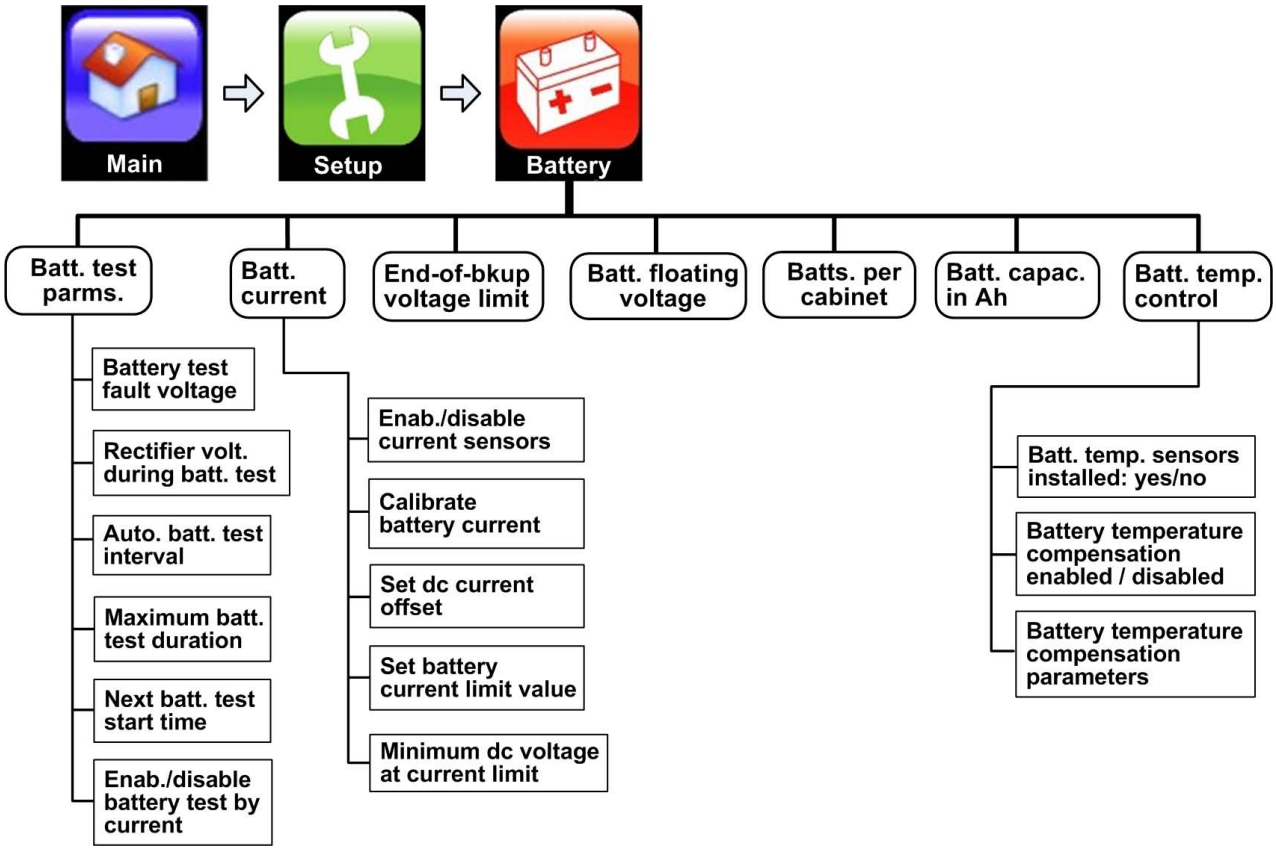


Figure 30: "Setup > Battery" options

7.2.4.1 SETUP > BATTERY > BATTERY TEST PARAMETERS

The parameters in this section relate to the battery test function.

7.2.4.1.1 BATTERY TEST FAULT VOLTAGE

When this voltage is reached during a battery test, the battery has failed the test.

7.2.4.1.2 RECTIFIER VOLTAGE DURING BATTERY TEST

Sets the value to which the rectifier's output voltage descends during a battery test.

7.2.4.1.3 AUTOMATIC BATTERY TEST INTERVAL

The UPS conducts a periodic battery test automatically according to the time interval specified here. The time interval is specified in weeks.

7.2.4.1.3.1 Factors delaying the automatic battery test

- In the event that the UPS's ac input voltage is high, the battery test is postponed until the UPS's input voltage becomes lower. A "high" input voltage in this case means "greater than the battery test voltage divided by √2". The battery test voltage is that defined above in section 7.2.4.1.1 "Battery test fault voltage".

  If the ac input voltage rises above this threshold during the battery test, the test is aborted and rescheduled to take place in 24 hours.

- If a battery test is scheduled to take place now but the battery has not yet been fully charged (has not yet been charged from the mains for eight consecutive hours since its last significant discharge), the test is postponed until the battery is fully charged.

7.2.4.1.4 MAXIMUM DURATION OF BATTERY TEST

Set the maximum time a battery test may continue. If the battery is able to power the load for this time period without its voltage descending to the "battery low voltage limit", the battery has passed the test.

7.2.4.1.5 NEXT BATTERY TEST START TIME

Use this function to change/override the start time of the next automatic battery test. The subsequent battery test interval is counted down from the completion of that test.

7.2.4.1.6 ENABLE/DISABLE BATTERY TEST BY CURRENT

If you have more than one battery bank and the current sensors are installed, it is possible to compare the current supplied by each battery bank. If the battery banks do not draw equal currents, then the battery current test fails when this test is enabled.

7.2.4.2 SETUP > BATTERY > BATTERY CURRENT

The parameters in this section relate to the battery output current.

7.2.4.2.1 ENABLE/DISABLE CURRENT SENSORS

Use this function to enable or disable the (optional) battery current sensors.

7.2.4.2.2 CALIBRATE BATTERY CURRENT

This function is used to calibrate battery current reading for any of the battery strings.

The "Set dc current offset" and "Calibrate battery current" functions should be performed only if the battery current measurement is not correct. They are used only when current sensors are added to the system.

1. Operate the UPS without a load and with batteries disconnected.
2. Perform the "Set dc current offset" function (only if the measured current is not zero).
3. Connect the UPS to its batteries and to a load and operate the UPS in battery mode.
4. Measure the actual battery current and correct the controller reading (if necessary) using the "calibrate battery current" function. Note: when the system is operating in battery mode, the battery current value is negative.

7.2.4.2.3 SET DC CURRENT OFFSET

The "Set dc current offset" sets the UPS's dc current measurement to relative zero.

The "Set dc current offset" and "Calibrate battery current" functions should be performed only if the battery current measurement is not correct. They are generally used only when current sensors are added to the system.

1. Operate the UPS without a load and with batteries disconnected.
2. Perform the "Set dc current offset" function (only if the measured current is not zero).
3. Connect the UPS to its batteries and to a load and operate the UPS in battery mode.
4. Measure the actual battery current and correct the controller reading (if necessary) using the "calibrate battery current" function. Note: when the system is operating in battery mode, the battery current value is negative.

7.2.4.2.4 SET BATTERY CURRENT LIMIT VALUE

Use this function to set a limit for the battery output current. There are two options:

- set maximum battery current to 0.1 x battery capacity.
- set maximum battery current to 0.2 x battery capacity.

7.2.4.2.5 MINIMUM DC VOLTAGE AT CURRENT LIMIT

Use this function to set a minimum value for the battery-charging voltage when current limiting is in effect.

The factory setting of 340 Vdc is recommended for most situations.

7.2.4.3 END-OF-BACKUP VOLTAGE LIMIT

During a mains power blackout, the batteries provide power to the UPS's inverter. In the process, the battery voltage continually decreases. The "End-of-backup voltage limit" lets you define how low you want to let the battery voltage go before the UPS shuts down.

This function enables you to define the battery voltage at which the UPS will cease to provide backup power and will shut itself down. This helps avoid overly-deep battery discharge, which shortens battery life.

The voltage limit is expressed in terms of volts per battery block. The normal voltage of a battery block is between 12 and 13.5 volts. The end-of-backup battery voltage limit can be from 9 to 11 volts per battery block. The Centric computes the average voltage per battery block, based on 40 cells.

7.2.4.4 BATTERY FLOATING VOLTAGE

This is the charging voltage. It is expressed as volts per battery cell. The factory default value is 13.5 V. This is the recommended value for practically all situations.

7.2.4.5 BATTERIES PER CABINET

For this parameter, specify the number of batteries in the "negative" battery cabinet and the number of batteries in the "positive" battery cabinet.

Explanation: The UPS's batteries are divided into two groups, which are housed in two battery cabinets. One of the cabinets provides the negative ("–") side of the total battery voltage; the other cabinet provides the positive ("+") side of the total battery voltage.

7.2.4.6 SETUP > BATTERY > BATTERY CAPACITY IN AH

Use this function to tell the **Centric** the total capacity (in ampere/hours) of the connected battery strings. This total battery capacity figure is used by the **Centric** in three ways:

- To provide an estimate of the remaining battery time, when the system is in battery mode.
- To calculate the battery current limit.
- To calculate the duration of the battery test.

If you do not know your battery capacity, look at one of the battery cells. The Ah rating of a battery cell is usually indicated on the outside of the cell. This same number is your battery capacity.

7.2.4.7 SETUP > BATTERY > BATTERY TEMPERATURE CONTROL

These functions are related to battery temperature compensation, a process that monitors the battery temperature and adjusts the charging voltage to avoid overcharging the battery. This prolongs battery life.

7.2.4.7.1 SETUP > BATT. > BATT. TEMP. CNTL. > TEMP SENSORS YES/NO

Indicate whether battery temperature sensors are present or not. Battery temperature sensors are required if one wishes to make use of battery temperature compensation.

7.2.4.7.2 SETUP > BATT. > BATT. TEMP. CNTL. > ENABLE/DISABLE BATT. TEMP. COMP.

Enables / disables battery temperature compensation.

7.2.4.7.3 SETUP > BATT. > BATT. TEMP. CNTL. > BATT. TEMP. COMP. PARAMTERS

The ideal parameters can vary depending on the type of battery cells being used and their manufacturer. Consult the battery manufacturer's data sheet for more information.

7.2.4.7.3.1 ***Temp. compensation factor for a single battery block***

The compensation factor is usually provided on the battery manufacturer's data sheet.

7.2.4.7.3.2 Low limit dc voltage at compensation

Lowest charging voltage to be used when battery temperature compensation is enabled.

7.2.4.7.3.3 High limit dc voltage at compensation

Highest charging voltage to be used when battery temperature compensation is enabled.

7.2.5 Setup > STATIC SWITCH

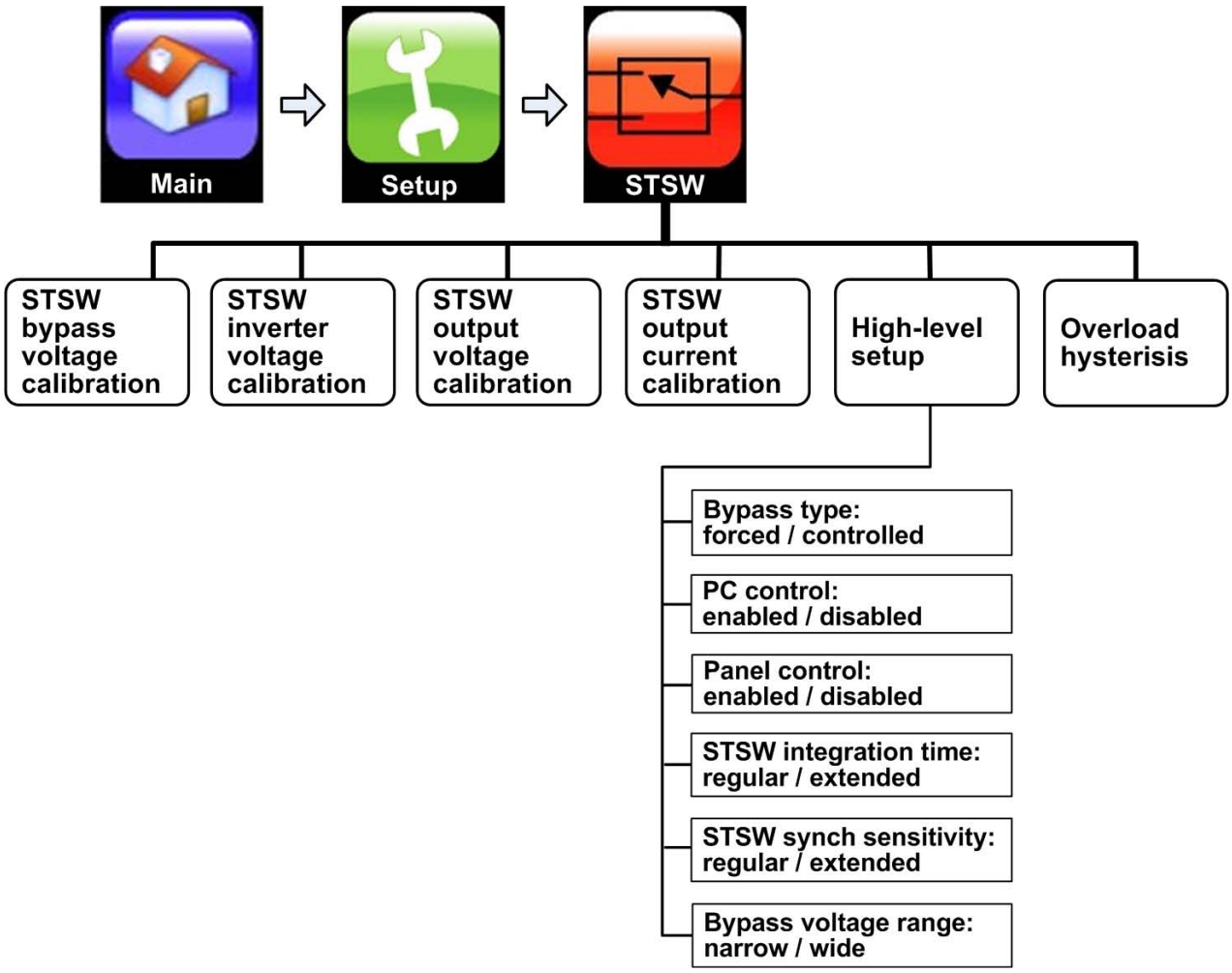


Figure 31: "Setup > Static Switch" options

7.2.5.1 SETUP > ST.SW. > CALIBRATE BYPASS VOLTAGE

For calibration of the bypass voltage reading, by phase.

7.2.5.2 SETUP > ST.SW. > CALIBRATE INVERTER VOLTAGE

For calibration of the inverter voltage reading, by phase.

7.2.5.3 SETUP > ST.SW. > CALIBRATE OUTPUT VOLTAGE

For calibration of the ac output voltage reading, by phase.

7.2.5.4 SETUP > ST.SW. > CALIBRATE OUTPUT CURRENT

For calibration of the ac output current reading, by phase.

Note:

- Static switch output current calibration should be performed only if necessary, not casually.
- Static switch output current calibration should be performed only under conditions where the system input and output current are stable and not subject to fluctuation.
- Calibration is best performed when the system is under relatively high load (70+ %).

7.2.5.5 SETUP > ST.SW. > HIGH-LEVEL SETUP

These functions are related to the static switch.

7.2.5.5.1 SETUP > ST.SW. > HI-LEVEL SETUP > BYPASS FORCED/CONTROLLED

When the UPS wants to move to bypass mode, this function determines whether the controller will check the quality of the bypass voltage or not, before moving to bypass.

Choose "Forced" if you want the UPS to move to bypass regardless of the quality of the bypass voltage.

Choose "Controlled" if you want the UPS to determine if the bypass voltage is acceptable before transferring to bypass. In this case, if the bypass voltage is not acceptable, the UPS remains in inverter mode. The range of what is an "acceptable" bypass voltage can be set to "wide" or "narrow". See section 7.2.5.5.4 below.

7.2.5.5.2 SETUP > ST.SW > HI-LEVEL SETUP > ST.SW. INTEGRATION TIME

This option controls the amount of time the static switch waits before transferring the load to bypass after detecting that the inverter output voltage is out of range. The "normal" setting is 3 ms, the "extended" setting is 20 ms.

7.2.5.5.3 SETUP > ST.SW. > HI-LEVEL SETUP > ST.SW. SYNCHRONIZATION SENSITIVITY

The UPS prevents transfers from inverter to bypass if there is a significant difference between the inverter output voltage and the bypass voltage. This option lets you control the degree of sensitivity of the UPS to such a voltage difference. The options are:

"Regular" sensitivity means that the UPS will not move to bypass when the voltage difference is greater than 20 V.

"Extended" sensitivity means the UPS will not move to bypass when the voltage difference is greater than 30 V.

7.2.5.5.4 SETUP > ST.SW. > HI-LEVEL SETUP >BYPASS VOLTAGE RANGE

This option relates to the "Forced / Controlled Bypass" option described in section 7.2.5.5.1 above. When "Controlled Bypass" is in effect, this option determines if the voltage range criterion used to determine an acceptable bypass voltage is "wide" (187 – 265 Vac) or "narrow"
(207 – 253 Vac).

7.2.5.6 SETUP > ST.SW. > OVERLOAD HYSTERISIS

This option sets the load level at which the load returns to the inverter after being transferred to bypass due to an overload. The return of the load to the inverter is blocked until the load level has decreased to this user-specified level.

This helps avoid a repeated transfer of the load back and forth between the inverter and bypass in a situation where the UPS is operating under near-overload conditions.

The factory default setting of 85 % is recommended for most environments.

7.2.6 Setup > ALARMS

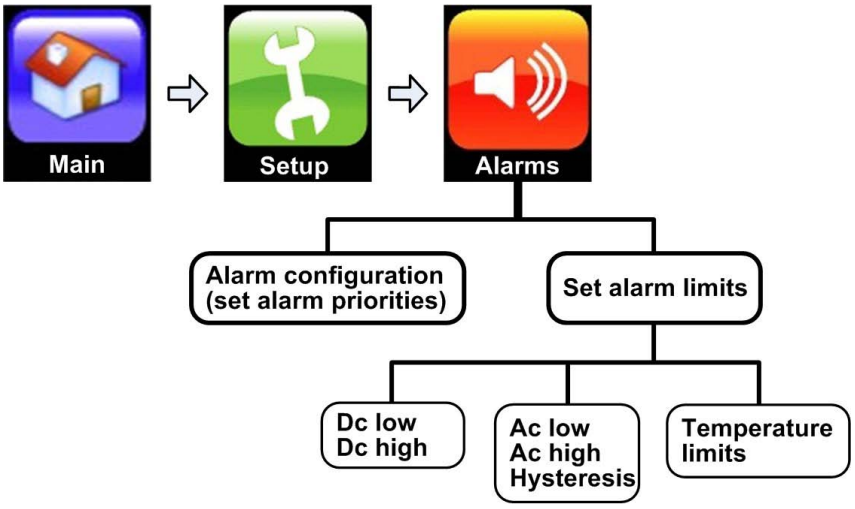


Figure 32: "Setup > Alarms" options

7.2.6.1 SETUP > ALARMS > SET ALARM PRIORITIES

This function enables you to assign one of three possible levels of importance to each type of system alarm. The levels of importance, in ascending order of importance, are Information, Warning, and Critical.

Factory default settings are already assigned to each alarm message when you install the UPS. It may be, however, that in your site a particular alarm condition is more or less important that the default value assigned to the alarm. This function allows you to override the default value for a given alarm.

You can scroll through all of the possible alarm messages in the scroll box at the top of the window. The assigned priority level for that alarm is highlighted. To modify the priority level, press the desired button.

It is also possible to instruct the system to ignore a specific alarm, by pressing the "Ignore" button near the upper left corner of the screen.

7.2.6.2 SETUP > ALARMS > ALARM LIMITS

This function lets you set the threshold values for several important alarms.

7.2.6.2.1 SETUP > ALARMS > ALARM LIMITS > DC VOLTAGE LIMITS

Use this function to set the voltage levels at which the "DC VOLTAGE HIGH" and "DC VOLTAGE LOW" will be activated.

7.2.6.2.2 SETUP > ALARMS > ALARM LIMITS > AC VOLTAGE LIMIT

Use this function to set the voltage levels at which the "AC VOLTAGE HIGH" and AC VOLTAGE LOW" alarms will be activated.

You can also set a "hysteresis" value. This value damps the sensitivity of the alarms to prevent a situation where, for example, a minor but frequent fluctuation of 1 Vac just above or below the threshold value causes an ac voltage alarm to turn on and off many times, rapidly.

The hysteresis value is the number of volts that a measurement must change before an alarm senses that the measurement has changed. So, in the example above, if you set a hysteresis value of 2, the alarm state wouldn't change until the fluctuation grew to 2 Vac. This would reduce the number of alarms while still ensuring that an alarm will be sounded when the voltage meets the threshold.

7.2.6.2.3 SETUP > ALARMS > ALARM LIMITS >TEMPERATURE LIMITS

This function lets you set the temperature (in °C) at which the high-temperature alarm and low-temperature alarm are generated. The temperature is read from an optional internal temperature sensor.

7.2.7 Setup > CONNECTIVITY

The functions in the "Setup > Connectivity" menu relate to the ability of the **Centric** to communicate with other devices.

