NetSure™ Control Unit (NCU) Controller

User Manual

Specification Number: 1M830B, 1M830D
Model Number: M830B, M830D

Software Version: 2.2.71B

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit https://www.vertiv.com/en-emea/support/ for additional assistance.

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Admonishments Used in this Document

DANGER! Warns of a hazard the reader ***will*** be exposed to that will ***likely*** result in death or serious injury if not avoided. (ANSI, OSHA)

WARNING! Warns of a potential hazard the reader ***may*** be exposed to that ***could*** result in death or serious injury if not avoided. This admonition is not used for situations that pose a risk only to equipment, software, data, or service. (ANSI)

CAUTION! Warns of a potential hazard the reader ***may*** be exposed to that ***could*** result in minor or moderate injury if not avoided. (ANSI, OSHA) This admonition is not used for situations that pose a risk only to equipment, data, or service, even if such use appears to be permitted in some of the applicable standards. (OSHA)

ALERT! Alerts the reader to an action that ***must be avoided*** in order to protect equipment, software, data, or service. (ISO)

ALERT! Alerts the reader to an action that ***must be performed*** in order to prevent equipment damage, software corruption, data loss, or service interruption. (ISO)

FIRE SAFETY! Informs the reader of fire safety information, reminders, precautions, or policies, or of the locations of fire-fighting and fire-safety equipment. (ISO)

SAFETY! Informs the reader of general safety information, reminders, precautions, or policies not related to a particular source of hazard or to fire safety. (ISO, ANSI, OSHA)

Important Safety Instructions

Safety Admonishments Definitions

Definitions of the safety admonishments used in this document are listed under “Admonishments Used in this Document” on page vii.

General Safety

DANGER! YOU MUST FOLLOW APPROVED SAFETY PROCEDURES.
Performing the following procedures may expose you to hazards. These procedures should be performed by qualified technicians familiar with the hazards associated with this type of equipment. These hazards may include shock, energy, and/or burns. To avoid these hazards:

a) The tasks should be performed in the order indicated.

b) Remove watches, rings, and other metal objects.

c) Prior to contacting any uninsulated surface or termination, use a voltmeter to verify that no voltage or the expected voltage is present. Check for voltage with both AC and DC voltmeters prior to making contact.

d) Wear eye protection.

e) Use certified and well-maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed.

f) This equipment is not suitable for use in locations where children are likely to be present.

g) This product is intended only for installation in a Restricted Access Location.

h) Only authorized and properly trained personnel should be allowed to install, inspect, operate, or maintain the equipment.

i) Do not work on LIVE parts. If required to work or operate live parts, obtain appropriate Energized Work Permits as required by the local authority or by other national building codes and local regulations.

Personal Protective Equipment (PPE)

DANGER! ARC FLASH AND SHOCK HAZARD.
Appropriate PPE and tools required when working on this equipment. An appropriate flash protection boundary analysis should be done to determine the “hazard/risk” category, and to select proper PPE.

Handling Equipment Containing Static Sensitive Components

ALERT! Installation or removal of equipment containing static sensitive components requires careful handling. Before handling any equipment containing static sensitive components, read and follow the instructions contained on the Static Warning Page.

Static Warning

This equipment contains static sensitive components. The warnings listed below must be observed to prevent damage to these components. Disregarding any of these warnings may result in personal injury or damage to the equipment.

1. Strictly adhere to the procedures provided in this document.
2. Before touching any equipment containing static sensitive components, discharge all static electricity from yourself by wearing a wrist strap grounded through a one megohm resistor. Some wrist straps have a built-in one megohm resistor; no external resistor is necessary. Read and follow wrist strap manufacturer's instructions outlining use of a specific wrist strap.
3. Do not touch traces or components on equipment containing static sensitive components. Handle equipment containing static sensitive components only by the edges that do not have connector pads.
4. After removing equipment containing static sensitive components, place the equipment only on static dissipative surfaces such as conductive foam or ESD bag. Do not use ordinary Styrofoam or ordinary plastic.
5. Store and ship equipment containing static sensitive components only in static shielding containers.
6. If necessary to repair equipment containing static sensitive components, wear an appropriately grounded wrist strap, work on a conductive surface, use a grounded soldering iron, and use grounded test equipment.

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1 Introduction

1.1 Preface

These instructions describe the complete functionality of the Vertiv™ NetSure™ Control Unit (NCU). Some functionality is dependent on hardware connected to the NCU. Your system may not utilize all the functionality described.

Refer also to the NCU Configuration Drawing (C-drawing) furnished with your system for a list of factory default settings.

1.2 Overview

The NCU performs the following functions:

- Rectifier Control, including an Energy Optimization Mode
- Converter Control
- Inverter Control
- System Components Monitoring and System Alarms Generation (including recording alarms in logs)
- Operating Data Acquisition and Data Logs
- Battery Management
- Energy Management via Energy Optimization Mode
- Power Split Feature
- Diesel Management Feature
- Supervisory Module (SM Modules) Monitoring
- Communications Function
- Consumption Map Function
- Efficiency Tracker Function

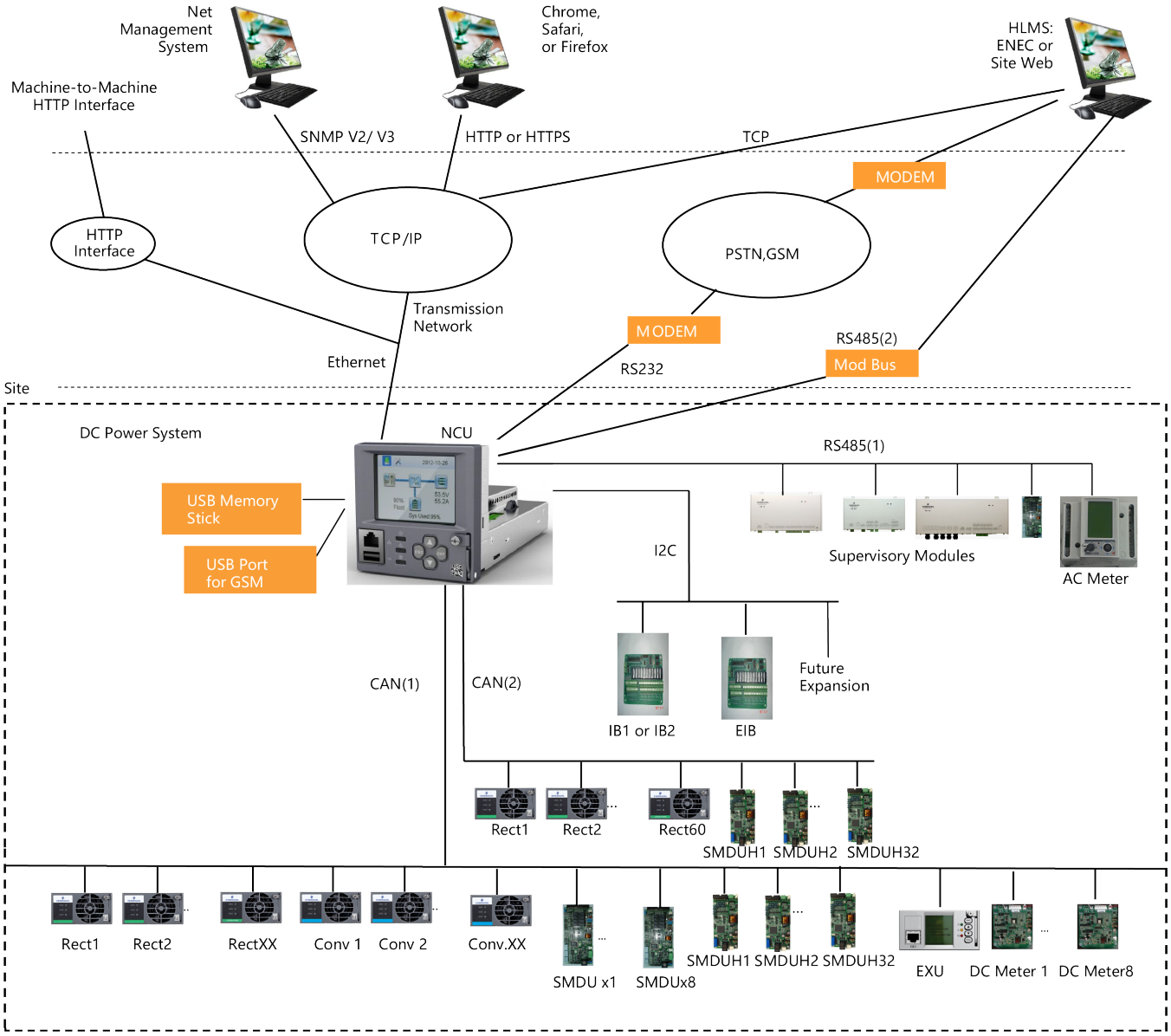
The NCU controls the system automatically via configured parameters.

A User can interface with the NCU locally using the local keypad and display or locally/remotely using the Web Interface.

The NCU can also be accessed via SNMP (v2 and v3). A machine-to-machine HTTP interface is also available.

Figure 1.1 illustrates the various applications that can be used to interface with the NCU.

Figure 1.1 Interfacing with the NCU



1.3 Function Descriptions

1.3.1 Rectifier, Converter, and Inverter Control

The NCU controls rectifiers, converters and inverters automatically.

1.3.2 System Components Monitoring and System Alarms Generation

The NCU monitors the components comprising the system (such as the rectifiers, converters, inverters, and supervisory modules) and generates alarms if a fault condition occurs. The NCU also maintains an alarm history log.

The available system alarms are programmed with an Alarm Severity Level. Each Alarm Severity Level has different visual/audible alarm attributes. Available Alarm Severity Levels and their attributes are listed in Table 2.3 Available Alarms.

The available system alarms can also be mapped to alarm relays (located on controller interface boards) that can be wired to external alarm circuits.

Table 1.1 Alarm Severity Levels

Alarm Severity Levels	Red LED	Yellow LED	Audible Alarm Buzzer
Critical Alarm (CR)	ON	--	ON
Major Alarm (MJ)	ON	--	ON
Observation Alarm (OA)	OFF	ON	OFF
No Alarm (NA)	OFF	OFF	OFF

- **Alarm Status Setting:** Indicates if the alarm is active or not active, and the severity level if active. The available alarm status settings are as follows.
  - **Critical Alarm:** The fault endangers the power systems continued function.
  - **Major Alarm:** The fault reduces the power systems functionality.
  - **Observation Alarm:** Special operating condition.
  - **No Alarm:** The alarm is disabled and no alarm is given.
- The alarm indicator turns OFF if the fault(s) that triggered the alarm clears.
- The audible alarm can be silenced by pressing any key on the NCU local interface pad. The audible alarm is also silenced if the fault(s) that triggered the alarm clears.
- An audible alarm cutoff feature can be programmed that silences the audible alarm after a preset programmable time period. The audible alarm can also be disabled.

  The available system alarms can also be mapped to alarm relays (located on NCU interface boards) that can be wired to external alarm circuits.

  If the system contains a modem, the NCU can be set to call an HLMS (High Level Monitoring System) via a modem when a critical and/or major alarm is issued and report the alarm to the HLMS.

1.3.3 Operating Data Acquisition and Data Logs

The NCU acquires and analyses real time data from the system's components such as the rectifiers, converters, inverters, and supervisory modules.

The NCU uses this data to process alarms and also records data in logs. The logs are viewed using the Web Interface and consists of the following. Logs can be saved in the .html (Web page) or .txt (text) format.

Data History Log/Event Log/Alarm History Log: There is a maximum of 60,000 data points recorded between these logs.

- **Alarm History Log:** Records 4000 latest alarms. The Web Interface displays the latest 500 items.
- **Battery Test Log:** Up to ten (10) battery discharge tests can be recorded.
- **Event Log:** Records 4000 latest events. The Web Interface displays the latest 500 items.
- **Data History Log:** The Web Interface displays the latest 500 items, and you can upload a file with up to the latest 6,000 items in a single date range. Use multiple date ranges to upload more than 6,000 items.
- **System Log:** Records 3000 items in run log. The Web Interface displays the latest 500 items.
- **Diesel Test Log:** Records 500 latest diesel test results.

NOTE! *For all logs except the* ***Battery Test Log****, once maximum number of log entries is reached, new entries overwrite the oldest entries.*

1.3.4 Battery Management

The NCU provides the following battery management functions.

- Battery Charge Temperature Compensation
- Battery Equalize Charge
- Battery Charge Current Limit
- High and Low Battery Temperature Alarms
- Battery Thermal Runaway Management (BTRM) Feature (Reduces Voltage during a High Battery Temperature Condition)
- Battery Discharge Test
- Battery Test Logs (maximum ten [10] tests saved)
- Battery LVD (Low Voltage Disconnect)
- Battery Capacity Prediction
- Battery Block and Battery Midpoint Monitoring
- Thermal Runway Detection and Management

Battery Charge Temperature Compensation

The NCU can be programmed to automatically increase or decrease system output voltage to maintain battery float current as battery temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. Temperature is monitored by a sensor mounted on the battery. See your power system documentation for temperature sensor information. You can also set high and low compensation temperature alarms.

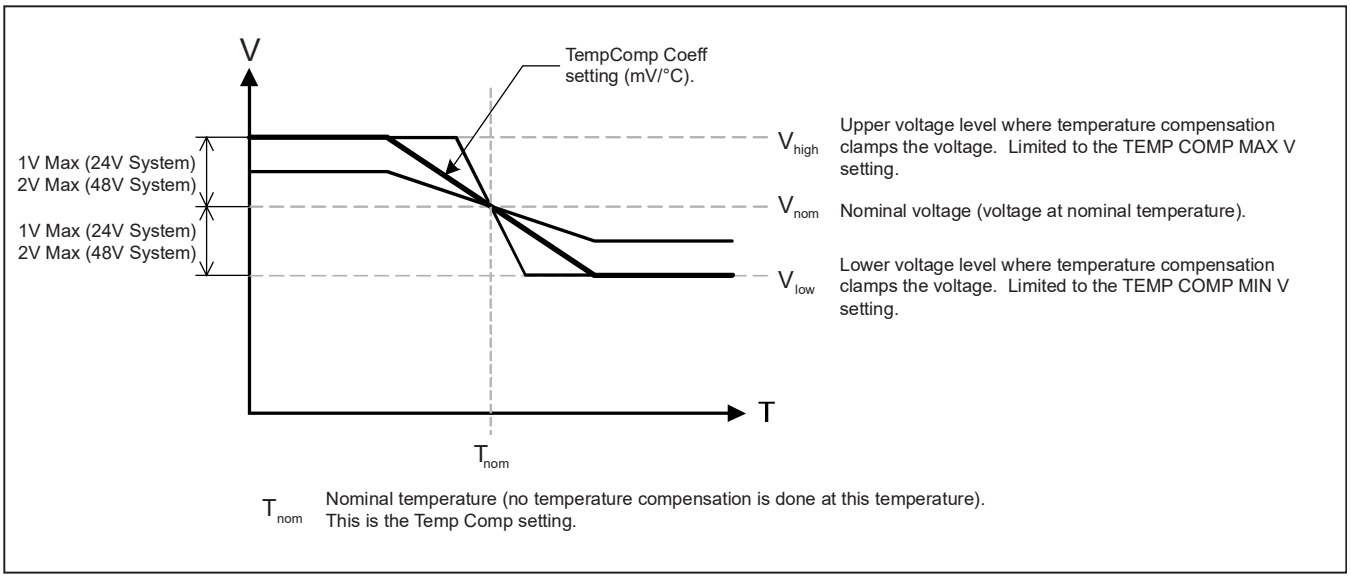
Functional Description (See Figure 1.2):

Battery charge temperature compensation adds a correction term, related to the temperature of the batteries, to the nominal value of the system voltage. The degree of regulation (TempComp Coeff), expressed in mV/°C/battery string, can be set per battery manufacturer recommendations.

To protect batteries and voltage-sensitive loads, compensation is automatically limited to a maximum of two volts (48V systems) or one volt (24-volt systems) above or below the nominal output level (float setting).

Temperature compensation is automatically disabled if communication between the controller and all rectifiers is lost, a DC over or under voltage alarm activates, a low voltage disconnection occurs, manual mode is entered, or the system enters the equalize or test modes.

Figure 1.2 Temperature Compensated Voltage Control



Battery Equalize Charge and Battery Charge Current Limit

The NCU can increase system output voltage for equalizing the charge on all battery cells of a conventional flooded cell battery, or for recharging the battery following a commercial power failure.

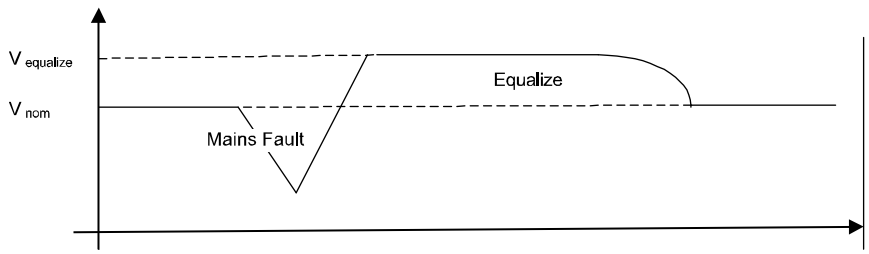
The charging function can be initiated cyclically (scheduled), automatically, or manually.

Refer to the battery manufacturer's instructions for equalize charging instructions.

Functional Description (See Figure 1.3):

- **Start of Charging:** When the battery charge current exceeds a preset value for three (3) minutes or if the calculated battery capacity has decreased to a preset value (after a commercial AC failure, for example), the charging function of the NCU is activated. A charging signal is sent from the NCU to the rectifiers to increase the voltage up to the battery charging level $V_{equalize}$.
- **Battery Current Limitation:** After a commercial AC failure or when some battery cells are permanently damaged, the current to the batteries can be quite extensive. To avoid overheating or further damages to the battery, the NCU limits the battery current to a preset level by limiting the charging voltage of the rectifiers. Should the battery current still exceed a higher preset value, an alarm is issued.
- **End of Charging:** When the charging current drops below a preset value, a defined prolonged charging time is started before the charging is stopped and the voltage of the rectifiers return to the float charging level (V_{nom}). For safety, there is an equalized charging limit time that stops the charging after a preset time.

Figure 1.3 Voltage Characteristics on Commercial AC Failure and Automatic Equalize Charging



High and Low Battery Temperature Alarms

The NCU can monitor battery temperature via a temperature sensor mounted on a battery cell. Values for high battery temperature and low battery temperature alarms can then be programmed into the NCU.

Battery Thermal Runaway Management (BTRM) Feature

The Battery Thermal Runaway Management (BTRM) feature reduces voltage during a high battery temperature condition.

You can designate a temperature sensor as the BTRM sensor. The BTRM sensor has High 2 and High 1 BTRM temperature alarm limits. If battery temperature exceeds the "BTRM Temp High 2" setting, system voltage is lowered to the BTRM voltage setting. This feature can also be disabled.

Battery Discharge Test and Battery Test Logs

The NCU can perform battery discharge tests to check the condition of the battery(s). There are three (3) types of battery discharge tests:

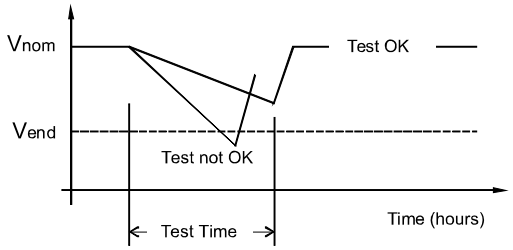
- Battery Test without Constant Current
- Battery Test with Constant Current
- Short Time Test (requires two battery shunts)

A User can manually start a battery discharge test or program the NCU to automatically start battery discharge tests at scheduled intervals. Twelve (12) Constant Current Tests can be scheduled by the month-day-hour. A Short Time Test can be scheduled to be performed every 1-365 days. During a battery discharge test, the NCU controls the rectifiers output to place the entire load or partial load on the batteries. The NCU monitors the discharge of the battery and saves the results in a battery test log. The NCU stores ten (10) battery discharge tests.

Functional Description:

For manual battery discharge tests as well as for scheduled battery discharge tests, the following parameters must be set: End Test Voltage, End Test Time, and End Test Capacity. See Figure 1.4.

Figure 1.4 Battery Test Diagram



Battery Discharge Test Sequence:

- For a Constant Current Test, the output voltage of the rectifiers is reduced so that the batteries supply the preset Constant Current Test Current to the load.
- If Constant Current is disabled, then the current being delivered by the batteries will be dependent on the load.
- For a Short Time Test, the output voltage of the rectifiers is reduced so that only the batteries power the load. If the batteries fail, the rectifiers power the load.
- The battery test continues until one of the following occurs:
  - The preset End Test Time, see Figure 1.4, expires. The battery has passed the test.
  - The battery capacity drops below the preset End Test Capacity. The battery has passed the test.

  - The battery voltage drops below the preset End Test Voltage (Vend) (see Figure 1.4). The battery has not passed the test and the test is interrupted. A bad battery alarm is activated.
  - If a critical alarm occurs during the test or there's not enough load, the battery test is aborted. In such cases a "Battery Test Fail" alarm will be activated (indicating the test couldn't be done). This alarm is different from the "Bad Battery" alarm (meaning the test was completed but the battery didn't pass it).

- A battery test alarm is active during a battery discharge test.
- If the battery has not passed the test, a bad battery alarm is activated.
- After the battery discharge test, the output voltage of the rectifiers increases so that the rectifiers supply the system and charge the batteries.

NOTE! *A procedure for performing a manual battery discharge test is provided on page 37.*

Battery LVD (Low Voltage Disconnect)

To prevent serious damage to the batteries during a commercial AC power failure, the batteries can be disconnected by voltage or time control.

The batteries are reconnected automatically when commercial AC power is restored or a predetermined DC voltage level is reached.

See "LVD Tab Programmable Parameter Descriptions" on page 126 for descriptions of programmable LVD parameters.

Battery Capacity Prediction

The NCU can predict battery capacity. When a battery is connected to the system at initial setup or increasing the number of batteries, you need to update the Battery Ah rating. After doing this and making sure the battery is fully charged you need to reset the battery capacity used percentage by performing the "Reset Battery Capacity" command to tell the NCU that the batteries are 100% charged. From this point forward the NCU will keep track of the battery current and time to predict the battery capacity used.

Battery Block and Battery Midpoint Monitoring

The NCU can monitor battery blocks (12 V blocks) or midpoint battery voltage of battery strings connected to the EIB (Controller Extended Interface Board) assembly. An alarm is issued when either battery block voltage or battery midpoint voltage is abnormal.

Thermal Runaway Detection and Management

Functional Description:

The system uses several control mechanisms to avoid thermal runaway.

- During a short high-rate discharge, the batteries will normally get hot. The NCU takes this into consideration. After completion of the discharge duty, the batteries are recharged with a limited current to avoid heating the batteries any further.
- The temperature of the batteries can be monitored, and the NCU sets the charge voltage appropriately, as previously described under "Battery Charge Temperature Compensation" on page 4.
- In addition to battery temperature compensation, if battery temperature rises above a set temperature limit, the system stops battery charging completely by lowering the output voltage to the "BTRM Voltage" setting. This allows the batteries to cool down. The system also provides alarm notification of this occurrence. Power supplied to customer equipment is not interrupted. See "Setting Battery Thermal Runaway Management (BTRM) Feature" on page 33 for programming.
- The battery LVD circuits can be programmed to open (disconnect) if a high temperature event occurs (HTD-High Temperature Disconnect). The contactor(s) open when battery temperature rises above a programmable value and close again when battery temperature falls below another programmable value. See "LVD Tab Programmable Parameter Descriptions" on page 126 for programming.

1.3.5 Energy Management

Energy Management consists of an Energy Optimization Mode.

Energy Optimization Mode

The NCU provides an Energy Optimization Mode (ECO) function. Energy Optimization permits an installation to only operate rectifiers as needed to maintain the load and keep batteries in a fully charged condition. As load increases, Energy Optimization turns on additional rectifiers as needed to maintain the load. As load decreases, Energy Optimization places rectifiers in standby to conserve energy usage. Rectifiers which are always operating to maintain any load requirements are cycled through the group of rectifiers controlled by this feature to provide uniform operating times for each rectifier.

ALERT! The Energy Optimization Mode should NOT be used in systems that operate without batteries.

1.3.6 Power Split Feature

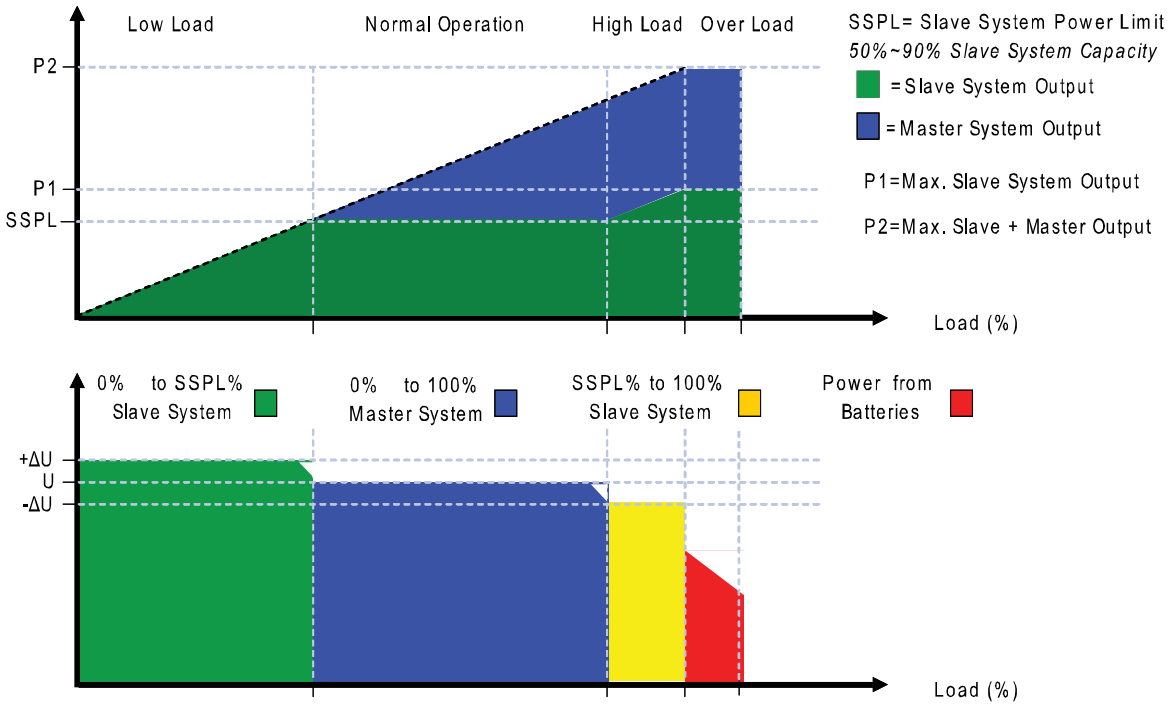
The Power Split feature allows you to connect the power system controlled via the NCU to an existing DC power system instead of extending or completely replacing the existing DC power system.

The power system controlled via the NCU functions as slave system to share load (split output) with the existing system (master system) that requires expansion. The NCU does not require communication with the master system's controller.

The Power Split feature provides for the sharing of total load in a controlled manner between the paralleled power systems.

When Power Split is programmed, the NCU adjusts rectifier output voltage per load demands to ensure proper sharing between the slave and master power systems. See Figure 1.5.

Figure 1.5 Power Split Feature



1.3.7 Radius Server Feature

When the radius server feature is enabled and a User attempts to login using the LCD or web page, the NCU first checks the username/password entered for a match programmed in the NCU. If the NCU authenticates, then the NCU grants the User access. This step is to allow a login in case the radius server is not available, has changed, etc.

If the authentication fails (either not present or wrong password), then the NCU checks the username/password entered using the radius interface. If the NCU authenticates, then the NCU grants the User access. If authentication fails, the NCU notifies the User and does not grant the User access.

If an IB4 board is present, the radius messages are sent to the IB4 network interface; otherwise, the radius messages are sent to the front (craft) port.

The NCU uses vendor-specific attributes to select the User's level of access. The Vertiv vendor id is 6302. The vendor-specific attribute is VV-Priv, which is a string with 4 possible values:

- Administrator: Administrator
- Browser: Browser
- Operator: Operator
- Engineer: Engineer

Here is the dictionary definition of this Vertiv vendor-specific attribute:

```
VENDOR          Vertiv      6302

BEGIN-VENDOR    Vertiv

ATTRIBUTE       VV-Priv     1       string

END-VENDOR      Vertiv
```

If the server responds with an unknown Service-Type, the NCU will record the event it in the system log and act as though access was rejected, per RFC 2865.

The NCU does not support the Access-Challenge response from the server. If this response is received, it is ignored.

The radius server settings are programmed using the Web Interface. Admin privilege level access is required.

1.3.8 Diesel Management Feature

The Diesel Management feature is available when an SM-AC supervisory module is connected to the NCU. The Diesel Management feature consists of a Diesel Test. The Diesel Test can be performed at specific intervals or a User can manually start the Diesel Test. The NCU records the test results.

1.3.9 Supervisory Module (SM Modules) Monitoring

Various devices (supervisory modules) can be connected to the NCU to extend its monitoring capabilities.

1.3.10 Hybrid Control Function (Supporting Generator, Solar and Wind Energy Input, and Optimization

Hybrid Control is designed for use in new installations or as an upgrade of existing sites powered by a diesel generator(s) when grid power is not available. The Hybrid control is also applicable to sites with highly unreliable or frequently unavailable grid power connection. The primary power source is still considered to be the diesel generator(s). Since grid power is always given priority, the primary power source is still considered to be the grid power.

NOTE! *The Hybrid Control function requires a specific configuration. Hybrid Control menus will not normally be displayed unless your NCU has been configured by Vertiv for this function. Contact Vertiv for a Hybrid Control configuration.*

Hybrid Control allows the option of selecting one of the following: Fixed Daily Time-based operation or Capacity Discharge based operation.

- **Fixed Daily:** Time-based operation is intended to be used with a combination of AC powered active cooling (air conditioners) and DC powered cooling (heat exchangers, etc.). The cycle period is synchronized to the 24hrs day-night cycle. It makes optimum use of the different temperature conditions during the day and the night to facilitate Hybrid fuel saving operation.
- **Capacity Discharge:** Based operation is intended for sites utilizing only DC powered cooling (heat exchangers, etc.). The cycle period is determined by User selectable depth of discharge (DOD) of the batteries per cycle, and associated recharge time. It provides optimum Hybrid fuel saving operation.
- **Capacity Discharge:** Based operation is intended for sites utilizing only DC powered cooling (heat exchangers, etc.). The cycle period is determined by User selectable depth of discharge (DOD) of the batteries per cycle, and associated recharge time. It provides optimum Hybrid fuel saving operation.
- **Operation from Grid Power:** Is performed with both Fixed Daily Time and Capacity Discharge modes of operation. Grid power is always given priority when available.

As the two types of control are specific to the hardware configuration of the site, the Fixed Daily Time or Capacity Discharge is a User selectable option on installation.

1.3.11 Hybrid Operation

Generator Control: A potential free relay contact output from the NCU interface board controls the start and stop of the diesel generator. The signal will be generated by the NCU and operates according to the Hybrid software mode of operation. The control logic is as follows:

- Energized Output Relay – Generator OFF
- De-energized Output Relay – Generator ON

This is a fail-safe logic to ensure generator operation in all cases where power or control to the relays is lost.

In addition, the type of signal to the Generator can be selected as N/O (Normally Open) or N/C (Normally Closed) by selecting the relevant output pins of the control relay.

Number of Generator Control Outputs: The NCU Hybrid software can control one or two generators. Each generator control is designated as DG1 or DG2 output. The User can select DG1, or DG2, or DG1 and DG2. When both are selected they will be alternatively used (two generators operation).

Diesel Fail Alarm: A diesel fail alarm will be generated if the Diesel Generator ON signal fails to bring the generator to operation and provide the system with AC power. Alarm will be triggered after 60 seconds (default value, settable) from ON signal. If two generator operation is selected, the second Diesel Generator ON signal will be activated simultaneously with the Diesel Fail alarm.

Battery Fuse Trip Alarm: In the event of a Battery Fuse trip condition, an alarm will be generated.

Under Voltage Alarms:

- **Under Voltage Alarm 1:** If voltage decreases below the Under-Voltage Alarm 1 setting, an alarm is raised.
- **Under Voltage Alarm 2:** If voltage decreases below the Under-Voltage Alarm 2 setting, the Diesel Generator is started and an alarm is raised.

LVD 1: Normal loads are disconnected.

LVD 2: Priority loads are disconnected.

Charge Voltage: Refer to Figure 1.6.

Equalize Charge: The battery will be recharged at the equalize voltage. This is the voltage set in the initial phase of battery recharge. See Figure 1.6.

As the voltage limit is reached, the charge current is gradually reduced – this effect is known as current tail. When the current tail falls below a threshold level, additional equalize charge time is added and then the recharge ends.

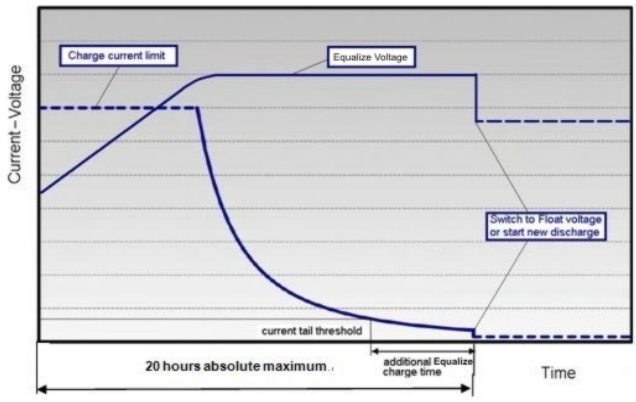
The equalize charge current tail threshold is settable from 0.002 to 0.02. Default setting is 0.01 (1A per 100Ah). The additional equalize charge time is settable from 1 hours to 24 hours (settable in minutes from 0 to 1440), default setting is 3 hours.

The duration of the equalize charge is the time from the start of the recharge to the end of the additional time. (Maximum charge time, determined from the time charge starts, is settable in the range of 1 hours to 48 hours, default setting is 18 hours).

The end of recharge is determined by a three (3) step approach:

- Step 1 - calculated battery capacity exceeds 90%. Calculation is performed by measurement of battery current and time, in Ah.
- Step 2 - charge current tail threshold is reached
- Step 3 - additional charge time is completed

Figure 1.6 Charge Voltage



Float Charge: Default float voltage is 53.5V at 25ºC with a temperature compensation of 72mV per ºC.

If battery temperature exceeds 38ºC (should be Very High Temperature alarm), the charge voltage is reduced to 48V to reduce gassing and prevent thermal runaway. The same is applicable as well for equalizing charge.

Equalizing Charge Cycle: As the cyclic use does not ensure complete battery recharge after every cycle, an equalizing charge cycle is added. The equalizing cycle is settable for every 2 to 365 days intervals, default setting is 100 days. Equalizing charge time is 12 hours independent of discharge time setting. Equalizing charge is performed at equalize voltage until end of additional equalize time and thereafter at float voltage for the remaining time. Also see Figure 1.6.

Equalize charge independently settable 0-1440 min (already set in equalize charge).

Early Termination of the Discharge Periods

During discharge, over temperature and under voltage conditions will interrupt the discharge and change the operation to charge with the Diesel Generator ON.

Over Temperature: The diesel generator will start and run for a period before it is stopped again. The run time is User selectable in the range 30 to 120 minutes, default setting is 60 minutes. Temperature is referenced to cabinet/shelter ambient temperature sensor connected to controller, not battery temperature. Over temperature start can be disabled completely from the Settings menu.

Under Voltage: The under-voltage start is triggered by under voltage alarm 2 voltage settings.

The diesel generator will start and run until the normal recharge cycle is due to finish depending on selected mode of operation.

Under Voltage with Fixed Daily Time: If the normal recharge cycle is from 7am until 7pm and under voltage has started the Diesel Generator at 5:30am, the effective recharge will be from 5:30am until 7pm.

Under Voltage with Capacity Discharge: If this mode is selected, the recharge will terminate.

Operation with Grid Power

Grid power is always used when available. If grid power becomes available during battery discharge, the discharge cycle is terminated and recharge cycle is initiated. If grid power becomes available during diesel generator operation, the diesel generator is switched OFF and operations continue on grid power.

Battery Recharge with Grid Power: Battery recharge with grid power can start from the beginning (when grid power becomes available during battery discharge) or can continue from diesel generator recharge, depending on the timing. In both cases, the recharge process will follow the recharge profile shown in Figure 1.6. If battery becomes fully recharged and grid power is still present, the operations will continue to be powered from grid and no battery discharge will be initiated for the duration of grid availability. In this case, battery voltage will revert to Float voltage.

Battery Discharge after Grid Failure: At the point of grid power failure, the battery capacity is unknown as these events occur in random manner. For maximizing the use of grid power and in anticipation of grid power becoming available again, the Hybrid operation will continue with battery discharge cycle. Discharge will continue until:

- The preset discharge time elapses (Fixed Daily Time).
- The preset DOD is reached (Capacity Discharge)

In both cases, the discharge can be terminated earlier as described in “Early Termination of the Discharge Periods” on page 12.

Fixed Daily

In this mode of operation, the total duration of a complete cycle is 24 hours. This duration is necessary as the operation is synchronized with day-night temperature pattern. When an extended recharge cycle is required, its termination will still follow the 24-hr schedule.

Cycle Duration: A complete cycle consists of discharge and charge periods during the combined total of 24hrs. The discharge period starts at 7pm. It Is then followed by recharge period (Diesel Generator ON) for the remainder of the 24hrs. The discharge time is User selectable in the range 1hrs to 22hrs, default setting is 12hrs.

Discharge: The discharge start time and duration are settable. Discharge period starts at 7pm. The discharge time is User selectable in the range 1hours to 22hours, default setting is 12hours.

Recharge: Recharge period (Diesel Generator ON) follows discharge for the remainder of the 24hrs. Recharge is performed at equalize voltage until added equalize time elapses and at float voltage for the remaining charge time.

High Load Alarm: To identify conditions where the load requirements are exceeding the dimensioning of the Hybrid site, an alarm will be generated. The alarm will be triggered when the maximum capacity per discharge cycle is exceeded. The threshold value will

be set as default to 40% of battery capacity. It will require capacity measurement per cycle. The alarm will be set once the high load threshold value is reached and is reset at the beginning of the next discharge period. This alarm will help the User identify the root cause of the under-voltage condition: high demand load, the loss of capacity due to battery aging, or insufficient charge capacity.

Capacity Discharge

The cycle period is determined by User selectable capacity discharge of the batteries and associated recharge times. The cycle repeats continuously. It does not follow a 24hrs pattern.

Capacity Discharge and Recharge: The battery discharge period is determined by the percentage of the nominal battery capacity [Ah] that will be discharged per cycle.

The depth of discharge [DOD] per cycle is User selectable in the range 20% to 80%. Default setting is 60%. The value is set as battery capacity at the end of each discharge period. Therefore, if a 60% discharge is chosen, the discharge value is set to 40%.

The time to recharge to full battery capacity depends on battery capacity at the start of the charge cycle and the available recharge current.

When the additional charge time has been reached; the generator will be stopped, the recharge cycle will end, and discharge cycle will be initiated.

For practical purposes, the battery capacity at the end of every recharge period is set to 100% if Step1, Step 2, and Step 3 have elapsed.

If end of charge is not reached within the set maximum hours, the recharge will be terminated and discharge cycle will be initiated.

1.3.12 Communications Function

The NCU is able to communicate with different equipment or, connect to different equipment for communication. See Figure 1.7.

a) 10M/100M Ethernet Port: The NCU can communicate with a supervisory computer or other devices through its 10M/100M Ethernet port. The communication cable shall be a shielded cable. The Ethernet port is located on the front panel of the NCU. This port supports Dynamic Host Configuration Protocol (DHCP) function.

NOTE! *Some systems may have an IB4 board with a second Ethernet port. The IB4 board is connected to the NCU's backplane connector (USB) via a factory provided cable. Refer to your system's documentation for location of the IB4 board (if furnished).*

b) IB2 (Interface Board) and EIB (Extended Interface Board): Some systems may have an IB2 (Interface Board) and/or EIB (Extended Interface Board) connected to the NCU. Each IB2 board provides eight (8) dry relay outputs. Each EIB board provides five (5) dry relay outputs. Every relay output has a set of NC (normally close) and NO (normally open) contacts.

   The relay outputs can be connected to customer external alarm circuits. Each relay output can be configured to change state when one or more alarm events occur.

   The relay outputs can also be connected to customer external equipment, so that the relay output can control or interface with the customer external equipment.

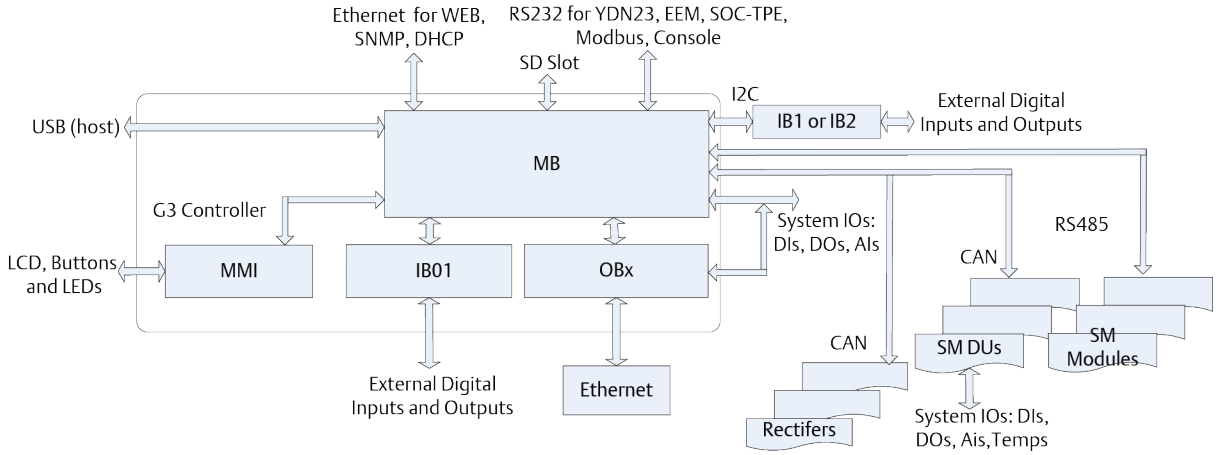
c) IB4 (Interface Board 4): Some systems may have an IB4 board. The IB4 board is a USB to LAN converter for the NCU, which includes a USB and an Ethernet port. The IB4 board is connected to the NCU's backplane connector (USB) via a factory provided cable. Refer to your system's documentation for location of the IB4 board (if furnished).

d) RS-485 Port: The NCU can communicate with an SM-AC, SM-Bat, or SMIO through the RS-485 port. The RS-485 port uses the parameters 19200, n, 8, 1.

e) Modbus Protocol: The NCU can communicate with an AC Meter using the Modbus protocol.

f) Modem (if available): When the NCU communicates through a modem, it uses PSTN/USB for long-distance monitoring. Power supply cables and communication cables will be prepared for the communication through the modem. Modem communication mode uses the EEM Protocol. Refer to your system's documentation.

Figure 1.7 The Controller Perspective



1.3.13 Consumption Map Function

The NCU controller has a consumption map function accessible via the Web pages. A User can designate a power system's output branch circuit (connected to a customer load) to be monitored for consumption. Customer load consumption parameters for this output branch circuit are displayed on the consumption map Web page.

Refer to "Web Interface Screens" on page 89.

1.3.14 Efficiency Tracker Function

The NCU controller has an efficiency tracker function if the tracking for estimating energy saving is installed in the system.

The system can calculate energy saving for R48-3500e4, R48-3500e3 or R48-3200 and then present saving in kWh based on average load of last 24h, week, month, 12 months since day1. Elapsed Saving, System Details are displayed on the Efficiency Tracker Web page.

Refer to "Web Interface Screens" on page 89.

2 Operation

2.1 Controller Initialization

The controller goes through an initialization process when power is initially applied to the system.

NOTE! *The initialization routine takes several minutes. During that time various alarm indicators may illuminate on the controller's front panel and an audible alarm may sound. Disregard all alarms. An audible alarm can be silenced at any time by momentarily depressing the ENT key on the controller.*

NOTE! *The controller does not turn off any relay when the controller is reset/replaced. If the relay is active when the controller is reset/replaced, it will stay active whether or not the alarm condition still exists. If possible, the alarm condition should be cleared before the controller is reset/replaced. If the alarm is not cleared, after starting the controller, it may be necessary to manually trigger an alarm condition to clear all alarm relays.*

Initialization

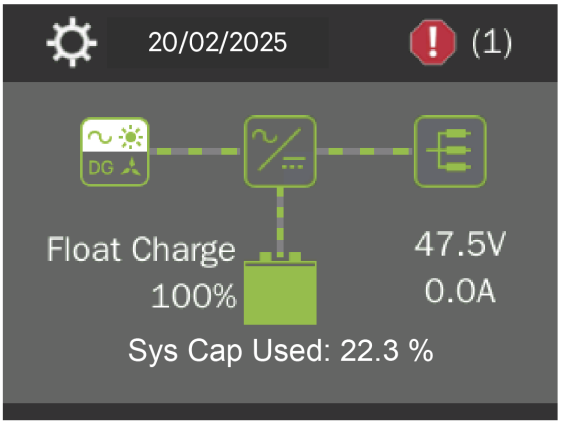
1. After the controller is powered on, the display shows the "logo" screen. The controller is initializing.
2. When initialization is complete, the language screen appears. Press the UP or DOWN arrow key to select the desired language. Press the ENT key to confirm the selection.
3. The following message appears.
   "Please go to webpage to change the factory default password. Press enter to continue."

   This message will appear every time the controller is rebooted until the factory default password is changed. See "Logging into the Controller via Web Interface Access" on page 24.
4. The Main Menu displays. See Figure 2.1 Local Display Main Menu

Main Menu

Date and time are alternately displayed.

Green - No Alarm
Red - Alarm



The number in ( ) indicates the total number of alarms.

Graphics	Menu Name	Description
	Alarm (Green - No Alarm) (Red - Alarm)	View active alarms and alarm history.
	Settings	Gain access to the NCU Controller's settings menus.
	Input Power	View AC, Solar, DG, and Wind related information.
	Module	View rectifier, solar converter, and converter module related information.
	DC	View DC equipments related information.
	Battery	View battery related information.

Press the UP and DOWN keys to highlight the desired Menu graphic in the Main Menu.

Press the ENT key to enter the selected menu.

To reboot the Controller, from the Main Menu press the ENT and ESC keys at the same time. Release both keys. Press ENT to confirm.

5. System information is displayed in multiple screens. Press the ESC key to view other system information. Press the down arrow key to view the next screen. Press the ESC key to return to the Main Menu.

6. From the Main Menu, press the UP and DOWN keys to highlight the desired Menu graphic in the Main Menu. Press the ENT key to enter the selected menu.

NOTE! *Repeatedly press the "ESC" key to return in reverse order level by level from any submenu until the Main Menu appears.*

2.2 Local Indicators

There are three (3) indicators located on the NCU's front panel. Refer to Table 2.1 for the function of the indicators. Refer to Figure 2.2 for location.

Figure 2.2 Local Indicators and Menu Navigation Keys Locations

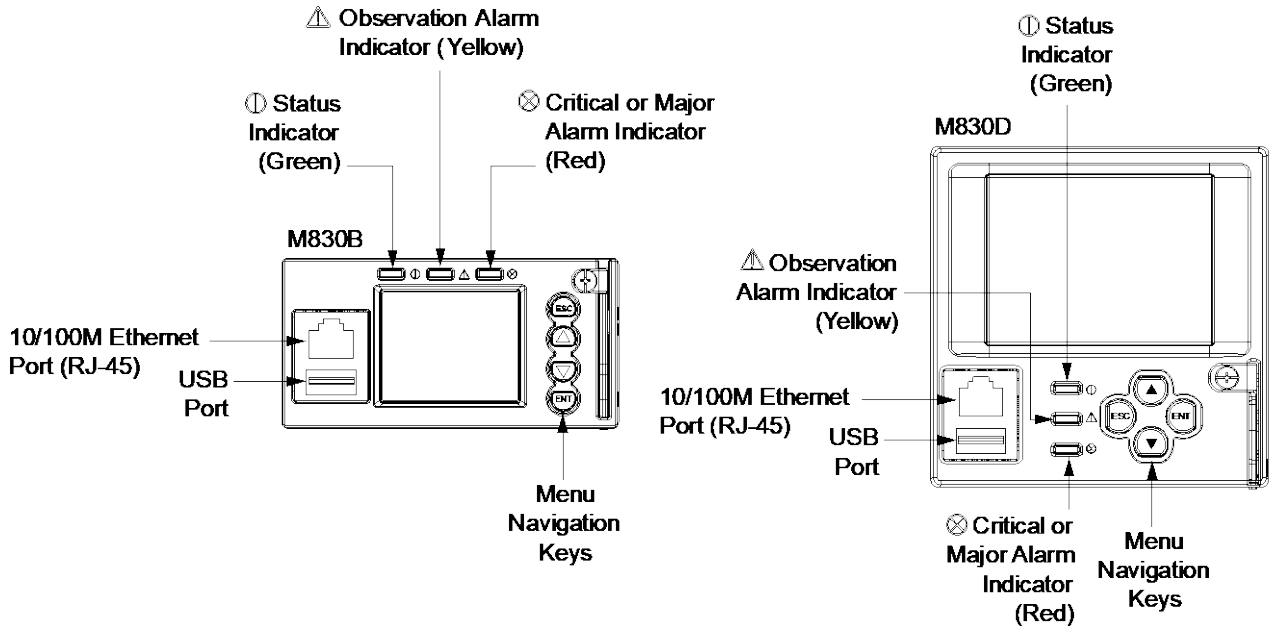


Table 2.1 Local Indicators

Indicator		Normal State	Fault State	Fault Cause
	Status (Green)	On	Off	No input power to the NCU.
	Observation Alarm (Yellow)	Off	On	The system has one or more active observation alarms. Alarm conditions are programmable.
	Major or Critical Alarm (Red)	Off	On	The system has one or more active Major or Critical alarms. Alarm conditions are programmable.

2.3 Using the Local Keypad and Display

See also “Passwords and Privilege Levels” on page 19.

2.3.1 Local Menu Navigation Keys and Local Display

There are four (4) menu navigation keys and a local display located on the NCU’s front panel. Refer to Table 2.2 for the function of the menu navigation keys. Refer to Figure 2.2 for location.

NOTE! *When the local display is lit, if no button is pushed for eight (8) minutes, the backlight of the local display extinguishes and the NCU returns to the Main Menu. Press any key to re-activate the local display.*

Table 2.2 Local Menu Navigation Keys

Key Symbol	Key Name	Function	
ESC	Escape	Press this key to go back to a previous menu or to cancel setting a parameter.	Press ESC and ENT together to reset the NCU, then press ENT to accept or ESC to cancel.
ENT	Enter	Press this key to go forward to the next menu, to select a parameter to edit, or to validate a parameter setting change.	
▲	Up Arrow	Press the up or down arrow keys to scroll through the menus or to change the value of a parameter.	--
▼	Down Arrow		

Press any key to silence an audible alarm.

2.3.2 Local Display Menus

Refer to “Local Display Menus” on page 65.

Navigating the Menus

To Select a Sub-Menu:
Press the UP and DOWN keys to highlight the desired sub-menu.
Press the ENT key to enter the selected sub-menu.

To Select a User and Enter a Password:
To select a User, use the UP and DOWN keys to move the cursor to the Select User field. Press ENT. Use the UP and DOWN keys to select a User previously programmed into the NCU. Press ENT to select the User. Note that only Users programmed into the NCU are shown. Users are programmed via the Web Interface.

To enter a password, use the UP and DOWN keys to move the cursor to the Enter Password field. Press ENT. Use the UP and DOWN keys to choose a character. Press ENT to accept and move to the next character. Continue this process until all characters are entered. Press ENT again to accept the password.

To Change a Parameter:
Press the UP and DOWN keys to move up and down the list of parameters.
Press ENT to select the parameter.
Press the UP and DOWN keys to change the parameter.
Press ENT to make the change. Press ESC to cancel the change.

2.4 Using the Web Interface

See also “Passwords and Privilege Levels” on page 19.

NOTE! *The NCU supports a 10/100M Ethernet connection.*

2.4.1 Overview

Via the Web Interface, a User (with proper access level) can:

- View real-time operating information (rectifiers, inverters, converters, AC, DC, batteries, etc.).
- View and download information recorded in logs.
- Send control commands.
- Set programmable parameters.
- Download and upload the “SettingParam.tar” file.
- Download firmware to the controller.

2.4.2 Multiple Browsers Supported

Multiple browsers are supported in the Web Interface. The User can use Chrome, Safari, or Firefox.

2.4.3 Web Interface Screens

Refer to “Web Interface Screens” on page 89.

2.5 Passwords and Privilege Levels

Local Keypad and Display

Anyone can browse the NCU via the local keypad and display. A User Name and Password is required to change settings. User Names and associated passwords are programmed into the NCU via the Web Interface. To change settings locally, a User Name and Password for a User with an access level of Level B (Operator) or higher is required. See “Users Tab” on page 148. Once a password is entered locally, it remains in effect for a preset time period to allow navigating between menus without re-entering the password.

Web Interface

Web interface access always requires a User name and password to be entered to gain access.

Web Interface User Privilege Levels: Users are programmed with a “privilege level” (see Table 5.1 on page 150). Each privilege level gives a User Web access to specific menus, as shown in Table 5.2 on page 150. A User has access to his/her level menus, plus all menus of the lesser privilege levels.

2.6 Multiple Languages Supported

Multiple languages are supported in the Local Interface and Web Interface. Refer to “Language Tab” on page 163.

2.7 Setup Procedures

2.7.1 Setting IPv4 Communications Parameters (if controller not set as DHCP)

The controller’s IPv4 parameters (IP, subnet mask, and gateway addresses) must be set to match your company’s network settings. The default settings for these parameters are shown below.

- IP Address: 192.168.100.100
- Subnet Mask Address: 255.255.255.0
- Gateway Address: 192.168.100.1

Local Menu Navigation:

Main Menu / Settings Icon / Comm Settings / enter parameters.

Web Menu Navigation:

Advance Settings Menu / Ethernet Tab / enter parameters.

2.7.2 Setting IPv6 Communications Parameters (if controller not set as DHCPv6)

The controller's IPv6 parameters (IPv6 address, IPv6 prefix, and IPv6 gateway address) must be set to match your company's network settings. The default settings for these parameters are shown below.

- Link-Local Address: fe80:209: f5ff: fe09:1002/64
- IPv6 Address: 20fa: fffd: fffc:fffb:fffa:fff9:fff8:fff7
- IPv6 Prefix: 0
- IPv6 Gateway: 20fa:1:fffe:ffff:fffe:fffd:ffff:fffe

Local Menu Navigation:

Main Menu / Settings Icon / Comm Settings / enter parameters.

Web Menu Navigation:

Advance Settings Menu / Ethernet Tab / enter parameters.

2.7.3 Setting for DHCP and DHCPv6

The DHCP and DHCPv6 functions allow the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed on the main system info screen (Main Menu / ESC) in the IP Address field or in the local display menu (Main Menu / Settings Icon / Comm Settings) in the IP Address field below the DHCP setting.

Local Menu Navigation:

Main Menu / Settings Icon / Comm Settings / DHCP (set to enabled) (can also view acquired IP address).
Main Menu / ESC (to view acquired IP address).

Web Menu Navigation:

None.

2.7.4 Connecting the Controller to your Local Area Network (LAN) when the System is NOT Equipped with an IB4 Board

An Ethernet port is located on the front panel of the NCU. This port supports Dynamic Host Configuration Protocol (DHCP) function.

If your system **does not have** an IB4 board, connect the Local Area Network (LAN) to the NCU's front panel port. This port can be assigned an IP address or can be set for DHCP. If set for DHCP, it will get its IP address from a DHCP server on the network. Refer to "Setting IPv4 Communications Parameters (if controller not set as DHCP)" on page 19 or "Setting IPv6 Communications Parameters (if controller not set as DHCPv6)" on page 20 to set the port parameters;

or,
"Setting for DHCP and DHCPv6" on page 20 to set the port as DHCP or DHCPv6.

2.7.5 Connecting the Controller to your Local Area Network (LAN) when the System IS Equipped with an IB4 Board

NOTE! *Your system may be furnished with an IB4 board. The IB4 board provides a second Ethernet port. The Ethernet port located on the NCU Controller's front panel can ONLY be used to connect a computer directly to the NCU. The Ethernet port located on the IB4 board can be used to connect the NCU to your Local Area Network (LAN). Refer to your system's documentation for location of the IB4 board (if furnished).*

NOTE! *If your system has an IB4 board, DO NOT connect your Local Area Network (LAN) to the NCU front Ethernet port.*

Some systems may have an IB4 board with a second Ethernet port. This port supports Dynamic Host Configuration Protocol (DHCP) function. Refer to your system's documentation for location of the IB4 board (if furnished).

If your system **has** an IB4 board, connect the Local Area Network (LAN) to the IB4 board port. The IB4 board port can be assigned an IP address or can be set for DHCP. If it is set for DHCP, it will get its IP address from a DHCP server on the network. Refer to "Setting IPv4 Communications Parameters (if controller not set as DHCP)" on page 19 or "Setting IPv6 Communications Parameters (if controller not set as DHCPv6)" on page 20 to set the port parameters;
or,
"Setting for DHCP and DHCPv6" on page 20 to set the port as DHCP or DHCPv6.

2.7.6 Connecting a Local Computer Directly to the Controller when the System is NOT Equipped with an IB4 Board

An Ethernet port is located on the front panel of the NCU. This port supports Dynamic Host Configuration Protocol (DHCP) function.

If your system **does not have** an IB4 board, perform the following procedure.

Procedure

1. Before connecting your computer directly to the controller's Ethernet port, use the following procedure to record your computer's network settings (so they can be returned to these values when done) and then change these settings in your computer to match the communications settings programmed in the controller.

NOTE! *Windows 7 operating system is used in this procedure, other operating systems are similar.*

   a) Record your computer's network settings by launching Control Panel in your computer. Navigate through Network and Sharing Center → Local Area Connection → Properties → Internet Protocol Version 4 (TCP/IPV4) → Properties.

   b) Record whether the "Obtain an IP address automatically" or "Use the following IP address" button is selected. If "Use the following IP address" button is selected, also record the following:

      IP Address: _____
      Subnet Mask: _____
      Default Gateway: _____

   c) Record your controller's network settings by navigating the controller's local display panel to Main Menu / Settings Icon / Comm Settings. Record the following controller's IP parameters. If these parameters were not changed, they should be at the default values as shown in the example section below.

      IPv4

      IP Address: _____

Subnet Mask: _____
Default Gateway: _____

Example:
IP Address: 192.168.1.2
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.1.1

IPv6

IPv6 Address: _____
IPv6 Prefix: _____
IPv6 Gateway: _____

Example:
IPv6 Address: 20fa:fffd:fffc:fffb:fffa:fff9:fff8:fff7
IPv6 Prefix: 0
IPv6 Gateway: 20fa:1:fffe:ffff:fffe:fffd:ffff:fffe

d) Change your local computer's network settings using the information you acquired in the above step, except that the last part of the IP address needs to be replaced with any different number.

IPv4

IP Address: _____
Subnet Mask: _____
Default Gateway: _____

Example:
IP Address: 192.168.1.3
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.1.1

IPv6

IPv6 Address: _____
IPv6 Prefix: _____
IPv6 Gateway: _____

Example:
IPv6 Address: 20fa:fffd:fffc:fffb:fffa:fff9:fff8:fff7
IPv6 Prefix: 0
IPv6 Gateway: 20fa:1:fffe:ffff:fffe:fffd:ffff:fffe

e) Select **OK**. Note that you may have to reboot your local computer for the settings to take effect. Follow any instruction you see on the screen.

2. Connect your computer directly to the controller's Ethernet port (RJ-45 jack located on the front of the controller). See Figure 2.2. The NCU's front panel port is configured with an IP address. Default is 192.168.1.2. This is the address you will type into your Web browser to access the NCU's Web Interface. You will also have to set the properties on your computer (refer to the previous procedure in step 1).

3. When finished, disconnect your computer from the NCU and, if necessary, reset your computer network settings as recorded in step 1.

2.7.7 Connecting a Local Computer Directly to the Controller when the System IS Equipped with an IB4 Board

NOTE! *Your system may be furnished with an IB4 board. The IB4 board provides a second Ethernet port. The Ethernet port located on the NCU Controller's front panel can ONLY be used to connect a computer directly to the NCU. The Ethernet port located on the IB4 board can be used to connect the NCU to your Local Area Network (LAN). Refer to your system's documentation for location of the IB4 board (if furnished).*

An Ethernet port is located on the front panel of the NCU. This port supports Dynamic Host Configuration Protocol (DHCP) function.

Some systems may have an IB4 board with a second Ethernet port. Refer to your system's documentation for location of the IB4 board (if furnished).

If your system **has** an IB4 board, perform the following procedure.

Procedure

1. Connect your computer directly to the controller's Ethernet port (RJ-45 jack located on the front of the controller). See Figure 2.2. The NCU's front panel port will have the following IPv4 Address: 192.168.100.100. Enter the address 192.168.100.100 in your Web browser to access the NCU's Web Interface via IPv4. The NCU's front panel port will have the following IPv6 Address. IPv6 Link-Local Address: fe80::209: f5ff:fe09:1002/64 or IPv6 Address: 20fa:fffd:fffc:fffb:fffa:fff9:fff8:fff7. Enter the IPv6 Link-Local Address: [fe80::209:f5ff:fe09:1002/64] or IPv6 Address: [20fa:fffd:fffc:fffb:fffa:fff9:fff8:fff7] to access the NCU's Web Interface via IPv6.
2. When finished, disconnect your computer from the NCU.

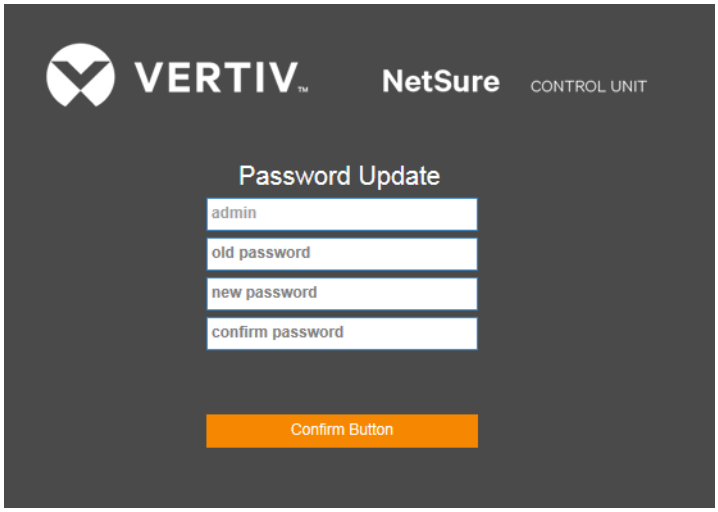
2.8 Logging into the Controller via Web Interface Access

Procedure

Chrome, Safari, and Firefox are supported.

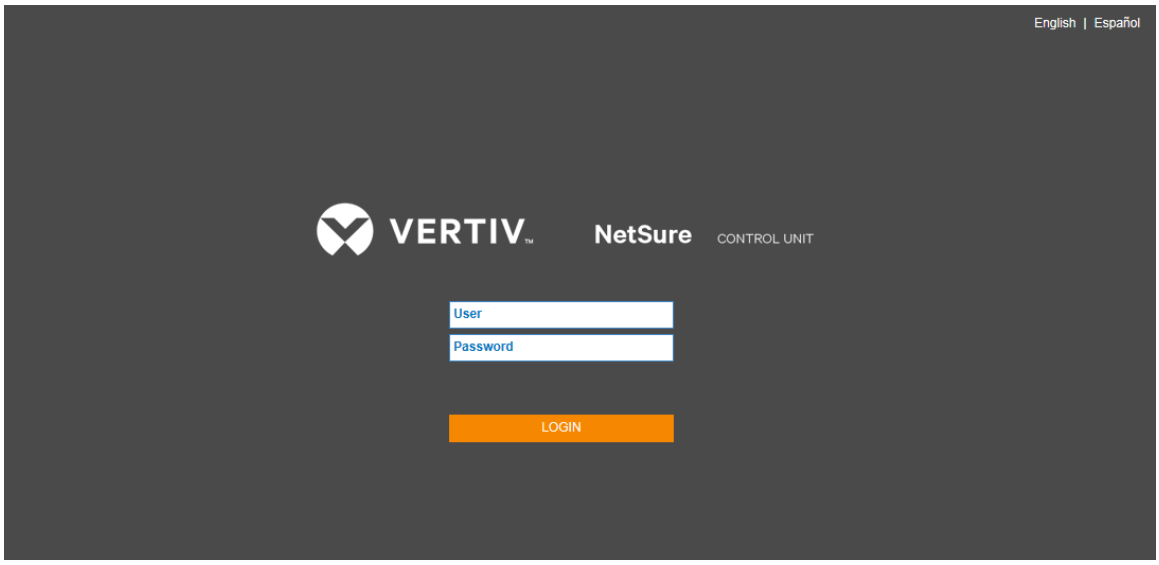
1. In your browser, enter http:// and the controller's IP address (see "Connecting a Local Computer Directly to the Controller when the System is NOT Equipped with an IB4 Board" on page 21 or "Connecting a Local Computer Directly to the Controller when the System IS Equipped with an IB4 Board" on page 23) and press **ENTER**. If your site requires secure HTTP and you were furnished with an NCU configuration with secure HTTP, enter https:// and the controller's IP address and press ENTER.
2. If this is the first time the NCU is accessed remotely, the following screen appears. This informs a User to change the default password the first time the NCU is accessed remotely. If the below procedure was performed, for subsequent logins the window in the next step appears.
   a) Enter the old password (default 12345678).
   b) Enter a new password.
   c) Re-enter the new password.
   d) Click the "Confirm Button".