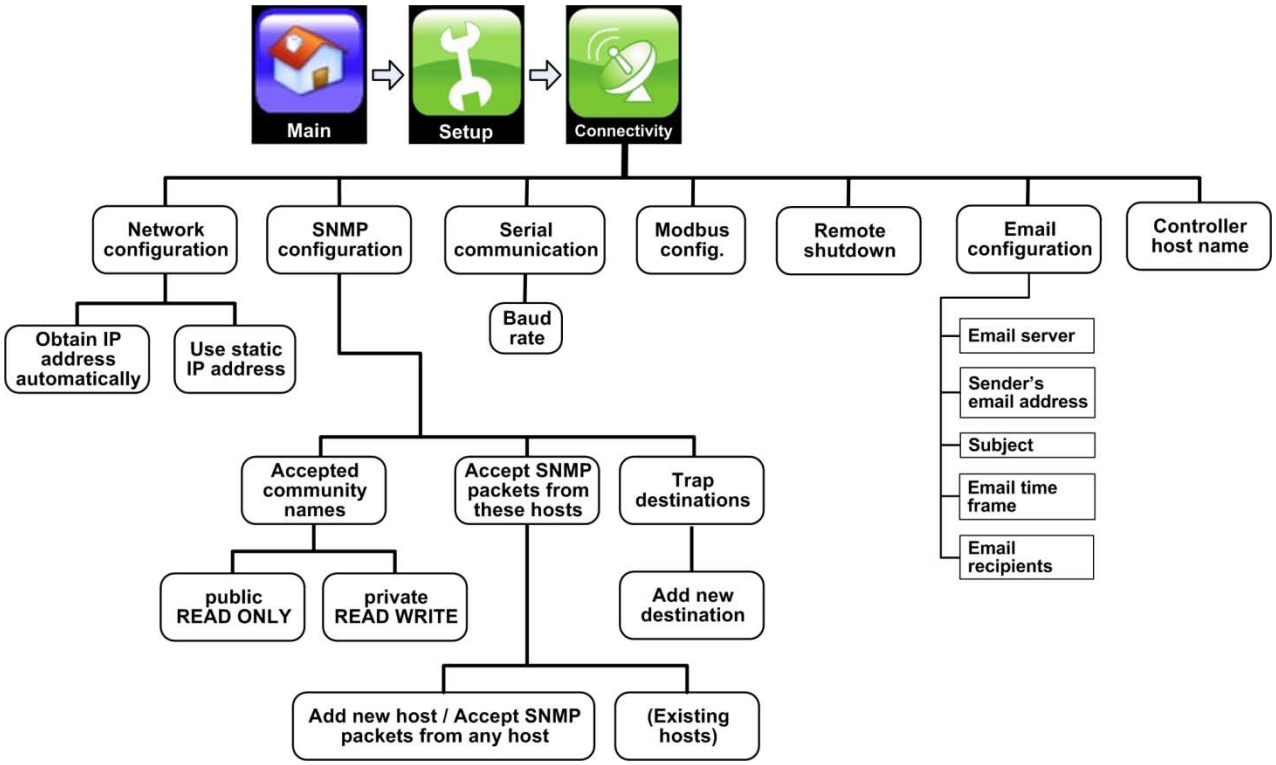


Figure 33: "Setup > Connectivity" options

7.2.7.1 NETWORK CONFIGURATION OPTIONS

7.2.7.1.1 NETWORK CONFIGURATION >OBTAIN IP ADDRESS AUTOMATICALLY

This is the right choice if your computer network supports dynamic assignment of IP addresses (DHCP). When you mark this checkbox the **Centric** will request and receive an IP address from the computer network. Obviously the **Centric** must be connected to the network for this to work. The network connection is a type RJ45 socket on the rear panel of the controller module.

7.2.7.1.2 NETWORK CONFIGURATION > USE STATIC IP ADDRESS

Choose this option to manually enter IP configuration information that you have received from your network support person. Use the keyboard on the screen to enter the numbers and periods.

7.2.7.2 SNMP CONFIGURATION OPTIONS (OPTIONAL FEATURE)

7.2.7.2.1 SNMP CONFIGURATION > ACCEPTED COMMUNITY NAMES

You have the option of creating community names. To create a new community, do the following:

1. Touch **Add new community…**:

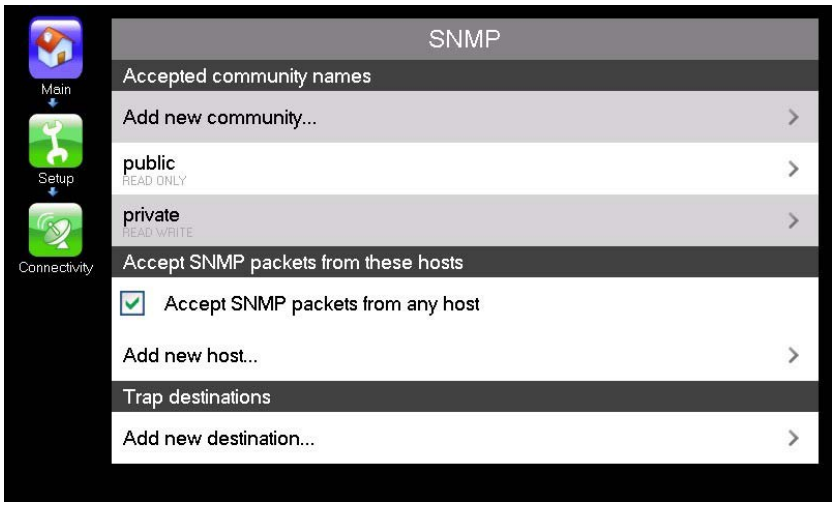


Figure 34: Setup > Connectivity > SNMP configuration options

2. Type in the desired community name and select the community rights. Click the arrow at the top of the screen to proceed.

Figure 35: Creating a new community

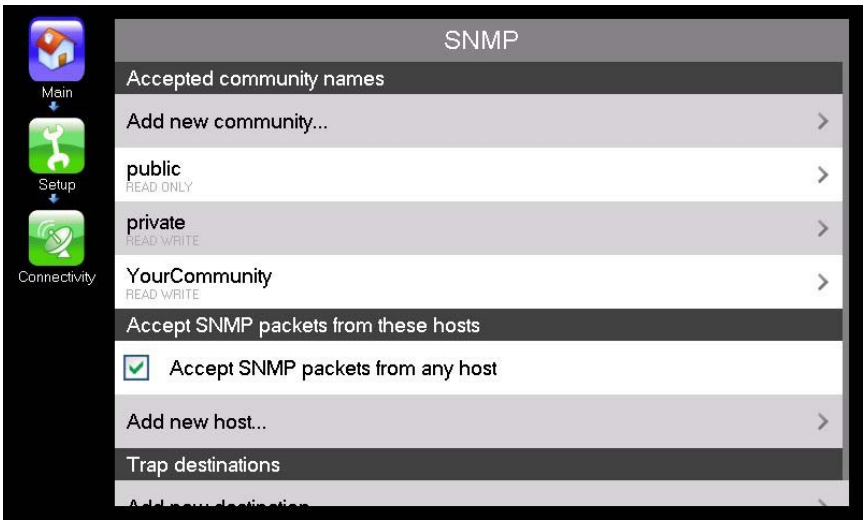


Figure 36: Community name accepted

3. To delete a community, first touch the community name to be deleted. In the screen that appears (similar to Figure 35), click **DELETE** at the bottom of the screen.

7.2.7.2.2 SNMP CONFIGURATION > ACCEPT SNMP PACKETS FROM THESE HOSTS

Selecting this check box allows SNMP packets to be accepted from any host. You also have the option of adding hosts (see Figure 36). Adding or deleting hosts is performed in the same manner as adding or deleting communities—see section 7.2.7.2.1.

7.2.7.2.3 SNMP CONFIGURATION > TRAP DESTINATIONS

An SNMP trap is a destination to which the **Centric** will send alarm notifications using the SNMP protocol. For each destination, an IP address and a port must be specified.

Adding or deleting trap destinations is performed in the same manner as adding or deleting communities—see section 7.2.7.2.1.

***Note**: **Centric** supports the UPS MIB (Management Information Base) standard.*

7.2.7.3 SERIAL COMMUNICATION (OPTIONAL FEATURE)

Serial communication is an optional feature, available by special order.

This option enables serial communication between the **Centric** and an external device. Indicate the port to be used and the baud rate. Choose one of the ports from the list.

If your system includes this option, the serial communication connector is labeled "RS232" and is located on the left side of the static switch on the rear side of the UPS.

Figure 37: Defining serial communication parameters

Note: If the serial communication option is ordered as an add-on to an existing system, the physical connection details may be other than described above.

7.2.7.4 MODBUS (OPTIONAL FEATURE)

The ability to use a Modbus link with the **Centric** is an optional feature, available by special order. A password may be required to use this feature. If you do not have the appropriate password, contact your distributor or sales agent.

Two types of Modbus links can be defined between the Centric and another device on the network: a serial link or a TCP/IP link. The two types of links are not mutually exclusive. In either case, with regards to Modbus, the Centric is a slave device to the Modbus master located elsewhere on the Modbus communication network. The Centric will respond to queries from the Modbus master.

The Centric's Modbus interface is compatible with most Building Management Systems (BMSs), using the register numbers shown in Table 6.

Note: The registers in Table 6 can be addressed either as holding registers (for example, 4x0001) or as input registers (for example, 3x0001).

7.2.7.4.1 DEFINING A TCP MODBUS LINK

Enter a unit ID (the Centric's ID on the Modbus network) and a TCP port number, as supplied by your Modbus network administrator, and select the "Allow TCP Modbus" checkbox.

7.2.7.4.2 DEFINING A SERIAL MODBUS LINK

Choose a protocol (RTU or ASCII) and a baud rate, as recommended by your Modbus network administrator, and select the "Allow serial Modbus" checkbox.

The Centric's physical connection for serial Modbus is a D9 connector located in "connector group 2" and labeled RS485. (See the *Centric 3x480 Installation Guide* for more information about this connector.

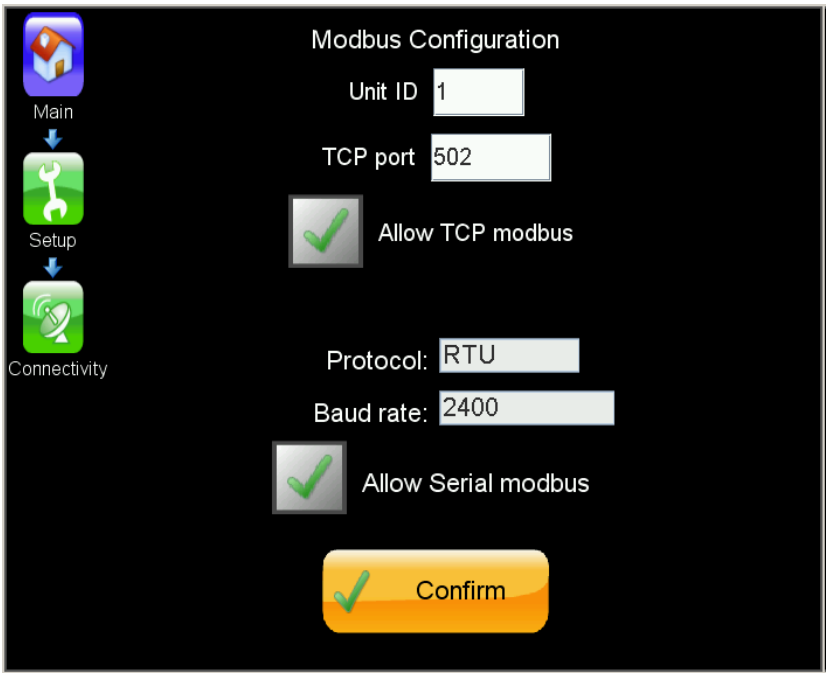


Figure 38: Defining Modbus communication parameters

Table 6: Holding Registers for Modbus queries

(Note: these registers can be addressed as either holding registers [for example, 4x0002] or input registers [for example, 3x0002])

	Register	Variable name	GET Values	Remarks
1	4x0001	Battery Condition	0: Good 1: Weak 2: Replace	
2	4x0002	Battery Status	0: Battery OK 1: Battery Low 2: Battery Depleted	Has effect only during power failure (battery discharge), "Battery low" usually comes minutes before the UPS batteries are depleted and it switches off
3	4x0003	Battery Charge	0: Floating 1: Charging 2: Resting 3: Discharging	Most common situation is "floating" as a constant state, however this depends on the UPS topology
4	4x0004	Seconds On Battery	seconds	Has effect only during power failure
5	4x0005	Estimated Minutes	minutes	Mathematical estimation of available backup time
6	4x0006	Estimated Charge	0-100%	Mathematical estimation of battery charge in percents
7	4x0007	Battery Voltage	×10 Vdc	Divide the value by 10 for real measurement: 485/10=48.5 Vdc
8	4x0008	Battery Current	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
9	4x0009	Battery Temperature	°C	Degrees centigrade
11	4x0011	Input Lines Number	1 to 3	Number of the UPS input phases
12	4x0012	Input Frequency Line 1	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
13	4x0013	Input Voltage Line 1	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
14	4x0014	Input Current Line 1	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
16	4x0016	Input Frequency Line 2	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
17	4x0017	Input Voltage Line 2	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
18	4x0018	Input Current Line 2	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
20	4x0020	Input Frequency Line 3	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
21	4x0021	Input Voltage Line 3	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac

	Register	Variable name	GET Values	Remarks
22	4x0022	Input Current Line 3	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
24	4x0024	Output Source	0: Normal 1: On Battery 2: On Bypass 3: Reducing 4: Boosting 5: Other 6: None	Depends on the UPS topology
25	4x0025	Output Frequency	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
26	4x0026	Output Number Of Lines	1 to 3	Number of the UPS output phases
27	4x0027	Output Voltage Line 1	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
28	4x0028	Output Current Line 1	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
30	4x0030	Output Load Line 1	%	Some units might show values over 100% in case of overload
31	4x0031	Output Voltage Line 2	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
32	4x0032	Output Current Line 2	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
34	4x0034	Output Load Line 2	%	Some units might show values over 100% in case of overload
35	4x0035	Output Voltage Line 3	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
36	4x0036	Output Current Line 3	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
38	4x0038	Output Load Line 3	%	Some units might show values over 100% in case of overload
39	4x0039	Bypass Frequency	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
40	4x0040	Bypass Number Of Lines	1 to 3	Number of the UPS bypass phases
41	4x0041	Bypass Voltage Line 1	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
42	4x0042	Bypass Current Line 1	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
44	4x0044	Bypass Voltage Line 2	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
45	4x0045	Bypass Current Line 2	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
47	4x0047	Bypass Voltage Line 3	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
48	4x0048	Bypass Current Line 3	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
50	4x0050	Temperature Alarm	0: Alarm off 1: Alarm on	

	Register	Variable name	GET Values	Remarks
61	4x0061	Ups General Fault Alarm	0: Alarm off 1: Alarm on	
	Register	**Variable name**	**GET Values**	**Remarks**
201	4x0201	System Model ID	1: Mega PowerPlus 2: PowerPlus Premium 3: Centric 4: PowerPlusPremium15 Future models for units with touch controller will be added.	
202	4x0202	Model Nominal Power	KW	As defined by controller settings
203	4x0203	Maximum Amount Of Modules		As defined by controller settings or the controller license
204	4x0204	Amount Of Installed Modules		As defined by controller settings, not the actual responding modules
205	4x0205	Amount Of Battery Cabinets		As defined by controller settings
206	4x0206	Multisystem Mode (Parallel Operation)	0: Stand alone 1: Multisystem	As defined by controller settings
207	4x0207	UPS On	0: UPS off 1: UPS on	
208	4x0208	All Modules Are Switched Off	0: All modules are off 1: At least one module is on	
209	4x0209	Battery Status	0: Charging 1: Discharging 2: Low 3: Depleted 4: Fault 5: Test in progress 6: Fully charged	Actual battery status as determined by controller

	Register	Variable name	GET Values	Remarks
210	4x0210	Seconds On Battery	Seconds	Only available during power failure, otherwise zero
211	4x0211	Estimated Backup Time	Minutes	Only available during power failure and when the battery is fully charged (6 in 4x0209), otherwise zero. This value is a rough approximation received by mathematical calculations, and assumes new and healthy batteries of average VRLA type in initial fully charged state.
212	4x0212	Estimated Charge	0-100%	Mathematical calculation of battery charge in percents; will send 200 if no value has been calculated
213	4x0213	DC Voltage positive	×10 Vdc	Divide the value by 10 for real measurement: 4051/10=405.1 Vdc
214	4x0214	DC Voltage Negative	×10 Vdc	Divide the value by 10 for real measurement: 4051/10=405.1 Vdc
215	4x0215	DC Voltage total	×10 Vdc	Divide the value by 10 for real measurement: 8102/10=810.2 Vdc
216	4x0216	Battery Current	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
217	4x0217	Battery Temperature	°C	Degrees centigrade
218	4x0218	Number of phases	1 to 3	Number of the UPS phases (always 3 for current units)
219	4x0219	Inverter Frequency Line 1	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
220	4x0220	Inverter Voltage Line 1	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
221	4x0221	Inverter Current Line 1	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
222	4x0222	Inverter Power Line 1	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
223	4x0223	Inverter Apparent Power Line 1	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
224	4x0224	Inverter Frequency Line 2	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
225	4x0225	Inverter Voltage Line 2	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
226	4x0226	Inverter Current Line 2	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
227	4x0227	Inverter Power Line 2	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
228	4x0228	Inverter Apparent Power Line 2	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
229	4x0229	Inverter Frequency Line 3	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
230	4x0230	Inverter Voltage Line 3	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
231	4x0231	Inverter Current Line 3	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
232	4x0232	Inverter Power Line 3	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
233	4x0233	Inverter Apparent Power Line 3	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
234	4x0234	Charger Voltage Line 1	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac

	Register	Variable name	GET Values	Remarks
235	4x0235	Charger Current Line 1	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
236	4x0236	Charger Power Line 1	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
237	4x0237	Charger Apparent Power line 1	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
238	4x0238	Charger Power factor Line 1	0 to 100	Divide the value by 100 for real measurement: 87/100 = 0.87 PF
239	4x0239	Charger Load level Line 1	%	
240	4x0240	Charger Voltage Line 2	×10 V	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
241	4x0241	Charger Current Line 2	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
242	4x0242	Charger Power Line 2	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
243	4x0243	Charger Apparent Power line 2	×10 KVA	Divide the value by 10 for real measurement: 502/10=50.2 Hz
244	4x0244	Charger Power factor Line 2	0 to 100	Divide the value by 100 for real measurement: 87/100 = 0.87 PF
245	4x0245	Charger Load level Line 2	%	
246	4x0246	Charger Voltage Line 3	×10 V	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
247	4x0247	Charger Current Line 3	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
248	4x0248	Charger Power Line 3	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
249	4x0249	Charger Apparent Power line 3	×10 KVA	Divide the value by 10 for real measurement: 502/10=50.2 Hz
250	4x0250	Charger Power factor Line 3	0 to 100	Divide the value by 100 for real measurement: 87/100 = 0.87 PF
251	4x0251	Charger Load level Line 3	%	
252	4x0252	Output Source	0: Normal 1: On Battery 2: On Bypass 3: Unknown	Unknown state can be shown when the controller can't communicate with the ST/SW module
253	4x0253	Output Frequency	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
254	4x0254	Output Voltage Line 1	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
255	4x0255	Output Current Line 1	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
256	4x0256	Output Power Line 1	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
257	4x0257	Output Apparent Power Line 1	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
258	4x0258	Output Power Factor Line 1	0 to 100	Divide the value by 100 for real measurement: 87/100 = 0.87 PF
259	4x0259	Output Load Line 1	%	

	Register	Variable name	GET Values	Remarks
260	4x0260	Output Voltage Line 2	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
261	4x0261	Output Current Line 2	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
262	4x0262	Output Power Line 2	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
263	4x0263	Output Apparent Power Line 2	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
264	4x0264	Output Power Factor Line 2	0 to 100	Divide the value by 100 for real measurement: 87/100 = 0.87 PF
265	4x0265	Output Load Line 2	%	
266	4x0266	Output Voltage Line 3	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
267	4x0267	Output Current Line 3	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
268	4x0268	Output Power Line 3	×10 KW	Divide the value by 10 for real measurement: 453/10=45.3 KW
269	4x0269	Output Apparent Power Line 3	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
270	4x0270	Output Power Factor Line 3	0 to 100	Divide the value by 100 for real measurement: 87/100 = 0.87 PF
271	4x0271	Output Load Line 3	%	
272	4x0272	Bypass Frequency	×10 Hz	Divide the value by 10 for real measurement: 502/10=50.2 Hz
273	4x0273	Bypass Voltage Line 1	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
274	4x0274	Bypass Current Line 1	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
275	4x0275	Bypass Apparent Power Line 1	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
276	4x0276	Bypass Voltage Line 2	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
277	4x0277	Bypass Current Line 2	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
278	4x0278	Bypass Apparent Power Line 2	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
279	4x0279	Bypass Voltage Line 3	×10 Vac	Divide the value by 10 for real measurement: 2315/10=231.5 Vac
280	4x0280	Bypass Current Line 3	×10 A	Divide the value by 10 for real measurement: 21/10=2.1 A
281	4x0281	Bypass Apparent Power Line 3	×10 KVA	Divide the value by 10 for real measurement: 769/10=76.9 KVA
282	4x0282	Active Alarms Count		Active alarms, except for the ones marked "ignored" or "for log only" in the controller configuration

	Register	Variable name	GET Values	Remarks
301	4x0301	General Fault	0: Alarm off 1: Alarm on	Any active alarm exists, except for the ones marked "ignored" or "for log only" in the controller configuration