NOTE! *By default, the "User Name" is "admin" and the "Password" is "12345678". See also "Users Tab" on page 148.*



3. The following Web Interface Login window opens. Enter a valid User Name and Password, then click LOGIN.

NOTE! *Before entering a User Name and password, you can select a local language that the Web Interface menus use from those listed in the top right corner of the login window. See "Language Tab" on page 163.*



4. After entering a valid User Name and Password and clicking LOGIN, the Web Interface "HOMEPAGE" window opens. Refer to “Web Interface Screens” on page 89.

2.9 Common Tasks Performed via the Local Keypad and/or Web Interface

2.9.1 General

Refer also to “Local Display Menus” on page 65 and “Web Interface Screens” on page 89 for menu item descriptions.

NOTE! *Ensure current configuration is backed up prior to changing settings (see “Backing Up the NCU Configuration” on page 38). Create new backup files after every successful update for your records and in case of controller failure.*

NOTE! *If you add or remove hardware from the system (except rectifiers, converters, and inverters), update the inventory via the “Auto Config” menu item (see “Updating the NCU Controller’s Device Inventory” on page 38).*

NOTE! *Some settings are restricted by other settings. Refer to Figure 3.4 for setting restrictions.*

2.9.2 Start Wizard

For initial startup, perform the Start Wizard from the local keypad and display to enter basic programmable parameters in one session. Refer to “Start Wizard Sub-Menu (accessed from Settings Menu)” on page 75 and “**Start Wizard Now**” on page 86.

2.9.3 Reset Admin Password Feature

The factory sets the NCU controller’s “Reset Admin Password” feature when the NCU is shipped. This feature reminds a User to reset the factory password when the controller is first initialized and also prevents a User from logging in remotely until the default password is changed. Once the default password is changed, this feature turns off automatically. If it is desired to re-activate this feature, from the local display, press the ESC and Down Arrow buttons at the same time. Press ENTER when prompted to activate this feature.

2.9.4 Viewing Alarms

Local Menu Navigation:

Main Menu / Alarm Icon / ENT.

Web Menu Navigation:

Active alarms are listed at the top of the window. Click on an alarm category to expand the alarm list.

2.9.5 Viewing System Status

Local Menu Navigation:

Main Menu / Input Power Icon / ENT.
Main Menu / Module Icon / ENT.
Main Menu / DC Icon / ENT.
Main Menu / Battery Icon / ENT.

Web Menu Navigation:

System status is displayed in the right windowpane of the Home page. Select the Power System tab and use the interactive links to view the various device group status pages. See “Device Group Status Pages” starting on page 92.

2.9.6 Viewing the NCU Controller’s Device Inventory

Local Menu Navigation:

Main Menu / ESC to view Info Screens / ENT to view Inventory.

Web Menu Navigation:

System Inventory Menu.

2.9.7 Clearing or Resetting Alarms

Local Menu Navigation:

Main Menu / Settings Icon / Alarm Settings / select alarm to clear or reset.

Web Menu Navigation:

Advance Settings Menu / Clear Data Tab / select Alarm History to clear.

2.9.8 Clearing Logs

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / Clear Data Tab / select log to clear.

2.9.9 Changing the Local LCD Display Orientation

M830B Only: The rotation of the text in the local menus can be changed to allow the controller to be mounted in different orientations. If the text is not in the proper orientation for your application, change the LCD Rotation setting.

Local Menu Navigation:

Main Menu / Settings Icon / Sys Settings / LCD Rotation.

Web Menu Navigation:

None

2.9.10 Disabling the Local Keypad Sound

Local Menu Navigation:

Main Menu / Settings Icon / Sys Settings / Keypad Voice.

Web Menu Navigation:

None.

2.9.11 Blocking Alarms

Local Menu Navigation:

Main Menu / Settings Icon / Alarm Settings / Alarm Blocked.

Web Menu Navigation:

Settings Menu / System Tab / Outgoing Alarms Blocked.

2.9.12 Changing the Date and Time

Local Menu Navigation:

Main Menu / Settings Icon / Sys Settings / Date.
Main Menu / Settings Icon / Sys Settings / Time.

Date: Use the Up Arrow and Down Arrow to select the date field. Press ENT. Use Up Arrow and Down Arrow to select the year then press ENT, next use Up Arrow and Down Arrow to select the month then press ENT, and finally use Up Arrow and Down Arrow to select the day then press ENT.

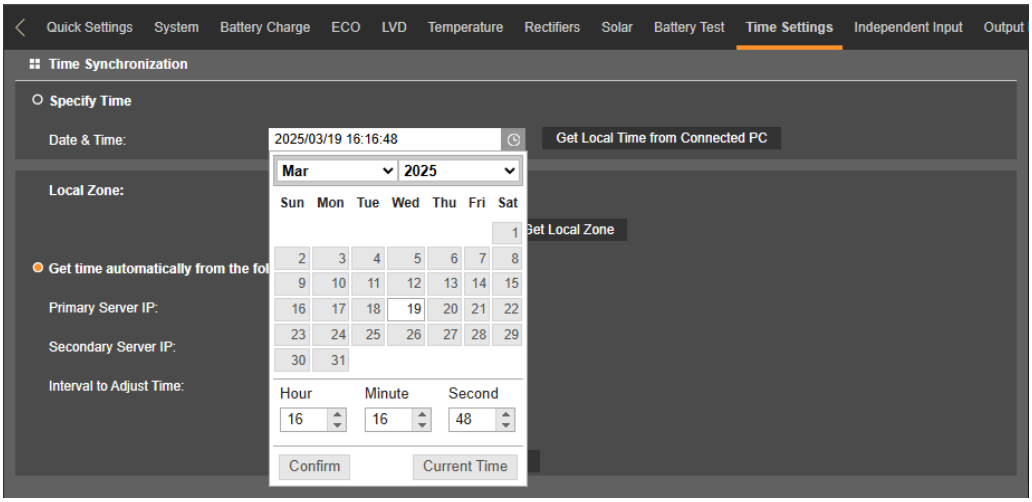
Time: Use the Up Arrow and Down Arrow to select the time field. Press ENT. Use Up Arrow and Down Arrow to select the hour then press ENT, next use Up Arrow and Down Arrow to select the minute then press ENT, and finally use Up Arrow and Down Arrow to select the second then press ENT.

Web Menu Navigation:

Settings Menu / Time Settings Tab.

In the Specify Time section, click on "Get Local Time from Connected PC" and then “Set” to automatically set the date and time. To manually set the date and time, click on “the clock symbol” and enter the date and time. See Figure 2.3. Then select the “Confirm” button. Then click on “Set” to save the change.

Figure 2.3 Manual Date and Time Menu



2.9.13 Adding, Deleting, and Modifying Users

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / Users Tab.

2.9.14 Setting IP Communications Parameters (if controller not set as DHCP or DHCPv6)

See also “Setting IPv4 Communications Parameters (if controller not set as DHCP)” on page 19 and “Setting IPv6 Communications Parameters (if controller not set as DHCPv6)” on page 20.

Local Menu Navigation:

Main Menu / Settings Icon / Comm Settings / enter parameters.

Web Menu Navigation:

Advance Settings Menu / Ethernet Tab / enter parameters.

2.9.15 Setting for DHCP and DHCPv6

The DHCP and DHCPv6 functions allow the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed on the main system info screen (Main Menu / ESC) in the IP Address field or in the local display menu (Main Menu / Settings Icon / Comm Settings) in the IP Address field below the DHCP setting.

Local Menu Navigation:

Main Menu / Settings Icon / Comm Settings / DHCP (set to enabled) (can also view acquired IP address).

Main Menu / ESC (to view acquired IP address).

Web Menu Navigation:

None.

2.9.16 Setting SNMP Parameters

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / SNMP Tab.

2.9.17 Setting Auto Equalize

Local Menu Navigation:

Main Menu / Settings Icon / Batt Settings / Charge / Auto EQ.
Also enter additional parameters from Web Interface (Settings Menu / Battery Tab / enter parameters)

Web Menu Navigation:

Settings Menu / Battery ChargeTab / Automatic Equalize (set to Yes) then enter the following parameters.

- Equalize Start Current
- Equalize Start Capacity
- Equalize Stop Current
- Equalize Stop Delay Time
- Maximum Equalize Charge Time

2.9.18 Programming the Audible Alarm Feature

Local Menu Navigation:

Main Menu / Settings Icon / Alarm Settings / Audible Alarm.

Web Menu Navigation:

None

2.9.19 Manually Forcing LVDs

Local Menu Navigation:

Main Menu / Settings Icon / Maintenance / “Auto/Man” State (change to Manual).
then
Main Menu / Settings Icon / Maintenance / LVD 1 Control or LVD 2 Control (select the other state).
then
Main Menu / Settings Icon / Maintenance / LVD 1 Control or LVD 2 Control (select the original state).
then
Main Menu / Settings Icon / Maintenance / “Auto/Man” State (change to Auto).

Web Menu Navigation:

Settings Menu / System Tab / “Auto/Manual” State (change to Manual).
then
Settings Menu / LVD Tab / LVD 1 Control or LVD 2 Control (select the other state).
then

Settings Menu / LVD Tab / LVD 1 Control or LVD 2 Control (select the original state).
then
Settings Menu / System Tab / “Auto/Manual” State (change to Auto).

2.9.20 Manually Forcing Relays

After completing the following steps, the relay will momentarily toggle to the chosen state. The relay then reverts back to being controlled by the NCU.

NOTE! *This may take a few minutes.*

Local Menu Navigation:

None.

Web Menu Navigation:

Settings Menu / System Tab / Power System/ “Auto/Manual” State (change to Manual).
then
Settings Menu /Output Relays / Relay IB1-DO # (select the other state).

then

Settings Menu / Output Relays / Relay EIB1-DO # (select the other state).

then

Settings Menu / System Tab / Power System / “Auto/Manual” State (change to Auto).

2.9.21 Assigning Severity Level to Alarms

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / Alarms Tab and DI Alarms Tab.

2.9.22 Assigning Relays to Alarms

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / Alarms Tab and DI Alarms Tab.

2.9.23 Placing the System in Float or Equalize Charge Mode

Local Menu Navigation:

Main Menu / Settings Icon / Maintenance / “EQ/FLT Control”.

Web Menu Navigation:

Settings Menu / Battery Tab / “Equalize/Float” Charge Control.

2.9.24 Viewing/Changing the Float Voltage Setting

Local Menu Navigation:

Main Menu / Settings Icon / Batt Settings / Charge / Float Voltage.

Web Menu Navigation:

Settings Menu / Battery Charge Tab / Float Charge Voltage.

2.9.25 Viewing/Changing the Equalize Voltage Setting

Local Menu Navigation:

Main Menu / Settings Icon / Batt Settings / Charge / EQ Voltage.

Web Menu Navigation:

Settings Menu / Battery Charge Tab / Equalize Charge Voltage.

2.9.26 Setting Battery Parameters

Local Menu Navigation:

Main Menu / Settings Icon / Batt Settings / navigate menus and enter parameters.

Web Menu Navigation:

Settings Menu / Battery Charge Tab / enter parameters.

2.9.27 Setting Battery Capacity Parameters

NOTE! *After setting the battery capacity, the User should also reset the battery capacity (battery must be fully charged). (from the Web Interface; Settings Menu / Battery Charge Tab / Reset Battery Capacity) (from the Local Interface; Settings Menu / Batt Settings / Basic Settings / Reset Batt Cap).*

Local Menu Navigation:

Main Menu / Settings Icon / Batt Settings / Batt1 Settings / Rated Capacity.

Web Menu Navigation:

Settings Menu / Battery Charge Tab / Batt1 Rated Capacity.
or
See “Individual Battery Settings Page” on page 105.

2.9.28 Setting Rectifier High Voltage Shutdown

Local Menu Navigation:

None.

Web Menu Navigation:

Settings Menu / Rectifiers Tab / HVSD (set to enabled) then set HVSD Limit.

2.9.29 Setting Over Voltage Alarm 1

Local Menu Navigation:

Main Menu / Settings Icon / Other Settings / Over Voltage 1.

Web Menu Navigation:

Settings Menu / System Tab / Over Voltage 1.

2.9.30 Setting Over Voltage Alarm 2

Local Menu Navigation:

Main Menu / Settings Icon / Other Settings / Over Voltage 2.

Web Menu Navigation:

Settings Menu / System Tab / Over Voltage 2.

2.9.31 Setting Under Voltage Alarm 1

Local Menu Navigation:

Main Menu / Settings Icon / Other Settings / Under Voltage 1.

Web Menu Navigation:

Settings Menu / System Tab / Under Voltage 1.

2.9.32 Setting Under Voltage Alarm 2

Local Menu Navigation:

Main Menu / Settings Icon / Other Settings / Under Voltage 2.

Web Menu Navigation:

Settings Menu / System Tab / Under Voltage 2.

2.9.33 Setting Temperature Sensors

Temperature sensors may be connected to the…

- System Temperature Ports 1, 2, 3 (if available),
- Temp1 and Temp2 ports on an IB2 Interface Board,
- Temp1 and Temp2 ports on an EIB Interface Board,
- Temp1 through Temp8 ports of up to eight (8) SM-Temp modules, and

Each port (sensor) may be set as None, Battery, or Ambient.

A temperature sensor set as an ambient temperature sensor may also be set as the sensor which displays the ambient temperature on the Web Interface's Homepage.

A temperature sensor set as a battery temperature sensor may also be set as the temperature compensation sensor (in addition, the temperature compensation sensor is the sensor which displays the battery temperature on the Web Interface's Battery Device Group Status Page).

A temperature sensor set as a battery temperature sensor may also be set as the BTRM (Battery Thermal Runaway Management) sensor (in addition, the BTRM sensor is the sensor which is used for the High Temperature Disconnect [HTD] Feature.)

Procedure

1. Set each temperature sensor in the system to None, Battery, or Ambient.

   ### Local Menu Navigation:

   None.

   ### Web Menu Navigation:

   Settings Menu / System Tab / Power System / Ambient Temp Sensor.

   Also enter values for the temp probe temperature alarms from the Web Interface (Settings Menu / System Tab / Power System / Ambient Temp Sensor.).

2. If desired, set a temperature sensor set as an ambient temperature sensor as the sensor which displays the ambient temperature on the Web Interface's Homepage.

   Local Menu Navigation:

   None.

   Web Menu Navigation:

   Settings Menu / System Tab / Power System / Ambient Temp Sensor.

   Also enter values for the ambient temperature alarms from the Web Interface (Settings Menu / System Tab).

3. If desired, set a temperature sensor set as a battery temperature sensor as the battery temperature compensation sensor.

   Local Menu Navigation:

   Main Menu / Settings Icon / Batt Settings / Temp Comp / TempComp Sensor.

   Web Menu Navigation:

   Settings Menu / Battery Test Tab / Temp Compensation Sensor.

   Also enter values for the compensation temperature alarms from the Web Interface (Settings Menu / Battery Charge Tab).

4. If desired, set a temperature sensor set as a battery temperature sensor as the BTRM sensor.

   Local Menu Navigation:

   None.

   Web Menu Navigation:

   Settings Menu / Battery Charge Tab / BTRM Temp Sensor.

   Also enter values for the BTRM temperature alarms from the Web Interface (Settings Menu / Battery Charge Tab).

2.9.34 Setting Battery Charge Temperature Compensation

The following need to be set for the Battery Charge Temperature Compensation feature.

See above for selecting the battery temperature compensation temperature sensor (or select maximum or average) and setting compensation temperature alarms.

Local Menu Navigation:

Main Menu / Settings Icon / Batt Settings / Temp Comp.

Enter values for the following parameters: TempComp Center, Temp Comp Coeff.

Web Menu Navigation:

Settings Menu / Battery Charge Tab.

Enter values for the following parameters:
Temp Compensation Center, Temp Comp Coefficient (slope).

2.9.35 Setting Battery Thermal Runaway Management (BTRM) Feature

The following need to be set for the Battery Thermal Runaway Management (BTRM) feature.

See above for selecting the Battery Thermal Runaway Management (BTRM) temperature sensor and setting BTRM temperature alarms.

Local Menu Navigation:

None.

Web Menu Navigation:

Settings Menu / Battery Charge Tab.

Enter values for the following parameters:
“BTRM Action” and “BTRM Voltage”.

2.9.36 Configuring the NCU Identification of Rectifiers and Assigning which Input Feed is Connected to the Rectifiers

When rectifiers are all installed prior to applying power and starting the system, the order in which the NCU identifies the rectifiers is by serial number (lowest serial number is Rect 1, next lowest is Rect 2, etc.). If you prefer the NCU to identify the rectifiers by position in the system, perform the following procedure.

Upon power up, the NCU arbitrarily assigns Phase A, B, or C to each rectifier. This assignment is used to display rectifier AC input phase voltage(s). The User may reassign the phase to each rectifier per your specific installation by following the procedure below.

Local Menu Navigation:

None.

Web Menu Navigation:

See “Individual Rectifier Settings Page” on page 96 and set the Rectifier ID and AC Feed (repeat for every rectifier).
then
Settings Menu / Rectifiers Tab / “Confirm Rect ID/Feed”.

2.9.37 Configuring the NCU Identification of Converters

When converters are all installed prior to applying power and starting the system, the order in which the NCU identifies the converters is by serial number (lowest serial number is Conv 1, next lowest is Conv 2, etc.). If you prefer the NCU to identify the converters by position in the system, perform the following procedure.

Local Menu Navigation:

None.

Web Menu Navigation:

See “Individual Converter Settings Page” on page 97 and set the Converter ID (repeat for every converter).
then
Settings Menu / “DC/DC” Converters Tab / Confirm Converter ID.

2.9.38 Configuring the NCU Identification of Inverters

When Inverters are all installed prior to applying power and starting the system, the order in which the NCU identifies the Inverters is by serial number (lowest serial number is Inv 1, next lowest is Inv 2, etc.). If you prefer the NCU to identify the Inverters by position in the system, perform the following procedure.

Local Menu Navigation:

None.

Web Menu Navigation:

See “Individual Converter Settings Page” on page 100 and set the Inverter ID (repeat for every Inverter).
then
Settings Menu / Inverters Tab / Confirm Inverter ID.

2.9.39 Setting Digital Inputs

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / DI Alarms Tab

2.9.40 Setting Battery Block and Battery Midpoint Monitoring (if equipped with an EIB Assembly)

Local Menu Navigation:

None.

Web Menu Navigation:

Settings Menu / Battery Charge Tab / and enter the following parameters.

Parameters

- EIB-# Voltage Type
- EIB-# Block In-Use Num
- EIB-# Block Voltage Diff or Block Voltage Diff (Mid)

2.9.41 Setting External Shunts (connected to the EIB Assembly)

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / Shunts Tab / EIB-# / press “Modify/View” and enter the following parameters. When done, press “Set”.

Parameters

- Set As (Not Used, General, Load, Battery, Source)
- Signal Full Name
- Signal Abbr Name
- Full Scale Current
- Full Scale Voltage
- Break Value (Device Rating)
- High 1 Curr Limit Alarm (% of Breaker Value)
- High 1 Curr Alarm Severity
- High 1 Curr Alarm Relay
- High 2 Curr Limit Alarm (% of Breaker Value)
- High 2 Curr Alarm Severity
- High 2 Curr Alarm Relay

WEB Menu Navigation (for shunts set as battery):

See “Individual Battery Settings Page” on page 105.

Parameters

- EIB#Battery #, Rated Capacity

2.9.42 Setting External Shunts (connected to the SMDU+ Assembly)

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / Shunts Tab / SMDUP # / press “Modify/View” and enter the following parameters. When done, press “Set”.

Parameters

- Set As (enabled, disabled)
- Signal Full Name
- Signal Abbr Name
- Full Scale Current
- Full Scale Voltage
- Break Value (Device Rating)
- High 1 Curr Limit Alarm (% of Breaker Value)
- High 1 Curr Alarm Severity
- High 1 Curr Alarm Relay
- High 2 Curr Limit Alarm (% of Breaker Value)
- High 2 Curr Alarm Severity
- High 2 Curr Alarm Relay

2.9.43 Setting Shunts (connected to the SMDU Assembly)

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / Shunts Tab / SMDU # / press “Modify/View” and enter the following parameters. When done, press “Set”.

Parameters

- Set As (Not Used, General, Load, Battery, Source)
- Signal Full Name
- Signal Abbr Name
- Full Scale Current
- Full Scale Voltage

- Break Value (Device Rating)
- High 1 Curr Limit Alarm (% of Breaker Value)
- High 1 Curr Alarm Severity
- High 1 Curr Alarm Relay
- High 2 Curr Limit Alarm (% of Breaker Value)
- High 2 Curr Alarm Severity
- High 2 Curr Alarm Relay

WEB Menu Navigation (for shunts set as battery):

Settings Menu / Quick Settings Tab / Signal Settings Section / SMDU#Batt# Rated Capacity and enter the following parameters.

Parameters

- SMDU#Batt#, Rated CapacitySetting the System Current Alarm

Local Menu Navigation:

None.

Web Menu Navigation:

Settings Menu / System Tab / System Current Alarm (Enter a value in AMPS). If system current exceeds this value, a system current alarm is issued.

2.9.44 Clearing the Maintenance Alarm

A maintenance time can be set which, once expires, issues a maintenance alarm. When the maintenance alarm is issued, perform the routine maintenance and reset the maintenance timer. To reset the maintenance timer and clear the Maintenance Alarm, clear the Maintenance Run Time.

Local Menu Navigation:

None.

Web Menu Navigation:

Settings Menu / System Tab / “Auto/Manual” State (change to Manual).
then
Settings Menu / System Tab / Clear Maintenance Run Time.
then
Settings Menu / System Tab / “Auto/Manual” State (change to Auto).

2.9.45 Performing a Manual Battery Discharge Test

Procedure

1. Check that the Rated Battery Capacity is set up correctly for each battery.
   Local Menu: Main Menu / Settings Icon / Batt Settings / Battery Test.
   Web Menu: Settings Menu / Battery Test
2. Check that the following Battery Test parameters are set correctly: Test Voltage Level, End Test Voltage, End Test Time, End Test Capacity, Record Threshold.
   Local Menu: Main Menu / Settings Icon / Batt Settings / Battery Test.
   Web Menu: Settings Menu / Battery Test / Battery Test Control.

3. Start the battery discharge test.
   Local Menu: Main Menu / Settings Icon / Maintenance / BattTestControl.
   Web Menu: Settings Menu / Battery Test / Battery Test Control.

4. Wait for the test to end.

5. View the battery test log and upload it to your computer as required. See “Battery Test Log Tab” on page 137.

2.9.46 Updating the NCU Controller’s Device Inventory

Local Menu Navigation:

Main Menu / Settings Icon / Other Settings / Auto Config.

Web Menu Navigation:

Advance Settings Menu / SW Maintenance Tab / Auto Config.

NOTE! *This is only needed if you have added or removed equipment on RS485 bus.*

2.9.47 Backing Up the NCU Configuration

To back up the NCU configuration, simply save the file named "SettingParam.tar".

NOTE! *It is strongly recommended that you save a copy of the “SettingParam.tar” file whenever you make any changes to the NCU. Then, if you ever replace the NCU or perform a "Restore Defaults" procedure, you can restore your customized settings by downloading the previously saved “SettingParam.tar” file back into the NCU.*

Prior to changing NCU settings, ensure the current "SettingParam.tar" file is backed up. After making changes, create a new backup file.

To aid in file management, you may change the name of the "SettingParam.tar" file to differentiate it from other "SettingParam.tar" files saved. The new name can use alpha and numeric characters preceding the original "SettingParam.tar" name (the end of the new file name **must** always be "SettingParam.tar"; for example, an acceptable filename would be "seville4SettingParam.tar").

Saving the “SettingParam.tar” File

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / SW Maintenance Tab.
See “Retrieve "SettingParam.tar" File Procedure” on page 167 to retrieve the “SettingParam.tar” file.

2.9.48 Reloading a Backed-Up NCU Configuration

To reload the NCU configuration, simply download a saved "SettingParam.tar" file into the NCU.

Reloading the “SettingParam.tar” File

Local Menu Navigation:

None.

Web Menu Navigation:

Advance Settings Menu / SW Maintenance Tab.
See “Upload/Download Procedure” on page 168 to download a "SettingParam.tar" file into the NCU.

2.9.49 Upgrading the NCU Using an Application ("All") Package

This procedure is typically used to upgrade your NCU when a new release of firmware is available for your application. The name of the Application "All" Package file must end in .tar or .tar.gz. An Application “All” package file has both the application (software) and configuration settings file and is usually supplied for an application upgrade.

A User can copy an Application ("All") Package from your computer to a USB memory device. You can then place the USB memory device into the NCU USB port and then download the file into the NCU Controller. If upgrading the NCU with a USB drive other than the supplied USB, the following USB drive specifications must be adhered to:

- USB 2.0 or below, 32G or less, formatted fat32 file system.

Local Menu Navigation (To Download an Application ("All") Package):

1. Copy the file to a USB memory device. The file must be in the root directory of the USB memory device. The file must be named app_V#.#.##.tar.gz.

NOTE! *#.#.## is the revision number (i.e. 1.1.40, 4.1.40, etc.).*

2. Connect the USB memory device to the USB port on the front of the controller.
3. Navigate to “Main Menu / Settings Icon / Sys Settings / Update App / select yes”. Once Yes is selected and confirmed, the configuration file located on the memory device located in the controller's USB port is loaded into the controller.
4. A percent (%) complete will be displayed and when finished the NCU will reboot automatically.
5. The controller enters an initialization routine, which takes a few minutes. The routine is complete and the controller is operational when normal system voltage is displayed on the screen.
6. Remove the memory device.

Web Menu Navigation (To Download an Application ("All") Package):

Advance Settings Menu / SW Maintenance Tab.
See “Upload/Download Procedure” on page 168 to download an Application (“All”) Package into the controller.

2.9.50 Restoring Factory Default Configuration

This procedure is used to restore all changes made to the NCU to factory defaults.

Procedure

ALERT! When this procedure is performed, the controller’s existing configuration and parameter settings will be lost. The “SettingParam.tar” file is deleted. Before restoring the factory default configuration, if you have made any changes to the NCU, save the “SettingParam.tar” file (see Backing Up the NCU Configuration on page 38).

Local Menu Navigation:

Main Menu / Settings Icon / Sys Settings / Restore Default.

Web Menu Navigation:

Advance Settings Menu / SW Maintenance Tab.
See “Restore Factory Default Configuration Procedure” on page 166.

2.9.51 Rebooting the Controller

NOTE! *The controller does not turn off any relay when the controller is reset/replaced. If the relay is active when the controller is reset/replaced, it will stay active whether or not the alarm condition still exists. If possible, the alarm condition should be cleared before the controller is reset/replaced. If the alarm is not cleared, after starting the controller, it may be necessary to manually trigger an alarm condition to clear all alarm relays.*

Local Menu Navigation:

At the Main Screen, press ENT and ESC at the same time to reset the NCU Controller.

Web Menu Navigation:

Advance Settings Menu / SW Maintenance Tab / Reboot Controller button.

2.9.52 Changing the Names of Items Displayed in the LCD and Web-Interface Menus

Local Menu Navigation:

none.

Web Menu Navigation:

Navigate to the appropriate tab in the Advance Settings menu. Press “Modify” and enter the signal name parameter(s). When done, press “Set”.

Digital Inputs

Advance Settings Menu / DI Alarms Tab.

Shunts

Advance Settings Menu / Shunts Tab.

Fuses

Advance Settings Menu / Fuse Tab.

2.10 Power Split Feature

In Power Split applications, the output of the power system controlled by the NCU can be connected in parallel with an existing power system. Each system is controlled independently via its own controller. The NCU power system is referred to as “slave” system and the existing power system as “master” system. The Power Split feature controls the NCU power system’s (“slave” system) output voltage and rectifiers' current limit so that “slave” system shares the load with “master” system.

Optional Functions: The NCU controller can mimic the equalize and battery test functions of “Master’s” controller. In addition, the NCU controller can mimic the low voltage load disconnect and/or low voltage battery disconnect functions of “master” system. This is accomplished by supplying digital signals from “Master’s” controller to the NCU. This allows these functions to remain active in “master” system.

2.10.1 Overview

See also “Power Split Feature” on page 8.

How Power Split Works

There are four User adjustable parameters for Power Split. They are:

- **Power Split Current Limit Value:** Current limit point for power system designated as “slave” system in a "Power Split" configuration.
- **Delta Voltage:** The offset voltage that the power system designated as “slave” system in a "Power Split" configuration is set to. It is suggested to leave this value at the default (0.5 volts).

- **Proportion Coeff:** The proportional coefficient that the power system designated as “slave” system in a "Power Split" configuration is set to. It is suggested to leave this value at the default (30%).
- **Integral Time:** The integral time that the power system designated as “slave” system in a "Power Split" configuration is set to. It is suggested to leave this value at the default (60 seconds).

The NCU controller uses these parameters to control the load sharing operation between the two power systems.

Depending on the systems’ configurations, their rectifier capacities, their distribution load capacities, and the Power Split configuration; four operating modes can occur.

Low Load Operation

When the total load current demand is lower than the Power Split Current Limit Value, the NCU power system voltage will be increased by the programmed DELTA VOLTAGE setting forcing the NCU power system to carry the load. Make sure that the output voltage does not exceed the battery float range recommended by the manufacturer. In this operating mode, no current will be delivered by the existing power system.

Normal Load Operation

When the total load current demand reaches the Power Split Current Limit Value, the NCU power system operates in output current limit and its output voltage will be decreased (up to the DELTA VOLTAGE setting) in order to regulate the current, allowing the existing power system to deliver the remaining current. Both the NCU power system and the existing power system are now providing current to the load.

High Load Operation

If current demand increases and the existing power system reaches its current limit setting, float voltage will again begin to decrease. When the voltage falls below the float setting minus the DELTA VOLTAGE setting, the NCU system will come out of current limit and now deliver the additional current necessary to satisfy the load. This operation may occur when the batteries are being recharged, such as after a commercial AC failure.

Overload Operation

If the load current is greater than the combined current capacities of the NCU system and the existing power system, both power systems will go into current limit. Both systems and the batteries will feed the load. The output voltage will depend on the conditions of the batteries. This operation occurs if the total capacity of the rectifiers is too low in relation to the need for increased current.

Operating Modes

Figure 1.5 illustrates the four modes of operation described above.

The Normal Load Operation is considered to be the normal mode. In this mode both the NCU system and the existing parallel power system are both delivering load current. This is main purpose of using Power Split, to avoid putting the burden of delivering the entire load onto one of the two power systems.

Requirements and Conditions

The two DC power systems must be connected in parallel as described in “Paralleling the Existing and NCU Power Systems” on page 42.

Before paralleling the two systems, the following conditions must be met for proper Power Split function.

NOTE! *The control features of the combined system are limited to those of the original power system.*

NOTE! *The same type of batteries with an equal amount of cells and the same charging voltages must be used for both systems.*

- The float voltage, equalize voltage, and battery test voltage of the NCU power system must be set to the same levels as that of the existing power system.
- The remote sense, if available and connected, of both the NCU power system and existing power system must be connected to the same point.
- If batteries are used, they must be of the same type.
- All the functions specific to the existing power system and NCU power system and which depend on the voltage or which act on the voltage must be disabled from the existing power system and NCU power system. This includes the following…

  a) any equalization function,

  b) any temperature compensation function,

  c) any charge control function,

  d) any battery discharge test function, and

  e) any invalid current alarm.

In lieu of this, if battery charging and battery test functions are implemented in the existing power system, they can remain if signals for starting are connected from the control system of the existing system to the NCU system.

Paralleling the Existing and NCU Power Systems

Important Safety Instructions

General Safety

DANGER! YOU MUST FOLLOW APPROVED SAFETY PROCEDURES.
Performing the following procedures may expose you to hazards. These procedures should be performed by qualified technicians familiar with the hazards associated with this type of equipment. These hazards may include shock, energy, and/or burns. To avoid these hazards:

a) The tasks should be performed in the order indicated.

b) Remove watches, rings, and other metal objects.

c) Prior to contacting any uninsulated surface or termination, use a voltmeter to verify that no voltage or the expected voltage is present. Check for voltage with both AC and DC voltmeters prior to making contact.

d) Wear eye protection.

e) Use certified and well-maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed.

AC Input Voltages

DANGER! This system operates from AC input voltage capable of producing fatal electrical shock.

DC Output and Battery Voltages

DANGER! Connecting the NCU power system to an existing power system for "Power Split" mode involves working on live equipment carrying live loads. This system produces DC Power and may have a battery source connected to it. Although the DC voltage is not hazardously high, the rectifiers and/or battery can deliver large amounts of current. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact an output terminal or battery terminal or exposed wire connected to an output terminal or battery terminal. NEVER allow a metal object, such as a tool, to contact more than one termination or battery terminal at a time, or to simultaneously contact a termination or battery terminal and a grounded object. Even a momentary short circuit can cause sparking, explosion, and injury. Remove watches, rings, or other jewelry before connecting leads. Cover any live busbars with a canvas sheet to prevent short circuits caused by falling tools or parts.

Preparing the Existing and NCU Power Systems

- Install and turn-up the NCU power system as describe in the installation instructions furnished with the power system.
- Set the float voltage on both the existing and NCU power systems to the same level. Temperature compensation functionality, if used, should be disabled on both power systems.

Paralleling the Systems

- Connect the Battery and Battery Return busbars of the NCU Power System to the main charge busbars (rectifier side of the shunt) on the parallel power system. Size the cable for the largest current between systems.