	Register	Variable name	GET Values	Remarks
302	4x0302	Module 1 Alarm	0: Alarm off 1: Alarm on	
303	4x0303	Module 2 Alarm	0: Alarm off 1: Alarm on	
304	4x0304	Module 3 Alarm	0: Alarm off 1: Alarm on	
305	4x0305	Module 4 Alarm	0: Alarm off 1: Alarm on	
306	4x0306	Module 5 Alarm	0: Alarm off 1: Alarm on	
307	4x0307	Module 6 Alarm	0: Alarm off 1: Alarm on	
308	4x0308	Module 7 Alarm	0: Alarm off 1: Alarm on	
309	4x0309	Module 8 Alarm	0: Alarm off 1: Alarm on	
310	4x0310	Module 9 Alarm	0: Alarm off 1: Alarm on	
311	4x0311	Module 10 Alarm	0: Alarm off 1: Alarm on	
312	4x0312	Module 11 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
313	4x0313	Module 12 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
314	4x0314	Module 13 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
315	4x0315	Module 14 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration

	Register	Variable name	GET Values	Remarks
316	4x0316	Module 15 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
317	4x0317	Module 16 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
318	4x0318	Module 17 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
319	4x0319	Module 18 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
320	4x0320	Module 19 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
321	4x0321	Module 20 Alarm	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
322	4x0322	Alarm In More Than One Module	0: Alarm off 1: Alarm on	
323	4x0323	Static Switch Warning Or Alarm	0: Alarm off 1: Alarm on	
324	4x0324	Static Switch Warning Or Alarm	0: Alarm off 1: Alarm on	
325	4x0325	Over Temperature	0: Alarm off 1: Alarm on	
326	4x0326	No AC Output To Load	0: Alarm off 1: Alarm on	
327	4x0327	DC Voltage High	0: Alarm off 1: Alarm on	
328	4x0328	DC Voltage Low	0: Alarm off 1: Alarm on	
329	4x0329	End Of Battery Backup	0: Alarm off 1: Alarm on	

	Register	Variable name	GET Values	Remarks
330	4x0330	Low Battery Voltage	0: Alarm off 1: Alarm on	
331	4x0331	Emergency Power Off Is Active	0: Alarm off 1: Alarm on	
332	4x0332	Batteries Failed Last Test	0: Alarm off 1: Alarm on	
333	4x0333	AC Input Voltage Low	0: Alarm off 1: Alarm on	
334	4x0334	AC Input Voltage High	0: Alarm off 1: Alarm on	
335	4x0335	AC Input Failure	0: Alarm off 1: Alarm on	
336	4x0336	No Output Current On Modules	0: Alarm off 1: Alarm on	
337	4x0337	Overload	0: Alarm off 1: Alarm on	
338	4x0338	Battery Test In Progress	0: Alarm off 1: Alarm on	
339	4x0339	Auxiliary Input Volt-Free Contact 1 Fault	0: Alarm off 1: Alarm on	
340	4x0340	Auxiliary Input Volt-Free Contact 2 Fault	0: Alarm off 1: Alarm on	
341	4x0341	Auxiliary Input Volt-Free Contact 3 Fault	0: Alarm off 1: Alarm on	
342	4x0342	Auxiliary Input Volt-Free Contact 4 Fault	0: Alarm off 1: Alarm on	
343	4x0343	Auxiliary Input Volt-Free Contact 5 Fault	0: Alarm off 1: Alarm on	

	Register	Variable name	GET Values	Remarks
344	4x0344	Shutdown By Off Button on Touch Panel	0: Alarm off 1: Alarm on	
345	4x0345	Shutdown By Hardware Off Button	0: Alarm off 1: Alarm on	
346	4x0346	Shutdown Through Communication	0: Alarm off 1: Alarm on	
347	4x0347	Shutdown Due To End Of Backup	0: Alarm off 1: Alarm on	
348	4x0348	Shutdown Due To Overload	0: Alarm off 1: Alarm on	
349	4x0349	Shutdown Due To EPO	0: Alarm off 1: Alarm on	
350	4x0350	One Module Not Responding	0: Alarm off 1: Alarm on	
351	4x0351	Static Switch Is Not Responding	0: Alarm off 1: Alarm on	
352	4x0352	All UPS Modules Are Not Responding	0: Alarm off 1: Alarm on	
353	4x0353	Controller Adapter Is Not Responding	0: Alarm off 1: Alarm on	
354	4x0354	Load Above 90%	0: Alarm off 1: Alarm on	
355	4x0355	Detected More Modules Then Defined	0: Alarm off 1: Alarm on	
356	4x0356	Fan Fault In One Of The UPS Modules	0: Alarm off 1: Alarm on	
357	4x0357	Load On Battery (Input AC Failure)	0: Alarm off 1: Alarm on	

	Register	Variable name	GET Values	Remarks
358	4x0358	Module Switching Adaptor Is Not Responding	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
359	4x0359	Module Switching Adaptor Is Not Switching	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
360	4x0360	More Than One Master Module Detected	0: Alarm off 1: Alarm on	
361	4x0361	AC Input Failure Page 1	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
362	4x0362	AC Input Failure Page 2	0: Alarm off 1: Alarm on	Only for Mega modular UPS in 20 module configuration
363	4x0363	Conflict In Nominal Settings Of UPS Modules	0: Alarm off 1: Alarm on	When output voltage or output frequency settings are not the same on all attached UPS modules
364	4x0364	Controller Battery Test Failed	0: Alarm off 1: Alarm on	Not available on Mega modular UPS, since there is no battery in the controller on this model
365	4x0365	Inverter Is Out Of Synchronization With Mains	0: Alarm off 1: Alarm on	
366	4x0366	Inverter Is Out Of Synchronization With Mains For Short Time	0: Alarm off 1: Alarm on	
367	4x0367	Controller Thread Limit Reached	0: Alarm off 1: Alarm on	
368	4x0368	Controller Memory Limit Reached	0: Alarm off 1: Alarm on	
369	4x0369	Controller Disk Space Limit Reached	0: Alarm off 1: Alarm on	

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7.2.7.5 REMOTE SHUTDOWN (OPTIONAL FEATURE)

The remote shutdown function is used to instruct the **Centric** to perform an orderly shutdown of a server or other computer in the event of an ac power outage or after a low-battery condition on the **Centric**. This function helps prevent data loss by ensuring that computer applications have been shut down in an orderly way before the UPS's battery runs out. The computer to be shut down (the "target computer") must of course have connectivity to the same computer network as the **Centric**.

The target computer must also have a Shutdown Agent installed on it. The Shutdown Agent is available as a self-installing “setup.exe” file intended to be run on the target computer. The install file can be downloaded from Gamatronic's website or supplied to you by your Gamatronic representative.

Upon selection of the remote shutdown option from the "Setup > Connectivity" menu, the remote shutdown submenu is displayed. The menu options are:

- **Add new destination**.
- **Select destinations from list**.

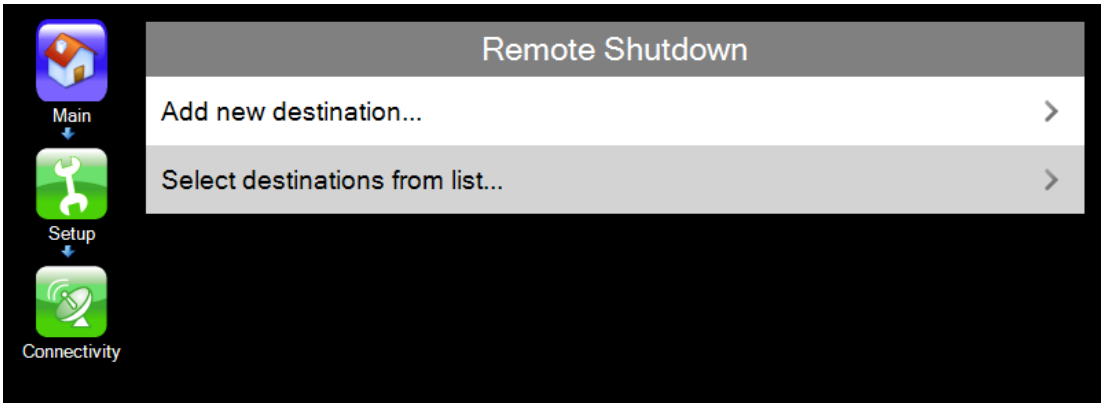


Figure 39: Remote shutdown submenu

7.2.7.5.1 ADD NEW DESTINATION

Choose this option if the desired target computer does not appear in the destination list displayed by the "Select destinations from list" option.

When this option is chosen, the "New shutdown destination" screen is displayed (see Figure 40). Upon choosing this option, the user must indicate the network name of the target computer, and the delay interval after which the computer will be shut down following an ac outage or a low-battery condition. The delay interval following an ac outage is expressed in minutes; the interval following a low-battery condition is expressed in seconds.

To create the new shutdown destination, after entering the destination name and changing any of the default parameters if required, press the arrow in the upper left corner of the screen. Or, to abandon the definition, press the "Connectivity" icon.

Figure 40: New shutdown destination

7.2.7.5.2 SELECT DESTINATIONS FROM LIST

This option displays a list in alphabetical order of all devices that are currently connected to the network and are in the "ON" state. Place a check mark in the box alongside the name of the desired target or targets, then press the arrow in the upper left of the screen to return to the remote shutdown submenu.

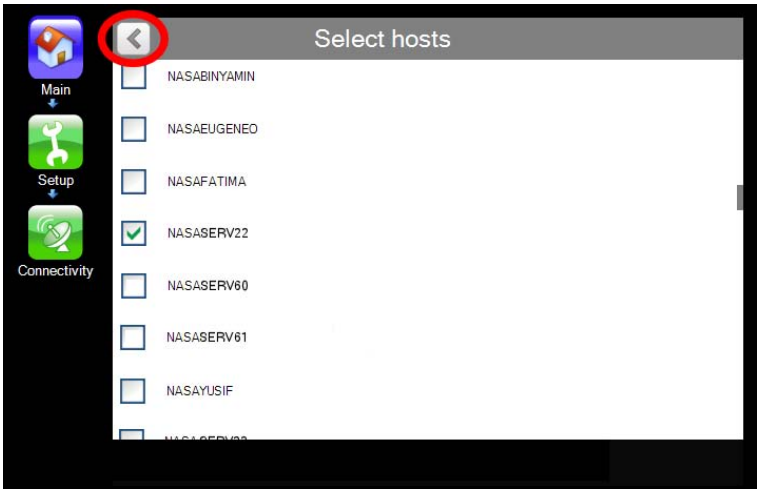


Figure 41: Select the shutdown target and press the arrow

You will see your target has been added to the menu.

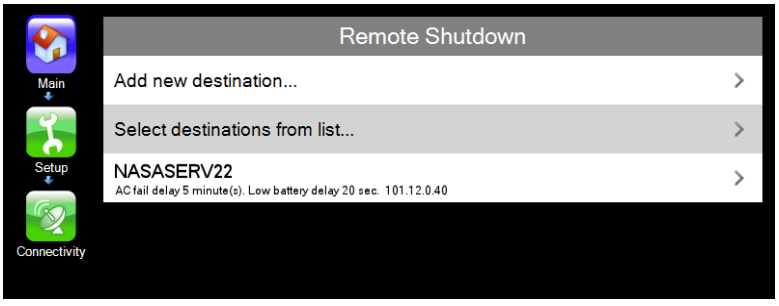


Figure 42: Remote shutdown menu with target destination added

The target's default shutdown intervals are displayed in small letters beneath the target name. If you want to modify the shutdown intervals, tap the target name. This puts you in edit mode, where you can modify the shutdown delay intervals.

The default port of 262 will be acceptable in most environments. In the case that port 262 is not available on the shutdown target computer (for example, if an application on the target computer requires exclusive use of that port), a different port may be used.

To apply your changes, press the arrow in the upper left corner of the screen (see Figure 43).
To abandon your changes, press the "Connectivity" icon.

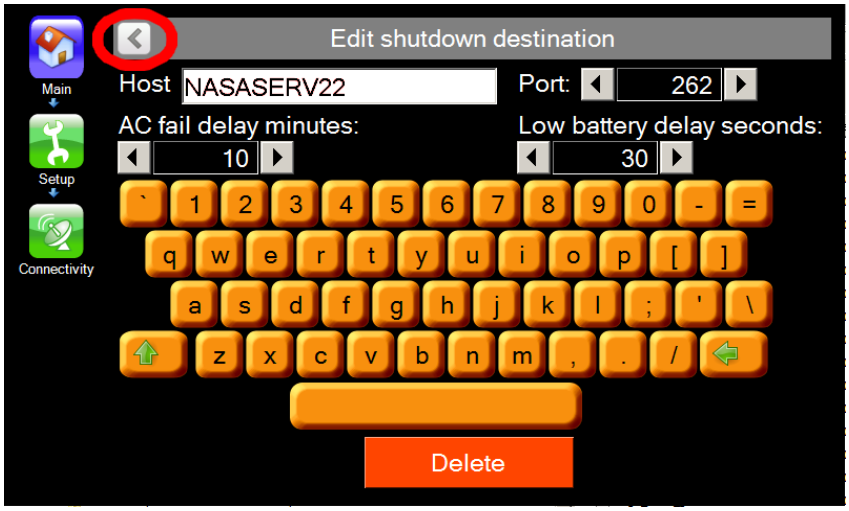


Figure 43: Shutdown destination screen

7.2.7.6 EMAIL CONFIGURATION (OPTIONAL FEATURE)

You can have the Centric send email messages to the email addresses of your choice, containing information about the starting and ending of system alarms.

The message body contains:

a timestamp,

the user-assigned priority of the message (Informational / Warning / Critical),

the main message text as it appears in the log,

the status of the log message: "On" (alarm condition started) or "Off" (alarm condition ended).

```
2013-06-30 14:42:54
Critical - No output current at one or more modules because of fault
Status: On

2013-06-30 14:42:51
Warning - Controller Battery Test Failed
Status: On

2013-06-30 14:42:51
Warning - AC input voltage high
Status: On

2013-06-30 14:42:48
Warning - Controller Battery Test Failed
Status: Off

2013-06-30 14:42:45
Warning - AC input voltage high
Status: Off
```

Figure 44: Example of email message body

To use the optional email alarm notification feature, several parameters must be configured:

Figure 45: The email configuration menu

Table 7: Description of email parameters

PARAMETER NAME	DESCRIPTION
EMAIL SERVER	**Host name or IP, and port:** Consult your network administrator for the name of your email server or its IP address, and for the proper port number to use. **Enable email notifications:** Mark the checkbox to enable email notification. **Enable authentication:** Causes verification of the sending email address. You are prompted for the email address and its password. **Enable TLS:** Enable the TLS encryption protocol for the outgoing emails.
SENDER EMAIL ADDRESS	This address will appear in the message header as the sending address.
SUBJECT	The text you wish to appear in the email subject field. Example: "Alarm notification from the Centric"
EMAIL TIME FRAME	Specifies the interval in minutes between the sending of a new email. Each new email contains all the system alarms that have occurred since the sending of the previous email.
EMAIL RECIPIENTS	Up to 10 target email addresses can be defined.

7.2.7.6.1 ADDING A NEW EMAIL RECIPIENT

1. Tapping the “Email recipients” button brings up a list of the existing recipients and the opportunity to add a new recipient. Tap the “Add new recipient” line.

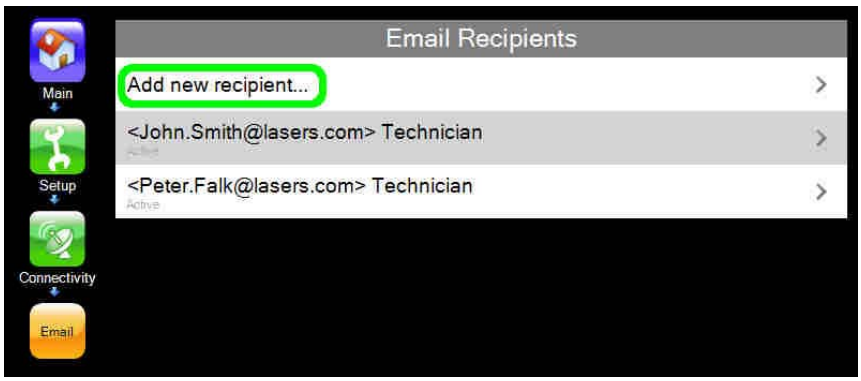


Figure 46: “Add new recipient” line

2. The “New email recipient” screen is displayed.
Enter the recipient’s email address and, optionally, a description.
The “Active/Inactive” checkbox is selected by default to indicate that the recipient is active and should be sent email.

   Tap the “Confirm” button to add the new recipient.

   Tapping the “Send” button sends a test email to the new recipient, to verify that it has been created successfully.

Figure 47: New email recipient screen

3. Now that the recipient has been created, the “Alarms” button in the lower left of the screen becomes available.

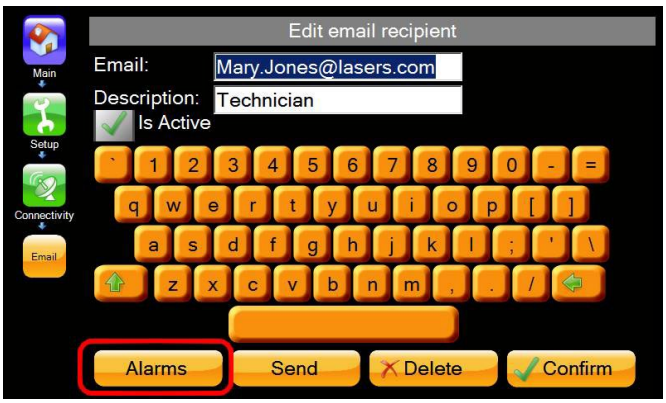


Figure 48: Alarms button on email recipient screen

Pressing the alarm button displays an “alarm selection” screen on which you indicate the alarms that you want to be included in the emails to the current recipient. The buttons at the bottom of the

screen (Figure 49) control which alarms are listed on the screen: “All”, or only those with an “information”, “warning”, or “critical” severity. From the alarms displayed, indicate the ones you want to go to the recipient by selecting the checkbox at the left of the message. Tap the “Confirm” button to register your choices.

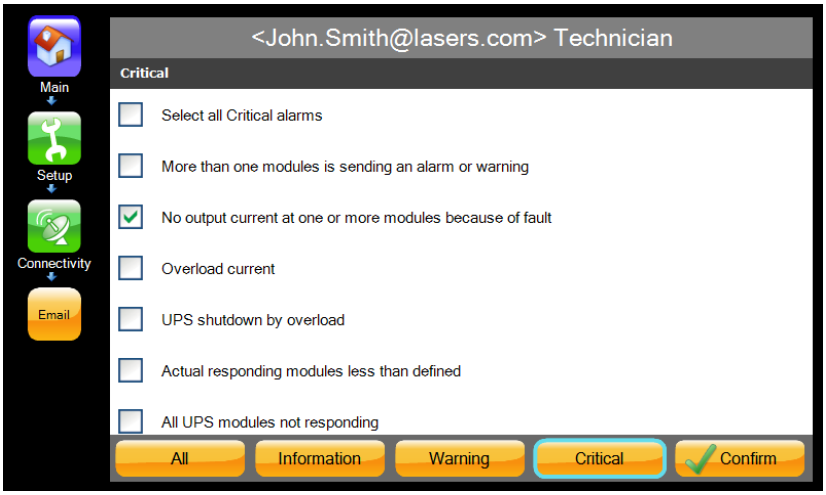


Figure 49: Alarm selection screen for email recipient

7.2.7.7 CONTROLLER HOST NAME

Use this option to specify a name for the controller. The network manager will see this name. In the event of any network-related problems he will be able to identify the device in question.

This is especially useful when there is more than one Centric connected to the network. If you give each Centric a unique name the network manager will be able to distinguish between them. This can be helpful in the event of any network-related problems.

7.2.8 Setup > TIME

This menu includes those features related to time.

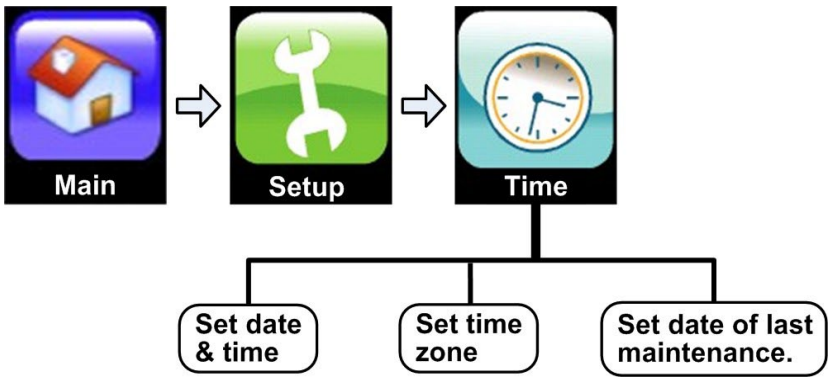


Figure 50: "Setup > Time" options

7.2.8.1 SETUP > TIME > ADJUST DATE / TIME

Modify any or all of the fields as required: year, month, day, hours, minutes, seconds.

Click "Confirm" to apply the data.

7.2.8.2 SETUP > TIME > CHANGE TIME ZONE

Use this function to set the UPS to the proper time zone.

7.2.8.3 SETUP > TIME > SET LAST MAINTENANCE DATE

This function allows you to keep a record of when the last maintenance performed on the **Centric**. The system password is required to change the last maintenance date.

7.2.9 Setup > ASSIGN SITE ID

This function enables descriptive text to be associated with the unit. When the **Centric** is connected to a computer network, this information can be seen by someone who is monitoring the UPSs via an SNMP program. This information is not seen or used by the network manager.
(For ID information seen by the network manager, see section 7.2.7.7 “Controller host name”).

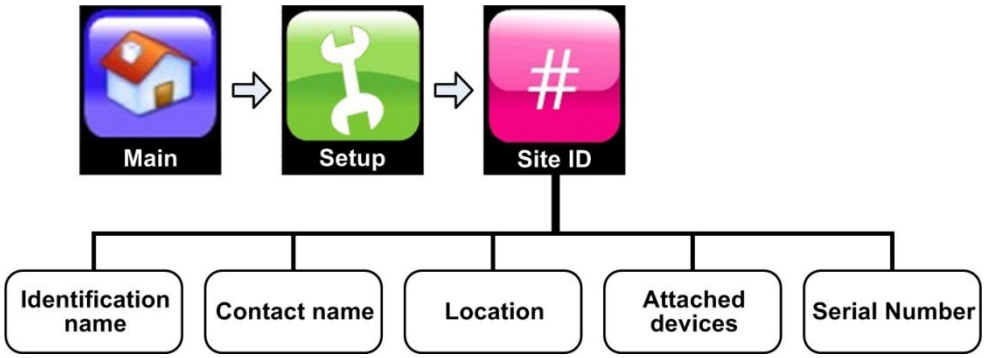


Figure 51: Assigning a site ID

For the authorization level of User, the descriptors are shown in Figure 51. Click on a field to display the virtual keyboard which you can use to enter the descriptive information.

7.2.10 Setup > DRY CONTACTS (optional feature)

This function enables the user to manage the **Centric**'s input and output dry contacts.
A password may be required to use the sub-functions on this menu. If you do not have the appropriate password it can be obtained from your distributor or sales agent.

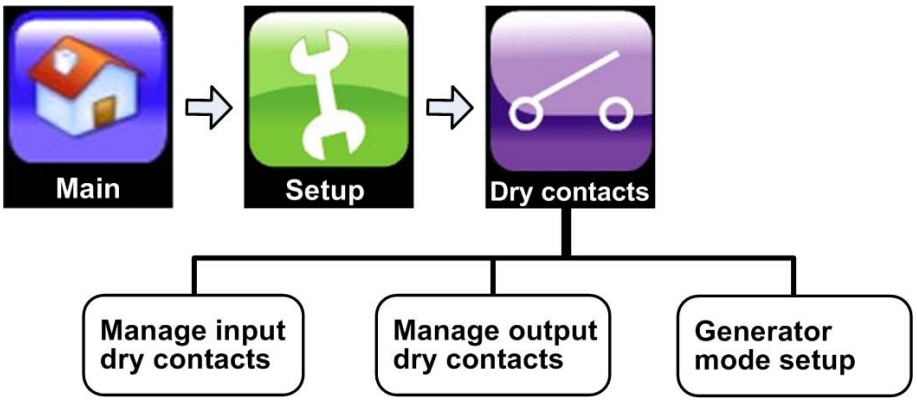


Figure 52: "Setup > Dry Contacts" option

7.2.10.1 SETUP > DRY CONTACTS > INPUT DRY CONTACTS

The input dry contacts enable the user to monitor the state (open or closed) of a relay external to the UPS, by generating an alarm condition when the state of the external relay changes. (The relay must be voltage free. **Connection of a voltage-bearing circuit or relay to the input dry contacts may damage the Centric**.)

For example, if the battery circuit breaker has trip-indicating auxiliary contacts which close when the circuit breaker closes and open when the circuit breaker opens, these auxiliary contacts on the battery circuit breaker can be connected to one of the pairs of input dry contacts on the UPS, and that pair of input dry contacts can then be programmed to generate an alarm condition when the battery circuit breaker is opened.

7.2.10.1.1 LOCATION OF THE INPUT DRY CONTACTS

The connections for the input dry contacts are located in two locations on the rear of the system controller. See Chapter 8.

The connections for four of the input dry contacts (AUX1, AUX2, AUX3, AUX4) are located in connector group 1.

The connection for the fifth input dry contact (AUX5) consists of two pins on the D9 alarm terminal in connector group 2.

7.2.10.1.2 USING THE INPUT DRY CONTACTS

The connection for each input dry contact consists of two pins – one independent pin (AUX1, AUX2, AUX3, AUX4, or AUX5), and the second pin, labeled COM (or COMMON).

Input dry contact AUX5 makes use of an opto-coupler. **No more than 30 V and 100 mA should be applied to input dry contact AUX5. Exceeding either of these limits may cause serious damage to the system controller.**

In the "Setup > Dry contacts > Input dry contacts screen the user defines the dry contact as normally open or normally closed, depending on the normal state of the external circuit. The user must also ensure that the input dry contact is enabled, by selecting the "Enabled" box for that dry contact in the same screen (see Figure 53).

An alarm has been pre-assigned to each of the input dry contacts. (You can see these alarms in the "Setup > Alarms" function. They are named "Auxiliary #1 fault" through "Auxiliary #5 fault". These names can be modified by the user.) Provided that the input dry contact is enabled, when it changes from its defined normal state the associated alarm condition is generated. Depending on the severity level associated with the alarm (in the "Setup > Alarms" function), the alarm generates an entry in the system log and may light up the alarm LED and sound the audible alarm.

Figure 53: Defining an input dry contact

7.2.10.2 SETUP > DRY CONTACTS > OUTPUT DRY CONTACTS

- There are six output dry contacts
- There are currently 48 alarm conditions to which the output dry contacts can be linked, so that when the alarm condition occurs, the state of the output dry contact will change.
- Any number of output dry contacts can be linked to a single alarm condition.
- Each output dry contact can be linked to any number of alarm conditions.

The output dry contacts are numbered 1 through 6.

The alarm conditions are listed in Table 8.

Table 8: Alarms that can trigger output dry contacts
(The messages are listed here in alphabetic order)

Ac input failure
Ac input voltage high
Ac input voltage low
Actual responding modules are less than defined
Adapter (PC710) not responding
All UPS modules not responding
Auxiliary #1 fault
Auxiliary #2 fault
Auxiliary #3 fault
Auxiliary #4 fault
Auxiliary #5 fault
Battery failed last test
Battery test in progress
Conflict with the nominal output voltage and/or frequency
Controller battery test failed
Dc voltage high
Dc voltage low
Detected modules are more than defined
Emergency Power Off is active
End of battery backup, battery discharged to shutdown limit
Fan failure
High load level
Load is now running on bypass
Low battery voltage
More than one module is sending an alarm or warning
No ac output to load
No output current at one or more modules because of fault
Overload current
Static switch is not responding
Static switch is sending alarm or warning
Sync fault
System active
Temperature fault
The system is operating with more than one master
UPS module #1 is sending an alarm or warning
UPS module #2 is sending an alarm or warning
UPS module #3 is sending an alarm or warning
UPS module #4 is sending an alarm or warning
UPS module #5 is sending an alarm or warning
UPS module #6 is sending an alarm or warning

UPS module #7 is sending an alarm or warning
UPS module #8 is sending an alarm or warning
UPS shutdown by “Off” button on LCD panel
UPS shutdown by Emergency Power Off
UPS shutdown by end of battery backup
UPS shutdown by hardware “Off” button
UPS shutdown by overload
UPS shutdown by remote user command

Figure 54 shows output dry contact #6 defined to change state when the **Centric** moves into or out of bypass mode. The move to bypass generates an alarm, and in this example dry contact #6 is linked to that alarm.

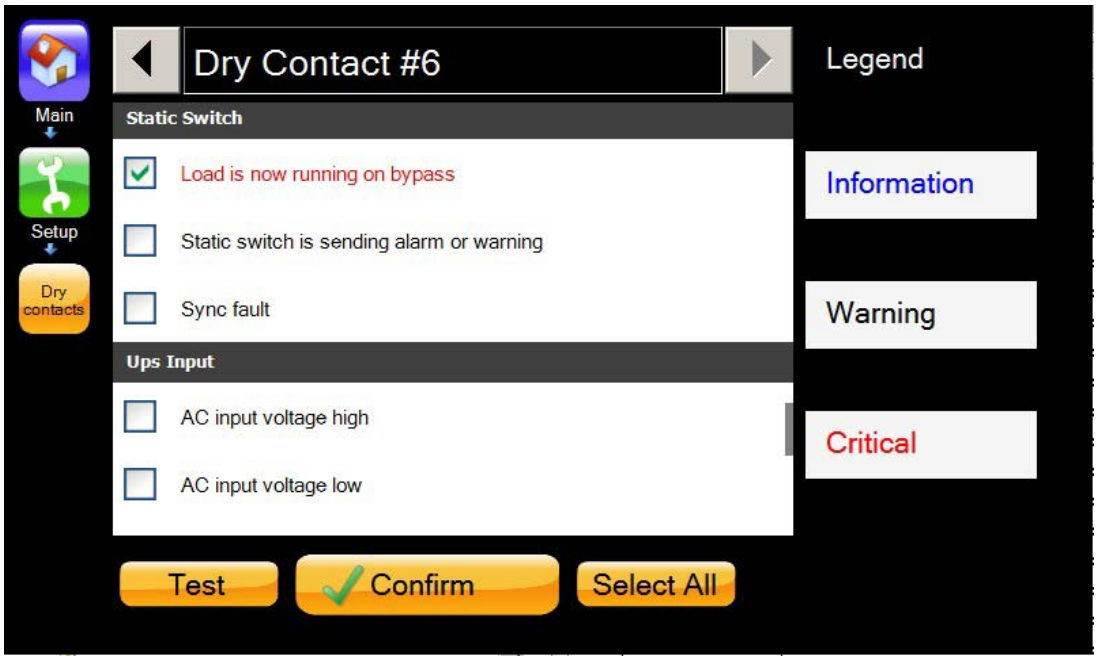


Figure 54: Example of an output dry contact linked to an alarm

7.2.10.2.1 LOCATION OF THE OUTPUT DRY CONTACTS

The connections for the output dry contacts are located in two locations on the upper rear panel of the UPS. See Chapter 8.

7.2.10.2.2 CONNECTING OUTPUT DRY CONTACTS 1 AND 2

The connections for output dry contacts 1 and 2 consist of pins on the D9 alarm connector on the upper right side of the **Centric** rear panel (connector group 2 – see Chapter 8).

The connection for output dry contact 1 is pin 5 and pin 4 (the COMMON pin) on the D9 alarm connector. Output dry contact 1 is Normally Open.

The connection for output dry contact 2 is pin 3 and pin 4 on the D9 alarm connector. Output dry contact 2 is Normally Open.

The factory default association of output dry contact 1 is the "Battery low" alarm. The factory default association of output dry contact 2 is the "Ac input failure" alarm. These associations can be changed if the user so desires.

7.2.10.2.3 CONNECTING OUTPUT DRY CONTACTS 3 THROUGH 6

The connections for output dry contacts 3 through 6 are located in connector group 1 (see Chapter 8). Each of these output dry contacts has 3 pins: COMx, NCx, and NOx (where "x" is the number of the output dry contact).

When connecting an output dry contact to the external circuit, the connection must be made using the COMx pin and either the NCx or NOx pin. Use of the NCx pin results in the circuit being Normally Closed. Use of the NOx pin makes the circuit Normally Opened.

7.2.10.2.4 OUTPUT DRY CONTACTS IN ACTION

Upon the occurrence of any of the alarm conditions in Table 8, the output dry contact(s) associated with that alarm (if any) changes state. Output dry contacts 1 and 2 are always Normally Open, so they close while the alarm exists. Output dry contacts 3 through 6 will change state from open to closed or from closed to open, depending on whether the NCx or NOx pin was used in connecting the output circuit. When the alarm condition ceases, the output dry contact reverts to its normal state.

7.2.10.2.5 TESTING AN OUTPUT DRY CONTACT

An output dry contact that has been associated with an alarm can be tested without actually invoking the related alarm condition, by pressing the "Test" button at the bottom of the output dry contact screen (see Figure 54).

Pressing the test button changes the state of the output dry contact to its "non-Normal" condition for about five seconds.

7.2.10.3 GENERATOR MODE SETUP

This function lets you instruct the UPS not to charge the batteries when the UPS is being fed by a generator. The object is to avoid overloading the generator.

To use this function, choose any one of the voltage-free contacts AUX1 through AUX5 (Figure 55), and the desired normal state of the contact (normally open or normally closed) . The generator must change the state of the dry contact when it begins operation. For example, if the normal state of the chosen dry contact is “open”, the generator must close the dry contact circuit when it begins operation. This informs the Centric that the generator is providing the input power and the batteries should not be charged.

Setting the normal state of the input dry contact (normally open or normally closed) is described in section 7.2.10.1.2. Be sure also that the input dry contact you choose has an “enabled” status (Figure 53).

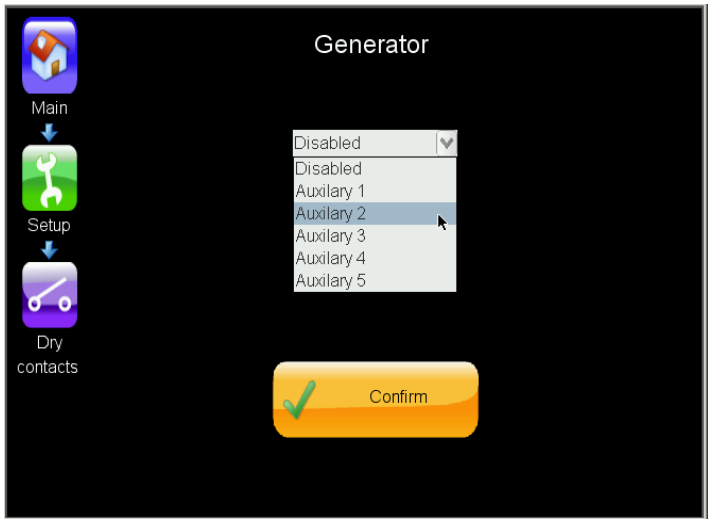


Figure 55: Generator mode setup screen

7.2.11 Setup > SAVE & RESTORE

This set of functions let you save the current UPS settings, and restore them later. This would enable you to experiment with new settings and then easily return to the previous settings. There is also an option to restore the factory default settings.

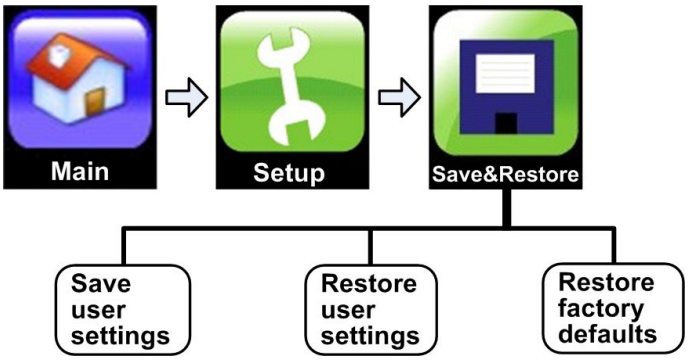


Figure 56: "Setup > Save & Restore" options

7.2.11.1 SETUP > SAVE & RESTORE > SAVE SETTINGS

Saves the current settings of the UPS in non-volatile memory.

7.2.11.2 SETUP > SAVE & RESTORE > RESTORE SETTINGS

Restores to active status the settings that you previously saved in non-volatile memory.

7.2.11.3 SETUP > SAVE & RESTORE >RESTORE FACTORY SETTINGS

This function is displayed only in “Technician” mode. Restores to active status the "factory default" settings of the UPS. Performing this function does not have any effect on what is saved by the SAVE SETTINGS function above.

Be aware that using the "restore factory settings" returns the **Centric** settings to what they were when the unit arrived at your premises. If, for example, you have since added additional power modules, the settings will not include the additional modules and you must readjust the settings to include the additional modules.

7.2.12 Setup > CHANGE AUTHORIZATION LEVEL

This function allows you to change the current security level of the software interface.

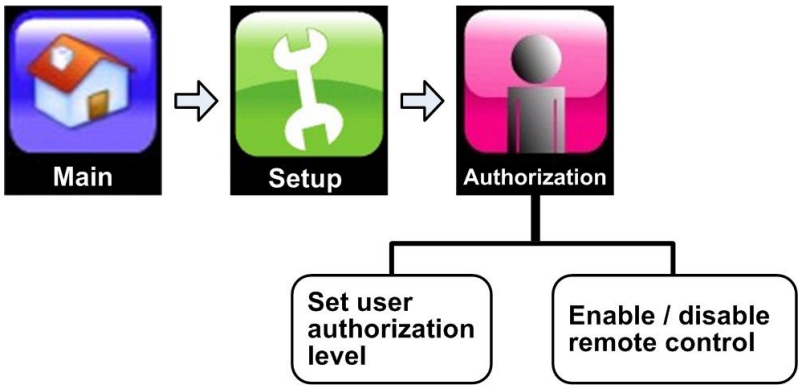


Figure 57: "Setup > Authorization" option

7.2.12.1 SETUP > AUTHORIZATION > SET USER AUTHORIZATION LEVEL

There are three security levels: User, Technician, and Super-User.

The "Technician" and "Super-User" levels have access to additional capabilities and menu functions; the additional functionality is hidden from the "User" level.

7.2.12.2 SETUP > AUTHORIZATION > ENABLE / DISABLE REMOTE CONTROL

Use this function to enable or disable remote access to the system. This controls access to the **Centric** from a remote terminal over a network.

7.3 OPERATION

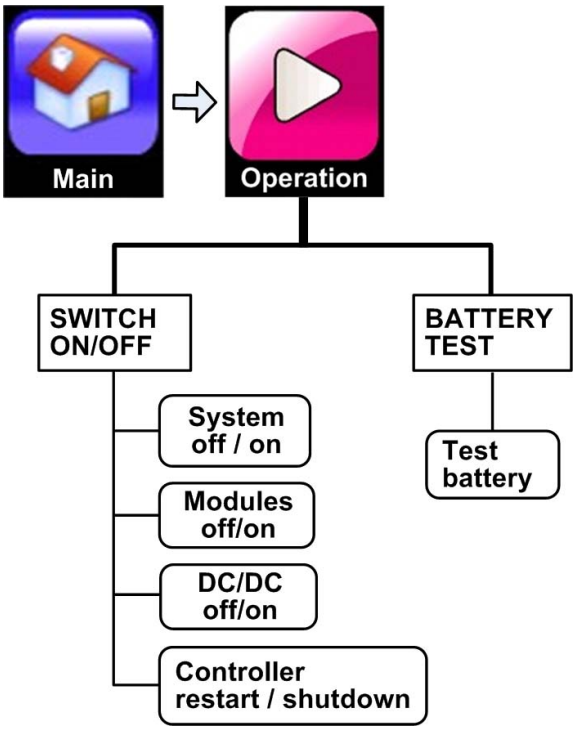


Figure 58: The "Operation" option on the main menu

7.3.1 Operation > SWITCH ON/OFF

This function is used to turn the UPS on and off. Pressing the "ON/OFF" button on the main screen also brings you to this option.

7.3.1.1 OPERATION > SWITCH ON/OFF > SYSTEM OFF

Turning the system OFF disconnects the load.

7.3.1.2 OPERATION > SWITCH ON/OFF > SYSTEM ON

Turns the modules ON and moves the load from bypass mode to inverter mode.
This function reverses a "Modules OFF" command.

7.3.1.3 OPERATION > SWITCH ON/OFF > MODULES OFF

Turns the power modules OFF. If all modules are shut off the load is automatically moved to bypass.

7.3.1.4 OPERATION > SWITCH ON/OFF > MODULES ON

Switches the power modules ON. After a short wait the load is automatically transferred to the inverter.

7.3.1.5 OPERATION > SWITCH ON/OFF > DC/DC OFF

Switches off a dc/dc module. Each dc/dc modules services two UPS modules
If a dc-dc block is switched off, its two associated UPS module will still function normally, except that in battery mode there will not be any dc current supplied to those modules. (There is no common dc bus between the UPS modules.)

7.3.1.6 OPERATION > SWITCH ON/OFF > DC/DC ON

Switches on a dc/dc module.

7.3.1.7 OPERATION > SWITCH ON/OFF > CONTROLLER RESTART

Restarts the controller; the load is unaffected.

7.3.1.8 OPERATION > SWITCH ON/OFF > CONTROLLER SHUTDOWN

Shuts down the controller. The load is unaffected. System functionality is reduced, meaning that most of the many options available through the LCD screen are now unavailable. .

7.3.2 Operation > TRANSFER LOAD

From this menu you can move the load from the inverter to the bypass voltage, or vice versa.

7.3.2.1 OPERATION > TRANSFER LOAD > TRANSFER LOAD TO INVERTER

Transfers the load from the bypass voltage to the inverter voltage.

7.3.2.2 OPERATION > TRANSFER LOAD > TRANSFER LOAD TO BYPASS

Transfers the load from the inverter voltage to the bypass voltage.

7.3.3 Operation > BATTERY TEST

Only one function under this menu; it executes a battery test. Once the battery test begins you have the option of aborting the test before it finishes.

Operational parameters for the battery test can be found
in section 7.2.4.1 "Setup > Battery > BATTERY TEST PARAMETERS" on page 40.

7.4 STATUS

Selecting the Status option on the Main Menu displays a diagram that summarizes the present status of the UPS.

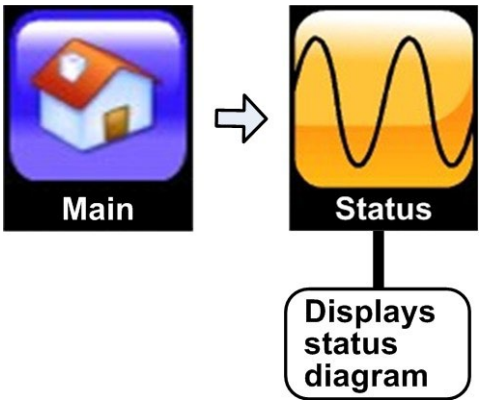


Figure 59: "Main Menu > Status" option

In the diagram, shown in Figure 60, the highlighted (yellow) line indicates the present power flow through the UPS.A yellow triangle with an exclamation point inside indicates an alarm condition related to the UPS component where the triangle is located. Clicking on the component will provide more detailed information about the problem.