  Note 1: *The connections between the two power systems should be done with power cables appropriately sized to be capable of carrying the maximum current that can circulate between the two power systems.*

  Note 2: *If the parallel power system incorporates a main plant shunt, the connections of the cables from the NCU power system to the parallel power system shall be made on the main charge busbars (rectifier side of the shunt).*

  Note 3: *To compensate for voltage drop, it is recommended to connect the power system's remote sense leads (if available) to the same point of sensing as the parallel power system.*

  Note 4: *There shall be only one battery return reference (BRR) cable for the two power systems. If the cable is appropriately sized on the parallel power system, keep it as the BRR for both power systems. If the cable is not appropriately sized on the parallel power system, install a new BRR cable and connect it preferably to the NCU power system since the parallel power system may eventually be phased out.*

  Note 5: *If battery disconnect units (BDUs) are used on the new or parallel power system, these shall be wired in such a way as to be all triggered simultaneously in order to prevent any overloading of these.*

  Note 6: *For the size and number of bridge cables between the two power systems, take into consideration the voltage drop, the available connecting points in each system, as well as the fact that these cables are unfused and shall therefore be run on a dedicated cable rack. "C" or "H" taps may be used to make full use of available connecting points.*

  Note 7: *The legacy system retains the function of its controller and the percent of load on each plant is controlled by the NCU. Alarms may be sent individually from each plant, or combined using an NCU Interface Board and the programmable relays resident in the controller.*

  Note 8: *Add a label on both power systems to indicate that these are operating in the Power Split Mode with each other.*

- **Optional Function Connections:** The following signals from the existing system must be connected to digital inputs of the NCU system interface board for these functions to be active: Equalize Charge in Progress, Battery Test in Progress, Load LVD Active, and Battery LVD Active. Otherwise disable these functions.

Programming the NCU Power Split Feature

After an NCU power system has been connected to an existing power system and both systems set for the same float voltage, you will have to configure the Power Split parameters in the NCU.

Procedure

1. In the Web Interface menus, set the Power Split mode to enabled. Navigate to Settings Menu / System / Power System / PowerSplit Mode. Set this parameter to "enabled".
2. Reboot the NCU by pressing ESC and ENT at the same time.
3. Navigate to Settings Menu / System / Power System.
4. Set the "Power Split Current Limit Value" to a value that will force the NCU system's rectifiers to operate in current limiting mode.

NOTE! *The Power Split Current Limit Value must be set lower than the total distribution current from the two plants. The default value is 60% of the NCU power system's rectifier capacity.*

5. Set the "Delta Voltage". This voltage is by default set to 0.5 V but can be readjusted.
    - If the distribution current is lower than 50% of the total capacity of the NCU power system, the "Delta Voltage" can be adjusted to a lower level than 0.5 V to get a system voltage that is closer to the desired float charging voltage.
    - If the voltage drop between the existing system and the NCU system is expected to be >0.5 V, the "Delta Voltage" can be adjusted to a higher level than 0.5 V to get a correct split function.
    - Temperature controlled battery charging cannot be set in the NCU power system in power split mode. If this function is implemented in the existing power system, a limited function within a temperature range of approximately ±15 °C will be achieved if the Delta Voltage is set to a higher level, maximum 2.00 V.
    - If the "Delta Voltage" 0.5 V is considered to be too high, the split function can be tested at various modes of operation to find a lower setting.

Optional Function Setup

Equalize Charge Setup

If the equalize charge function is to be used, equalize charge must be implemented in the existing power system and an equalizing signal from its control unit must be connected to the NCU.

1. In the Web Interface menus, navigate to Settings Menu / Battery charge / Equalize Charge Voltage. Set the "Equalize Charge Voltage" to the same value as the equalize voltage of the existing power system.
2. Using the Web Interface menus (see " Power Split Tab" on page182), select the NCU digital input connected to the existing systems equalize control circuit.

NOTE! *Equalize charging is controlled by the existing power system via an incoming digital signal. The system will remain at the set equalize charge voltage level as long as this signal is active.*

Battery Test Setup

If the battery test function is to be used, battery test must be implemented in the existing power system and a test signal from its control unit must be connected to the NCU.

1. In the Web Interface menus, navigate to Settings Menu / Battery Test.
2. Set the "End Test Voltage" to the same value as the end voltage of the existing power system.

3. Set the “Test Voltage Level” to the same value as the test voltage of the existing power system.
4. Using the Web Interface menus (see “Battery Test Function” on page 177), select the NCU digital input connected to the existing systems battery test control circuit.

NOTE! *Other settings in this menu regarding “Battery Test” are inactive.*

NOTE! *Battery test is controlled by the existing power system via an incoming digital signal. The system will remain at battery test as long as this signal is active.*

Low Voltage Disconnect Setup

If low voltage disconnect functions are to be used, they must be implemented in the existing power system and signals from its control unit must be connected to the NCU.

1. Using the Web Interface menus (see “Battery Test Function” on page 177), select the NCU digital inputs connected to the low voltage disconnect control circuits.

Temperature Compensated Battery Charge

There is no possibility to activate the “Temperature Compensated Battery Charge” function when the NCU power system is configured for “Power Split” mode.

However, the possibility to change the “Delta Voltage” enables the NCU power system to follow the existing power system that has the functionality to a certain limit.

Example: The “Delta Voltage” in the NCU power system is set to 1.0V. The existing power system is set to compensate 3.0 mV/cell/°C. This means that the NCU power system can follow the temperature compensation of the existing; power system in the range of ±14 °C from the set normal battery temperature (3.0 mV x 24 cells x 14 °C = 1.008 V).

Verifying the Operation of the Power Split Feature

After programming the “Power Split” feature, verify its operation as follows.

1. In a Power Split application where the NCU power system is taking the entire load and the rectifiers in the existing power system are all in the standby mode, use an external dry load bank of sufficient capacity to increase the load on the NCU power system over the “POWER SPLIT CURRENT LIMIT” value.
    a) Verify that the NCU power system limits the total output of its rectifiers to the current equivalent to this programmed percentage.
    b) Verify that the NCU power system lowers its output voltage by the value of the programmed “DELTA VOLTAGE”.
    c) Verify that the rectifiers in the existing power system take the additional load as the load increases pass the “POWER SPLIT CURRENT LIMIT” value.
    d) Further increase the load in order to exceed the total capacity of the rectifiers in the existing power system (or shut down some of the rectifiers in the existing power system if the capacity of the external dry load bank is not sufficient). Verify that the NCU power system starts taking the additional load as soon as the total capacity of the rectifiers in the existing power system is exceeded.
2. In a Power Split application where the NCU power system is taking only part of the load (operating continuously at the current level equivalent to the programmed “POWER SPLIT CURRENT LIMIT” percentage) and the rectifiers in the existing power system are taking the rest of the load, use an external dry load bank of sufficient capacity to increase the load in order

to exceed the total capacity of the rectifiers in the existing power system (or shut down some of the rectifiers in the existing power system if the capacity of the external dry load bank is not sufficient).

a) Verify that the NCU power system starts taking the additional load as soon as the total capacity of the rectifiers in the existing power system is exceeded.

2.11 Resolving Alarms

Table 2.3 lists the alarms that are shown in the Web Interface Advance Settings Menu under the Alarms Tab. These are also the possible alarms that display in the alarm screens on the local display and Web Interface. Table 2.3 also provides guidelines for fixing the condition that caused the alarm.

NOTE! *These instructions describe the complete functionality of the controller. Some functionality is dependent on hardware connected to the controller. Some alarms listed may not display in your system or may be named differently. Refer to the NCU Configuration Drawing (C-drawing) furnished with your system.*

Refer also to the NCU Configuration Drawing (C-drawing) furnished with your system for the factory default “Alarm Severity Level” settings and “Alarm Relay” mapping to the available alarms.

Rectifier Lost Alarm Description: The rectifier lost alarm occurs if the NCU updates the inventory and finds that the number of rectifiers is different. Two conditions cause the NCU to update its inventory. The first condition is if the NCU reboots. Every time the NCU starts up it updates the inventory. The second condition is when a rectifier is installed in the system. This causes the NCU to update its inventory. When a rectifier is installed, the NCU re-inventories which clears any “Rect Comm Fail” alarms. The NCU then finds the inventory doesn’t match what it used to and a “Rectifier Lost” alarm is activated.

Table 2.3 Available Alarms

Alarm Name	Alarm Description	Action to Correct
Power System Alarms		
Supervision Unit Fail	Controller self-detection test fails.	Replace the controller.
CAN Communication Failure	CAN bus communications failure. No devices communicating on CAN bus.	Check communications cables.
Outgoing Alarms Blocked	Alarm relays are forced in the "off" state and alarms are blocked from changing the relay state.	Verify why controller setting was changed before changing back.
Maintenance Time Limit Alarm	Controller issues a maintenance alarm.	Perform routine maintenance and reset maintenance timer.
Config Error (Backup Config)	Configuration error 1.	Reload the "SettingParam.tar" file.
Config Error (Default Config)	Configuration error 2.	
Abnormal Load Current	When a load shunt is furnished, the system load current measurement is imbalanced with internally calculated system load current. This is a check to see if the shunt reading is accurate and makes sense.	Check why current is imbalanced. Check what current is not being reported correctly (load, rectifier, battery, etc.).
Overload	Output overload condition.	Check the load.
SPD	Surge protection device needs attention.	Check surge protection device.
Emergency Stop/Shutdown	System in emergency stop or emergency shutdown mode.	Check why the system was placed in this mode.
System Temperature 1 Not Used	Temperature sensor port #1 is not used.	Temperature sensor is enabled but not plugged in.
System Temperature 2 Not Used	Temperature sensor port #2 is not used.	
System Temperature 3 Not Used	Temperature sensor port #3 is not used.	

Alarm Name	Alarm Description	Action to Correct
IB2-1 Temperature 1 Not Used	Temperature sensor port #1 (on IB2-1 Board) is empty.	Temperature sensor is enabled but not plugged in.
IB2-1 Temperature 2 Not Used	Temperature sensor port #2 (on IB2-1 Board) is empty.	
IB2-2 Temperature 1 Not Used	Temperature sensor port #1 (on IB2-2 Board) is empty.	
IB2-2 Temperature 2 Not Used	Temperature sensor port #2 (on IB2-2 Board) is empty.	
EIB-1 Temperature 1 Not Used	Temperature sensor port #1 (on EIB-1 Board) is empty.	
EIB-1 Temperature 2 Not Used	Temperature sensor port #2 (on EIB-1 Board) is empty.	
EIB-2 Temperature 1 Not Used	Temperature sensor port #1 (on EIB-2 Board) is empty.	
EIB-2 Temperature 2 Not Used	Temperature sensor port #2 (on EIB-2 Board) is empty.	
System Temperature 1 Sensor Fail	Temperature sensor #1 failure.	Replace temperature sensor. Note: The alarm "Temp Sensor Fail" will occur if the temperature sensor fails internally or is not plugged in; however, this alarm will be suppressed if "Temp Not Used" alarm is active.
System Temperature 2 Sensor Fail	Temperature sensor #2 failure.	
System Temperature 3 Sensor Fail	Temperature sensor #3 failure.	
IB2-1 Temperature 1 Sensor Fail	Temperature sensor #1 (connected to IB2-1 Board) failure.	Replace temperature sensor. Note: The alarm "Temp Sensor Fail" will occur if the temperature sensor fails internally or is not plugged in; however, this alarm will be suppressed if "Temp Not Used" alarm is active.
IB2-1 Temperature 2 Sensor Fail	Temperature sensor #2 (connected to IB2-1 Board) failure.	
IB2-2 Temperature 1 Sensor Fail	Temperature sensor #1 (connected to IB2-2 Board) failure.	
IB2-2 Temperature 2 Sensor Fail	Temperature sensor #2 (connected to IB2-2 Board) failure.	
EIB-1 Temperature 1 Sensor Fail	Temperature sensor #1 (connected to EIB-1 Board) failure.	
EIB-1 Temperature 2 Sensor Fail	Temperature sensor #2 (connected to EIB-1 Board) failure.	
EIB-2 Temperature 1 Sensor Fail	Temperature sensor #1 (connected to EIB-2 Board) failure.	
EIB-2 Temperature 2 Sensor Fail	Temperature sensor #2 (connected to EIB-2 Board) failure.	
DHCP Failure	The DHCP function is enabled, but effective IP address cannot be acquired.	Verify DHCP IP address.
PLC Config Error	PLC configuration error.	Re-enter the PLC logic functions.
485 Communication Failure	485 communications failure.	--
Observation Summary	Observation alarm summary (one or more alarms designated as minor is active).	Check additional alarms.
Major Summary	Major alarm summary (one or more alarms designated as major is active).	Check additional alarms.
Critical Summary	Critical alarm summary (one or more alarms designated as critical is active).	Check additional alarms.
Rectifier Group Lost///// Secondary NCU Lost	A rectifier group cannot be detected by the controller.	Check communications cables. Check additional alarms.
Over Voltage 1	Output voltage is higher than the Over Voltage 1 Alarm threshold.	Check why system voltage is high. Check the alarm setting.
Over Voltage 2	Output voltage is higher than the Over Voltage 2 Alarm threshold.	

Alarm Name	Alarm Description	Action to Correct
Under Voltage 1	Output voltage is lower than the Under Voltage 1 Alarm threshold.	Check why system voltage is low. If there is a mains failure, check if some load could be switched off in order to prolong the operating time of the plant. If the system load is too high related to rectifier capacity, install additional rectifiers. If the batteries are being recharged, the alarm will cease by itself when battery voltage has increased to the charging level.
Under Voltage 2	Output voltage is lower than the Under Voltage 2 Alarm threshold.	
Over Voltage 1 (24V)	Output voltage is higher than the Over Voltage 1 Alarm threshold.	Check why system voltage is high. Check the alarm setting.
Over Voltage 2 (24V)	Output voltage is higher than the Over Voltage 2 Alarm threshold.	
Under Voltage 1 (24V)	Output voltage is lower than the Under Voltage 1 Alarm threshold.	Check why system voltage is low. If there is a mains failure, check if some load could be switched off in order to prolong the operating time of the plant. If the system load is too high related to rectifier capacity, install additional rectifiers. If the batteries are being recharged, the alarm will cease by itself when battery voltage has increased to the charging level.
Under Voltage 2 (24V)	Output voltage is lower than the Under Voltage 2 Alarm threshold.	
Diesel Run Over Temperature	Diesel generator run over temperature alarm.	Check diesel generator.
DG1 is Running	Diesel generator 1 is running.	--
DG2 is Running	Diesel generator 2 is running.	--
Hybrid is High Load	Diesel generator high load alarm.	Check load on diesel generator.
DG1 Failure	Diesel generator 1 has failed.	Check diesel generator.
DG2 Failure	Diesel generator 2 has failed.	Check diesel generator.
Grid is on	AC is on grid.	--
High Ambient Temperature	Main Ambient Temperature High1 alarm.	Check why temperature is high or low.
Low Ambient Temperature	Main Ambient Temperature Low alarm.	
Very High Ambient Temperature	Main Ambient Temperature High2 alarm.	
Ambient Temp Sensor Fault	Main ambient temperature sensor failure.	Replace temperature sensor.
DI1~DI8 Alarm	NCU Digital input #1 to #8 alarm is active.	Check why alarm is active.
IB Communication Failure	IB Communication Fails	Check why IB communication fails.
System Temperature 1 Very High	Temperature sensor #1 sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
System Temperature 1 High	Temperature sensor #1 sensing temperature higher than high temperature threshold 1.	
System Temperature 1 Low	Temperature sensor #1 sensing temperature lower than low temperature threshold.	
System Temperature 2 Very High	Temperature sensor #2 sensing temperature higher than high temperature threshold 2.	
System Temperature 2 High	Temperature sensor #2 sensing temperature higher than high temperature threshold 1.	
System Temperature 2 Low	Temperature sensor #2 sensing temperature lower than low temperature threshold.	
System Temperature 3 Very High	Temperature sensor #3 sensing temperature higher than high temperature threshold 2.	
System Temperature 3 High	Temperature sensor #3 sensing temperature higher than high temperature threshold 1.	
System Temperature 3 Low	Temperature sensor #3 sensing temperature lower than low temperature threshold.	

Alarm Name	Alarm Description	Action to Correct
IB2-1 Temperature1 Very High	Temperature sensor #1 (connected to IB2-1 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
IB2-1 Temperature1 High	Temperature sensor #1 (connected to IB2-1 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
IB2-1 Temperature1 Low	Temperature sensor #1 (connected to IB2-1 board and set as Ambient) sensing temperature lower than low temperature threshold.	
IB2-1 Temperature2 Very High	Temperature sensor #2 (connected to IB2-1 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
IB2-1 Temperature2 High	Temperature sensor #2 (connected to IB2-1 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
IB2-1 Temperature2 Low	Temperature sensor #2 (connected to IB2-1 board and set as Ambient) sensing temperature lower than low temperature threshold.	
IB2-2 Temperature1 Very High	Temperature sensor #1 (connected to IB2-2 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
IB2-2 Temperature1 High	Temperature sensor #1 (connected to IB2-2 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
IB2-2 Temperature1 Low	Temperature sensor #1 (connected to IB2-2 board and set as Ambient) sensing temperature lower than low temperature threshold.	
IB2-2 Temperature2 Very High	Temperature sensor #2 (connected to IB2-2 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
IB2-2 Temperature2 High	Temperature sensor #2 (connected to IB2-2 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
IB2-2 Temperature2 Low	Temperature sensor #2 (connected to IB2-2 board and set as Ambient) sensing temperature lower than low temperature threshold.	
EIB-1 Temperature1 Very High	Temperature sensor #1 (connected to EIB-1 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
EIB-1 Temperature1 High	Temperature sensor #1 (connected to EIB-1 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
EIB-1 Temperature1 Low	Temperature sensor #1 (connected to EIB-1 board and set as Ambient) sensing temperature lower than low temperature threshold.	
EIB-1 Temperature2 Very High	Temperature sensor #2 (connected to EIB-1 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
EIB-1 Temperature2 High	Temperature sensor #2 (connected to EIB-1 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
EIB-1 Temperature2 Low	Temperature sensor #2 (connected to EIB-1 board and set as Ambient) sensing temperature lower than low temperature threshold.	
EIB-2 Temperature1 Very High	Temperature sensor #1 (connected to EIB-2 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
EIB-2 Temperature1 High	Temperature sensor #1 (connected to EIB-2 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
EIB-2 Temperature1 Low	Temperature sensor #1 (connected to EIB-2 board and set as Ambient) sensing temperature lower than low temperature threshold.	

Alarm Name	Alarm Description	Action to Correct
EIB-2 Temperature2 Very High	Temperature sensor #2 (connected to EIB-2 board and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
EIB-2 Temperature2 High	Temperature sensor #2 (connected to EIB-2 board and set as Ambient) sensing temperature higher than high temperature threshold 1.	
EIB-2 Temperature2 Low	Temperature sensor #2 (connected to EIB-2 board and set as Ambient) sensing temperature lower than low temperature threshold.	
SMTemperature1 Temperature1 Very High	Temperature sensor #1 (connected to SM-Temp 1 and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp1 Temp1 High	Temperature sensor #1 (connected to SM-Temp 1 and set as Ambient) sensing temperature higher than high temperature threshold 1.	
SMTemp1 Temp1 Low	Temperature sensor #1 (connected to SM-Temp 1 and set as Ambient) sensing temperature lower than low temperature threshold.	
…	…	…
SMTemp1 Temp8 Very High	Temperature sensor #8 (connected to SM-Temp 1 and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp1 Temp8 High	Temperature sensor #8 (connected to SM-Temp 1 and set as Ambient) sensing temperature higher than high temperature threshold 1.	
SMTemp1 Temp8 Low	Temperature sensor #8 (connected to SM-Temp 1 and set as Ambient) sensing temperature lower than low temperature threshold.	
…	…	…
SMTemp8 Temp1 Very High	Temperature sensor #1 (connected to SM-Temp 8 and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp8 Temp1 High	Temperature sensor #1 (connected to SM-Temp 8 and set as Ambient) sensing temperature higher than high temperature threshold 1.	
SMTemp8 Temp1 Low	Temperature sensor #1 (connected to SM-Temp 8 and set as Ambient) sensing temperature lower than low temperature threshold.	
…	…	…
SMTemp8 Temp8 Very High	Temperature sensor #8 (connected to SM-Temp 8 and set as Ambient) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
SMTemp8 Temp8 High	Temperature sensor #8 (connected to SM-Temp 8 and set as Ambient) sensing temperature higher than high temperature threshold 1.	
SMTemp8 Temp8 Low	Temperature sensor #8 (connected to SM-Temp 8 and set as Ambient) sensing temperature lower than low temperature threshold.	
High Load Level1	Load current above high level 1 setting.	Check why load current is high.
High Load Level2	Load current above high level 2 setting.	
DI9	NCU Digital input #9 alarm is active.	Check why alarm is active.
DI10	NCU Digital input #10 alarm is active.	
DI11	NCU Digital input #11 alarm is active.	
DI12	NCU Digital input #12 alarm is active.	

Alarm Name	Alarm Description	Action to Correct
Relay 14 Test	Testing Relay DO1.4	--
Relay 15 Test	Testing Relay DO15.	
Relay 16 Test	Testing Relay DO16.	
Relay 17 Test	Testing Relay DO17.	
Over Maximum Power Alarm	NOT IMPLEMENTED AT THIS TIME	NOT IMPLEMENTED AT THIS TIME
SMS Modem Fail	SMS modem has failed.	Check why SMS modem failed.
Manual State	NCU in manual state.	--
SNMP Config Error	SNMP configuration error.	--
DG1 Test Start Fail	Fails to start the DG1 Test.	Check why Start DG1 Test fails.
DG2 Test Start Fail	Fails to start the DG2 Test.	Check why Start DG2 Test fails.
DG1 Test Stop Fail	Fails to stop the DG1 Test.	Check why Stop DG1 Test fails.
DG2 Test Stop Fail	Fails to stop the DG2 Test.	Check why Stop DG2 Test fails.
DG1 is Testing	DG1 is testing	--
DG2 is Testing	DG2 is testing	--
Hybrid Shift Active	Hybrid shift is actived	--
SolarShiftSOC Disabled BMSFail	If communication with BMS is lost, or if the SOC of the BMS battery drops below DG Stop Point xxx SOC during time interval DG Stop BMS xxx Start Time and DG Stop BMS xxx Stop Time.	--
Mains Failure	AC input power failure.	--
DG1 Failed to Stop	Fails to stop the DG1.	Check why Stop DG1 fails.
DG2Failed to Stop	Fails to stop the DG2.	Check why Stop DG2 fails.
Internal Communication Failure	Internal has lost communications with the controller.	--
Rectifier Group Alarms		
Multi-Rectifiers Failure	More than one rectifier has failed or a Mains Failure.	Check input voltage to rectifiers. Replace rectifiers.
Rectifier Lost	A rectifier cannot be detected by the controller.	Reset the Rectifier Lost alarm. Replace defective rectifier.
ECO Mode Active	Rectifier Energy Optimization Mode is enabled.	Check why system was placed into this mode.
All Rectifiers Comm Fail	No response from all rectifiers.	Check the connectors and cables or the CAN loop. Replace the controller.
ECO Cycle Alarm	If Energy Optimization Mode is enabled and the controller oscillates in and out of Energy Optimization more than 5 times, this alarm is generated.	Check for other alarms. Reset this alarm.
Low Rectifier Capacity	Rectifier capacity is low.	--
High Rectifier Capacity	Rectifier capacity is high.	--
Rectifier Alarms		
AC Input Failure	No AC input power to a rectifier.	Check why no AC input power available.
Rectifier High Temperature	A rectifier has a high temperature condition.	Check why temperature is high.
Rectifier Fault	A rectifier has a fault condition.	Refer to Rectifier User Manual for troubleshooting information.
Overvoltage	A rectifier has an overvoltage condition.	
Rectifier Protected	A rectifier is in protected mode.	
Fan Failure	A rectifier's fan has failed.	Replace fan.
Current Limit	NOT IMPLEMENTED AT THIS TIME	NOT IMPLEMENTED AT THIS TIME
Communication Fail	A rectifier has lost communications with the controller.	Check communications cables. Reset the Communication Fail alarm. Replace the rectifier.

Alarm Name	Alarm Description	Action to Correct
Derated	A rectifier is in output power derating mode.	Refer to Rectifier User Manual for troubleshooting information.
Current Sharing Alarm	A rectifier has a current sharing alarm.	
AC Under Voltage Protection (Three Phase Rectifier's Only)	A rectifier is in under voltage protection mode. Example: When the rectifier's AC voltage is between a predefined AC value (see Rectifier User's Manual) and the rectifier's power draw is greater than a predefined power level (see Rectifier's User's Manual), you will get the alarm "AC Under Voltage Protection".	
DC Output Shut Off	When the rectifier is protected, or the controller shut off the DC output.	--
Rectifier Group 2 [3, 4] Alarms		
Multi-Rectifiers Failure	No response from all rectifiers.	Check the connectors and cables or the CAN loop. Replace the controller.
Rectifier Lost	A rectifier cannot be detected by the controller.	Reset the Rectifier Lost alarm. Replace defective rectifier.
All Rectifiers Comm Fail	A rectifier has lost communications with the controller.	Reset the Comm Fail alarm. Replace defective rectifier.
ECO Mode Active	The rectifier gets into the ECO mode	--
ECO Cycle Alarm	The rectifier gets into the ECO cycle mode.	--
Low Rectifier Capacity	The rectifier capacity is low.	Check why the rectifier capacity is low.
High Rectifier Capacity	The rectifier capacity is high	Check why the rectifier capacity is high.
Group I [II, III] Rectifier Alarms		
AC Input Failure	No AC input power to a rectifier.	Check why no AC input power available.
Rectifier High Temperature	A rectifier has a high temperature condition.	Check why temperature is high.
Rectifier Fault	A rectifier has a fault condition.	Refer to Rectifier User Manual for troubleshooting information.
Overvoltage	A rectifier has an over voltage condition.	
Rectifier Protected	A rectifier is in protected mode.	
Fan Failure	A rectifier's fan has failed.	Replace fan.
Power Limit	NOT IMPLEMENTED AT THIS TIME	NOT IMPLEMENTED AT THIS TIME
Rectifier Communication Fail	A rectifier has lost communications with the controller.	Check communications cables. Reset the Communication Fail alarm. Replace the rectifier.
Derated	A rectifier is in output power derating mode.	Refer to Rectifier User Manual for troubleshooting information.
Current Sharing Alarm	A rectifier has a current sharing alarm.	
AC Undervoltage Protection	A rectifier is in under voltage protection mode.	
Inverter Group (module must be present in system) Alarms		
Inverter Lost	An inverter cannot be detected by the controller.	Reset the Inverter Lost Alarm. Replace defective inverter.
All Inverters Communication Failure	No response from all inverters.	Check the connectors and cables or CAN loop.
Inverter High Load	Inverter has high load.	Check why inverter has high load.
Synchronization Phase Failure	Inverters phase not in sync.	Check cables between inverter shelves. Replace inverter.
AC Out Setting Error	AC Out setting is error.	--
Synchronization Frequency Failure	Inverter's frequency not in sync.	--
Synchronization Mode Failure	Inverter's mode not in sync.	--
Redundancy Warning	Redundancy is about to be lost, for example if number of expected inverters are 6, redundancy is 2, and there are 5 inverters in the system.	--

Alarm Name	Alarm Description	Action to Correct
Redundancy Lost	Redundancy is lost, for example if number of expected inverters are 6, redundancy is 1, and there are 5 inverters in the system.	Put same number of inverters in the system.
Redundancy Lost+1	Redundancy is lost, for example if number of expected inverters are 6, redundancy is 1, and there are 4 inverters in the system.	Put same number of inverters in the system.
Redundancy Lost+2	Redundancy is lost, for example if number of expected inverters are 6, redundancy is 1, and there are 3 inverters in the system.	Put same number of inverters in the system.
Redundancy Lost+3	Redundancy is lost, for example if number of expected inverters are 6, redundancy is 1, and there are 2 inverters in the system.	Put same number of inverters in the system.
Inverter (module must be present in system) Alarms		
No Response	No response from inverter.	Reset the Inverter Lost Alarm. Replace defective inverter.
Inverter Fail	An inverter has a fault condition.	Refer to Inverter User Manual for troubleshooting information.
Input AC Volt Abnormal	An inverter has an AC input voltage condition.	--
Input DC Volt Abnormal	An inverter has a DC input voltage condition.	--
Over Temperature	An inverter has an over temperature condition.	--
Fan Fail	An inverter has a fan condition.	--
High Load	An inverter is near to being overloaded condition.	--
Over Load	An inverter has an overload condition.	Check why inverter is over loaded.
Module ID Repeated	An inverter has an ID repeated.	Refer to Inverter User Manual for troubleshooting information.
Parallel Flow Anomaly	An inverter has a parallel flow condition.	--
Parallel Out of Sync	An inverter has a parallel sync condition.	--
Parallel CAN Comm Fail	An inverter has a parallel CAN Comm condition.	--
Phase Anomaly	An inverter has a Phase condition.	--
Inverter DC Only Mode	An inverter is in DC Only mode	--
Software Remote Stop	An inverter has been stopped by software.	--
Hardware Remote Stop	An inverter has been stopped by hardware.	--
Low Output Voltage	An inverter has a low output voltage.	--
Inverter Derating	An inverter is derating	--
Battery Group Alarms		
Short Battery Test Running	Battery is in short time test mode.	--
Equalize Charge for Test	Battery is in equalize charge test mode.	--
Manual Test	Battery is in manual battery discharge test mode.	--
Planned Test	Battery is in planned battery test mode.	--
AC Fail Test	AC power has been switched off to the rectifiers to perform a battery discharge test.	--
Manual EQ Charge	Battery is in manual equalize charging mode.	--
Automatic Equalize	Battery is in automatic equalize charging mode.	--

Alarm Name	Alarm Description	Action to Correct
Cyclic EQ Charge	Battery is in cyclic equalize charging mode.	--
Master Equalize Charge in Progr	In Power Split mode, “Slave” starts equalize charging with the “Master”.	--
Master Battery Test in Progress	In Power Split mode, “Slave” starts the test with the “Master”.	--
Discharge Current Imbalance	Battery distribution current imbalance alarm.	The currents from two groups of batteries are not equal. Check the batteries.
Abnormal Battery Current	The equalize charging current exceeds the alarm setting.	Check the alarm setting.
Temperature Compensation Active	Battery charge temperature compensation is active.	--
Battery Current Limit Active	Battery is in current limit.	--
Bad Battery	Battery test fails.	Check the batteries.
Battery Discharge	Battery is discharging.	A battery test is active (the discharge test will stop automatically). There is a mains failure (check that it is not caused by open AC input circuit breaker). The system load is higher than rectifier capacity, causing the batteries to discharge (install additional rectifiers).
Battery Test Failure	Battery test fails.	Check the batteries.
Very High Compensation Temperature	Compensation temperature sensor sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High Compensation Temperature	Compensation temperature sensor sensing temperature higher than high temperature threshold 1.	
Low Compensation Temperature	Compensation temperature sensor sensing temperature lower than low temperature threshold.	
Compensation Sensor Fault	Temperature Compensation temperature sensor failure.	Replace temperature sensor.
Very High Temp1	Temperature sensor #1 sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High Temp 1	Temperature sensor #1 sensing temperature higher than high temperature threshold 1.	
Low Temp 1	Temperature sensor #1 sensing temperature lower than low temperature threshold.	
Very High Temp2	Temperature sensor #2 sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High Temp 2	Temperature sensor #2 sensing temperature higher than high temperature threshold 1.	
Low Temp 2	Temperature sensor #2 sensing temperature lower than low temperature threshold.	
Very High Temp3 (OB)	Temperature sensor #3 sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High Temp 3 (OB)	Temperature sensor #3 sensing temperature higher than high temperature threshold 1.	
Low Temp 3 (OB)	Temperature sensor #3 sensing temperature lower than low temperature threshold.	
Very High IB2 Temp1	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High IB2 Temp1	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 1.	
Low IB2 Temp1	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature lower than low temperature threshold.	

Alarm Name	Alarm Description	Action to Correct
Very High IB2 Temp2	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High IB2 Temp2	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 1.	
Low IB2 Temp2	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature lower than low temperature threshold.	
Very High EIB Temp1	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High EIB Temp1	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 1.	
Low EIB Temp1	Temperature sensor #1 (connected to IB2 board and set as Battery) sensing temperature lower than low temperature threshold.	
Very High EIB Temp2	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High EIB Temp2	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature higher than high temperature threshold 1.	
Low EIB Temp2	Temperature sensor #2 (connected to IB2 board and set as Battery) sensing temperature lower than low temperature threshold.	
Very High at Temp 8	Temperature sensor #1 (connected to Temp 8 and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High at Temp 8	Temperature sensor #1 (connected to Temp 8 and set as Battery) sensing temperature higher than high temperature threshold 1.	
Low at Temp 8	Temperature sensor #1 (connected to Temp 8 and set as Battery) sensing temperature lower than low temperature threshold.	
.....	.....	.....
Very High at Temp 71	Temperature sensor #1 (connected to Temp 71 and set as Battery) sensing temperature higher than high temperature threshold 2.	Check why temperature is high or low.
High at Temp 71	Temperature sensor #1 (connected to Temp 71 and set as Battery) sensing temperature higher than high temperature threshold 1.	
Low at Temp 71	Temperature sensor #1 (connected to Temp 71 and set as Battery) sensing temperature lower than low temperature threshold.	
Very High BTRM Temperature	Battery temperature (monitored by the sensor set as BTRM) is higher than the BTRM Temperature Alarm 2 threshold.	Check why temperature is high or low.
High BTRM Temperature	Battery temperature (monitored by the sensor set as BTRM) is higher than the BTRM Temperature Alarm 1 threshold.	
BTRM Temperature Sensor Fault	BTRM temperature sensor failure.	Replace temperature sensor.
Li-Ion Battery Lost	A Li-Ion Battery cannot be detected by the controller.	Check communications cables. Clear the Li-Ion Battery Lost alarm.
1 Li-Ion Battery Disconnect	One (1) Li-Ion Battery is disconnected.	Check why the Li-Ion Battery disconnected.
2+Li-Ion Battery Disconnect	Two (2) or more Li-Ion Batteries are disconnected.	Check why the Li-Ion Batteries disconnected.
1 Li-Ion Battery No Reply	One (1) Li-Ion Battery has lost communications with the controller.	Check communications cables. Clear the Li-Ion Communication Fail alarm.
2+Li-Ion Battery No Reply	Two (2) Li-Ion Battery has lost communications with the controller.	Check communications cables. Clear the Li-Ion Communication Fail alarm.

Alarm Name	Alarm Description	Action to Correct
Inventory Update In Process	Only available if NCU configuration includes the Li-Ion battery interface. Li-Ion Battery inventory being updated.	--
ABCL is active	Only available if NCU configuration includes the Li-Ion battery interface. Active Battery Charge Current Limit is active.	--
Battery Charge Prohibited Alarm	Only available if NCU configuration includes the Li-Ion battery interface. A battery charge prohibited alarm is active.	See why alarm is active.
Battery 1 Mid Point Alarm	This alarm is only applicable for NS5100 Access systems, where you can monitor battery status using mid- point measurement. This alarm corresponds to EIB alarm Bad Battery Block when it is setup for mid- point monitoring, but it does not require an EIB. Instead, some inputs directly on NCU are used.	--
Battery 2 Mid Point Alarm	This alarm is only applicable for NS5100 Access systems, where you can monitor battery status using mid- point measurement. This alarm corresponds to EIB alarm Bad Battery Block when it is setup for mid- point monitoring, but it does not require an EIB. Instead, some inputs directly on NCU are used.	--
Battery Test Multiple Abort	The battery test has been aborted 3 times.	Investigate why test was aborted
BT Interrupted-Main Fail	There is a mains failure during a battery test.	Check why mains fail.
AC is on Standby	AC is on Standby mode.	--
PLS Control by SOC failed	BMS SOC is less than "Peak Load Shift Batt SOC" or system voltage is less than "Peak Load Shift Volt" when Peak Load Shift is active.	--
Split Charging Active	Split charging function is active	--
Battery 1 Alarms		
Battery Current Limit Exceeded	Battery current limit point is exceeded.	--
Over Battery Current	Battery is in over current.	--
Low Capacity	Battery has low capacity.	Check the batteries.
Battery Current Imbalance Alarm	Battery distribution current imbalance alarm.	The currents from two groups of batteries are not equal. Check the batteries.
Battery Current High 1 Curr	Current above High limit.	Check why current is high.
Battery Current High 2 Curr	Current above Very High limit.	
Battery Fuse Alarms		
Fuse 1 Alarm	Fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
…	…	
Fuse 6 Alarm	Fuse #6 is open.	
SMDU Battery Fuse Unit Alarms (SMDU Module must be present in system)		
Batt Fuse 1 Alarm	Battery fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
…	…	
Batt Fuse 6 Alarm	Battery fuse #4 is open.	
SMDU Battery Alarms (SMDU Module must be present in system)		
Exceed Current Limit	Battery current limit point is exceeded.	--
Over Battery Current	Battery is in over current.	--
Low Capacity	Battery has low capacity.	Check the batteries.

Alarm Name	Alarm Description	Action to Correct
SM Battery Alarms (SM-BAT Module must be present in system)		
Current Limit Exceeded	Battery is in over current.	--
Over Battery Current	Battery current is high.	--
Battery Leakage	Battery has leakage current.	Check the batteries.
Low Acid Level	Battery has low acid level.	Check the batteries.
Battery Disconnected	Battery disconnection is active.	--
High Battery Temperature	Battery has high temperature condition.	--
Low Battery Temperature	Battery has low temperature condition.	--
Cell Voltage Difference	Battery cell voltage difference detected.	Check the batteries.
SM-BAT Unit Failure	Battery monitoring device has failed.	Replace device.
Battery Temperature Sensor Failure	Battery temperature sensor has failed.	Replace temperature sensor.
Low Capacity	Battery has low capacity.	Check the batteries.
Battery Not Responding	Battery monitoring device has lost communications with the controller.	Check communications cables.
Temperature Sensor not Used	No battery temperature sensor.	--
DC Distribution Alarms		
Over Voltage1	DC voltage is high.	Check why DC voltage is high.
Over Voltage2	DC voltage is very high.	
Under Voltage1	DC voltage is low.	Check why DC voltage is low.
Under Voltage2	DC voltage is very low.	
Over Voltage1 (24V)	DC voltage is high(24V).	Check why DC voltage is high.
Over Voltage2 (24V)	DC voltage is very high(24V).	
Under Voltage1 (24V)	DC voltage is low(24V).	Check why DC voltage is low.
Under Voltage2 (24V)	DC voltage is very low(24V).	
Current High Current	Current above High limit.	Check why current is high.
Current Very High Current	Current above Very High limit.	
Current High 1 Curr	Current above High limit.	Check why current is high.
Current High 2 Curr	Current above Very High limit.	
DC Fuse Unit Alarms		
Fuse 1 Alarm	DC output fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
…	…	
Fuse 12 Alarm	DC output fuse #12 is open.	
SMDU DC Fuse Alarms (SMDU Module must be present in system)		
Fuse 1 Alarm	DC output fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
…	…	
Fuse 16 Alarm	DC output fuse #16 is open.	
SMDUP1 [2, 3, 4, 5, 6, 7, 8] DC Fuse Alarms (SMDU+ Module must be present in system)		
Fuse 1 Alarm	DC output fuse #1 is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
…	…	
Fuse 25 Alarm	DC output fuse #25 is open.	
LVD Unit Alarms (Low voltage disconnect must be present in system)		
LVD 1 Disconnect	LVD1 contactor is in disconnect mode.	--

Alarm Name	Alarm Description	Action to Correct
LVD 2 Disconnect	LVD2 contactor is in disconnect mode.	--
LVD 1 Fail	LVD1 contactor has failed.	Check the contactor functions. Replace the contactor.
LVD 2 Fail	LVD2 contactor has failed.	
LVD3 Unit Alarms		
LVD 3 Disconnect	LVD3 contactor is in disconnect mode.	--
LVD 3 Fail	LVD3 contactor has failed.	Check the contactor functions. Replace the contactor.
SMDU LVD Alarms (SMDU Module must be present in system)		
LVD 1 Disconnect	LVD1 contactor is in disconnect mode.	--
LVD 2 Disconnect	LVD2 contactor is in disconnect mode.	--
LVD 1 Contactor Fail	LVD1 contactor has failed.	Check the contactor functions. Replace the contactor.
LVD 2 Contactor Fail	LVD2 contactor has failed.	
Rectifier AC Alarms		
High Line Voltage L1-L2	Voltage between Line 1 and Line 2 is higher than the High Line Voltage Alarm threshold.	Check why voltage is high.
Very High Line Voltage L1-L2	Voltage between Line 1 and Line 2 is higher than the Very High Line Voltage Alarm threshold.	
Low Line Voltage L1-L2	Voltage between Line 1 and Line 2 is lower than the Low Line Voltage Alarm threshold.	Check why voltage is low.
Very Low Line Voltage L1-L2	Voltage between Line 1 and Line 2 is lower than the Very Low Line Voltage Alarm threshold.	
High Line Voltage L2-L3	Voltage between Line 2 and Line 3 is higher than the High Line Voltage Alarm threshold.	Check why voltage is high.
Very High Line Voltage L2-L3	Voltage between Line 2 and Line 3 is higher than the Very High Line Voltage Alarm threshold.	
Low Line Voltage L2-L3	Voltage between Line 2 and Line 3 is lower than the Low Line Voltage Alarm threshold.	Check why voltage is low.
Very Low Line Voltage L2-L3	Voltage between Line 2 and Line 3 is lower than the Very Low Line Voltage Alarm threshold.	
High Line Voltage L3-L1	Voltage between Line 3 and Line 1 is higher than the High Line Voltage Alarm threshold.	Check why voltage is high.
Very High Line Voltage L3-L1	Voltage between Line 3 and Line 1 is higher than the Very High Line Voltage Alarm threshold.	
Low Line Voltage L3-L1	Voltage between Line 3 and Line 1 is lower than the Low Line Voltage Alarm threshold.	Check why voltage is low.
Very Low Line Voltage L3-L1	Voltage between Line 3 and Line 1 is lower than the Very Low Line Voltage Alarm threshold.	
High Phase Voltage L1	Line 1 voltage is above high voltage threshold.	Check why voltage is high.
Very High Phase Voltage L1	Line 1 voltage is above very high voltage threshold.	
Low Phase Voltage L1	Line 1 voltage is below low voltage threshold.	Check why voltage is low.
Very Low Phase Voltage L1	Line 1 voltage is below very low voltage threshold.	
High Phase Voltage L2	Line 2 voltage is above high voltage threshold.	Check why voltage is high.
Very High Phase Voltage L2	Line 2 voltage is above very high voltage threshold.	
Low Phase Voltage L2	Line 2 voltage is below low voltage threshold.	Check why voltage is low.
Very Low Phase Voltage L2	Line 2 voltage is below very low voltage threshold.	
High Phase Voltage L3	Line 3 voltage is above high voltage threshold.	Check why voltage is high.
Very High Phase Voltage L3	Line 3 voltage is above very high voltage threshold.	

Alarm Name	Alarm Description	Action to Correct
Low Phase Voltage L3	Line 3 voltage is below low voltage threshold.	Check why voltage is low.
Very Low Phase Voltage L3	Line 3 voltage is below very low voltage threshold.	
Mains Failure	Commercial AC power failure.	Check why no commercial AC power.
IB2-1 (Interface Board) Alarms (IB2-1 must be present in system)		
Communication Fail	IB2-1 board has lost communications with the controller.	Check communications cables.
DI1 Alarm	Digital input #1 alarm is active.	Check why alarm is active.
...	...	
DI7 Alarm	Digital input #7 alarm is active.	
DI8 ESTOP	Digital input #8 alarm is active.	
IB2-1 D01 Test	Testing Relay 1 (on IB2-1 Board).	--
...	...	
IB2-1 D08 Test	Testing Relay 8 (on IB2-1 Board).	
IB2-2 (Interface Board) Alarms (IB2-2 must be present in system)		
Communication Fail	IB2-2 board has lost communications with the controller.	Check communications cables.
DI1 Alarm	Digital input #1 alarm is active.	Check why alarm is active.
...	...	
DI7 Alarm	Digital input #7 alarm is active.	
DI8 Alarm	Digital input #8 alarm is active.	
IB2-2 D01 Test	Testing Relay 1 (on IB2-2 Board).	--
...	...	
IB2-2 D08 Test	Testing Relay 8 (on IB2-2 Board).	
EIB-1 (Extended Interface Board) Alarms (EIB-1 board must be present in system)		
EIB Communication Fail	EIB-1 board has lost communications with the controller.	Check communications cables.
Bad Battery Block	Battery block fails.	Check batteries.
EIB-1 D01 Test	Testing Relay 1 (on EIB-1 Board).	--
...	...	
EIB-1 D05 Test	Testing Relay 5 (on EIB-1 Board).	
Current1 High Curr	Current 1 above High limit.	Check why current is high.
Current1 Very High Curr	Current 1 above Very High limit.	
Current2 High Curr	Current 2 above High limit.	
Current2 Very High Curr	Current 2 above Very High limit.	
Current3 High Curr	Current 3 above High limit.	
Current3 Very High Curr	Current 3 above Very High limit.	
EIB-1 (Extended Interface Board) Battery Alarms (EIB-1 Board must be present in system)		
Battery Current Limit Exceeded	Battery current limit point is exceeded.	--
Battery Over Current	Battery is in over current.	--
Battery Low Capacity	Battery has low capacity.	Check the batteries.
EIB-2 (Extended Interface Board) Alarms (EIB-2 board must be present in system)		
EIB Communication Fail	EIB-2 board has lost communications with the controller.	Check communications cables.
Bad Battery Block	Battery block fails.	Check batteries.

Alarm Name	Alarm Description	Action to Correct
Testing Relay 9	Testing Relay 9 (on EIB-2 Board).	--
…	…	
Testing Relay 13	Testing Relay 13 (on EIB-2 Board).	
Current1 High Current	Current 1 above High limit.	Check why current is high.
Current1 Very High Current	Current 1 above Very High limit.	
Current2 High Current	Current 2 above High limit.	
Current2 Very High Current	Current 2 above Very High limit.	
Current3 High Current	Current 3 above High limit.	
Current3 Very High Current	Current 3 above Very High limit.	
Current1 High 1 Current	Current 1 above High limit.	
Current1 High 2 Current	Current 1 above Very High limit.	
Current2 High 1 Current	Current 2 above High limit.	
Current2 High 2 Current	Current 2 above Very High limit.	
Current3 High 1 Current	Current 3 above High limit.	
Current3 High 2 Current	Current 3 above Very High limit.	
EIB-2 (Extended Interface Board) Battery Alarms (EIB-2 Board must be present in system)		
Battery Current Limit Exceeded	Battery current limit point is exceeded.	--
Battery Over Current	Battery is in over current.	--
Battery Low Capacity	Battery has low capacity.	Check the batteries.
SMDU Unit 1 [2, 3, 4, 5, 6, 7, 8] Alarms (SMDU Module must be present in system)		
Under Voltage	Distribution voltage is below under voltage threshold.	Check why system voltage is low.
Over Voltage	Distribution voltage is above over voltage threshold.	Check why system voltage is high.
Communication Fail	The SMDU 1 has lost communications with the Controller.	Check communications cables.
Current1 High Current	Current 1 above High limit.	Check why current is high.
Current1 Very High Current	Current 1 above Very High limit.	
…	…	
…	…	
Current5 High Current	Current 5 above Very High limit.	
Current5 Very High Current	Current 5 above Very High limit.	
Shunt1 Coefficient Conflict	Shunt 1 coefficient conflicting.	Verify shunt size.
…	…	
Shunt5 Coefficient Conflict	Shunt 4 coefficient conflicting.	
Current1 High Curr	Current 1 above High limit.	Check why current is high.
Current1 Very High Curr	Current 1 above Very High limit.	
…	…	
…	…	
Current5 High Curr	Current 5 above High limit.	
Current5 Very High Curr	Current 5 above Very High limit.	
Converter Group Alarms		
Multiple Converters Fail	More than one converter has failed.	Check input voltage to converters. Replace converters.
Converter Lost	A converter cannot be detected by the Controller.	Reset the Converter Lost alarm. Replace defective converter.
All Converters Comm Fail	No response from all converters.	Check the connectors and cables or the CAN loop. Replace the controller.
Over Current	Over current condition exists.	Check why.
Converter Protect	A converter is in protected mode.	Refer to Converter User Manual for troubleshooting information.

Alarm Name	Alarm Description	Action to Correct
Converter Alarms		
Communication Fail	A converter has lost communications with the controller.	Check communications cables. Reset the Communication Fail alarm. Replace the converter.
Over Temperature	A converter has an over temperature condition.	Check why temperature is high.
HVSD Alarm	A converter has an overvoltage condition.	Refer to Converter User Manual for troubleshooting information.
Fan Fail	A converter's fan has failed.	Replace fan.
Power Limit	NOT IMPLEMENTED AT THIS TIME	NOT IMPLEMENTED AT THIS TIME
Low Input Volt	Input voltage to a converter is low.	--
Converter Fail	A converter has a fault condition.	Refer to Converter User Manual for troubleshooting information.
EEPROM Fail	A converter's EEPROM has failed.	
Thermal Shutdown	A converter is in thermal shutdown.	
Mod ID Overlap	Converter module ID's overlap.	--
Under Voltage	A converter has an under-voltage condition. (The hysteresis value is 2V.)	--
Over Voltage	A converter has an over voltage condition. (The hysteresis value is 2V.)	--
Under Voltage (24V)	A converter has an under-voltage condition. (The hysteresis value is 1V.)	--
Over Voltage (24V)	A converter has an over voltage condition. (The hysteresis value is 1V.)	--
Converter Summary Alarm	Converter alarm summary (one or more alarms designated as converter is active).	"Manufacturer Use" Only.
SMDUP 1 [2, 3, 4, 5, 6, 7, 8] Unit Alarms (SMDU+ Module must be present in system)		
Communication Fail	Communications failure.	Check communications cables.
Current1 High Current	Current 1 above High limit.	--
Current1 Very High Current	Current 1 above Very High limit.	--
…	…	--
…	…	--
Current25 High Current	Current 25 above High limit.	--
Current25 Very High Current	Current 25 above Very High limit.	--
Shunt Coefficient Conflict	Shunt coefficient conflicting.	Verify shunt size.
Fuel Tank Group Alarms		
Fuel Group Communication Failure	Fuel tank group communication failure.	Check communications cables.
SMIO Generic Unit 1 Alarms (SM-IO Module must be present in system)		
SMIO Failure	SMIO has failed.	--
SMIO Generic Unit 3 [4, 5, 6, 7, 8] Alarms (SM-IO Module must be present in system)		
High Analog Input 1 Alarm	Input #1 above high alarm threshold.	--
Low Analog Input 1 Alarm	Input #1 below low alarm threshold.	--
…	…	--
…	…	--
High Analog Input 5 Alarm	Input #5 above high alarm threshold.	--
Low Analog Input 5 Alarm	Input #5 below low alarm threshold.	--

Alarm Name	Alarm Description	Action to Correct
High Frequency Input Alarm	Input frequency above high frequency alarm threshold.	--
Low Frequency Input Alarm	Input frequency below low frequency alarm threshold.	--
SMIO Failure	SM-IO board failure.	Replace the board.
Testing Relay 1	Testing Relay 1.	--
Testing Relay 2	Testing Relay 2.	
Testing Relay 3	Testing Relay 3.	
Diesel Generator Group Alarms		
Diesel Test in Progress	Diesel test in progress.	--
Diesel Generator Test Failure	Diesel test failed.	--
Diesel Generator Alarms		
Low DC Voltage	Generator has low DC voltage.	--
Diesel Generator Supervision Fai	Generator monitoring device has failed.	--
Diesel Generator Failure	Generator has failed.	--
Diesel Generator Connected	Generator is connected to the system.	--
Low Fuel Level	Generator has low fuel level.	--
High Water Temperature	Generator has high water temperature.	--
Low Oil Pressure	Generator has low oil pressure.	--
Periodical Maintenance Required	Periodical maintenance is required to be performed.	--
SMDUH Unit 1 [2, 3, 4, 5, 6, 7, 8] Alarms (SMDUH Module must be present in system)		
Under Voltage	Distribution voltage is below low voltage threshold.	Check why system voltage is low.
Over Voltage	Distribution voltage is above high voltage threshold.	Check why system voltage is high.
Communication Fail	The SMDUH has lost communications with the controller.	Check communications cables.
OBFuel Tank Alarms		
High Fuel Level Alarm	Fuel tank high level alarm.	--
Low Fuel Level Alarm	Fuel tank low level alarm.	--
Fuel Theft Alarm	Fuel tank theft alarm.	--
Tank Height Error	Fuel tank height error.	--
Fuel Tank Config Error	Fuel tank configuration error.	--
SM Temp Group Alarms (SM-Temp Module must be present in system)		
SM Temp Lost	SM-Temp cannot be detected by the controller.	Reset the SMTemp Lost alarm. Replace defective SM-Temp.
SM Temp 1-8 Alarms (SM-Temp Module must be present in system)		
Communication Fail	SM-Temp has lost communications with the controller.	Check communications cables.
Temperature sensor 1 Shorted	Probe shorted.	Replace temperature sensor.
...	...	
Temperature sensor 8 Shorted	Probe shorted.	
Temperature sensor 1 Open	Probe open.	Replace temperature sensor.
...	...	
Temperature sensor 8 Open	Probe open.	

Alarm Name	Alarm Description	Action to Correct
DC Meter Group Alarms (DC Meter must be present in system)		
DC Meter Lost	DC meter cannot be detected by the controller.	Reset the DC Meter Lost alarm. Replace defective DC Meter.
DC Meter Alarms (DC Meter must be present in system)		
Communication Fail	DC meter has lost communications with the controller.	Check communications cables.
Solar Converter Group		
Multiple Solar Converter Failure	Multiple solar converter has failed.	Replace the solar converter.
Solar Converter Lost	Solar converter is lost.	Replace the solar converter.
All Solar Converters Comm Fail	The communication of all solar converters has failed.	Check communications cables.
Solar Converter		
Input Fail	No input power to a solar converter.	Check why no input power available.
Solar Converter Temperature High	A solar converter has a high temperature condition.	Check why temperature is high.
Solar Converter Fail	A solar converter has a fault condition.	Refer to Solar Converter User Manual for troubleshooting information.
Over Voltage	A solar converter has an overvoltage condition.	
Solar Converter Protected	A solar converter is in protected mode.	
Fan Fail	A solar converter's fan has failed.	Replace fan.
Current Limit	A solar converter is in current limit.	Solar converter overload. The load is higher than solar converter capacity. If one or more of the solar converters are defective, replace the faulty solar converters.
Solar Converter Comm Fail	A solar converter has lost communications with the controller.	Check communications cables. Reset the Solar Converter Communication Fail alarm. Replace the solar converter.
Derated	A solar converter is in output power derating mode.	Refer to Solar Converter User Manual for troubleshooting information.
Current Share Alarm	A solar converter has a current sharing alarm.	
Input Under Voltage Protection	A solar converter is in under voltage protection mode.	
Input Not DC	Input to solar converter mounting position is not DC.	--
Low Light Intensity	The light intensity is low.	--
Insulation Detect Fail	The insulation detection fails.	--
Insulation Fail Posi PE	This is part of ground fault detection when you have connected PV panels to input +. Alarm is generated if any leakage current flowing from + cable to ground.	Fix the insulation fault and restart MPPT modules
Insulation Fail Negi PE	This is part of ground fault detection when you have connected PV panels to input+. Alarm is generated if any leakage current flowing from - cable to ground.	Fix the insulation fault and restart MPPT modules
AC Meter (AC Meter must be present in system)		
Communication Fail	AC meter has lost communications with the controller.	Check communications cables.
L1-L2 Over Voltage 1	Voltage between Line 1 and Line 2 is higher than the L1-L2 Over Voltage 1 Alarm threshold.	Check why voltage is high.
L1-L2 Over Voltage 2	Voltage between Line 1 and Line 2 is higher than the L1-L2 Over Voltage 2 Alarm threshold.	
L1-L2 Under Voltage 1	Voltage between Line 1 and Line 2 is lower than the L1-L2 Under Voltage 1 Alarm threshold.	Check why voltage is low.
L1-L2 Under Voltage 2	Voltage between Line 1 and Line 2 is lower than the L1-L2 Under Voltage 2 Alarm threshold.	

Alarm Name	Alarm Description	Action to Correct
L2-L3 Over Voltage 1	Voltage between Line 2 and Line 3 is higher than the L2-L3 Over Voltage 1 Alarm threshold.	Check why voltage is high.
L2-L3 Over Voltage 2	Voltage between Line 2 and Line 3 is higher than the L2-L3 Over Voltage 2 Alarm threshold.	
L2-L3 Under Voltage 1	Voltage between Line 2 and Line 3 is lower than the L2-L3 Under Voltage 1 Alarm threshold.	Check why voltage is low.
L2-L3 Under Voltage 2	Voltage between Line 2 and Line 3 is lower than the L2-L3 Under Voltage 2 Alarm threshold.	
L3-L1 Over Voltage 1	Voltage between Line 3 and Line 1 is higher than the L3-L1 Over Voltage 1 Alarm threshold.	Check why voltage is high.
L3-L1 Over Voltage 2	Voltage between Line 3 and Line 1 is higher than the L3-L1 Over Voltage 2 Alarm threshold.	
L3-L1 Under Voltage 1	Voltage between Line 3 and Line 1 is lower than the L3-L1 Under Voltage 1 Alarm threshold.	Check why voltage is low.
L3-L1 Under Voltage 2	Voltage between Line 3 and Line 1 is lower than the L3-L1 Under Voltage 2 Alarm threshold.	
L1 Over Voltage 1	L1 voltage is above over voltage 1 threshold.	Check why voltage is high.
L1 Over Voltage 2	L1 voltage is above over voltage 2 threshold.	
L1 Under Voltage 1	L1 voltage is below under voltage 1 threshold.	Check why voltage is low.
L1 Under Voltage 2	L1 voltage is below under voltage 2 threshold.	
L2 Over Voltage 1	L2 voltage is above over voltage 1 threshold.	Check why voltage is high.
L2 Over Voltage 2	L2 voltage is above over voltage 2 threshold.	
L2 Under Voltage 1	L2 voltage is below under voltage 1 threshold.	Check why voltage is low.
L2 Under Voltage 2	L2 voltage is below under voltage 2 threshold.	
L3 Over Voltage 1	L3 voltage is above over voltage 1 threshold.	Check why voltage is high.
L3 Over Voltage 2	L3 voltage is above over voltage 2 threshold.	
L3 Under Voltage 1	L3 voltage is below under voltage 1 threshold.	Check why voltage is low.
L3 Under Voltage 2	L3 voltage is below under voltage 2 threshold.	
Mains Failure	Commercial AC power failure.	Check why no commercial AC power.
Severe Mains Failure	Commercial AC power voltage is too low.	Check why voltage is low.
High Frequency	Commercial AC power has high frequency.	--
Low Frequency	Commercial AC power has low frequency.	--
High Temperature	AC input temperature sensor sensing high temperature condition.	--
Low Temperature	AC input temperature sensor sensing low temperature condition.	--
L1 High Current	High L1 current.	--
L2 High Current	High L2 current.	--
L3 High Current	High L3 current.	

3 Local Display Menus

3.1 Overview

This section provides descriptions of the Local Display Menus. Refer also to “Passwords and Privilege Levels” on page 19 and “Description of Local Display Menus Programmable Parameters” on page 80. For Web Interface, refer to “Web Interface Screens” on page 89.

3.2 Menus

Figure 3.1 to Figure 3.9 provide flow diagrams of the menus accessed via the NCU Controller local display and keypad.

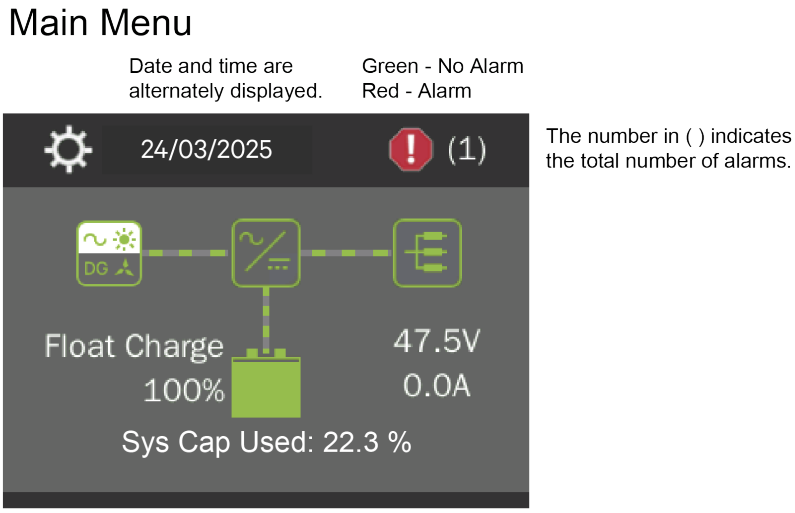
NOTE! *These instructions describe the complete functionality of the NCU Controller. Some functionality is dependent on hardware connected to the NCU Controller. Some menu items shown may not be present in the NCU Controller used in your system.*

3.3 Main Menu

The Main Menu is shown in Figure 3.1. This is the first screen displayed when the local display is activated by pressing any key on the NCU's front panel.

The current displayed on the Main Menu is "total system current". The "total system current" equals total rectifier current or total solar converter current minus total battery current when battery shunt exists or calculated battery current. If you do not calculate battery current, "total system current" equals total rectifier current or total solar converter current.

Figure 3.1 Main Menu



Graphics	Menu Name	Description
	Alarm (Green - No Alarm) (Red - Alarm)	View active alarms and alarm history.
	Settings	Gain access to the NCU Controller's settings menus.
	Input Power	View AC, Solar, DG, and Wind related information.
	Module	View rectifier, solar converter, and converter module related information.
	DC	View DC equipments related information.
	Battery	View battery related information.

Press the UP and DOWN keys to highlight the desired Menu graphic in the Main Menu.

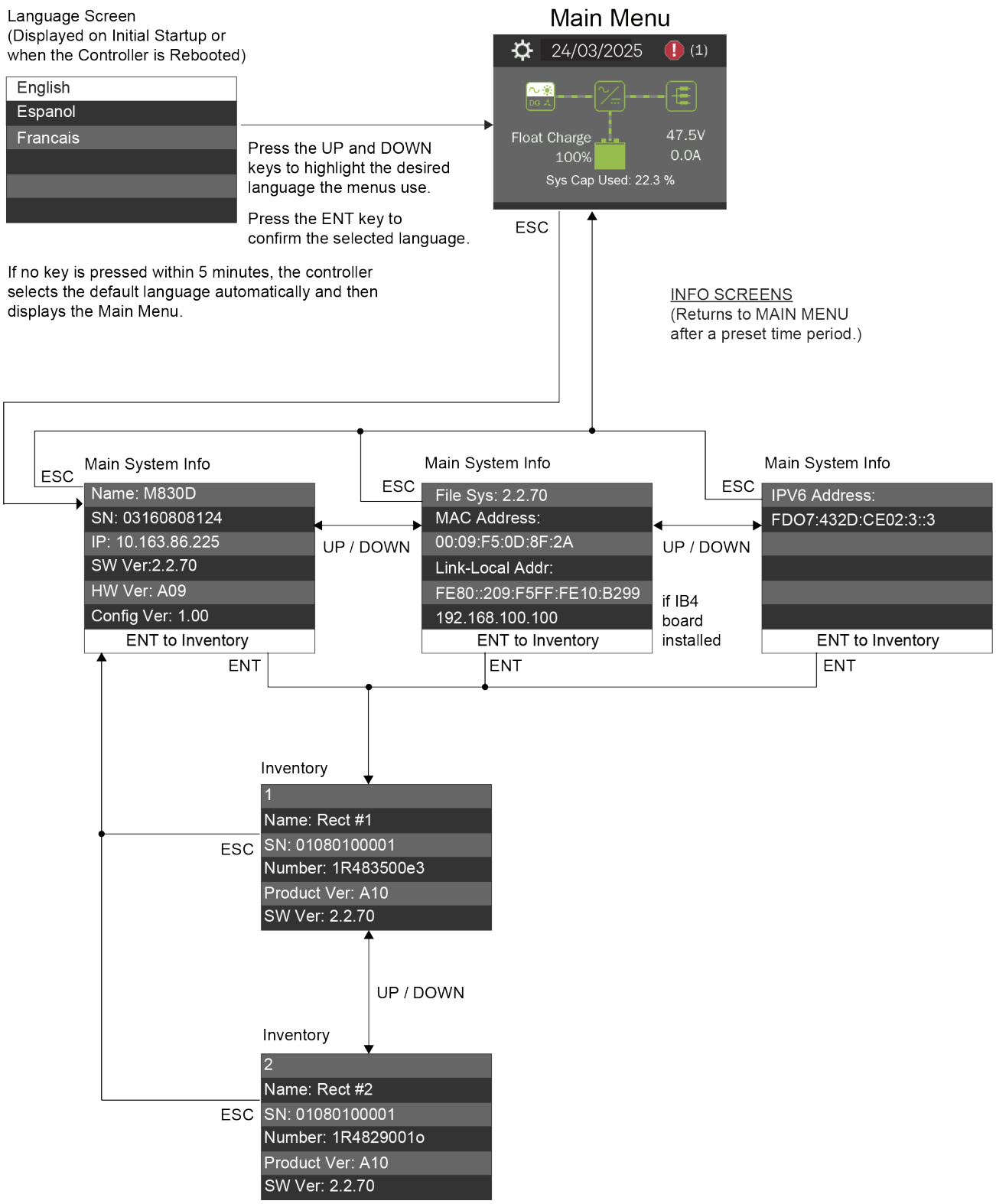
Press the ENT key to enter the selected menu.

To reboot the Controller, from the Main Menu press the ENT and ESC keys at the same time. Release both keys. Press ENT to confirm.

3.4 Controller Information Menu (accessed from the Main Menu)

Controller information screens can be accessed from the Main Menu as shown in Figure 3.2.