Clicking on the various parts of the diagram reveals more detailed information, including present voltage and current readings.

The Status screen shows the power source and destination route currently in use. The route will be different for each of the 3 automated operation modes.

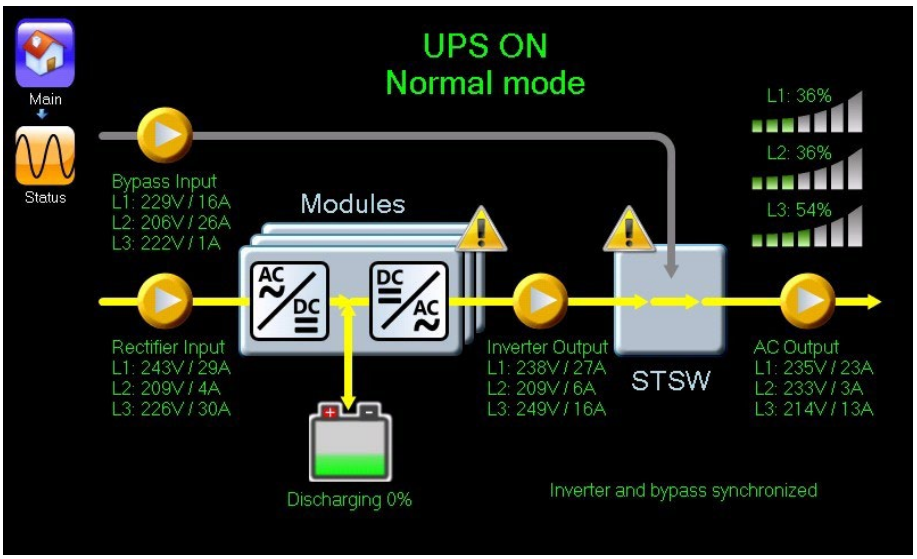
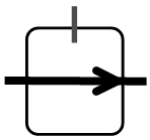
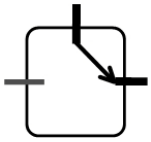


Figure 60: The Status Screen

The Status screen shows the power source and destination route currently in use. The route is different for each of the 3 automated operation modes.

Table 9: Key to Figure 60 (the Status screen)

ITEM	DESCRIPTION
1	Navigation trail – shows how you arrived at this screen.
2	Voltage and amperage reading of each bypass input phase. Pressing the  bypass input icon displays additional measurements for each bypass input phases.
3	UPS state (ON / OFF) and mode (Normal [inverter] mode / Bypass mode / Battery mode / No output).
4	Load level, indicates the load on each output phases, as a percentage of maximum capacity. The white vertical bars fill with colour from left to right as the load increases on the phase.
5	Voltage and amperage readings for each phase of the rectifier input. Pressing the  rectifier input icon displays more detailed readings for each rectifier input phase.
6	This graphic represents the UPS power modules. Pressing this icon gives access to detailed readings of each UPS module's ac input, ac output, dc current, status, and nominal values.
7	Modules alarm icon. When present, indicates that there is an active alarm condition for one or more of the UPS modules. To see the modules' status in detail, press the "modules" icon and then press the "status" button at the bottom of the modules screen.
8	Static switch alarm icon. When present, indicates that there is an active alarm condition for the static switch. To see the static switch status in detail, press the "static switch" icon and then press the "detail" button.
9	Voltage and amperage reading for each phase of the inverter output. Pressing the  inverter output icon displays the more detailed reading for each inverter output phase.
10	Static switch. This icon indicates the source of the output power – whether it is from the inverter or the bypass input. This graphic is displayed when the output source is the inverter (normal mode and battery mode):  This graphic is displayed when the output source is the bypass input (bypass mode):  Pressing the static switch icon displays the static switch detail screen.

ITEM	DESCRIPTION
11	Voltage and amperage readings of the static switch output, which is the UPS output. Pressing the bypass input icon button displays more detailed readings for all output phases.
12	Battery status and charge level. Pressing the battery icon displays more detailed information on the status of the battery.

7.5 PROFILE

The PROFILE function displays a summary of the operating parameters of various parts of the system.

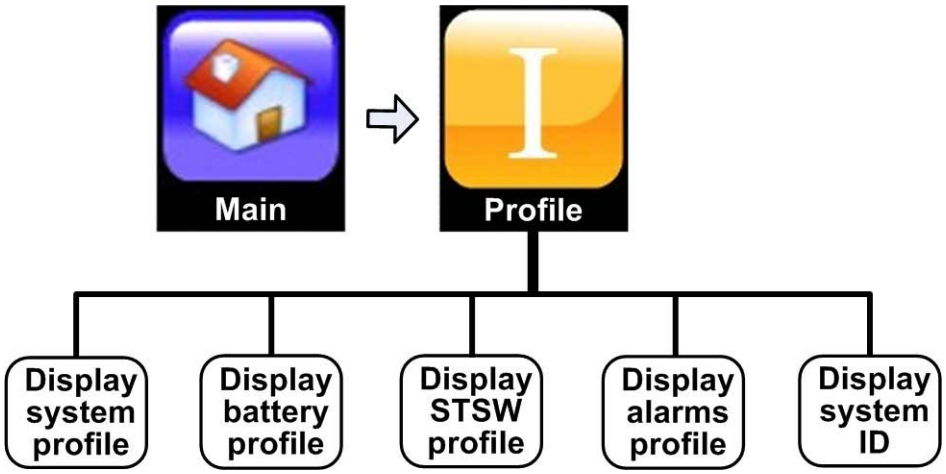


Figure 61: "Main Menu > Profile" options

7.5.1 Profile > SYSTEM

Lists the current values for a number of basic system settings, including:

- Nominal power.
- Number of phases.
- Nominal ac voltage.
- Nominal frequency.
- Number of modules.
- Number of modules for redundancy.
- Number or battery cabinets.
- Operation mode (stand-alone or parallel).
- Automatic restart (enabled/disabled).
- Shutdown by long ac fail (enabled/disabled).
- Last maintenance date.

More information about these parameters is available in section 0 "Setup > SYSTEM" on page 24.

7.5.2 Profile > BATTERY

Lists the current values for a number of important battery parameters, including:

- Nominal charger voltage.
- Battery low limit voltage.
- Rectifier voltage at battery test.
- End-of-backup battery voltage limit.
- Automatic battery test period (in weeks).
- Test duration limit.
- Current sensor status (active/inactive).
- Current limit (enabled/disabled).
- Current limit values (in amps).
- Battery cabinet capacities (in Ah).
- Temperature sensor status (active/inactive).
- Temperature compensation status (active/inactive).
- Temperature compensation factor (mV/°C).
- Limit dc voltage at compensation (400 – 440V).

More information about these parameters is available in section 7.2.3 "Setup > DC-DC" on page 35.

7.5.3 Profile > ST.SW.

Lists the current values for several parameters related to the static switch, including:

- Bypass (forced or controlled).
- Control by PC activity status (active/inactive).
- Control by panel activity status (active/inactive).
- Voltage range (wide/narrow).
- Frequency range (in Hertz).
- Integration time (regular/extended).
- Synchronization sensitivity (regular/extended).

More information about these parameters is available in section 7.2.3 "Setup > DC-DC" on page 35.

7.5.4 Profile > ALARMS

Lists current parameter values, mostly alarm limit values, for alarms, including:

- Dc voltage high limit.
- Dc voltage low limit.
- Ac voltage high limit.
- Ac voltage low limit.
- Over temperature limit.
- Under temperature limit.
- Ac voltage hysteresis.

Section 7.2.6 "Setup > ALARMS" on page 46 has more information on the parameters displayed in the "Profile > Alarms" screen.

7.5.5 Profile > IDENTIFICATION

Lists several identifiers:

- Manufacturer.
- Model name.
- Software version.
- System serial number.
- Identification.
- Contact name.
- Location.
- Attached devices.
- Module#1.

- Module#4 (or Module#8, depending on the UPS model.

7.6 LOG

Selecting this option displays the log file.

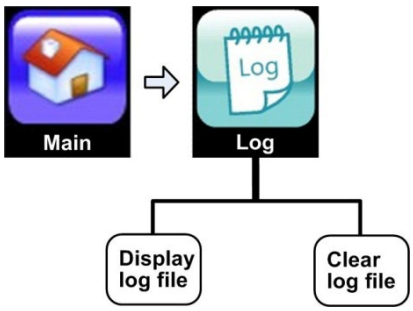


Figure 62: "Main Menu > Log" options

The log file display screen includes a button that you can press to clear the log file if you so desire. If you do not clear the log file, when it reaches the maximum number of entries (490), it continues in "wrap-around" mode, overwriting the oldest messages, so that the log file always contains the 490 last log events.

Every log message has a severity level assigned to it. There are four different severity levels, as described in Table 10.

Table 10: Log message types (alarm types)

LOG MESSAGE SEVERITY LEVEL	ICON	MEANING	GENERATES AUDIBLE ALARM (BEEPS) ?
Informational		No action required.	No
Warning		Reports a problem and generates an audible alarm (beeps)	Yes
Error		Reports a more serious problem.	Yes
Alarm removed		A previously reported alarm condition has been resolved.	No. Causes audible alarm to cease if no warning-level or error-level alarms remain

(In certain unusual situations, the user may want to change the severity level of a given log message. This can be accomplished in the "Setup > Alarms > Alarm configuration" screen.)

Figure 63 shows an example of a listing of the log file.

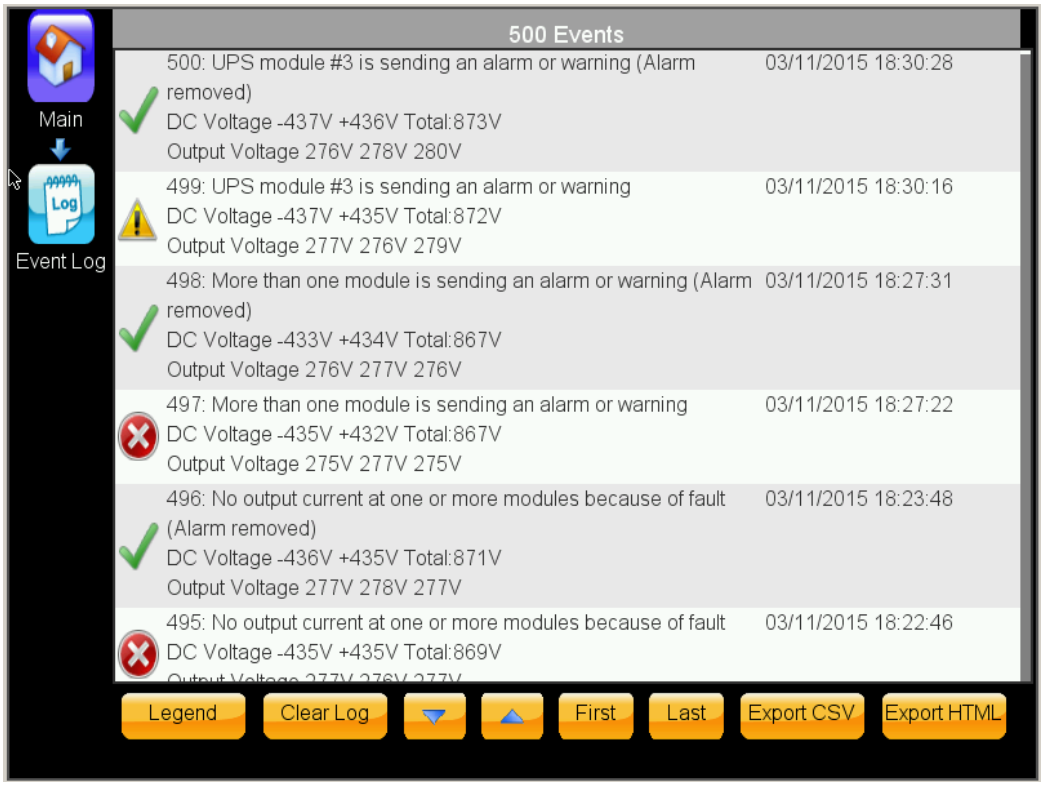


Figure 63: Listing of the log file contents

To scroll through the log messages, slide your finger up or down along the touch screen, or use the “up and down arrow” keys.

To display detailed information about the system status at the time the log entry was recorded, tap the log message in question. For example, tapping the message the message with the yellow triangle in Figure 63 ("UPS module #3 is sending an alarm or warning") displays the status of system parameters at the time of the fault (Figure 64). Touching any of the buttons at the bottom of the screen displays the detailed readings for the selected system component as recorded at the time of the log entry.

The buttons at the bottom of the screen in Figure 64 enable you to focus on the readings of specific system components, such as the battery, the output stage, the bypass input, and so on, including individual modules.

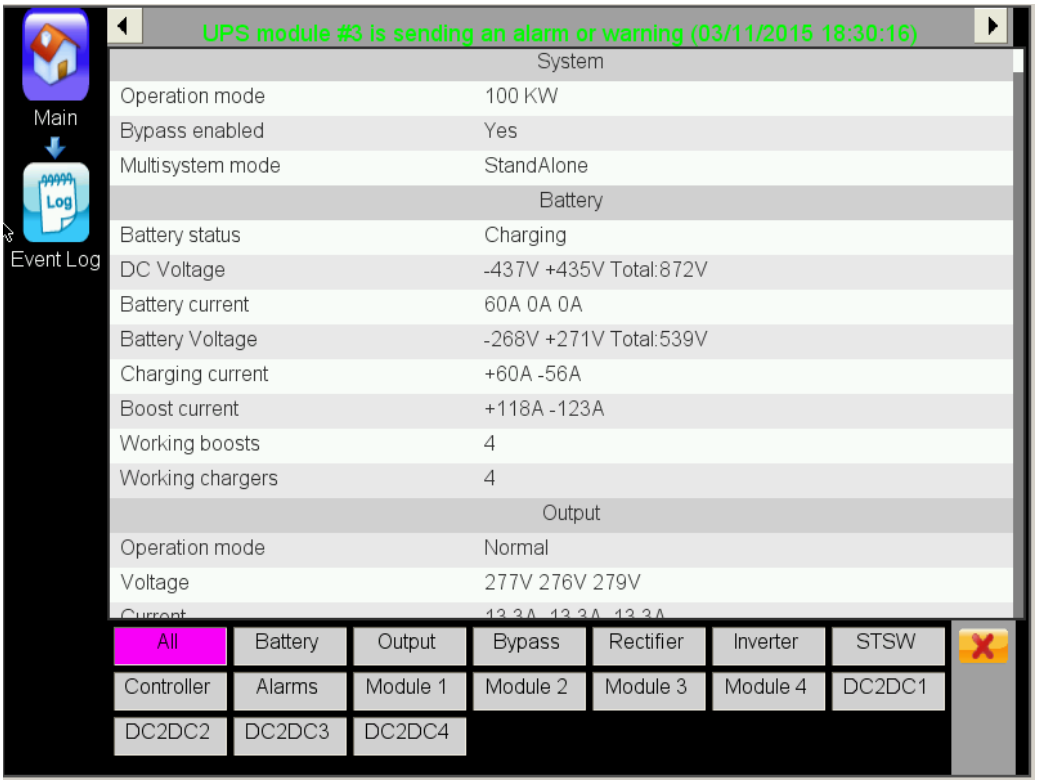


Figure 64: Log record - detailed display

You can navigate to the detailed readings for the previous or the next log message by tapping on the left and right arrows at the top of the screen.

To close the detailed reading screen and return to the list of log messages, tap the "X" (or "Close") button at the bottom right of the screen.

If you don't feel like pressing buttons, you can just keep on scrolling down through the "All" screen, and you will see all of the same readings that are accessed individually by the other buttons.

7.6.1 The "Alarms" button on the log detail screen

In Figure 65, in the second row of buttons at the bottom of the screen, the "Alarm" button can be seen. (If this button is not present on the screen and you want this feature, ask your dealer for a software upgrade.)

Tapping this button displays a list of all alarms that were active at the time the viewed log record. This can helpful to understanding the state of the system at the time the alarm of interest occurred. Figure 65 shows an example of the "Alarms" display from the log detail screen.

Figure 65: "Alarms" display from the log detail screen

For help in understanding the log messages see section 010 “Troubleshooting”.

7.7 CONNECTIVITY

This function displays the status of the **Centric**'s connection to the computer network, the UPS's IP address, and related information. This is of relevance if you are using the remote access feature, which allows monitoring and control of the **Centric** from a remote computer over an intranet or the Internet.

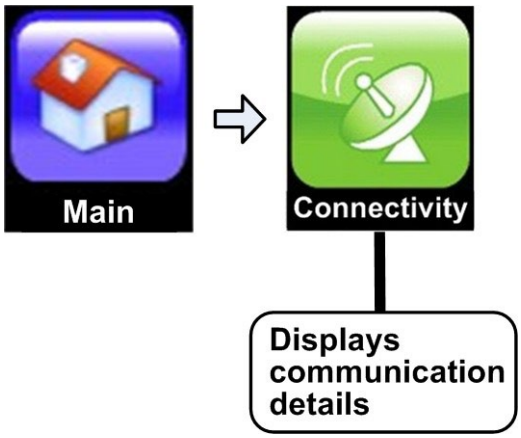


Figure 66: "Main Menu > Connectivity" option

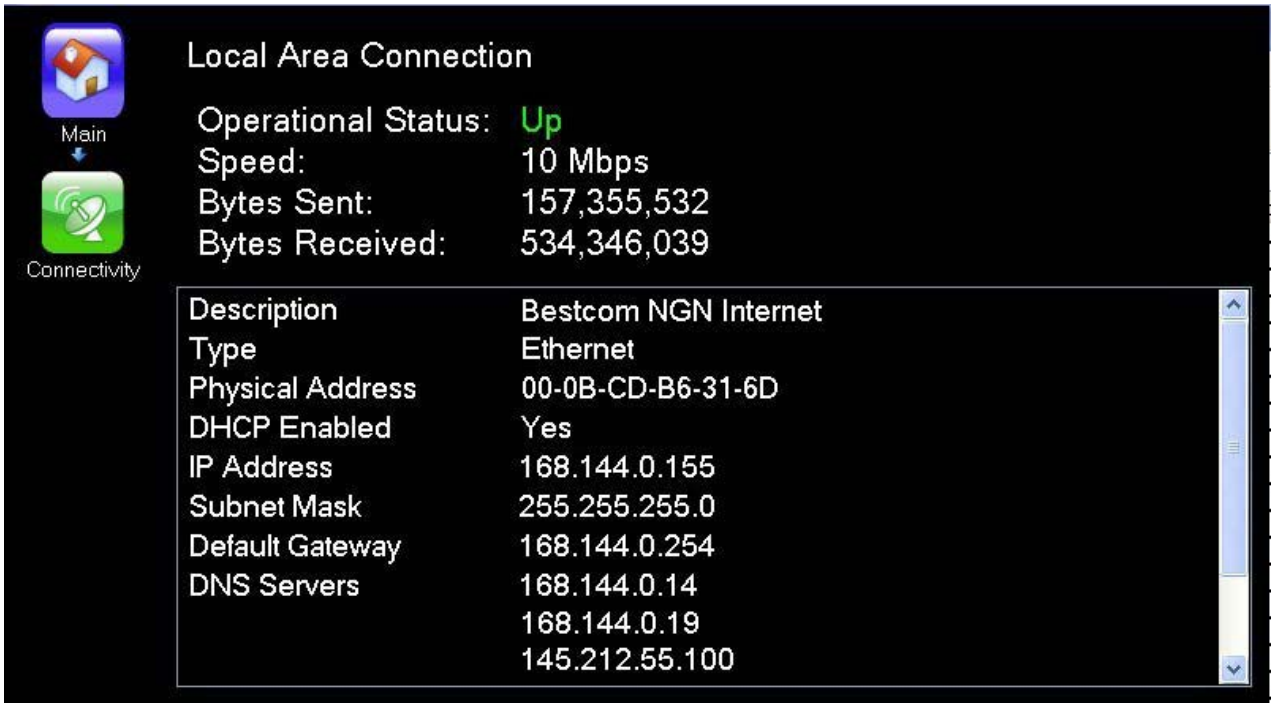


Figure 67: "Connectivity" display from main menu

7.8 TIME

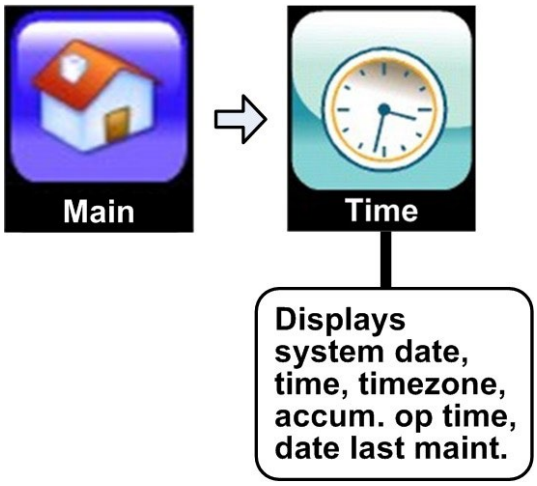


Figure 68: "Main Menu > Time" option

This main menu option displays the time on the UPS's internal clock, the time zone, the current operating time (the time since the unit was last turned on), and the last recorded maintenance date.

Figure 69: The "Time" function on the main menu

7.9 LANGUAGE

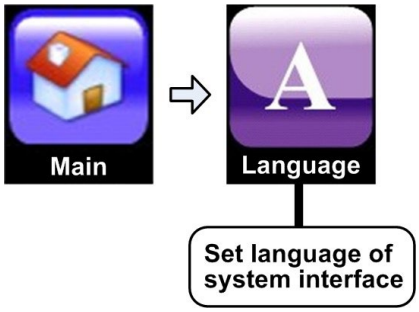


Figure 70: "Main Menu > Language" option

This function gives you the ability to choose the language in which the display screen options and messages are displayed.