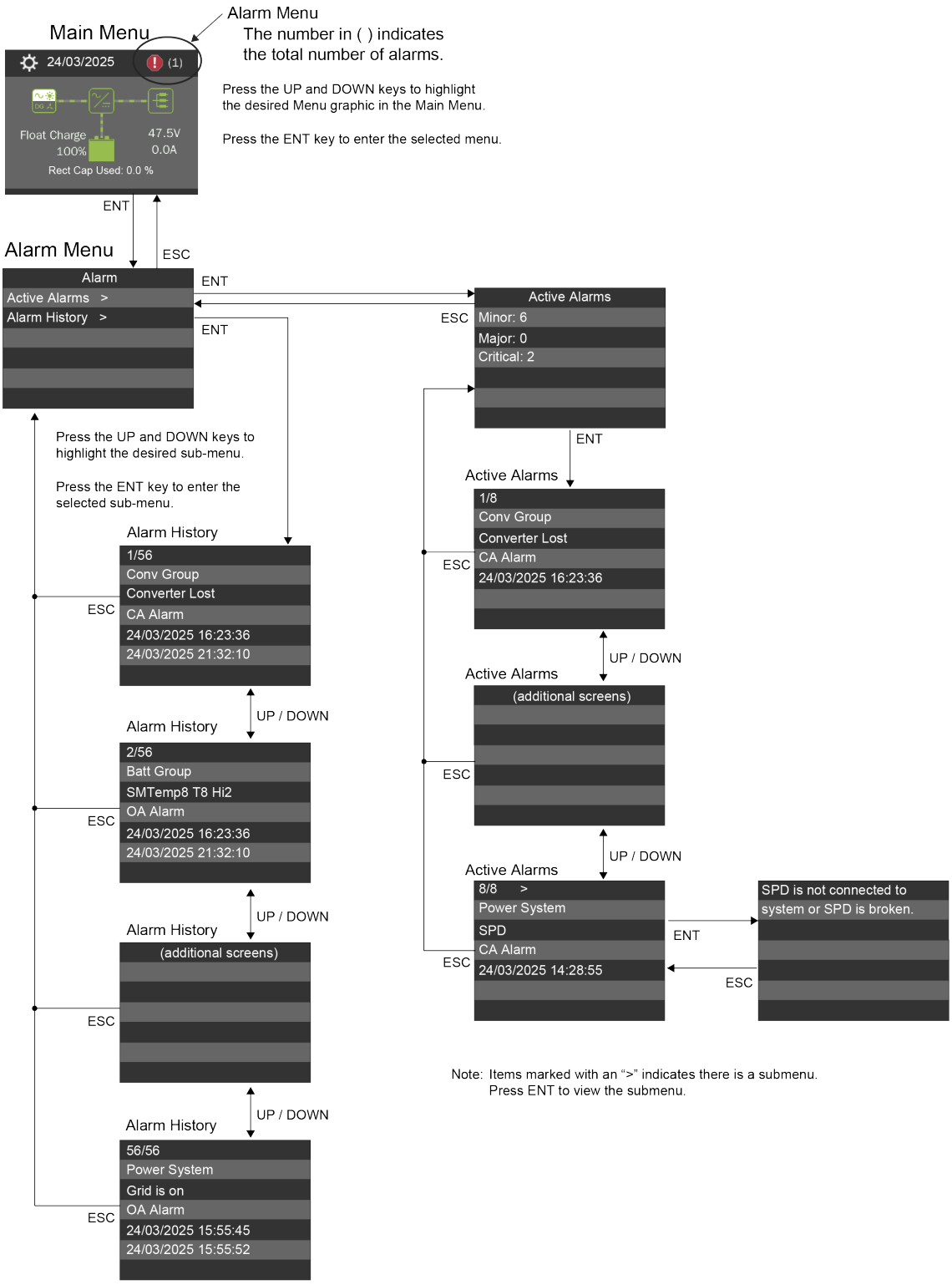
Figure 3.2 Controller Information Menu



3.5 Alarm Menu

The Alarm Menu can be accessed from the Main Menu as shown in Figure 3.3.

Figure 3.3 Alarm Menu



3.6 Settings Menu

The Settings Menu can be accessed from the Main Menu as shown in Figure 3.4.

Figure 3.4 Settings Menu

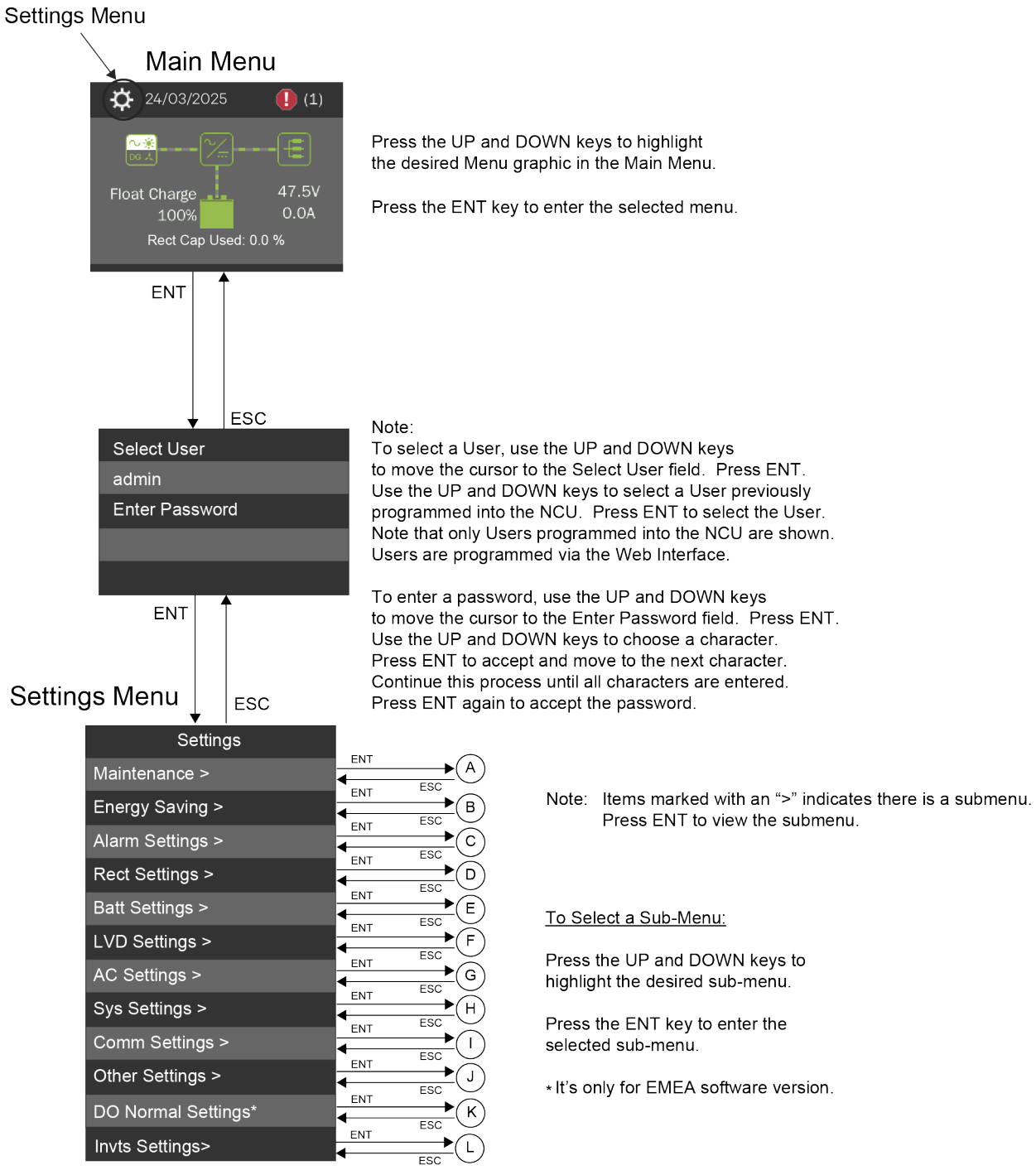
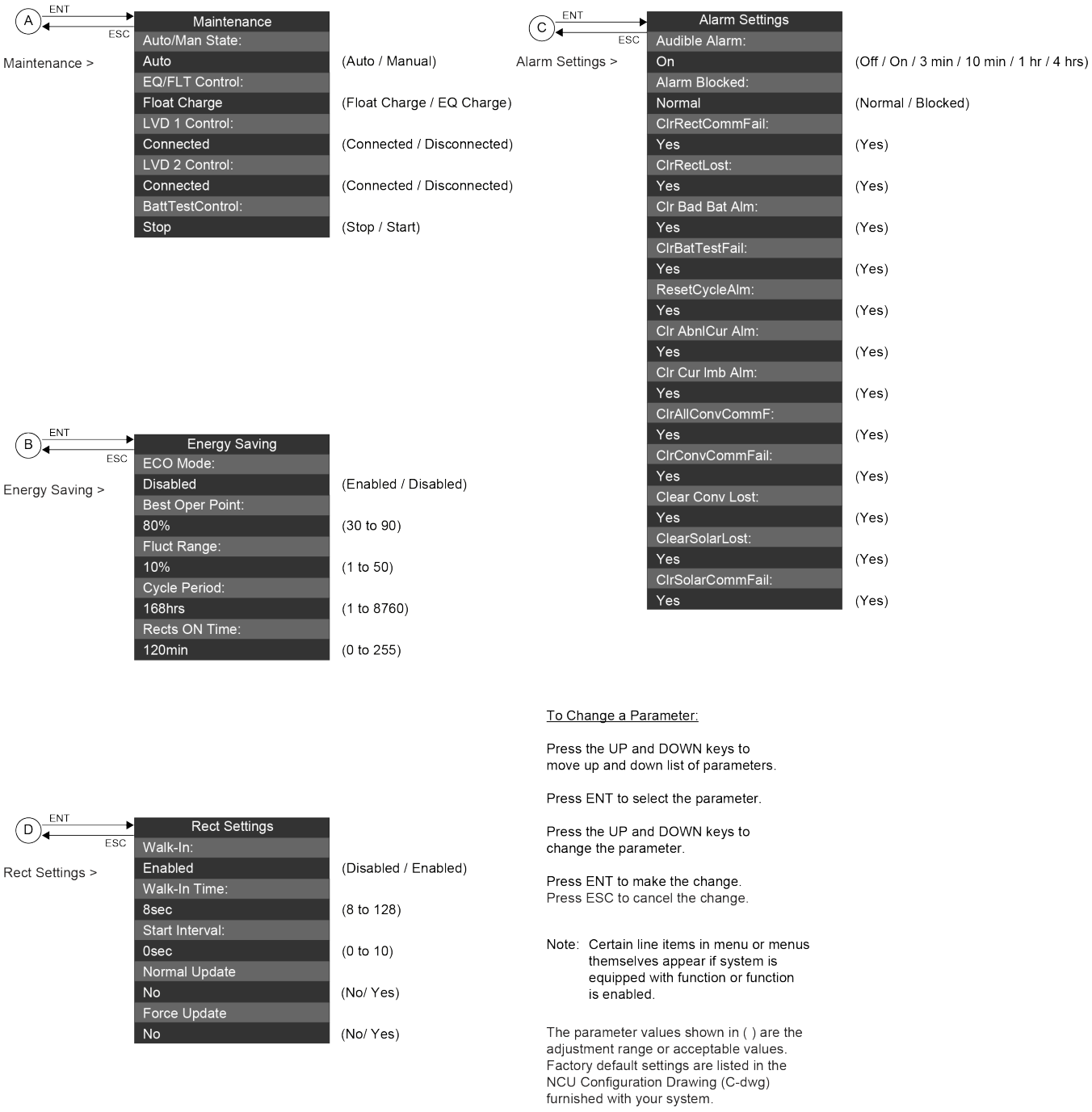


Figure 3.4 Settings Menu



To Change a Parameter:

Press the UP and DOWN keys to move up and down list of parameters.

Press ENT to select the parameter.

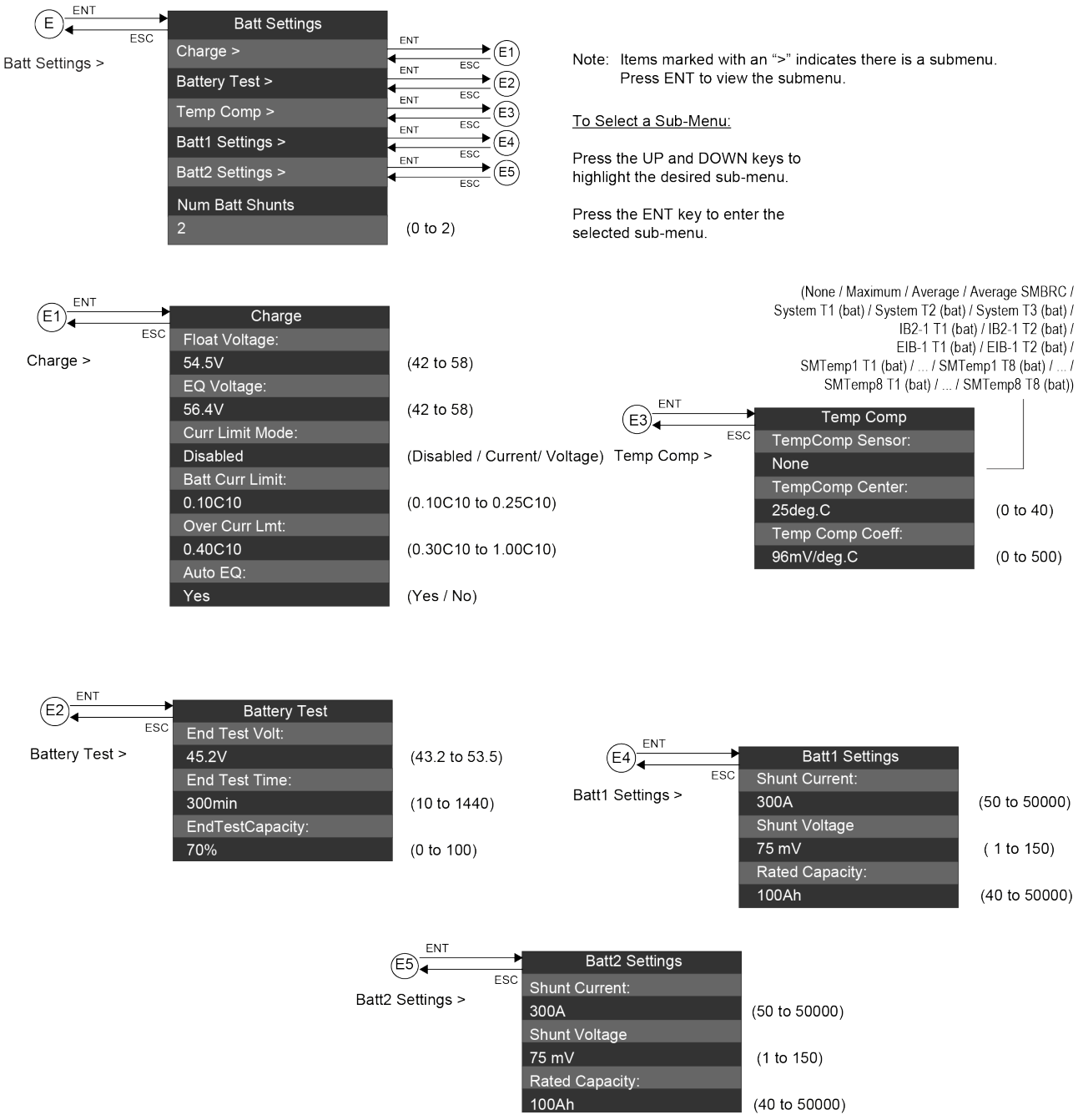
Press the UP and DOWN keys to change the parameter.

Press ENT to make the change.
Press ESC to cancel the change.

Note: Certain line items in menu or menus themselves appear if system is equipped with function or function is enabled.

The parameter values shown in ( ) are the adjustment range or acceptable values. Factory default settings are listed in the NCU Configuration Drawing (C-dwg) furnished with your system.

Figure 3.4 Settings Menu



To Change a Parameter:

Press the UP and DOWN keys to move up and down list of parameters.

Press ENT to select the parameter.

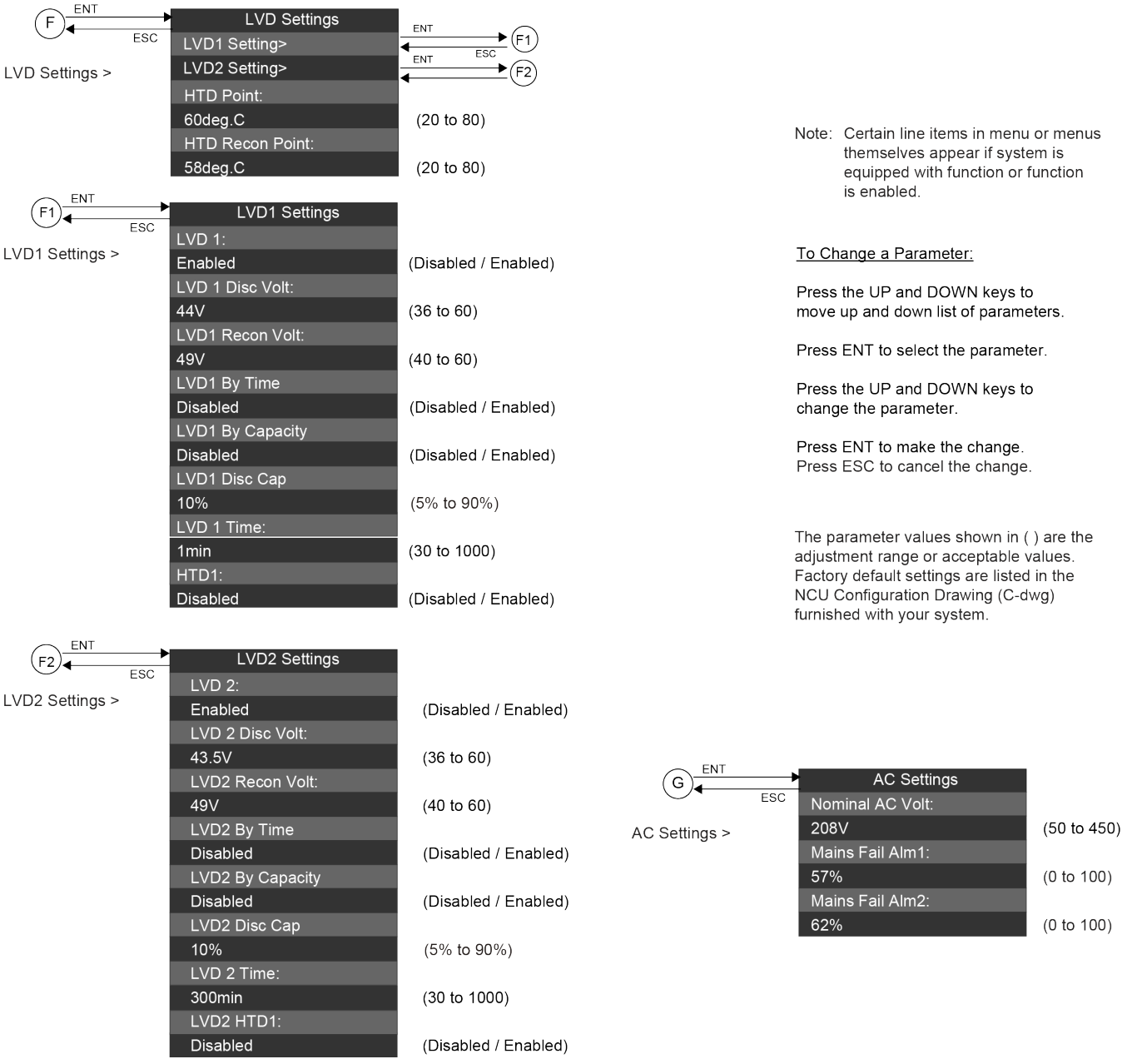
Press the UP and DOWN keys to change the parameter.

Press ENT to make the change.
Press ESC to cancel the change.

The parameter values shown in ( ) are the adjustment range or acceptable values. Factory default settings are listed in the NCU Configuration Drawing (C-dwg) furnished with your system.

Note: Certain line items in menu or menus themselves appear if system is equipped with function or function is enabled.

Figure 3.4 Settings Menu



Note: Certain line items in menu or menus themselves appear if system is equipped with function or function is enabled.

To Change a Parameter:

Press the UP and DOWN keys to move up and down list of parameters.

Press ENT to select the parameter.

Press the UP and DOWN keys to change the parameter.

Press ENT to make the change.
Press ESC to cancel the change.

The parameter values shown in ( ) are the adjustment range or acceptable values. Factory default settings are listed in the NCU Configuration Drawing (C-dwg) furnished with your system.

Figure 3.4 Settings Menu

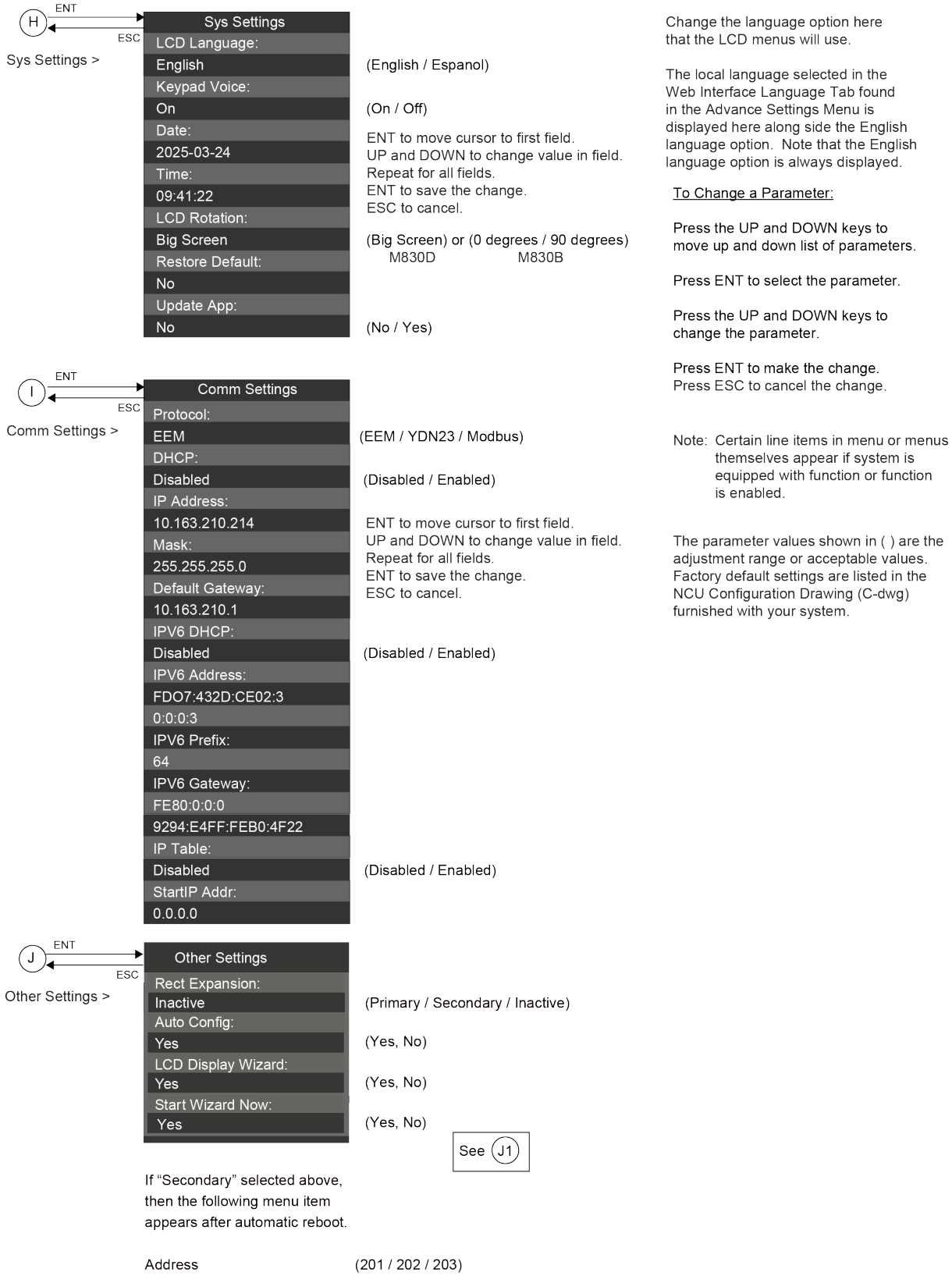
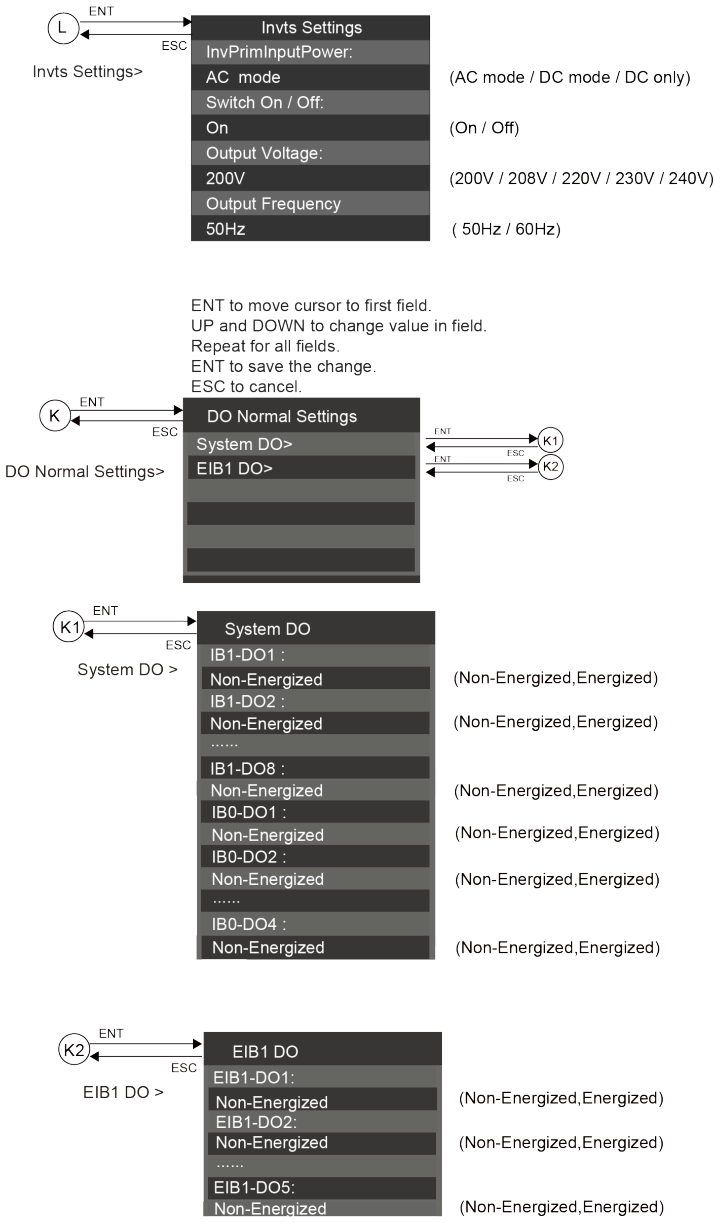


Figure 3.4 Settings Menu



Note: Certain line items in menu or menus themselves appear if system is equipped with function or function is enabled.

To Change a Parameter:

Press the UP and DOWN keys to move up and down list of parameters.

Press ENT to select the parameter.

Press the UP and DOWN keys to change the parameter.

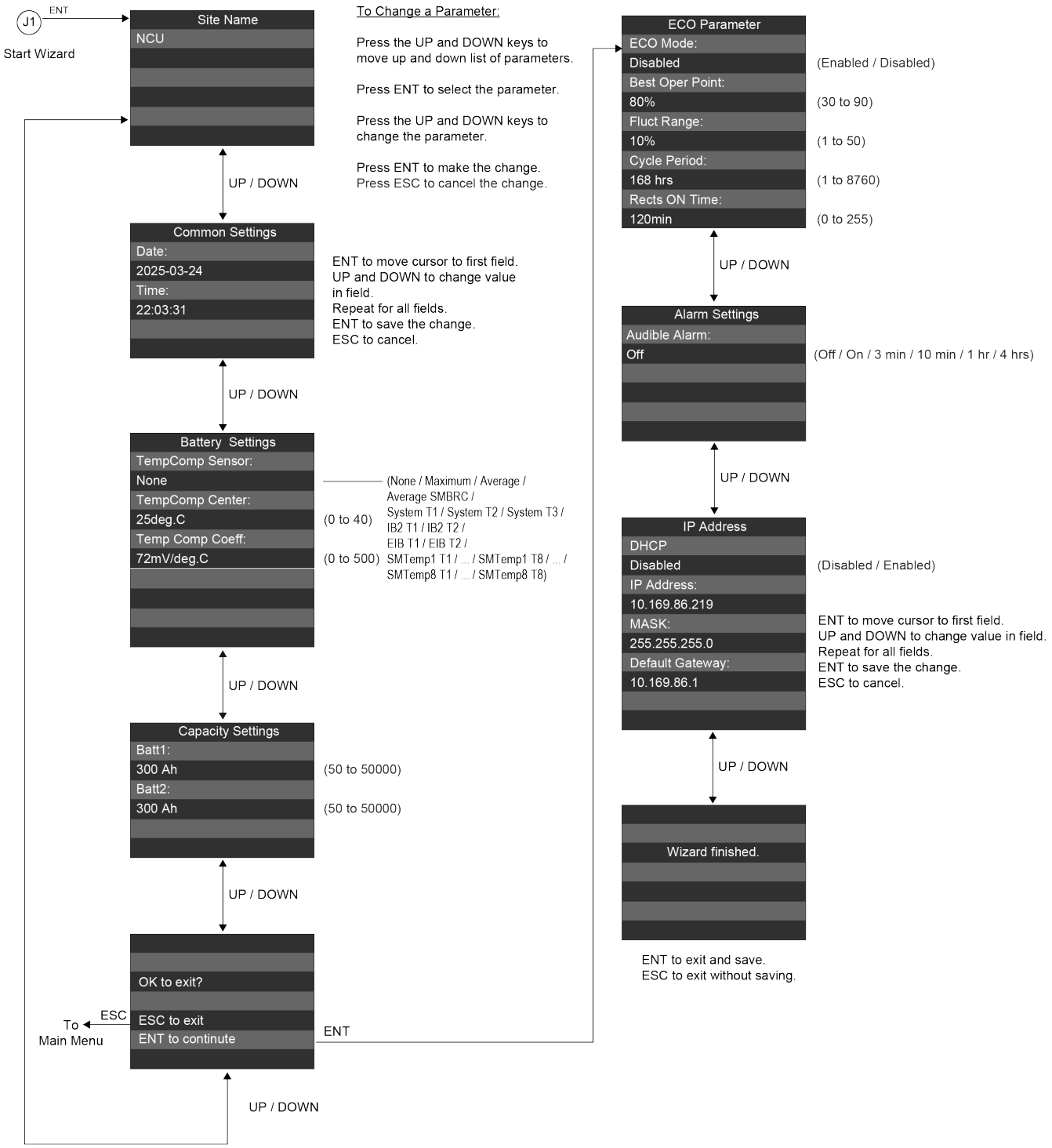
Press ENT to make the change.
Press ESC to cancel the change.

The parameter values shown in ( ) are the adjustment range or acceptable values. Factory default settings are listed in the NCU Table of Set Values or the NCU Configuration Drawing (C-dwg) that may be furnished with your system.

3.7 Start Wizard Sub-Menu (accessed from Settings Menu)

The Start Wizard menu can be accessed from the Settings Menu (in “Other Settings” sub-menu). See Figure 3.5 for Start Wizard menu.

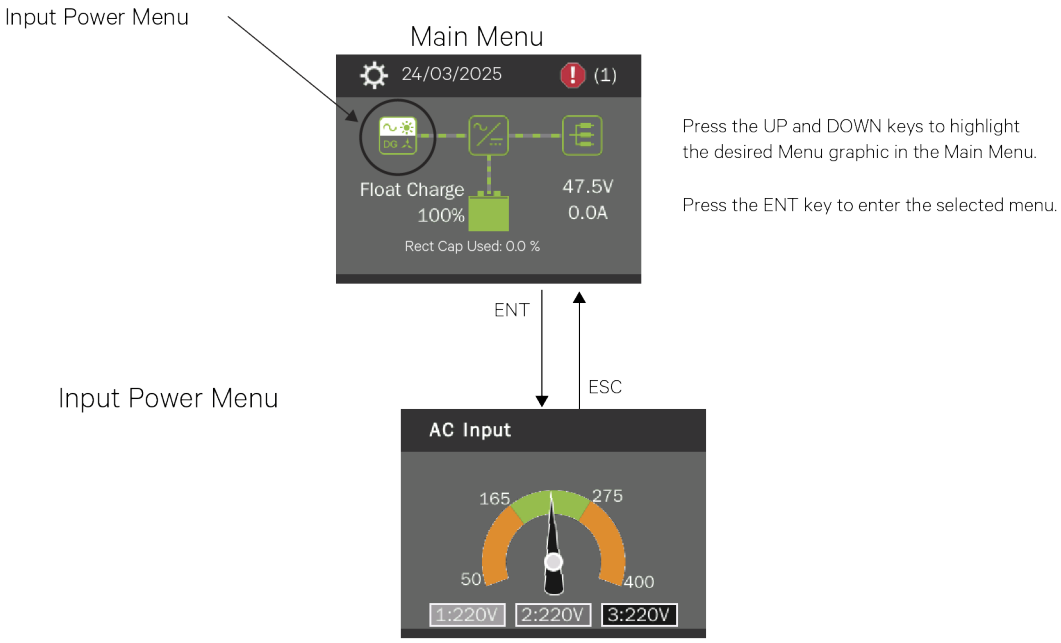
Figure 3.5 Start Wizard Sub-Menu (accessed from Setting's Menu)



3.8 Input Power Menu

The Input Power Menu can be accessed from the Main Menu as shown in Figure 3.6.

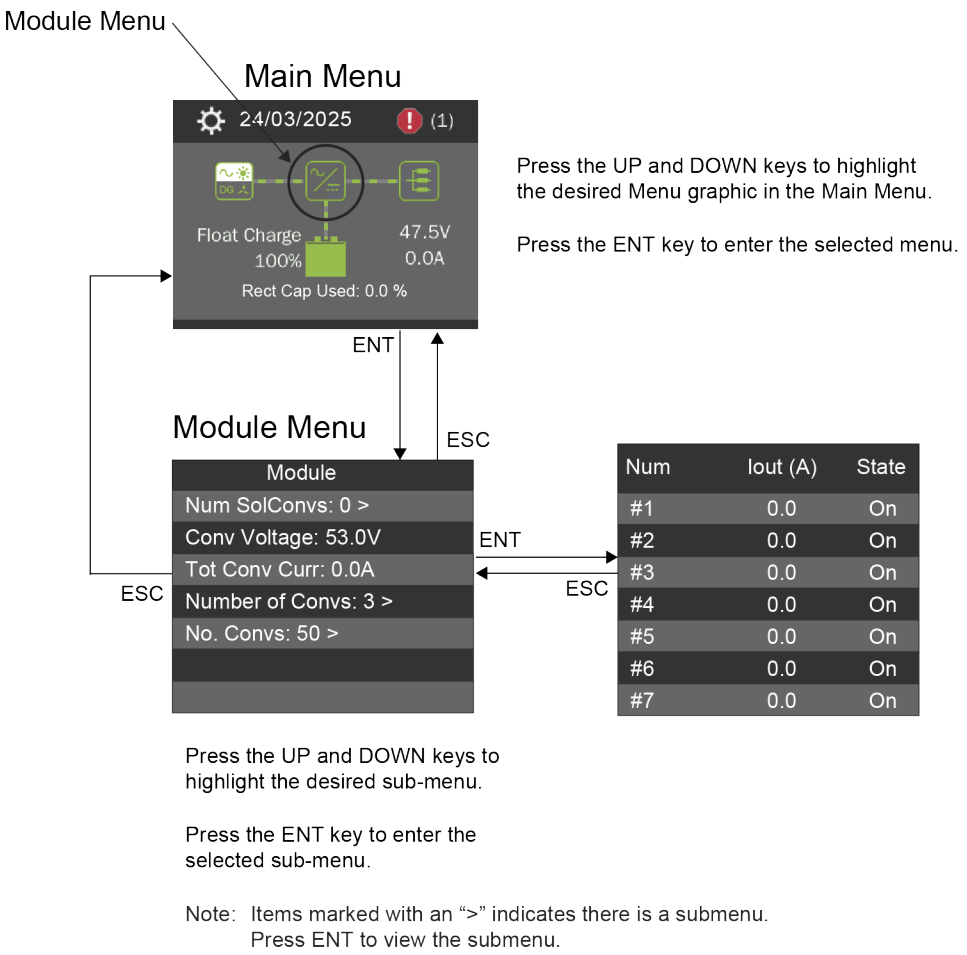
Figure 3.6 Input Power Menu



3.9 Module Menu

The Module Menu can be accessed from the Main Menu as shown in Figure 3.7.

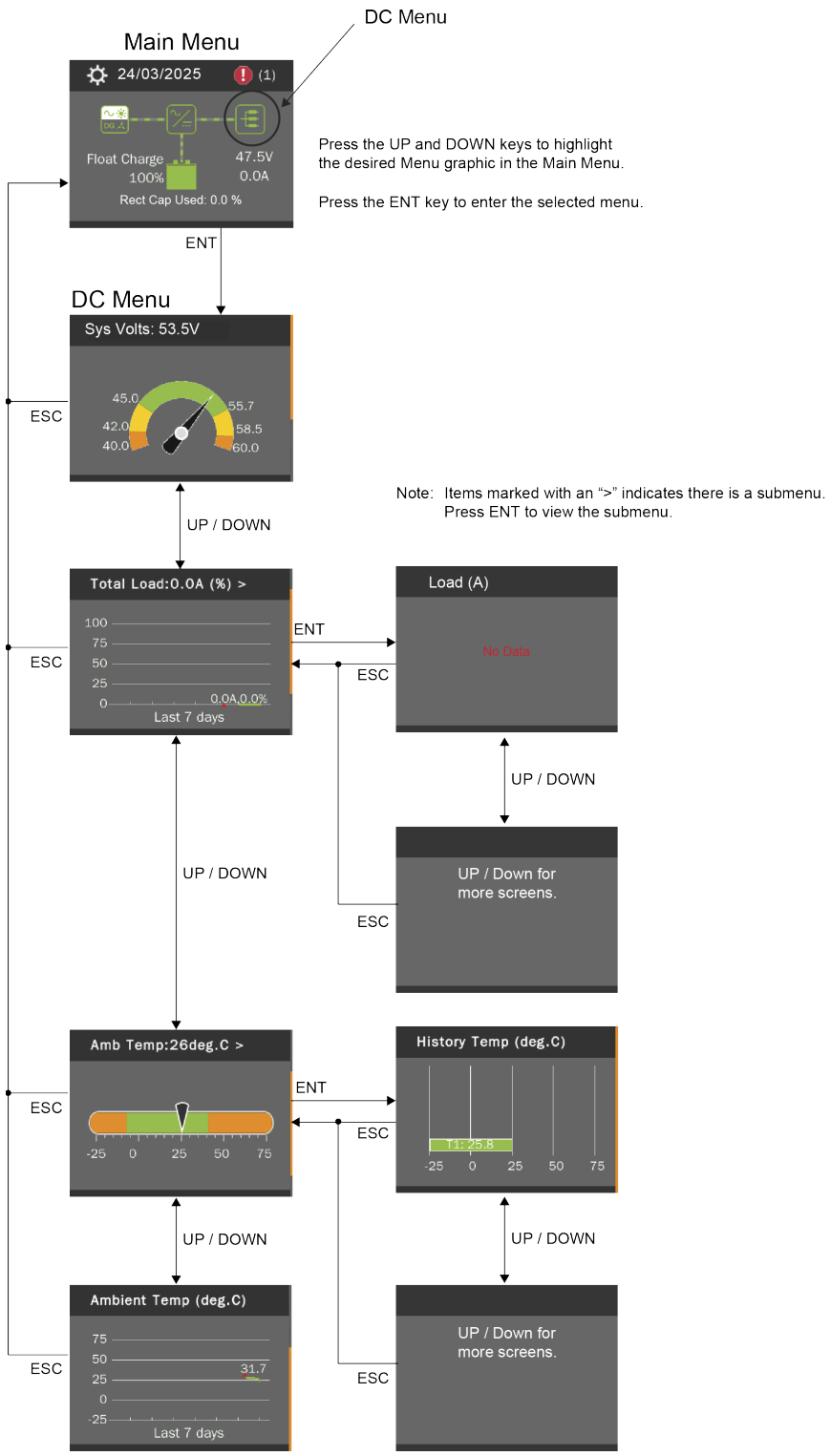
Figure 3.7 Module Menu



3.10 DC Menu

The DC Menu can be accessed from the Main Menu as shown in Figure 3.8.

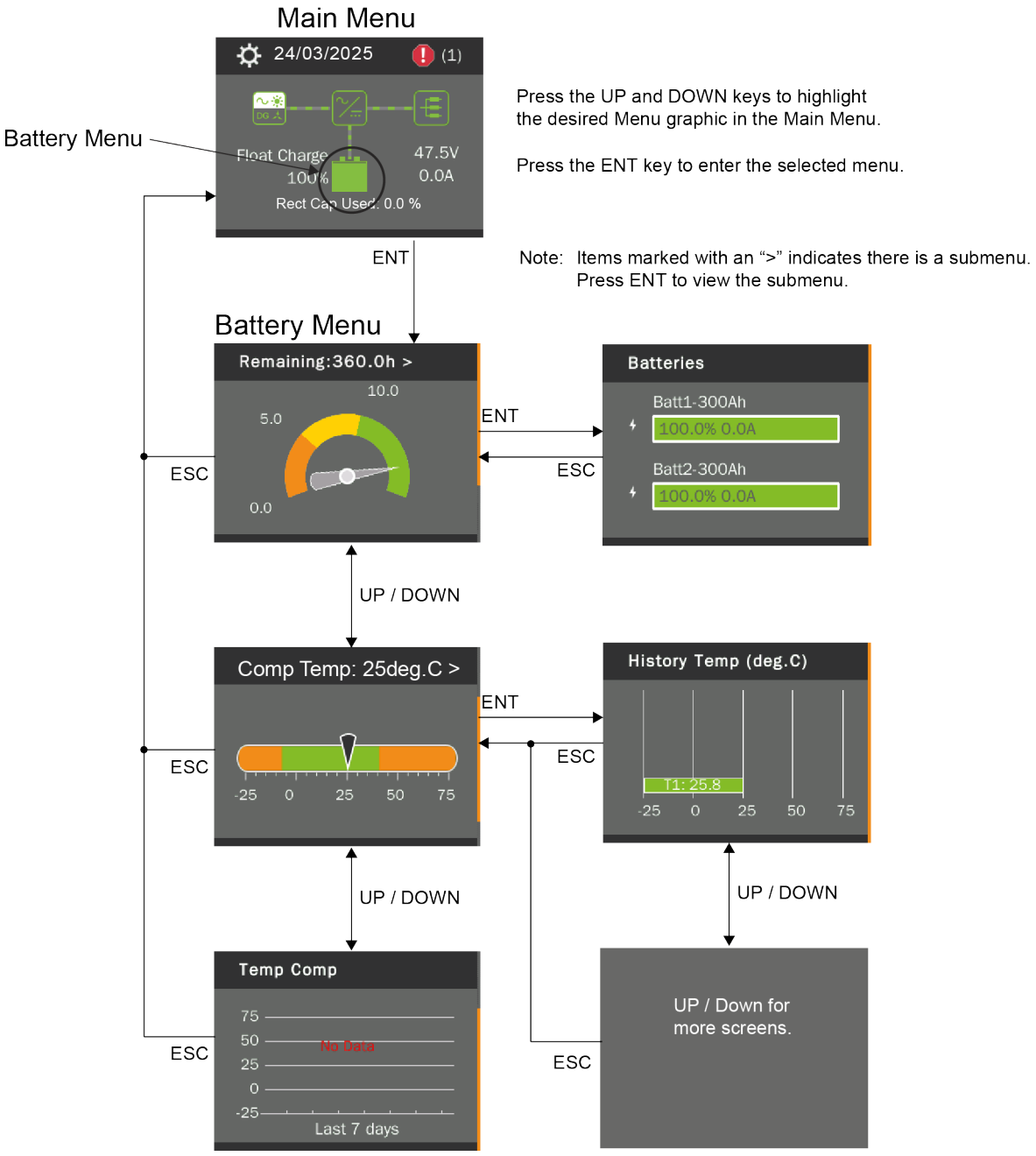
Figure 3.8 DC Menu



3.11 Battery Menu

The Battery Menu can be accessed from the Main Menu as shown in Figure 3.9. The actual display of the Battery Menu is dependent on the NCU configuration.

Figure 3.9 Battery Menu



4 Description of Local Display Menus Programmable Parameters

The following are descriptions of the programmable parameters presented in the local display menus.

4.1 Settings Menu

See Figure 3.4.

4.1.1 Maintenance Sub-Menu

- **Auto/Man State:**
  - **Auto:** The controller automatically controls the power system.
  - **Manual:** A User can manually change certain power system control settings. When you return to Auto Mode, any settings changed in Manual Mode are returned to their previous setting (setting before being placed in Manual Mode). This provides a convenient means of making temporary adjustment changes for testing purposes.
- **EQ/FLT Control:** Places the system in Equalize Charge or Float Charge mode.
- **LVD 1 Control:** Temporarily connects or disconnects LVD 1 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LVD 2 Control:** Temporarily connects or disconnects LVD 2 when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **BattTestControl:** Starts or stops battery test.

4.1.2 Energy Saving Sub-Menu

- **ECO Mode:** Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.

ALERT! The Energy Optimization Mode should NOT be used in systems that operate without batteries.

NOTE! *If the battery is ever disconnected, disable Energy Optimization Mode until the battery is reconnected.*

- **Best Operating Point:** Percent of full load capacity that the rectifiers operate under in the Energy Optimization Mode.
- **Fluct Range:** If load fluctuation is less than this value, rectifiers are not turned on or off for Energy Optimization.
- **Cycle Period:** This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.
- **Rects ON Time:** Time all rectifiers are turned on at the end of the “Cycle Period”.

4.1.3 Alarm Settings Sub-Menu

- **Audible Alarm:** Programs the audible alarm feature.
  - **Off:** Disables the audible alarm.
  - **On:** When a new alarm occurs, the audible alarm sounds. Press any key to silence the audible alarm.
  - **3 min / 10 min / 1 hr / 4 hrs:** When a new alarm occurs, the audible alarm sounds. The audible alarm automatically silences after the selected time period.

- **Alarm Blocked:**
  - **Normal:** Alarms are processed normally.
  - **Blocked:** Forces the alarm relays in the "off" state and blocks alarms from changing the relay state.
- **ClrRectCommFail:** Clears a rectifier communication fail alarm.
- **ClrRectLost:** Clears a rectifier lost alarm.
- **Rst RectGrpLost:** Resets rectifier group lost alarms.
- **Clr Bad Bat Alm:** Clears a bad battery alarm.
- **ClrBatTestFail:** Clears a battery test fail alarm.
- **ClrCycleAlm:** Clears a rectifier oscillator alarm.
- **Clr AbnlCur Alm:** Clears an abnormal current alarm.
- **Clr Cur Imb Alm:** Clears a current imbalance alarm.
- **ClrAllConvCommF:** Clears an “All Converter Comm Fail” alarm.
- **ClrConvComm Fail:** Clears a converter communication fail alarm.
- **Clear Conv Lost:** Clears a converter lost alarm.

4.1.4 Rect Settings Sub-Menu

- **Walk-In:** Enables or disables the start-up walk-in feature for all rectifiers.
- **Walk-In Time:** Sets the start-up walk-in time when the “Walk-In” setting above is set to enabled.
- **Start Interval:** Sets the sequence start interval (time period between starting each rectifier in the system).
- **Normal Update:** Starts rectifier firmware normal update.
- **Force Update:** Starts force update of firmware of one rectifier. There should only be one rectifier in the system.

4.1.5 Batt Settings Sub-Menu

The BATT SETTINGS sub-menu consists of following sub-menus.

Charge Sub-Menu

- **Float Voltage(R):** Float charge output voltage setting for rectifier when the “Solar Mode” setting under “System” TAB in Web Interface is set to “RECT-SOLAR” or “Disabled”.
- **EQ Voltage(R):** Equalize charge output voltage setting for rectifier when the “Solar Mode” setting under “System” TAB in Web Interface is set to “RECT-SOLAR” or “Disabled”.
- **Curr Limit Mode:** Selects the current limit mode (Disabled, Current or Voltage).
- **Batt Curr Limit:** Maximum battery charging current setting. For example, a value of 0.150C10 means that the charging current is limited to 15% of the battery’s nominal capacity.
- **Over Curr Lmt:** Battery over current alarm setting. For example, a value of 0.300C10 means that when the charging current reaches 30% of the battery’s nominal capacity, an alarm will be extended.

- **Auto EQ:** Enables or disables the Automatic Equalize Charge feature. **The following parameters need to be set via the Web Interface.**

  EQ Start Curr: The system is transferred to Equalize Charge mode when battery charge current increases to this setting. For example, a value of 0.060C10 means that an Automatic Equalize is started if the battery charge current is greater than 6% of the battery's nominal capacity.

  EQ Start Cap: The system is transferred to Equalize Charge mode when remaining battery capacity decreases to this setting.

  EQ Stop Curr: When in Equalize Charge mode and the battery charge current decreases below this setting for the "EQ Stop Delay" time period, the system is transferred to Float Charge mode. For example, a value of 0.010C10 means that when the charging current is less than 1% of the battery's nominal capacity, the system returns to the Float mode.

  EQ Stop Delay: See "EQ Stop Curr" above.

NOTE! *If the power system has been automatically placed in Equalize mode, disabling Auto EQ will* ***not*** *return the system to Float mode until the current Equalize cycle is completed. To return immediately to Float mode, navigate as follows: Main Menu / Settings Icon / Maintenance / "EQ/FLT Control", and select Float Charge.*

  Maximum EQ Time: This is the maximum duration, in minutes, that an Automatic Equalize Charge will last regardless of the other settings.

  Cyc EQ: Enables or disables cyclic (scheduled) Equalize charging. When enabled, the following parameters can be set.

  Cyc EQ Interval: Cyclic (scheduled) Equalize charging interval.

  Cyc EQ Duration: Cyclic (scheduled) Equalize charging duration.

Battery Test Sub-Menu

- **Test Volt Level:** System output voltage setting during a battery discharge test.
- **End Test Volt:** This is the "end of test voltage level" for battery discharge tests. A battery discharge test will end if battery voltage decreases to this setting.
- **End Test Time:** This is the "end of test time period" for battery discharge tests. A battery discharge test will end if this time period is exceeded.
- **EndTestCapacity:** This is the "end of test remaining battery capacity" for battery discharge tests. A battery discharge test will end if remaining battery capacity decreases to this setting. For example, a value of 0.700C10 means that when the discharging current reaches 70% of the battery's nominal capacity, the battery test is ended.

Temp Comp Sub-Menu

- **TempComp Sensor:** Select "None" for no temperature compensation, or the temperature sensor [None / Max / Average / Temp1 / Temp2] sensing battery temperature for temperature compensation. You can also select Maximum or Average which takes the maximum or average reading of the temperature sensors [any of None / Max / Average / Temp1 / Temp2] set as battery temperature sensors. When set, the following parameters can also be set.

NOTE! *The temperature compensation sensor is also the sensor which displays the battery temperature on the Web Interface's Homepage.*

- **TempComp Center:** Sets the temperature at which the system operates at normal voltage levels.

- **Temp Comp Coeff:** Sets the temperature compensation slope or rate of change per °C above or below the "TempComp Center" setting. This value is expressed in millivolt per °C per string (mV/°C/str). For example, for a rate of change of 72 mV/°C/str in a 24-cell 48V nominal battery string, the rate of change is 3 mV per cell.

Batt1 Settings Sub-Menu

- **Shunt Current:** Enter the battery string's shunt current rating.
- **Shunt Voltage:** Enter the battery string's shunt voltage rating.
- **Rated Capacity:** Enter the battery string's rated capacity. After setting the battery capacity, the User should also reset the battery capacity (battery must be fully charged). See "Setting Battery Capacity Parameters" on page 31.
- **Num Batt Shunts:** Sets the number of battery shunts in the system.

4.1.6 LVD Settings Sub-Menu

LVD1 Settings

- **LVD 1:** Enables or disables LVD1.
- **LVD 1 Disc Volt:** LVD1 low voltage disconnect setting (when LVD set for voltage).
- **LVD1 Recon Volt:** LVD1 reconnect setting (when LVD set for voltage).
- **LVD1 By Time:** Enables or disables the LVD1 By Time function.
- **LVD1 By Capacity:** Enables or disables the LVD1 by battery capacity function.
- **LVD1 Disc Cap:** Sets the value of LVD1 discharge capacity, the default value is 10%. During discharging, when the capacity reaches to the discharge capacity value, the discharge stops.
- **LVD 1 Time:** The time period before LVD1 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 1 HTD:** Enables or disables the High Temperature 1 Disconnect feature. This feature causes LVD1 contactors to open (disconnect) if a high temperature event occurs.

LVD2 Settings

- **LVD 2:** Enables or disables LVD2.
- **LVD 2 Disc Volt:** LVD2 low voltage disconnect setting (when LVD set for voltage).
- **LVD 2 Recon Volt:** LVD2 reconnect setting (when LVD set for voltage).
- **LVD2 By Time:** Enables or disables the LVD2 By Time function.
- **LVD2 By Capacity:** Enables or disables the LVD2 by battery capacity function.
- **LVD2 Disc Cap:** Sets the value of LVD2 discharge capacity, the default value is 10%. During discharging, when the capacity reaches to the discharge capacity value, the discharge stops.
- **LVD 2 Time:** The time period before LVD2 disconnection once an AC fail condition occurs (when LVD set for time).
- **LVD 2 HTD:** Enables or disables the High Temperature 2 Disconnect feature. This feature causes LVD2 contactors to open (disconnect) if a high temperature event occurs.

- **HTD Point:** Sets high temperature limit at which LVD1 and/or LVD2 contactors will open (disconnect) if the HTD1 and/or HTD2 features are enabled. If this temperature is reached, a disconnect occurs regardless of voltage.

- **HTD Recon Point:** Sets temperature at which a reconnect will occur following a High Temperature Disconnect.

4.1.7 AC Settings Sub-Menu

- **Nominal AC Volt:** Enter the nominal line-to-neutral voltage (single phase rectifier) or nominal line-to-line voltage (three phase rectifier).
- **Mains Fail Alm1:** Sets the Mains Fail Alarm 1 value (percent of nominal).
- **Mains Fail Alm2:** Sets the Mains Fail Alarm 2 value (percent of nominal).

  Corresponding Alarms:
  - Low Phase Voltage L1 (Nominal Minus "Mains Fail Alarm 1 Percent of Nominal)
  - Very Low Phase Voltage L1 (Nominal Minus " Mains Fail Alarm 2 Percent of Nominal)
  - High Phase Voltage L1 (Nominal Plus " Mains Fail Alarm 1 Percent of Nominal)
  - Very High Phase Voltage L1 (Nominal Plus "V Mains Fail Alarm 2 Percent of Nominal)
  - Phase L1 used in the example above, Phase L2 and Phase L3 are similar.

4.1.8 Sys Settings Sub-Menu

- **LCD Language:** Select the language the menus are displayed in.
- **Keypad Voice:** Sets the keypad sound on or off.
- **Date:** Sets the date. Refer to “Changing the Date and Time” on page 27 for a procedure to change the date.
- **Time:** Sets the time. Refer to “Changing the Date and Time” on page 27 for a procedure to change the time.
- **LCD Rotation:** Sets the rotation of the text in the menus (allowing the controller to be mounted in different orientations).
  - **0 deg:** Display will be in the horizontal position (M830B only).
  - **90 deg:** Display will be in the vertical position (NCU controller mounted 90 deg clockwise) (M830B only).
  - **Big Screen:** Setting for M830D only.
- **Restore Default:** Restores the controller’s default settings.
- **Update App:** Updates the controller’s application using a USB memory device.

4.1.9 Comm Settings Sub-Menu

- **Protocol:** Selects the protocol type, the default protocol is EEM. The options are EEM / YDN23 / Modbus.
- **DHCP:** The DHCP function allows the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed in the IP Address field below the DHCP setting in the local display menu (Main Menu / Settings Icon / Comm Settings).
- **IP Address:** Sets the controller's IPv4 address. Enter the address in the format nnn.nnn.nnn.nnn, where $0 \leq nnn \leq 255$. The address must be a valid address and must not be 255.255.255.255.
- **Mask:** Sets the controller's IPv4 network netmask. Enter the address in the format nnn.nnn.nnn.nnn, where $0 \leq nnn \leq 255$.

- **Default Gateway:** Sets the controller's IPv4 gateway address. Enter the address in the format nnn.nnn.nnn.nnn, where 0 ≤ nnn ≤ 255. This is the address of the gateway of the network on which the controller resides. The address must be a valid address and must not be 255.255.255.255.
- **IPV6 DHCP:** The IPV6 DHCP function allows the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed in the IP Address field below the DHCP setting in the local display menu (Main Menu / Settings Icon / Comm Settings).
- **IPV6 Address:** Sets the controller's IPv6 address. Enter the address in the format nnnn:nnnn:nnnn:nnnn:nnnn:nnnn:nnnn:nnnn, nnnn must follow IPv6 address rules.
- **IPV6 Prefix:** Sets the controller's IPv6 prefix.
- **IPV6 Gateway:** Sets the controller's IPv6 gateway address. Enter the address in the format nnnn:nnnn:nnnn:nnnn:nnnn:nnnn:nnnn:nnnn, nnnn must follow IPv6 address rules.
- **Protocol:** the options for Protocol are EEM / YDN23 /Modbus.
- **IP Tables:** Enables or disables IP Tables functions.
- **Start IP Addr:** This is the start address for IP tables, the default value is 0.0.0.0.

4.1.10 Other Settings Sub-Menu

- **System Expansion:**
  - **Inactive:** Select this option if this is the only NCU controller in the power system.
  - **Primary:** Select this option if the power system consists of multiple bays with multiple NCU controllers, and this NCU controller is to be the primary controller. Note that only one (1) NCU controller can be set as the primary controller.
  - **Secondary:** Select this option if the power system consists of multiple bays with multiple NCU controllers, and this NCU controller is to be a secondary controller.

    Address: If “Secondary” is selected, this menu item appears after an automatic reboot. Sets the address of an NCU controller set as a secondary controller.

NOTE! *When primary or secondary is selected, the NCU will start auto configuring. This process will take more than three (3) minutes.*

Primary/Secondary Procedure:

Up to four (4) NCU controllers can be connected together when a power system requires a greater number of rectifiers than can be controlled by a single NCU controller. One (1) controller is designated as the primary controller, the others as secondary controllers. The rectifiers controlled by the secondary controllers are designated as RectifierGroup 2 through 4 in the menus.

NOTE! *Changing the Rectifier Expansion setting may take more than three (3) minutes for the NCU to configure the feature.*

1. Connect the NCU controllers in the multiple bays via the RS485 interface.
2. Set one of the NCU controllers as the primary controller via the “Rect Expansion” menu item in the OTHER SETTINGS menu.
3. Set all other NCU controllers as secondary controllers via the “Rect Expansion” menu item in the OTHER SETTINGS menu.

4. Set the Address of the NCU controllers set as secondary controllers to 201, 202, or 203 via the “Address” menu item in the OTHER SETTINGS menu. Note that each secondary controller must be set to a different address.

- **Auto Config:** Auto configures the controller for the devices connected to it.
- **LCD Display Wizard:** Selects to run the Start Wizard after the controller is restarted. Refer to the next section and Figure 3.5.
- **Start Wizard Now** (see Figure 3.5).

Site Name Sub-Menu

Enter the site name and other site information.

Common Settings Sub-Menu

Date: Sets the date. Refer to “Changing the Date and Time” on page 27 for a procedure to change the date.

Time: Sets the time. Refer to “Changing the Date and Time” on page 27 for a procedure to change the time.

Battery Settings Sub-Menu

TempComp Sensor: Select "None" for no temperature compensation, or the temperature sensor [System Temp1, System Temp2, System Temp3, IB2-1 Temp1, IB2-1 Temp2, IB2-2 Temp1, IB2-2 Temp2, EIB-1 Temp1, EIB-1 Temp2, EIB-2 Temp1, EIB-2 Temp2, SMTemp1 Temp1, …, SMTemp1 Temp8, …, SMTemp8 Temp1, …, SMTemp8 Temp8], SMDUE1 Temp1, …, SMDUE1 Temp10, SMDUE2 Temp1, …, SMDUE2 Temp10] sensing battery temperature for temperature compensation. You can also select Maximum or Average which takes the maximum or average reading of the temperature sensors [any of System Temp1, System Temp2, System Temp3, IB2-1 Temp1, IB2-1 Temp2, IB2-2 Temp1, IB2-2 Temp2, EIB-1 Temp1, EIB-1 Temp2, EIB-2 Temp1, EIB-2 Temp2, SMTemp1 Temp1, …, SMTemp1 Temp8, …, SMTemp8 Temp1, …, SMTemp8 Temp8], SMDUE1 Temp1, …, SMDUE1 Temp10, SMDUE2 Temp1, …, SMDUE2 Temp10] set as battery temperature sensors. When set, the following parameters can also be set.

NOTE! *The temperature compensation sensor is also the sensor which displays the battery temperature on the Web Interface’s Homepage.*

TempComp Center: Sets the temperature at which the system operates at normal voltage levels.

Temp Comp Coeff: Sets the temperature compensation slope or rate of change per °C above or below the "Temp Comp" setting. This value is expressed in millivolt per °C per string (mV/°C/str). For example, for a rate of change of 72 mV/°C/str in a 24-cell 48V nominal battery string, the rate of change is 3 mV per cell.

Capacity Settings Sub-Menu

Batt1: Enter the battery string’s rated capacity.

Batt2: Enter the battery string’s rated capacity.

OK to Exit?

Press ESC to end the wizard or press ENT to continue the wizard to enter the following parameters.

ECO Parameter Sub-Menu

ECO Mode: Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.

ALERT! The Energy Optimization Mode should NOT be used in systems that operate without batteries.

NOTE! *If the battery is ever disconnected, disable Energy Optimization Mode until the battery is reconnected.*

Fluct Range: If load fluctuation is less than this value, rectifiers are not turned on or off for Energy Optimization.

Cycle Period: This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.

Rects ON Time: Time all rectifiers are turned on at End of Cycle.

Alarm Settings Sub-Menu

Audible Alarm: Programs the audible alarm feature.

Off: Disables the audible alarm.

On: When a new alarm occurs, the audible alarm sounds. Press any key to silence the audible alarm.

3 min / 10 min / 1 hr / 4 hrs: When a new alarm occurs, the audible alarm sounds. The audible alarm automatically silences after the selected time period.

IP Address Sub-Menu

DHCP: The DHCP function allows the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed in the IP Address field below the DHCP setting in the local display menu (Main Menu / Settings Icon / Comm Settings).

IP Address: Sets the controller's IP address. Enter the address in the format nnn.nnn.nnn.nnn, where 0 ≤ nnn ≤ 255. The address must be a valid address and must not be 255.255.255.255.

Mask: Sets the controller's network netmask. Enter the address in the format nnn.nnn.nnn.nnn, where 0 ≤ nnn ≤ 255.

Default Gateway: Sets the controller's gateway address. Enter the address in the format nnn.nnn.nnn.nnn, where 0 ≤ nnn ≤ 255. This is the address of the gateway of the network on which the controller resides. The address must be a valid address and must not be 255.255.255.255.

4.1.11 DO Normal Settings

System DO Sub-Menu

IB1-DO1 to IB1-DO8: Chooses whether the IB1-DOx is Energized or Non-Energized.

IB0-DO1 to IB0-DO4: Chooses whether the IB0-DOx is Energized or Non-Energized.

EIB1 DO Sub-Menu

EIB1-DO1 to EIB1-DO5: Chooses whether the EIB1-DOx is Energized or Non-Energized.

4.1.12 Invts Settings Sub-Menu

- **Invt Mode AC / DC:** Sets the input mode of operation (AC Mode, DC Mode, DC Only).
- **Switch On / Off:** The options for Switch On / Off is 'All On' or 'All Off'.
- **Output Voltage:** This setting is only available when inverters have been switched off. The options for 'Output Voltage' are 200V, 208V, 220V, 230V and 240V.
- **Output Frequency:** This setting is only available when inverters have been switched off. The options for 'Output Frequency' are 50 Hz and 60 Hz.

5 Web Interface Screens

5.1 Overview of Web Function

This section provides descriptions of the Web Interface Screens. Refer also to “Passwords and Privilege Levels” on page 19 and “Using the Web Interface” on page 19. For Local Display Menus, refer to “Local Display Menus” on page 65.

NOTE! *Best viewed at 1024 x 768 resolution.*

5.2 Homepage

In the Web Interface, after entering a valid **User Name** and **Password** and clicking **LOGIN**, the "Homepage" window opens. See also “Logging into the Controller” on page 24.

Figure 5.1 NCU Homepage

The homepage window is divided into the following areas:

1. System Status Information Area (see “System Status Information Area” on page 90).
2. System Specifications Information Area (see “System Specifications Information Area” on page 90).
3. Controller Specifications Information Area (see “Controller Specifications Information Area” on page 90).
4. Site Information Area (see “Site Information Area” on page 90).
5. Alarms Area (see “Alarms Area” on page 91).

6. System Status Area (see “System Status Area” on page 92).
7. Menu Navigation Area (see “Menu Navigation Area” on page 111).

5.3 System Status Information Area

Output voltage and output current are displayed here.

5.4 System Specifications Information Area

System specifications are displayed here.

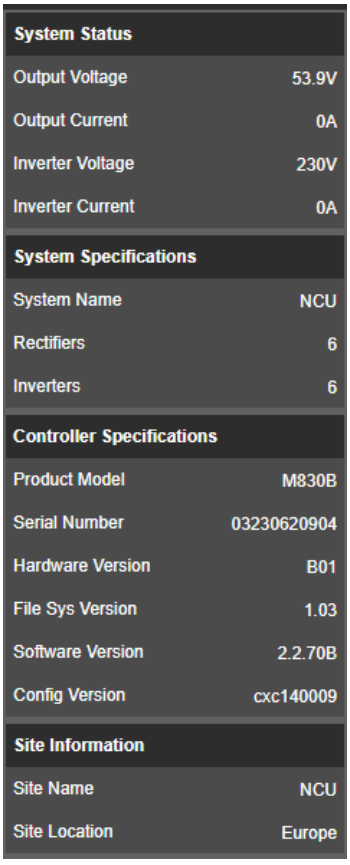
5.5 Controller Specifications Information Area

Controller specifications are displayed here.