7.10 HELP

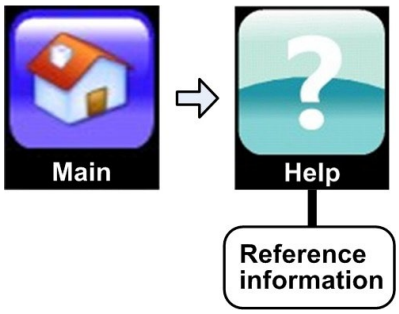


Figure 71: "Main Menu > Help" option

The Help function provides reference information to assist you in operating the unit and defining its operational parameters.

8. MINOR REAR PANEL CONNECTORS

There are three groups of minor connectors on and near the controller rear panel.
Two of the minor connector groups are detailed here. Connector group 3 is discussed in the *Centric 3x480 Installation Guide*.

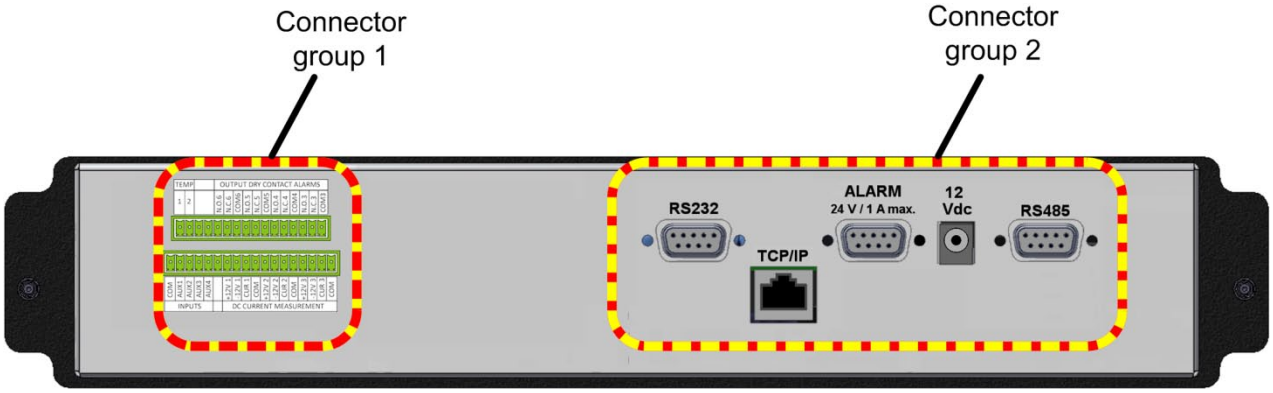


Figure 72: Location of minor connectors on the controller's rear panel

Table 11: Key to Figure 72

ITEM	CONNECTOR DESCRIPTIONS
1	**Connector group 1:** • Dc current measurement connections • 4 input dry contacts (AUX1 – AUX4) • 4 output dry contacts (output dry contacts 3 – 6)
2	**Connector group 2:** • RS232 (D9) • RJ45 (network) • Alarm (D9) (includes input dry contact AUX5) • 12 Vdc (for related optional devices) • RS485 (D9) (for serial Modbus communication)

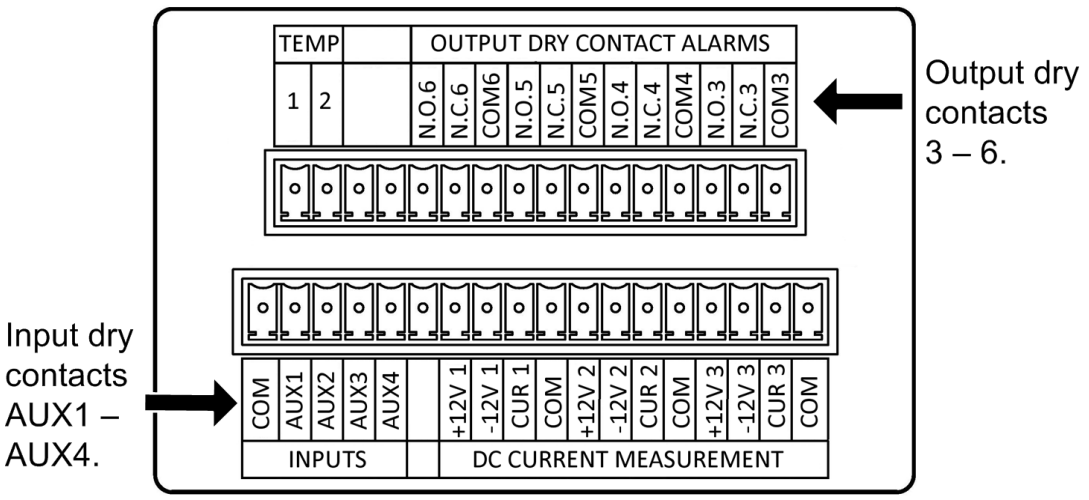


Figure 73: Close-up of connector group 1

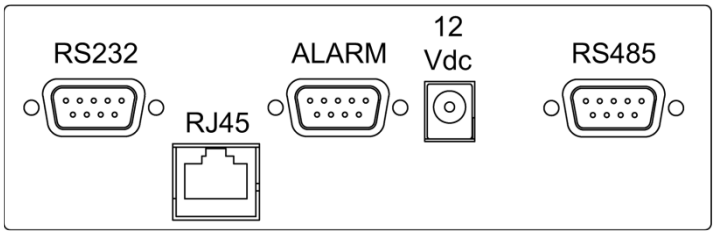


Figure 74: Close-up of connector group 2

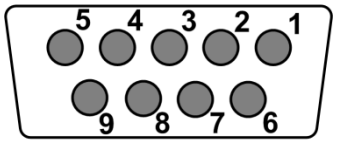


Figure 75: Pin numbers in D9 connectors

Table 12: Assignments for D9 connectors on rear of controller

PIN #	ALARM CONNECTOR		RS232 CONNECTOR	RS485 CONNECTOR
	PINS FOR DRY CONTACTS	PINS FOR REMOTE PANEL		
1	Input dry contact #5 (AUX5)	-	Not used	RTX-
2	Reserved	-	RXD, Receive data	Not used
3	Output dry contact #2. Normally Open. (Default value when closed is line failure; can be reassigned)	-	TXD, Transmit data	RTX+
4	COMMON (Ground)	-	Not used	Not used
5	Output dry contact #1. Normally Open. (Default value when closed is low battery; can be reassigned)	-	GND	Not used
6	-	Remote clock	Not used	Not used
7	-	Remote data	Not used	Not used
8	-	Remote ground	Not used	Not used
9	-	Remote power	Not used	Not used

9. OPERATING THE MAINTENANCE BYPASS SWITCH

Maintenance bypass is an optional feature. In maintenance bypass mode, the UPS output terminals continue to supply power to the load, but the interior of the UPS is isolated from all power flows. This enables a technician to work safely on the UPS (after turning off the battery circuit breaker or disconnecting the battery fuse) without any interruption of power to the load.

When present, the three maintenance bypass switches are located on the Centric's rear panel.

9.1 Putting the UPS in maintenance bypass mode

During normal operation of the UPS, the maintenance bypass switches are positioned as shown in Figure 76.

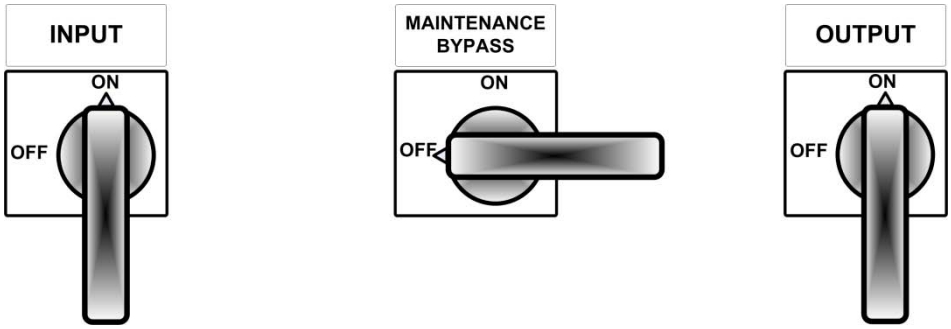


Figure 76: Normal position of the maint. bypass switches

To put the system in maintenance bypass mode:

1. Go to the "Operation > Transfer Load" screen. Verify that the message "Inverter and bypass synchronized" is displayed near the top of the screen. (If it is not, you cannnot continue.)

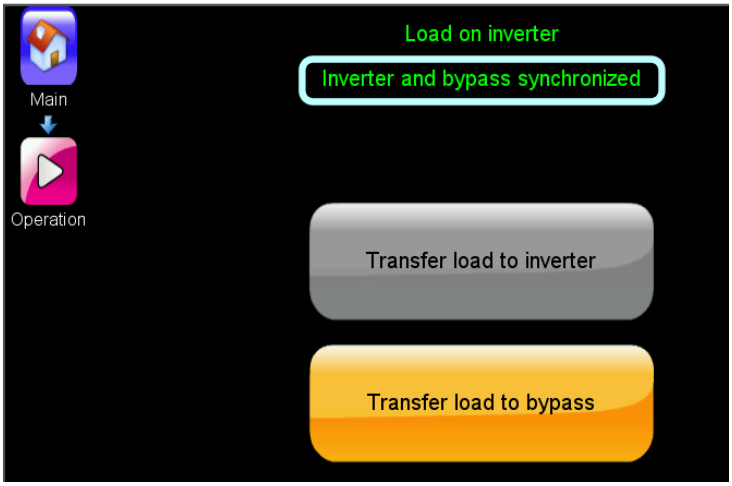


Figure 77: Inverter and bypass synchronized

2. Select "Transfer load to bypass".
3. Return to the Status screen and verify that the UPS is in bypass mode.

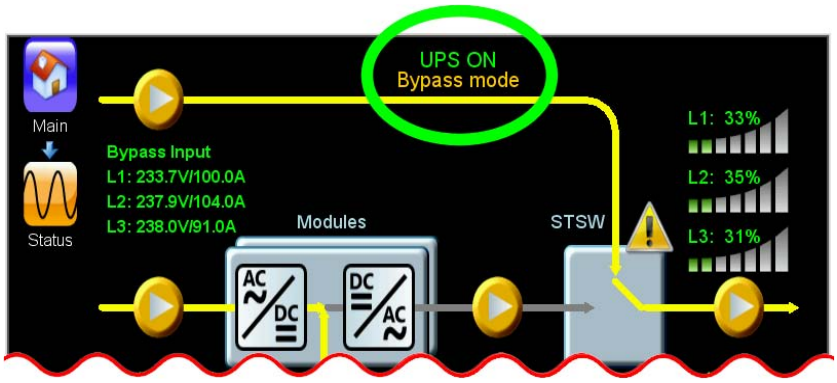


Figure 78: The system is in bypass mode

Then, using the three maintenance bypass switches on the UPS rear:

4. Switch ON the MAINTENANCE BYPASS switch (the middle switch).
5. Switch OFF the ac OUTPUT switch (the right-side switch).
6. Switch OFF the rectifier INPUT switch (the left-side switch).

The switches are now positioned as shown in Figure 79.

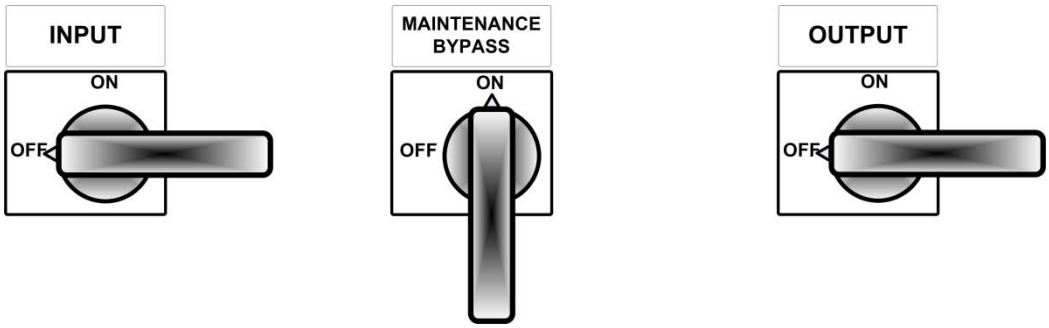


Figure 79: Switch positions in maint. bypass mode

7. On the battery box, switch OFF the battery circuit breaker. Immobilize the battery box circuit breaker with tape and a sign to prevent the circuit breaker from being switched ON while the UPS is being serviced.

The system is now in maintenance bypass mode.

9.2 Returning the UPS to normal operation

To move the system from maintenance bypass mode to normal operation mode:

1. Switch ON the battery circuit breaker.
2. Switch ON the rectifier INPUT..
3. Switch ON the UPS (refer to section 5.2.2.1).
4. Go to the “Operation > Transfer Load” screen. Verify that the message “Inverter and bypass synchronized” is displayed near the top of the screen, then select “Transfer Load to Bypass”..
5. Go to the Status screen and verify that the system is in bypass mode.
6. Switch ON the ac OUTPUT switch (the right-side switch).
7. Switch OFF the MAINTENANCE BYPASS switch (the middle switch).
8. Go to the “Operation > Transfer Load” screen and select “Transfer load to inverter”.
9. Go to the Status screen and verify that the system is in inverter mode (the message “UPS ON, NORMAL MODE” is displayed.

The loads are now supplied by the UPS.

10. TROUBLESHOOTING

There are two places to look for information when analyzing a problem: the status screen and the log screen.

The status screen provides a quick overview of the system status, including access to real-time voltage and current measurements.

The log screen provides access to a detailed record of the system status at the time the log entry was recorded, including voltage and current measurements. See section 7.6 for information on how to use the log file.

Table 13 below explains the meaning of the log messages and suggests remedial action.
The log messages in Table 13 are listed in alphabetical order.

Table 13: Troubleshooting table

LINE #	ALARM MESSAGE OR STATE OF UPS	E / R	EXPLANATION / RECOMMENDED ACTION, IF ANY	DEFAULT SEVERITY
1.	Ac input failure.	E	There is no ac input voltage. The UPS will automatically go to bypass mode, or if the bypass voltage is also absent, then battery mode.	Warning
		R	Verify that the input circuit breakers are ON. Verify that the input cable connections are secure.	
2.	Ac input voltage is high.	E	The ac input voltage is higher than normal.	Warning
		R	The UPS can accommodate a high input voltage for a short period of time, after which it transfers the load to bypass. If the bypass voltage is also too high, the UPS will go to battery mode.	
3.	Ac input voltage is low.	E	The input voltage is lower than normal.	Warning
		R	The UPS automatically transfers the load to bypass. If the bypass voltage is also too low, the UPS will go to battery mode.	
4.	Actual responding modules less than defined.	E	The number of power modules installed is greater than the number of power modules defined to the UPS.	Warning
		R	Either too many modules were defined to the system, or too few modules were inserted into the system. • If too many modules were defined, correct the definition ("Setup > System > Number of modules"). • If too few modules were inserted, insert the proper number of modules.	
5.	Adapter (PC710) not responding.	E	PC710 is a communication adapter in the computer rack.	Critical
		R	Replace PC710.	
6.	All UPS modules not responding.	E	A communication problem exists between the modules and the controller.	Critical
		R	• There may be a break in the communication cable, or it has become disconnected. • The controller may need to be rebooted. • A single defective module may be monopolizing the communication channel. Pull out one module and see if the problem is solved. If not, put the module back in, and pull out the next module. Do this with each module. If you find that removing a specific module resolved the problem, that module is defective and should be replaced with a good module.	
7.	Auxiliary #N fault.	E	Input dry contact #"N" has changed state.	Warning
		R	The response to this notification depends upon the nature of the external circuit connected to this input dry contact. This is user-defined.	
8.	Batteries failed last test.	E	The last battery test found the battery voltage lower than acceptable.	Critical
		R	• Check value of voltage threshold for battery test. 350 V is recommended. Repeat the test after 2 hrs. • Check dc voltage between leads of each battery. If any battery measures <10 V replace it immediately.	
9.	Battery test in progress.	E	A battery test is in progress.	Informational

LINE #	ALARM MESSAGE OR STATE OF UPS	E / R	EXPLANATION / RECOMMENDED ACTION, IF ANY	DEFAULT SEVERITY
		R	No action required. When the test has completed it is a good idea to check the log to verify that the battery passed the test.	
10.	Conflict with the nominal output voltage and/or frequency values.	E	The output voltage or frequency of one or more modules does not match the value defined in the controller ("Settings > System > Nominal settings").	Warning
		R	Compare the output voltage and frequency values defined in the controller against the output of each UPS module ("Status > Modules > Output"). It may be that a UPS module or a controller module from a system with different nominal values was inserted into this system. If the controller has incorrect values, enter the correct values and tap confirm. This should resolve the problem. If a module has incorrect values, turn the module off ("Operation > Turn on/off > Modules off", select the module in question on the screen and choose "Complete shutdown"). Then switch the module back on ("Operation > Turn on/off > Modules on", select the module in question on the screen and tap "Confirm". The module should correct itself to match the controller's nominal output voltage and frequency. If this does not work, then switch off the module, re-enter the correct values into the controller, and then switch the module back on.	
11.	Controller disk space limit reached.	E	Software problem in the controller	Warning
		R	Contact Gamatronic's technical support team.	
12.	Controller memory limit reached.	E	Software problem in the controller	Warning
		R	Contact Gamatronic's technical support team.	
13.	Controller threads limit reached.	E	Software problem in the controller	Warning
		R	Contact Gamatronic's technical support team.	
14.	Dc voltage is high.	E	Dc voltage is above normal.	Warning
		R	Perform the instructions in section 10.1 "Troubleshooting "Dc high".	
15.	Dc voltage is low.	E	Dc voltage is below normal.	Warning
		R	Perform the instructions in section 10.2 "Troubleshooting "Dc low".	
16.	Detected modules are more than defined.	E	More modules are installed than have been defined to the system.	Informational
		R	Either too few modules were defined to the system, or too many modules were inserted into the system. If too few modules were defined, correct the definition ("Setup > System > Number of modules"). If too many modules were inserted, insert the proper number of modules.	
17.	Emergency Power Off is active.	E	The EPO switch has been activated, resulting in a shutdown of the output to the load.	Informational
		R	Only after the emergency situation has been resolved, the Centric can be restarted as described in section 2.8.2.1 "Restarting the UPS".	

LINE #	ALARM MESSAGE OR STATE OF UPS	E R	EXPLANATION RECOMMENDED ACTION, IF ANY	DEFAULT SEVERITY
18.	End of battery backup. Battery is discharged to shutdown limit.	E	The system was running in battery mode and the battery is now exhausted.	Informational
		R	Verify that the ac input circuit breaker is "ON". Wait for mains power to return. If auto-restart is enabled ("Setup > System > Shutdown and Autorestart") the Centric will start up automatically when the power returns. In any case, battery charging begins automatically upon return of the ac input power.	
19.	High load level.	E	The UPS is at 90% load level.	Warning
		R	Be prepared to disconnect nonessential loads if the load level continues to increase.	
20.	Load is now running on battery.	E	The UPS is in battery mode.	Critical
		R	Verify ac input CB is on; check input voltage value; wait for mains power to return.	
21.	Load is now running on bypass.	E	The UPS is operating in bypass mode.	Critical
		R	Perform the instructions in section 10.3 "Troubleshooting "Bypass mode".	
22.	Low battery voltage.	E	The battery voltage is low. UPS shutdown due to battery discharge is imminent.	Critical
		R	Shut down the critical load(s).	
23.	More than one module is sending an alarm or warning	E	Self explanatory.	Critical
		R	Perform the instructions in section 10.4 "Troubleshooting "UPS modules".	
24.	No ac output to load.	E	The UPS is not providing any output power.	Critical
		R	Perform the instructions in section 10.5 "Troubleshooting "No output".	
25.	No output current at one or more modules due to fault.	E	One or more modules have no ac output.	Critical
		R	To determine the problematic module(s), "Status > Modules". In the diagram, tap the bottom module in the module stack, then select "Output" in the grid at the bottom of the screen. Tap each module in turn from bottom to top and look at the output data to determine which module(s) is producing no output. Replace the bad modules.	
26.	Outputs of all UPS modules are disconnected, dc voltage is normal.	E	Possible master-slave problem at PC819 board.	- - -
		R	Replace PC819 in STSW slot.	
27.	Overload current.	E	The load devices are demanding more power than the UPS can supply.	Critical
		R	The UPS can tolerate an overload for a short period of time, after which the load is automatically transferred to bypass. When the overload is eliminated the load is automatically returned to the inverter. If overloading is a persistent problem, the load on the UPS needs to be reduced. Alternatively, consider adding UPS modules to the system to increase its output power.	
28.	Short sync fault	E	A short-lived synchronization fault occurred between the inverter and bypass. The fault is logged to the log file.	Warning

LINE #	ALARM MESSAGE OR STATE OF UPS	E R	EXPLANATION RECOMMENDED ACTION, IF ANY	DEFAULT SEVERITY
		R	This is the result of a brief variation in the bypass frequency. It is usually of no concern.	
29.	Static switch is sending an alarm or warning.	E	One of the bypass, inverter or output voltages may be out of range. The inverter output voltage may not be synchronized to the bypass voltage The bypass input frequency may be out of range.	Warning
		R	Perform the instructions in section 10.5 "Troubleshooting "No output"".	
30.	Static switch not responding.	E	There is a problem with communication between the controller and the static switch.	Warning
		R	Is it just the STSW that isn't communicating? Is data from the UPS modules being passed to the controller? The controller may not be firmly seated in its shelf, resulting in a bad electrical connection with the communication cable. The controller may be frozen and needs to be rebooted. Is the Alarm LED lit up? Verify that the communication flat cable is connected firmly on the STSW and on the controller rear. The STSW controller card (PC796) may need replacement.	
31.	Sync fault (compare with "Short sync fault")	E	A prolonged (minutes) loss of synchronization occurred between the bypass and the inverter frequencies.	Warning
		R	This could be due to an unstable bypass source. There may be a problem with the communication cable and its connection to the static switch. If this problem occurs during first-time operation of the UPS, it could be due to improper phase order, or improper definition of the bypass frequency (60 Hz instead of 50, for example. See "Setup > System > Nominal settings").	
32.	Temperature fault.	E	The battery temperature sensor has registered a temperature outside of the acceptable range (too high or too low). Measured temperature can be seen on the "status" screen (tap on the battery icon).	Critical
		R	The room's air conditioning may need to be adjusted to lower the air temperature. The temperature sensor may have malfunctioned. The temperature alarm thresholds can be seen at "Setup > Alarms > Set limits > Temperature limits". See Table 3 on page 7 for recommended air temperature for optimal battery life.	
33.	The system is operating with	E	The system should have only 1 master module, yet the controller says there is more than 1.	Warning

LINE #	ALARM MESSAGE OR STATE OF UPS	E R	EXPLANATION RECOMMENDED ACTION, IF ANY	DEFAULT SEVERITY
	more than one master.	R	Go to "Status > Modules > Status". Click on each module in turn and look at the "Operation mode" field to see which modules are defined as masters. The first module from the bottom is supposed to be the master. Remove the "other" master (the higher one) and replace it with a known good module. If you have no replacement module, swap the two master modules. The assumption here is that the upper master is stuck in master mode, and the lower one is normal and will revert to slave status when moved upward.	
34.	UPS module N is sending an alarm or warning. [1]	E	A problem has been detected by the module's control logic.	Warning
		R	Perform the instructions in section 10.4 "Troubleshooting "UPS modules".	
35.	UPS shutdown by Emergency Power Off.	E	The UPS has turned itself off due to activation of the EPO switch.	Informational
		R	Only after the emergency situation has been resolved, the Centric can be restarted as described in section 2.8.2.1 "Restarting the UPS".	
36.	UPS shutdown by end of battery backup.	E	The UPS was in battery mode, and the battery became exhausted, so the UPS automatically turned itself off.	Informational
		R	No action required. When normal ac input returns, battery charging will begin automatically.	
37.	UPS shutdown by hardware Off button.	E	The UPS was shut down by pressing the physical "OFF" button of the LCD screen.	Informational
		R	No action required.	
38.	UPS shutdown by Off button on LCD panel.	E	The UPS was shut down by pressing the OFF software button on the touch screen.	Informational
		R	No action required.	
39.	UPS shutdown by overload.	E	The UPS turned itself off automatically due to a serious overload condition.	Informational
		R	Before restarting the UPS, determine what caused the overload, and reduce the load on the UPS.	
40.	UPS shutdown by remote user command.	E	A user with remote access to the UPS shut the UPS down.	Informational
		R	No action required.	

[1] The UPS module slots are numbered from bottom to top.

10.1 Troubleshooting "Dc high"

This procedure is to be performed only as directed by Table 13 above.

If the internal dc voltage of the module is too high, the battery can be damaged.

1. Activate the battery test ("Operation > Battery test"). During the test, the dc voltage is lowered.
2. Use a calibrated voltmeter to measure the dc voltage between both battery connection terminals and the "midpoint" battery terminal (i.e., between "+" and midpoint, and between "–" and midpoint. If the voltage as measured by the voltmeter differs from the value measured by the UPS itself, the modules' dc meters need to be recalibrated.
3. Verify that the dc fuses in each module are normal (not blown open).
   Any module with dc voltage lower than the other moudules, has a faulty dc fuse and must be repaired.
4. If measurements are correct and all fuses ae normal, do the following:

4.1 Disconnect batteries from the UPS either by switching of the battery circuit breaker or by removing the battery fuses.

4.2 Transfer the load to bypass.

4.3 Cancel the battery test and verify that the dc voltage returns to the same high value.

4.4 Shut down the bottom UPS module ("Operation > Turn on/off > Modules off", select the module in question on the screen and choose "Complete shutdown").
See if the dc voltage returns to a normal value. If so, you have found the problematic module. Replace the module.

4.5 If the dc voltage did not return to normal, switch the module back on ("Operation > Turn on/off > Modules on"),
then shut down next module and see if the dc voltage returns to a normal value.
Continue likewise until you have checked all of the modules, using the "complete shutdown" command.

10.2 Troubleshooting "Dc low"

This procedure is to be performed only as directed by Table 13 above.

1. The usual cause of a low dc voltage is that the battery is charging after a deep discharge or a battery test, and its charging current is limited by the current limiting mechanism.
2. Use a calibrated voltmeter to measure the dc voltage between both battery connection terminals and midpoint (i.e., between "+" and midpoint, and between "–" and midpoint. If the voltage as measured by the voltmeter differs from the value measured by the UPS itself, the modules' dc meters need to be recalibrated.
3. If the dc voltage displayed by the UPS is accurate (i.e., matches your voltmeter reading), wait 20 or 30 minutes and check the dc voltage again. If the voltage has risen, this is an indication that the battery is being charged. To accelerate the process, verify that the battery setup values are correct, as follows.

3.1 Go to "Setup > Battery > Battery capacity". Verify that the defined battery capacity in ampere/hours matches the rating of the battery.

3.2 Go to "Setup > Battery > Battery current". If the current limit is defined as 10 %, increase it to 20 %. If dc voltage begins to rise you can return the current limit value to 10 % and wait for the battery to charge fully. This could take up to 10 hours, depending on the state of the battery.

4. If you have carried out the above instructions and the dc voltage remains low, do the following:

4.1 Disconnect batteries from the UPS either by switching of the battery circuit breaker or by removing the battery fuses.

4.2 Transfer the load to bypass.

4.3 Cancel any battery test that may have started automatically.

4.4 Shut down the bottom UPS module ("Operation > Turn on/off > Modules off", select the module in question on the screen and choose "Complete shutdown").
See if the dc voltage returns to a normal value. If so, you have found the problematic module. Replace the module.

4.5 If the dc voltage did not return to normal, switch the module back on
("Operation > Turn on/off > Modules on"),
then shut down next module and see if the dc voltage returns to a normal value.
Continue likewise until you have checked all of the modules, using the "complete shutdown" command.

10.3 Troubleshooting "Bypass mode"

This procedure is to be performed only as directed by Table 13 above.

1. The load can be transferred to bypass for any of the following reasons:

   a) command from the controller: either a manual command, or due to overload of the inverter.

   b) command from the static switch panel.

   c) command from a parallel connected UPS, if any.

   d) inverter RMS voltage detection: voltage is out of specified range (±10 % from nominal value).

   e) inverter voltage fast detection: sag to zero volts (blackout) or out of range of ±15 % (brownout) for 3 mS.

   f) inverter contactor fault.

   g) SCR fault.

   In cases "f" and "g" above, the load is locked on bypass to prevent recurring back-and-forth transfer of the load. Such repeated rapid transfer can be dangerous for the load. The load will also be locked on bypass automatically if the static switch performs 7 load transfers in 10 minutes. To return the load to the inverter in such cases, issue the following instruction from the controller:
   ("Operation > Load > Transfer load to inverter").

2. To transfer the load manually, go to "Operation > Transfer load" and select "Transfer load to inverter"..

3. If the static switch could not transfer the load to the inverter, and the load is locked on bypass after each attempt to transfer the load to the inverter, the static switch must be repaired. Either the static switch's inverter cantactor or SCR is faulty.

10.4 Troubleshooting "UPS modules"

This procedure is to be performed only as directed by Table 13 above.

1. "Setup > Authorization > Switch to technician level > (enter password) > tap 'OK'".
2. "Status > Modules". Select the module that is sending the alarm. Remember that the module shelves are numbered from bottom to top – the bottom shelf is #1, the next higher shelf is #2, and so on.

   Compare its status and measurements with those of normal modules.
3. In the same screen, tap "Detail 1" and look at the "Fault info" field (Figure 80). This field indicates the problem that caused the module's alarm.

   Look also at the "Last shutdown reason" field. If it says something other than "None", it means that the fault resulted in a shutdown of the UPS module.

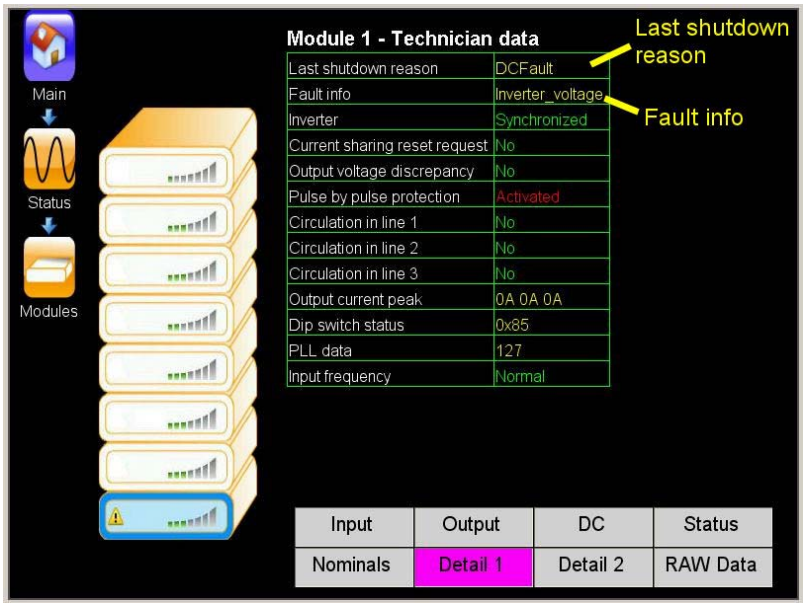


Figure 80: Last shutdown reason

4. Additional information can be found in the communication array which is displayed in the "RAW Data" window (Figure 81). Bytes 51 and 52 together make up the fault world, described below.

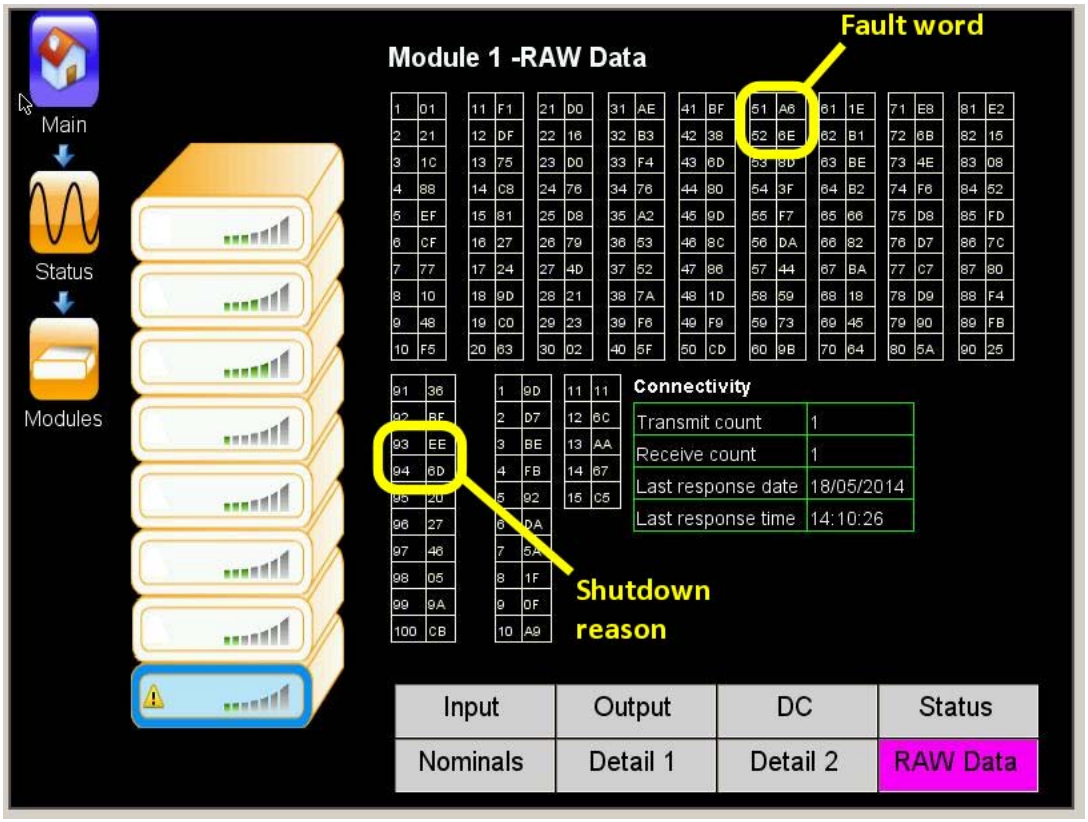


Figure 81: Shutdown reason in hex, and Fault_word

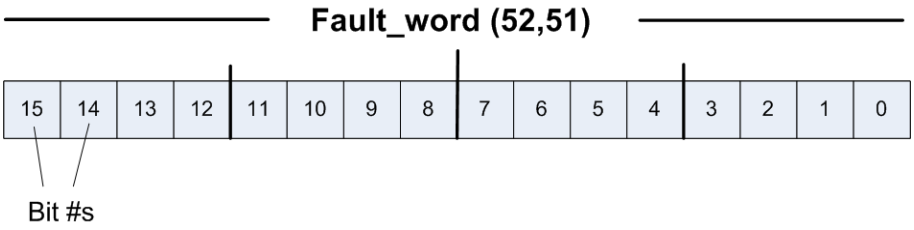


Figure 82: Structure of Fault_word

Table 14: Interpreting Fault_word

Bit number (decimal)	Hexadecimal value when "on"	Meaning when bit "on"
0	01	Overload
1	02	Inverter voltage
2	04	Input voltage
3	08	Dc high
4	10	Input frequency fault
5	20	Dc voltage low (battery discharged)
6	40	Input overload
7	80	IGBT desaturation
8	100	PLL without data (slave)
9	200	Inverter blackout (no voltage for 25 msec)
10	400	Inverter temperature
11	800	Inverter pulse-by-pulse (PBP) protection
12	1000	PFC temperature
13	2000	12 V_inv out of range
14	4000	12 V_PFC out of range
15	8000	Circulation

5. The field Shutdown_reason (bytes 94 and 93) contains the sum (boolean “OR”) of all relevant alarm codes for the module, for 3 minutes after the alarm event.

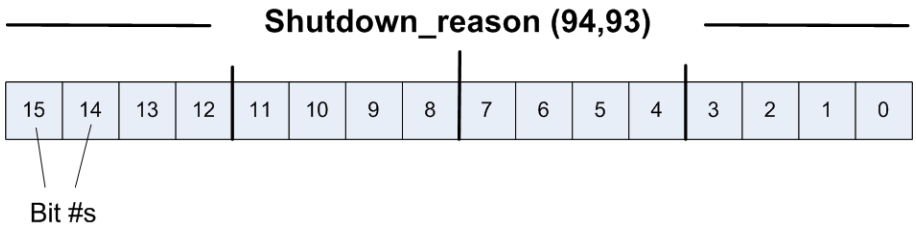


Figure 83: Structure of Shutdown_reason

Table 15: Interpreting Shutdown_reason

Bit number (decimal)	Hexadecimal value when “on”	Meaning when bit is “on”
0	01	Dc very low.
1	02	Input voltage.
2	04	12 V out of range.
3	08	Dc fault.
4	10	IGBT desaturation.
5	20	PFC temperature.
6	40	Inverter voltage out of range.
7	80	Pulse-by-pulse (PBP) protection, or inverter voltage blackout.
8	100	Inverter shutdown due to command.
9	200	Complete shutdown.
10	400	Lock after 7 times output relays OFF during 5 minutes, unlock after 5 hrs.
11	800	PLL of slave without data
12	1000	Dc high.
13	2000	Circulation.
14	4000	Inverter overload.
15	8000	Inverter temperature.

6. Navigate to the “Detail 2” window (“Status > Modules > Detail 2”).
When the output of the module is disconnected or the inverter is shut down, the measured voltages must be in the range 2.45 – 2.54 V.

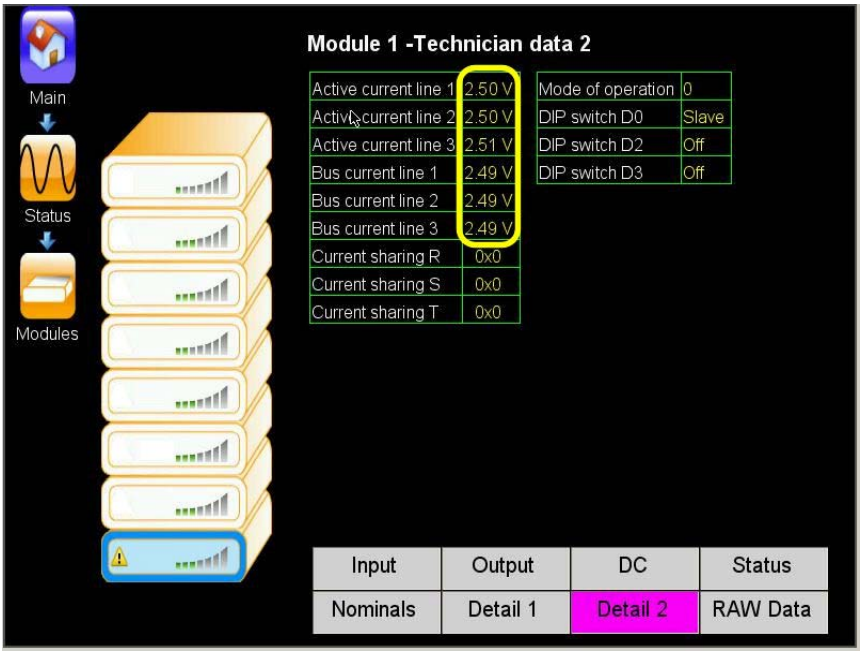


Figure 84: The "Detail 2" or "Technician data 2" screen

7. Verify that measured dc voltage is within the range 400 – 410 V, when ac input is normal and the battery is charged.

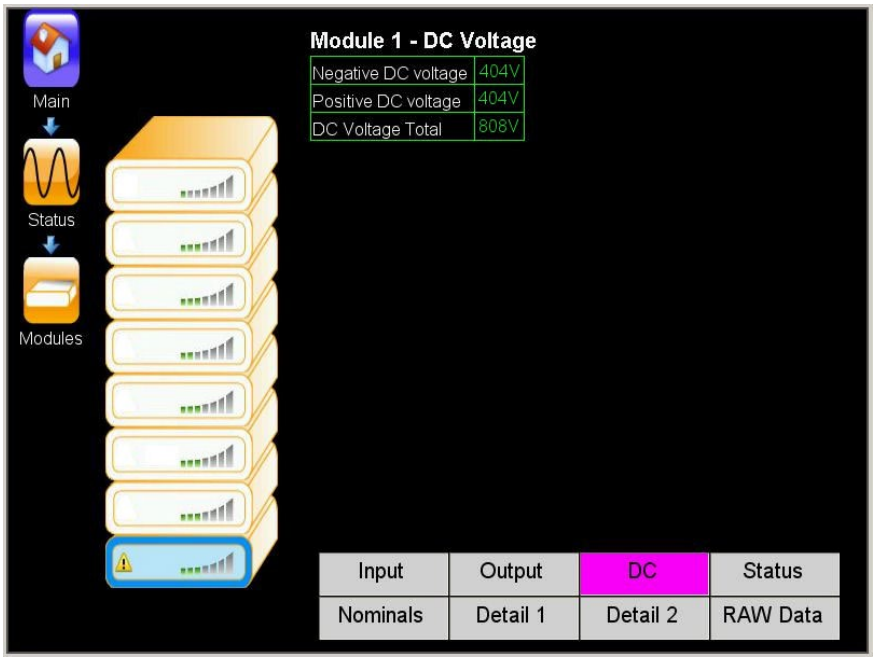


Figure 85: Dc voltage screen

8. Inaccuracy in measurements made by the Centric can be corrected using calibration mode (Setup > Modules). To perform calibration, choose the parameter to be calibrated (Figure 86), enter the true value of the voltage or current, then tap Confirm.

   Remember that calibration affects all of the modules in the system.

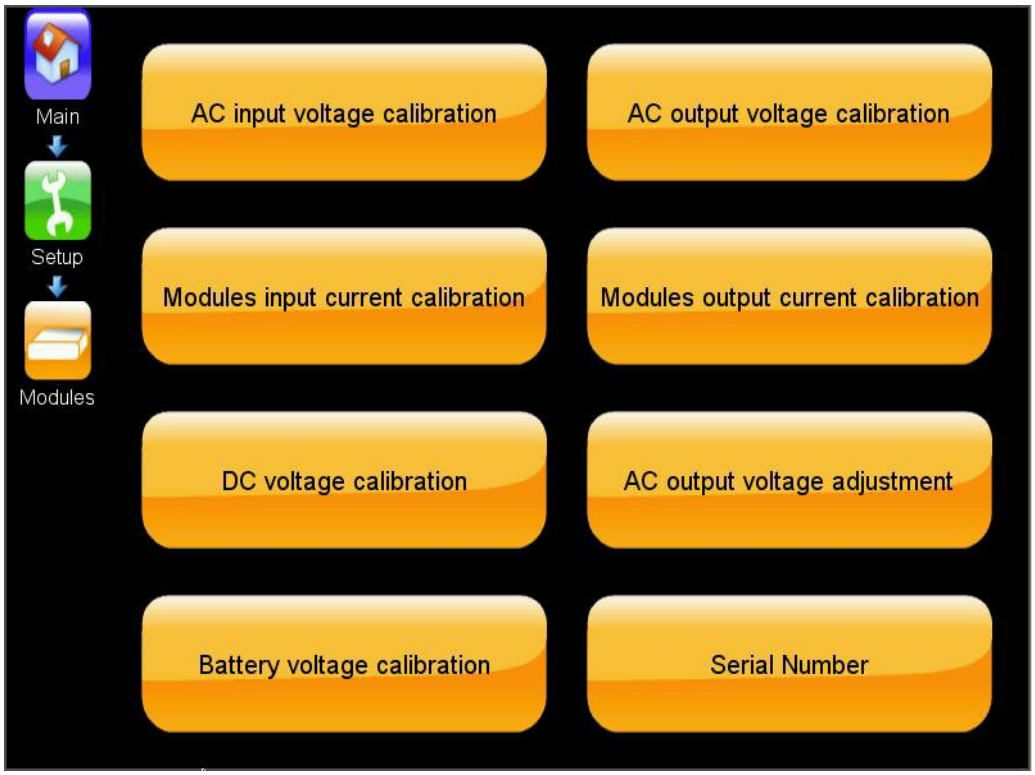


Figure 86: Calibration menu

9. The output voltage of an individual module can be adjusted using the “Ac output voltage adjustment” option on the calibration menu (Figure 86). The outupt voltage adjustment is performed per phase.

   To adjust a module’s output voltage, select the module, enter the desired values by which the phases will be increased or decreased, then tap Confirm.

   Be careful with output voltage adjustments! Remember that the UPS modules are connected in parallel to one another, and so when you adjust one module you can be affecting current sharing.

   The best way to perform output voltage adjustment is to transfer the load to the bypass voltage and then put the UPS in maintenance bypass mode, if you have this option. Then shut down all the other modules, and adjust each module one by one, with all of the other modules off.

10. In all cases, if the red “Alarm” LED on a module’s front panel is lit, perform a complete shutdown of the problematic module (“Operation > Turn on/off > Modules off > (Select module) > Confirm”) and then after 1 or 2 minutes restart the module (“Operation > Turn on/off > Modules on > (Select module) > Confirm”).

    If the module gets automatically disconnected again from the common output, note the shutdown reason as described above. If the shutdown reason was desaturation (x’10’), the module must be replaced. In the case of pulse-by-pulse protection (x’80’), circulation, (x’2000’), or high dc voltage (x’1000’), the output voltage must be adjusted as described in item “9” above.

11. In the event that the module seems to be faulty, it must be replaced. There are general principles of safety that apply to the insertion and removal of power modules. These principles also reduce the chances of unplanned electrical disturbance to the loads.

    a**)** The ideal situation is where the **Centric** can be turned off before performing the insertion or removal of a power module.

b) Where it is very inconvenient to turn off the **Centric**, the next best procedure is to turn off all loads or disconnect them from the **Centric** while the insertion or removal of the module is in process.

c) Where it is not possible to disconnect or turn off the loads, the next best procedure is to perform the insertion or removal of a module with the system in bypass mode.

d) If none of the above situations can be obtained, the insertion or removal of modules can still be accomplished safely.

10.5 Troubleshooting "No output"

This procedure is to be performed only as directed by Table 13 above.

There are a number of possible reasons for a "no output voltage" condition.

a) The EPO (Emergency Power Off) switch was activated.
See "Emergency Power Off is active" in Table 13.

b) A complete shutdown of the UPS was performed.
Restart ths system as follows: "Operation > Turn on/off > System on".

c) Shutdown may have been due to battery discharge following a failure of the power mains.
See "End of battery backup" in Table 13.

d) Bypass is in "Controlled" mode (see 7.2.5.5.1) and both the inverter voltage and the bypass voltage are out of range. Verify that the static switch measurements are correct; perform calibration if necessary ("Setup > STSW > Bypass voltage calibration" and/or "Setup > STSW > Inverter voltage calibration").

   If the static switch measurements are correct, change the bypass configuration to "Forced" ("Setup > STSW > High-level setup > Forced > Confirm").

10.6 Troubleshooting "Static switch"

This procedure is to be performed only as directed by Table 13 above.

1. Navigate to the static switch screen ("Status > STSW"). Compare inverter voltage and output current from that screen with the same data from the inverter.

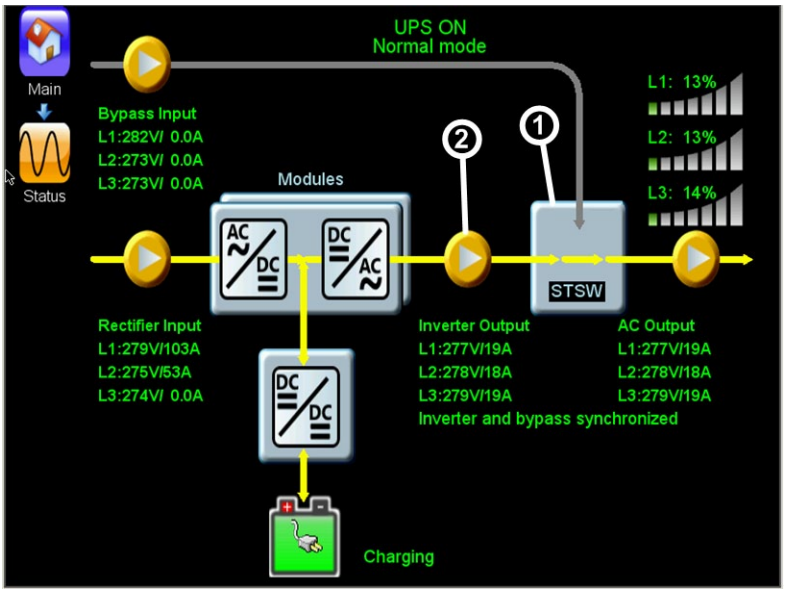


Figure 87: Status screen

In the Status screen, tap the Static Switch icon ("1" in Figure 87).
The **static switch measurements screen** is displayed (Figure 88). Record the **inverter voltage** and **output current** that you see on the screen.

Then return to the Status screen and tap the inverter output tab ("2" in Figure 87). The **inverter output measurement screen** is displayed (Figure 89). Compare the **voltage** and **current** measurements there to the ones you recorded from the static switch measurements screen. If the difference is greater than ±3 % for voltage or ±10 % for current, calibrate the static switch.

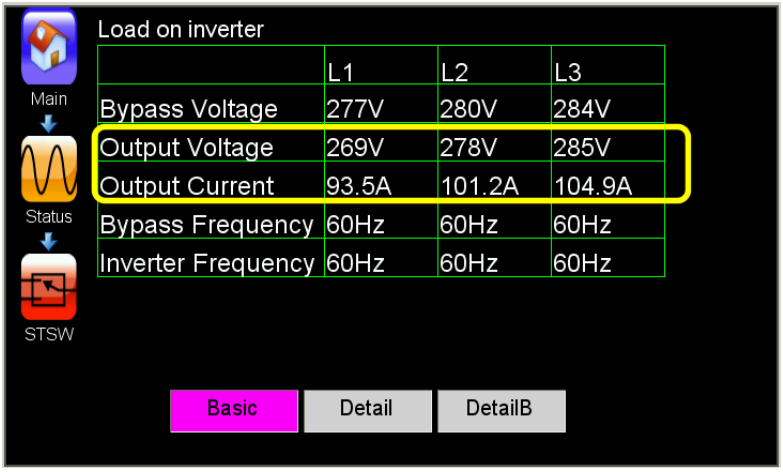


Figure 88: Measurements on the STSW tab

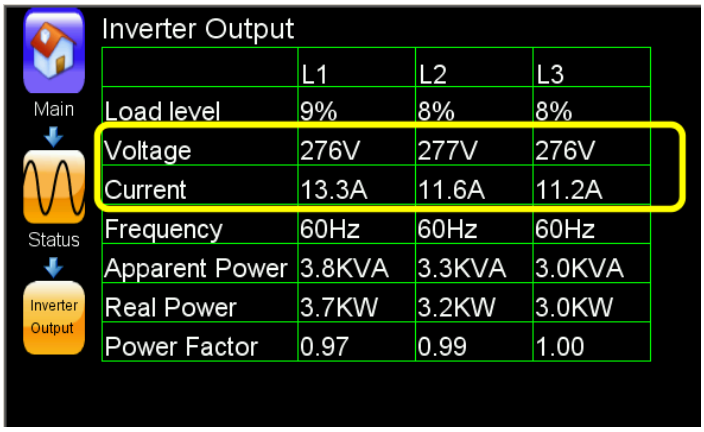


Figure 89: Voltage and current measmts. on the inverter output tab

2. Return to the static switch measurements screen ("Status > STSW icon"). Compare the bypass voltage measurements with the true mains power voltages. If the difference is greater than ±3 %, perform static switch calibration.

3. If the inverter is not synchronized to bypass, check the measured bypass frequency (Figure 90). Verify that the setup of the nominal frequency and the frequency tracking range ("Setup > System > Nominal settings" {Figure 91) corresponds to the actual frequency at bypass input. Correct the setup values if necessary.

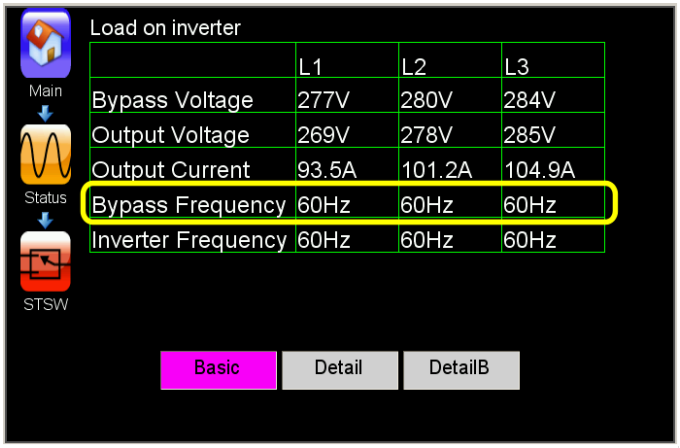


Figure 90: Bypass frequency measured at the static switch

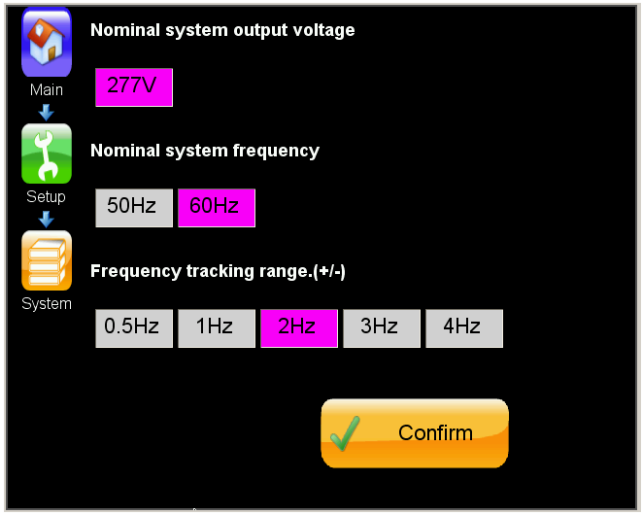


Figure 91: "Setup nominal values" screen

4. A static switch alarm is generated if there is a significant difference between the inverter voltage and the bypass voltage. The maximum acceptable difference can be set to “regular” (20 V) or “extended” (30 V).

   Setting the “synchronization sensitivity” to “extended” in the static switch high level setup screen may help eliminate repeated static switch alarms, assuming that a 30 V difference upon transfer to bypass is acceptable for your critical loads.
   (“Setup > STSW > High-level setup > Select the static switch synchr. sensitivity > Extended”.)
   See item 1 in Figure 92.

   Note: the synchronization sensitivity option has effect only if the “controlled bypass” function on this same screen is set to “controlled” (see item 2 in Figure 92).

5. If frequent transfers of the load to bypass (say, once per hour) are occurring, it could be an indication of sudden heavy loads, such as the start current of motors, or inrush current of a non-linear load or of transformers. In such a case, it is recommended to go to the static switch high level setup and set the static switch integration time to “extended 20 ms” and set the bypass voltage range to “wide”.
   (“Setup > STSW > High-level setup > Select the static switch integration time > Extended 20 ms”.)
   (“Setup > STSW > High-level setup > Select the bypass voltage range > Wide”.)
   See items 3 and 4 in Figure 92.

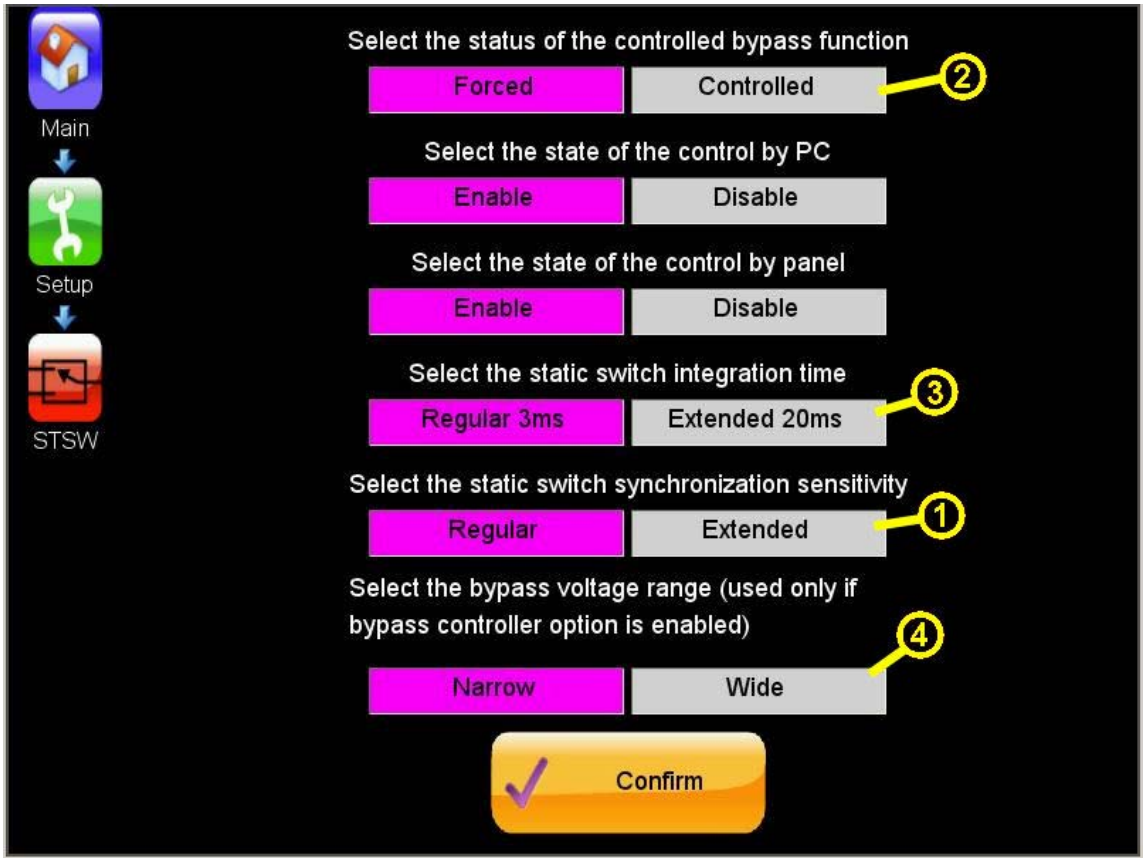


Figure 92: Setup > STSW > High-level setup

11. PERIODIC PREVENTIVE MAINTENANCE

The **Centric** should be inspected on a regular basis by a trained and qualified technician to verify that the Centric UPS and batteries are in proper electrical and physical condition.

A procedure for periodic preventive maintenance can be found in the *Centric Installation Guide*. It is recommended that this inspection procedure be performed every three to six months, or in any case at least once annually.

12. THE BUILT-IN WEB INTERFACE (OPTION)

The **Centric** can be monitored from a distance over an intranet or the Internet, through the same menus and screens used on the **Centric** control panel.
This feature is compatible with Windows, WIndows NT, and Linux networks.

Note: Use of the built-in web interface on Windows requires the **Microsoft Internet Explorer browser version 7** or higher.

An SNMP agent and the associated MIB are available upon request.

12.1 Preliminaries to use of the Web interface

To enable the **Centric** Web interface:

1 Consult with your Network Administrator to obtain an IP address for your **Centric**, and the appropriate mask and gateway address.

2 Configure the **Centric** with the IP address. See the **Centric** Installation Guide for instructions to configure the IP address.

3 Connect the **Centric** to the local Ethernet network using the Ethernet (RJ45) port on the rear panel of the **Centric** controller. This is the port labeled “SNMP” on the controller rear panel.

4 On a computer terminal that has connectivity to the **Centric** IP address, open a Web browser and enter the **Centric** IP address in the URL bar. For example: “//192.102.2.130” (without quotation marks), and press Enter. You should see the **Centric**'s main menu. If your computer screen doesn't have touch capability, use your mouse to make selections.

Be aware that the functionality of the web interface is deliberately limited – no updates to the system can be performed using the web interface.

13. CENTRIC SPECIFICATIONS

Table 16: Technical specifications

System specifications for the CENTRIC 3x480 Vac modular UPS									
Topology					Modular, double-conversion, VFI				
Operation					Continuous				
Input									
Voltage (Vac)					3x480 Vac, 4 wires + Gnd or 3 wires + Gnd				
Voltage range (%)					+10 / -15				
Current (A)					3x38 per module – no inrush current at startup				
Rectifier frequency (Hz)					40 ~ 70				
Power factor correction					>0.99				
THDI (%)					<3				
Inrush current					None				
Output									
Rated power (kVA / kW)					120 / 120, 240 / 240*				
Nominal frequency (Hz)					50/60				
Frequency tracking range (Hz)					±(0.5, 1, 2, 3, 4) selectable				
Frequency tracking slew rate (Hz/sec)					1				
Frequency in free-running mode (Hz)					50/60, ±0.1 %				
Nominal voltage (Vac)					3x480 Vac, 4 wires + Gnd or 3 wires + Gnd				
Static voltage regulation (%)					±1				
Regulation for unbalanced load (%)					±1 for 100 % unbalanced load				
Dynamic response to 100 % load step (%)					±2				
Overload withstand	Inverter mode				110 % : 10 min, 125 % : 60 s, 150 % : 30 s				
	Bypass mode				125 % : 10 min, 1000 % : 1 cycle				
Waveform					Sinusoidal				
THD (%)					Linear load: <2; non-linear load: <6				
Load CF (max)					6:1				
Ac-ac efficiency, nominal					Up to 96				
Batteries									
Nominal voltage (Vdc)					480 (240 pole-to-midpoint)				
Charging voltage (Vdc)					540 (270 pole-to-midpoint)				
Quantity					2 x 20 × 12 Vdc				
Type					Sealed, lead acid, rechargeable, maintenance-free				
General									
Maximum power dissipation (W, Po=30 kW)					N*1217 W (N*4153 BTU/h), where N = # modules				
Ambient temperature	(°C)				-10 ~ +40 (operating), -20 ~ +60 (storage)				
	(°F)				+14 ~ +104 (operating), -4 ~ +140 (storage)				
Relative humidity (%)					95, maximum, non-condensing				
Altitude (m)					1500 without derating				
Enclosure					IP20				
Cooling system					Multi-fan with speed control (forced)				
Design & manufacturing standards									
Safety					UL 1778 (4th edition), IEC 62040-1				
EMC					FCC part 15/B, IEC 62040-2				
Design classification					IEC 62040-3				
Low magnetic field radiation					EMF as per ICNIRP				
Dimensions									
# of power modules	1	2	3	4	5	6	7	8	
Power output (kW)	30	60	90	120	150	180	210	240	
Weight (kg)	206.1	224.8	264.5	283.2	322.9	341.6	381.3	400	
Height (mm / inches)	2015 / 79.4								
Width (mm / inches)	600 / 23.6								
Depth (mm / inches)	1000 / 39.5								

** 240 kW model to be launched soon.*
All specifications are subject to change without advance notice.

CENTRIC: TECHNICAL SPECIFICATIONS FOR THE SYSTEM CONTROLLER	
Display	LCD flat panel, touch-sensitive
Other indicators	Audible alarm
Analog input channels	4 input dry contacts (N.O. / N.C.)
Real-time clock (RTC)	Yes, with backup
Power meter	kVA, kW, PF
Volt-free outputs (dry contacts)	6 outputs, rated 48 V / 1 A
Output dry contacts	Ac failure Dc failure UPS module(s) failure Load on bypass Battery test failure Over/under temperature Overload (Each system alarm type can be routed to the dry contact of your choice.)
Communication ports	Serial, Ethernet, USB
Communication protocols	RS232, RS485, TCP/IP, SNMP, Modbus
Communications with system modules	Serial, isolated
Events log	500 events
System operation without controller	Unchanged
On-screen parameters	Load bar-graph 3-phase voltages 3-phase currents Battery voltage Status of each UPS module Static-switch parameters and status Battery sensor temperature
RTC operation without power	Indefinitely
Power requirements	3 × 480 Vac OR 400 Vdc (battery)
Remote indication panel capability	Yes

For a full company profile, please visit our website at www.gamatronic.com.

Gamatronic Building, Jerusalem, Israel

Gamatronic's product range:

- UPS Systems
- Power systems for Telecom
- Dc-to-Ac Inverters
- Dc-to-Dc Converters
- Frequency Converters
- Battery Chargers
- Power Management Solutions

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