5.6 Site Information Area

Site information is displayed here.

Figure 5.2 System Status Information, System Specifications Information, Controller Specifications Information, and Site Information Areas



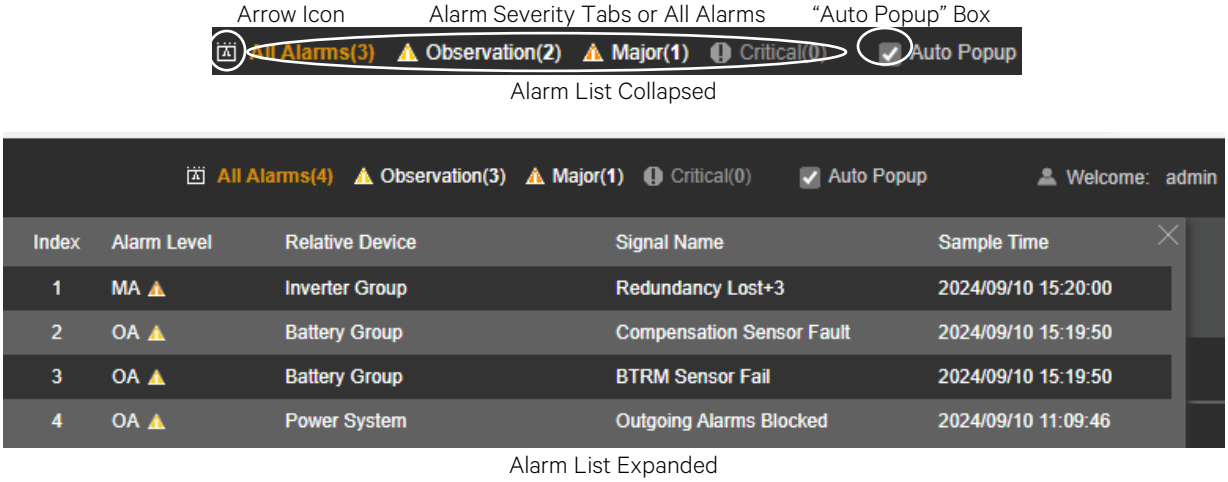
5.7 Alarms Area

Any alarms active in the power system are shown in this area.

- When viewing the Alarm List, click the “arrow” icon to collapse the Alarm List. Click the "arrow" icon again to expand the Alarm List.
- The alarms area contains tabs to allow viewing all alarms or a type of alarm (severity). For example, click the Critical tab to display alarms set as Critical alarms.
- When the “Auto Popup” box is checked and the Alarm List is collapsed, a new alarm will cause the Alarm List to expand.

NOTE! *Observation alarms are shaded yellow, major alarms are shaded orange, and critical alarms are shaded red.*

Figure 5.3 Alarms Area



5.8 System Status Area

System status is displayed in this area and consists of a Power System tab (see page 92) and General Status tab (see page 107).

Temperature Reading

- The temperature sensor set as “Ambient Temp Sensor” (Settings Menu / System Tab) is the sensor which displays the ambient temperature on the Power System tab.

System Current Reading

- “System Current” equals total rectifier current or total solar converter current minus total battery current when battery shunt exists or calculated battery current. If you do not calculate battery current, “System Current” equals total rectifier current or total solar converter current.

Calculated Load Current Reading

This value changes based on equipment installed.

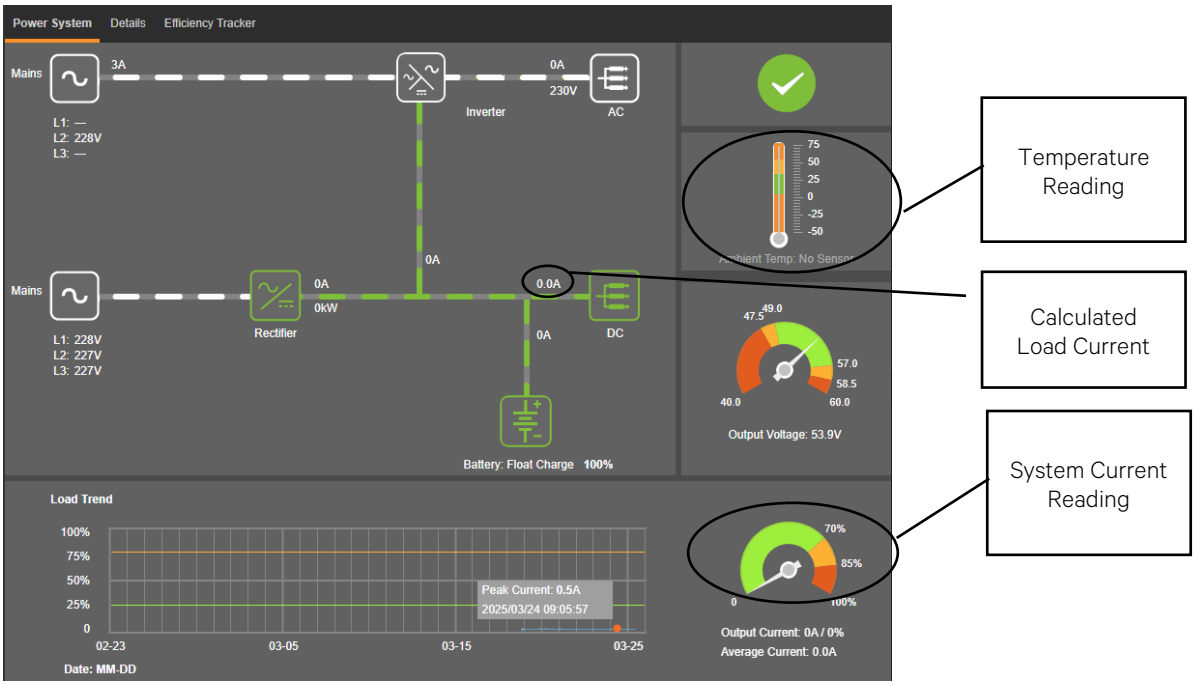
- If no Load Shunts, then the value is calculated same as the "System Current".
- If Load Shunts exist and Converters exist, then the value is calculated as:
  System Current - Converter Input Current
- If Load Shunts exist and no Converters, then the value is same as the "Total DC Load".

5.8.1 Power System Tab

The Power System tab displays power system status in a graphical block diagram format. This includes status of the input power, modules (i.e., rectifiers, inverters, converters), DC load, AC load, and battery. Also displayed are alarm status, ambient temperature, output voltage, output current, average current, and a load trend chart.

NOTE! *The load trend chart gets data from the “Data History Log” and will plot the MAXIMUM value per hour per day.*

Figure 5.4 Sample Power System Tab (with Rectifiers and Inverters Installed in System)

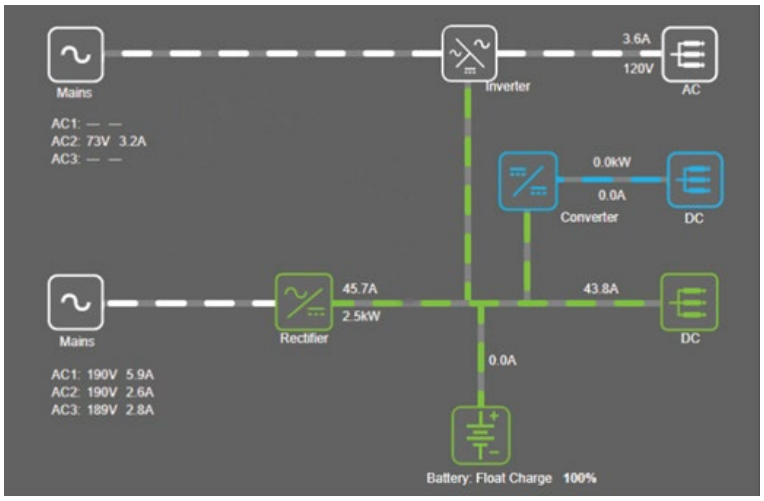


Device Group Status Pages

The power system status block diagram has interactive links. Clicking on a link takes you to that device group's status page. A device group's status page displays current or logged operating parameters for that device group.

The following sections describe the Module (i.e., rectifier, inverter, converter), DC, AC, and the Battery device groups as samples of how to use these links.

Figure 5.5 Sample Power System Status Page Block Diagram (with Rectifiers, Inverters and Converters Installed in System)



Module (Rectifier, Converter) Device Group Status Page

Clicking on a rectifier, converter icon on the power system status block diagram opens the status page for the module's Device Group. The Module Device Group status page contains multiple tabs (depending on the modules installed in your power system). This includes Rectifier and Converter tabs.

Rectifier Device Group Status Page Tab

This tab displays status values such as "Total Current", "Number of Rectifiers", etc.

Figure 5.6 Rectifier Device Group Status Page Tab

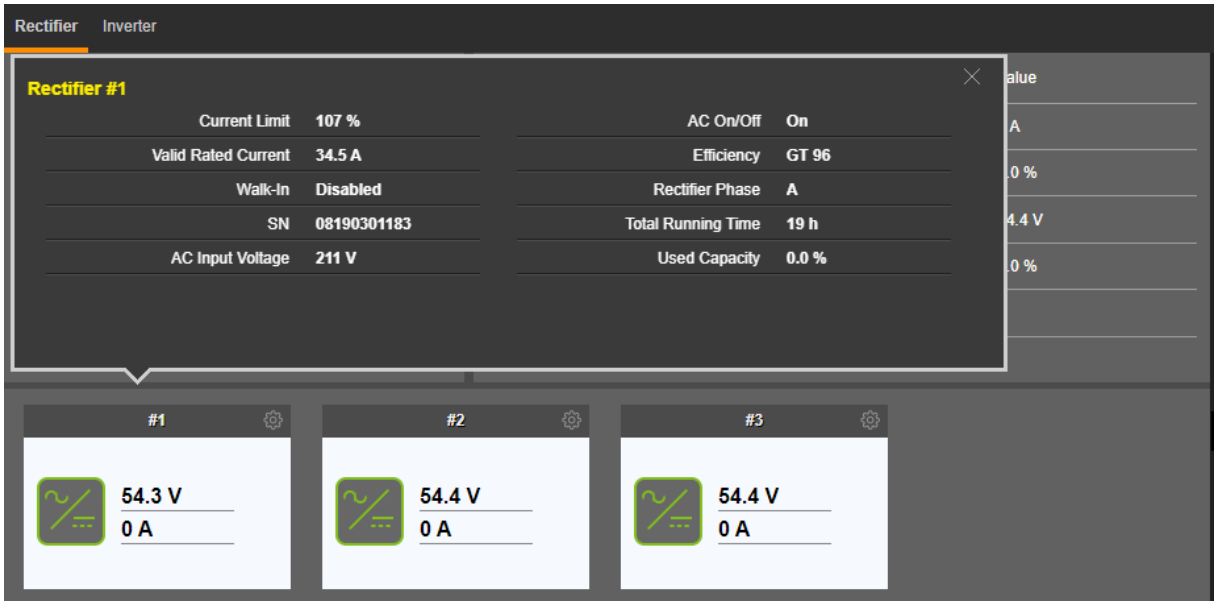
NOTE! *The "Rectifier Capacity Used" and load percentage indicators are based on the nominal ratings under nominal operating conditions.*

NOTE! *"Rectifier Capacity Used" and "Maximum Used Capacity" are based on 54 VDC.*

Individual Rectifier Status Page

Displayed on the Rectifier Device Group status page are the individual rectifiers installed in the system. Click on an individual rectifier icon to display its status such as "Valid Rated Current", etc.

Figure 5.7 Individual Rectifier Status Page



Individual Rectifier Settings Page

In the Rectifier Device Group Status Page Tab, click the settings wheel icon to go to the individual rectifier settings page. Click Back to go back to the Rectifier Device Group Status Page Tab.

Figure 5.8 Selecting an Individual Rectifier Settings Page

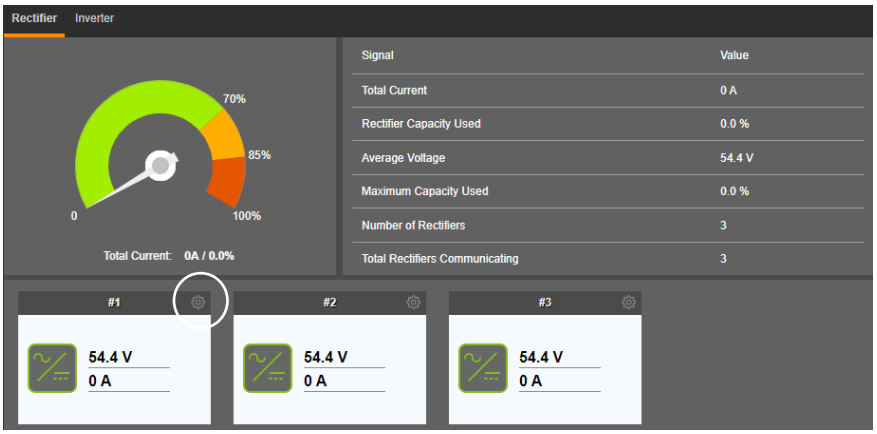
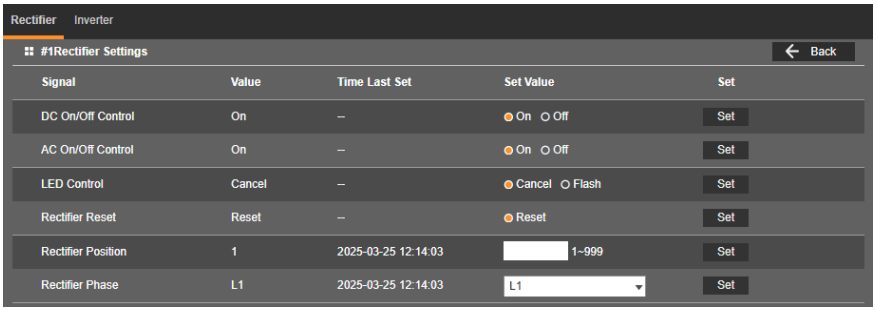


Figure 5.9 Individual Rectifier Settings Page



NOTE! *Settings that appear "grayed out" can only be made when the controller is in the "manual control" state. If the controller is set for "automatic" control, change the "Auto/Manual State" setting first to the "Manual" setting.*

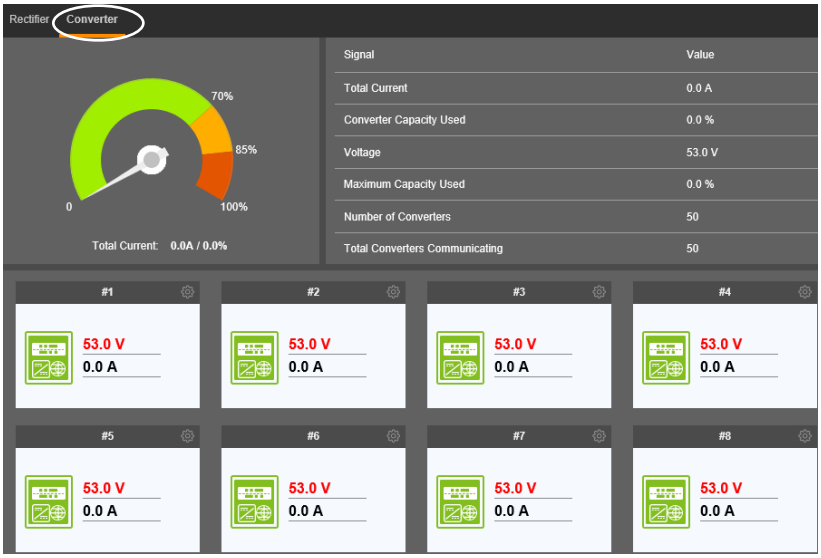
- **DC On/Off Control:** Temporarily turns the rectifier's DC output on or off when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **AC On/Off Control:** Temporarily turns the rectifier's AC input on or off when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LED Control:** Temporarily sets whether or not the rectifier's local power indicator blinks when the controller is communicating with the rectifier when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Rectifier Reset:** Temporarily sets the rectifier's over voltage reset feature when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Rectifier Position:** Sets the rectifier's identification number.
- **Rectifier Phase:** Sets the phase connected to the rectifiers input. Indicates the Phase Connected to the rectifier's input.

NOTE! After Setting ID and / or Phase for all rectifiers, you must go to Settings-Rectifiers Tab and click 'Yes' on 'Confirm Rect Position / Phase' to make your changes take effect.

Converter Device Group Status Page Tab

This tab displays status values such as “Total Current”, “Number of Converters”, etc.

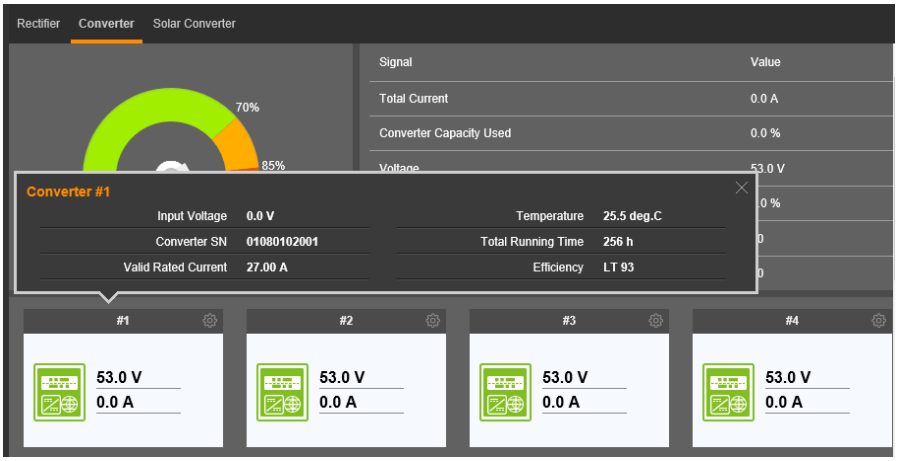
Figure 5.10 Converter Device Group Status Page Tab



Individual Converter Status Page

Displayed on the Converter Device Group status page are the individual converters installed in the system. Click on an individual converter icon to display its status such as "Current", etc.

Figure 5.11 Individual Converter Status Page



Individual Converter Settings Page

In the Converter Device Group Status Page Tab, click the settings wheel icon  to go to the individual converter settings page. Click  to go back to the Converter Device Group Status Page Tab.

Figure 5.12 Selecting an Individual Converter Settings Page

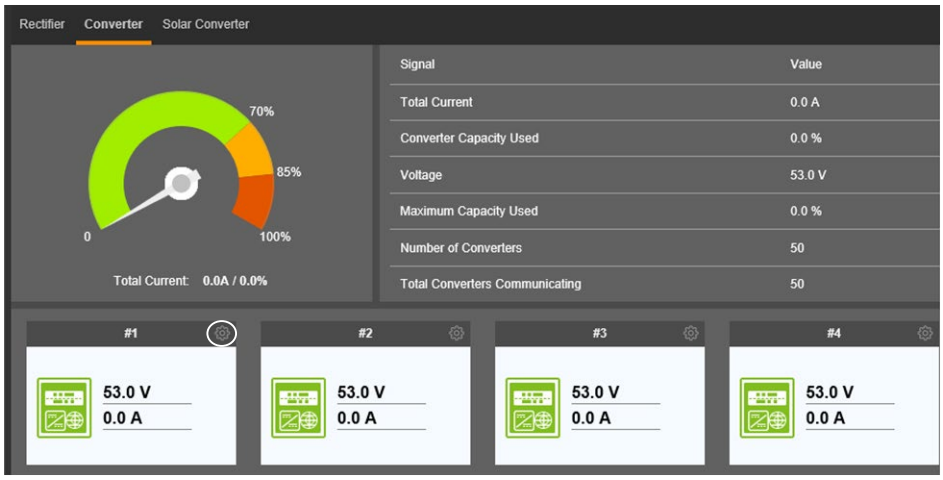
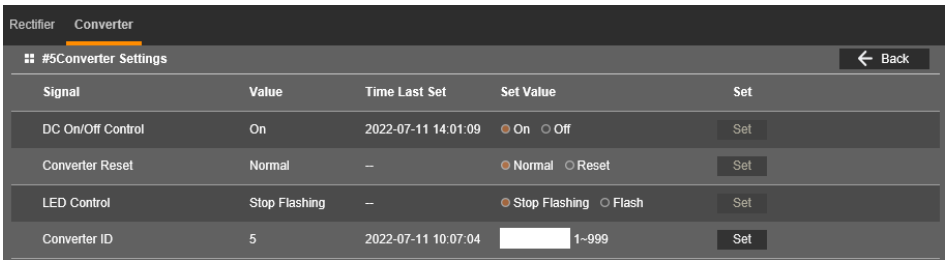


Figure 5.13 Individual Converter Settings Page



NOTE! *Settings that appear "grayed out" can only be made when the controller is in the "manual control" state. If the controller is set for "automatic" control, change the "Auto/Manual State" setting first to the "Manual" setting.*

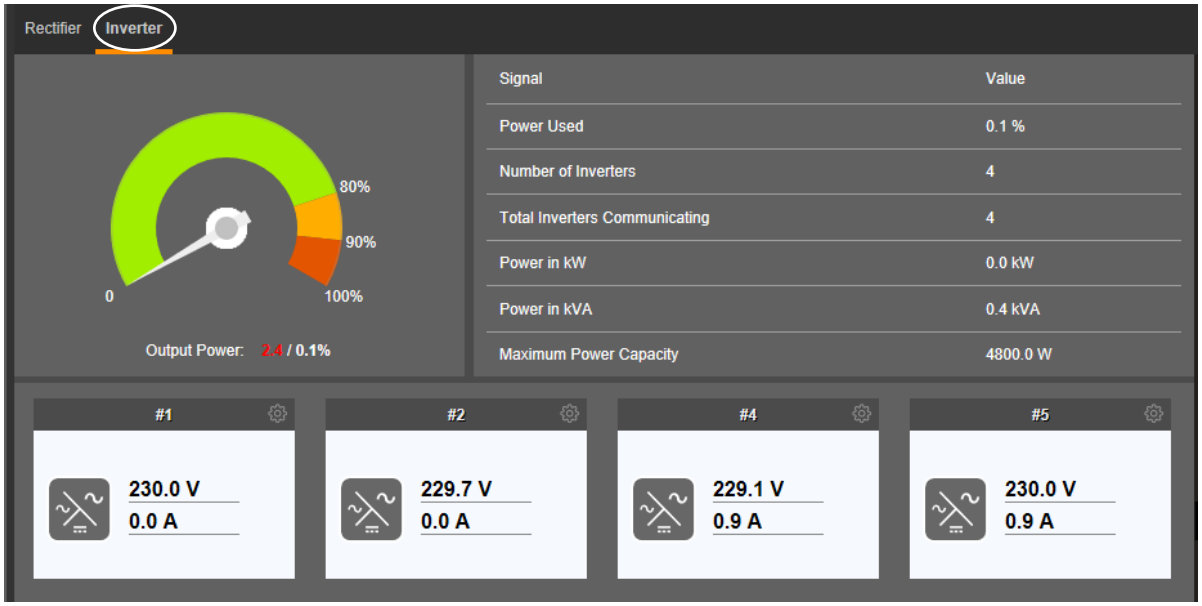
- **DC On/Off Control:** Temporarily turns the converter's DC output on or off when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Converter Reset:** Temporarily sets the converter's over voltage reset feature when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **LED Control:** Temporarily sets whether or not a converter's local power indicator blinks when the controller is communicating with the converter when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Converter ID:** Sets the converter's identification number.

NOTE! After Setting ID for all converters, you must go to Settings-DC / DC Converters Tab and click 'Yes' on 'Confirm Converters Position' to make your changes take effect.

Inverter Device Group Status Page Tab

This tab displays status values such as “Power Used”, “Number of Inverters”, etc.

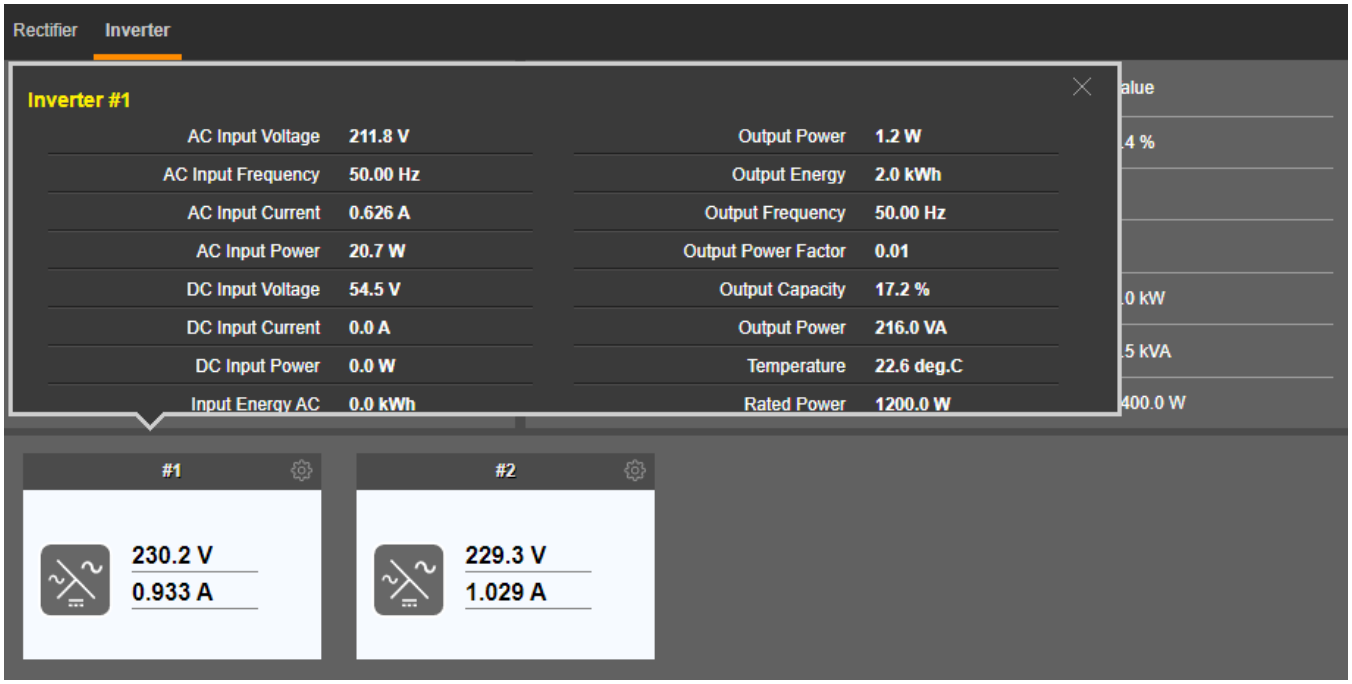
Figure 5.14 Inverter Device Group Status Page Tab



Individual Inverter Status Page

Displayed on the Inverter status page is the individual Inverter installed in the system. Click on an individual Inverter icon to display its status such as "Input Current", "Input Power ", etc.

Figure 5.15 Individual Inverter Status Page



Individual Inverter Settings Page

In the Inverter Device Group Status Page Tab, click the settings wheel icon to go to the individual Inverter settings page. Click Back to go back to the Inverter Device Group Status Page Tab.

Figure 5.16 Selecting an Individual Inverter Settings Page

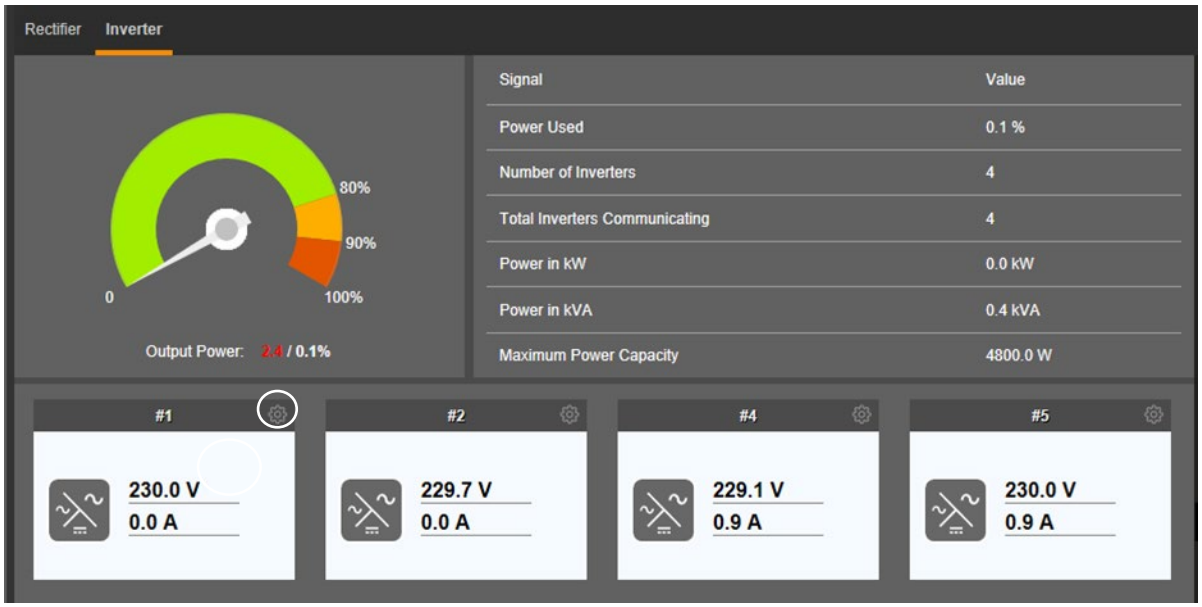
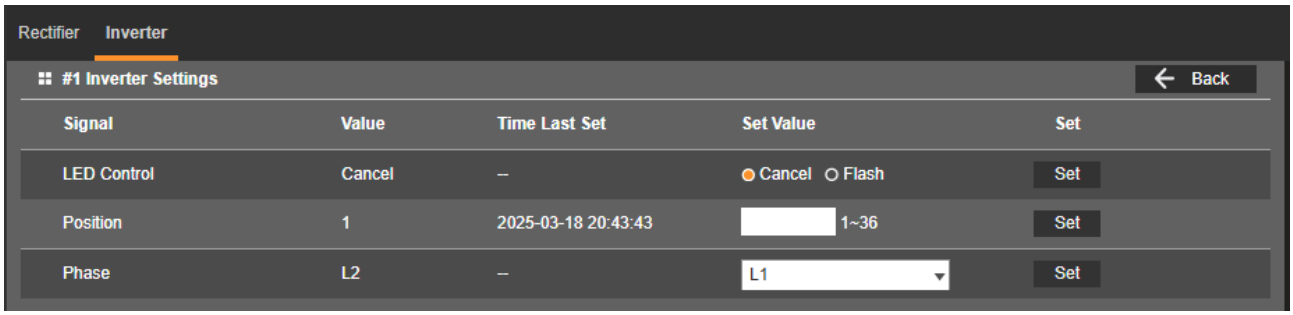


Figure 5.17 Individual Inverter Settings Page



NOTE! *Settings that appear "grayed out" can only be made when the controller is in the "manual control" state. If the controller is set for "automatic" control, change the "Auto/Manual State" setting first to the "Manual" setting.*

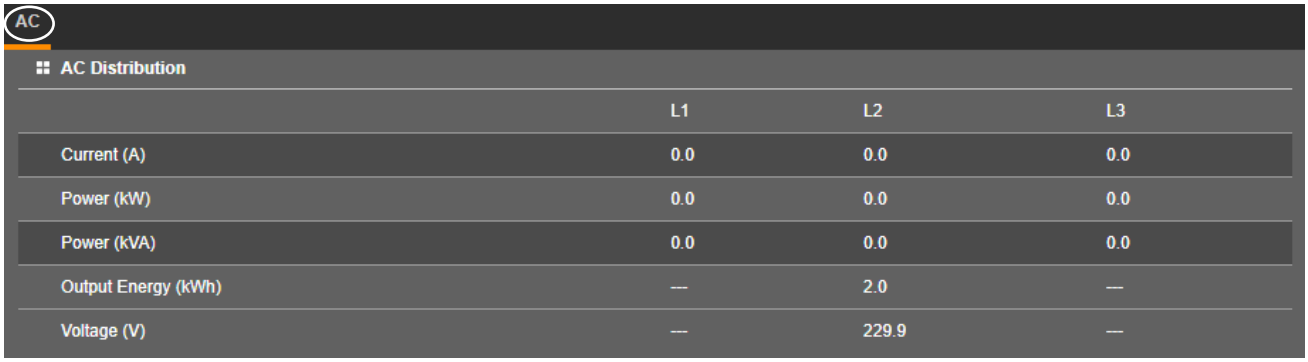
- **LED Control:** Temporarily sets whether or not an inverter's local power indicator blinks when the controller is communicating with the solar converter when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Position:** Sets the inverter position.
- **Phase Setting:** Sets the Phase of the inverter.

NOTE! After Setting Position and / or Phase for all inverters, you must go to Settings-Inverter Tab and click 'Yes' on 'Confirm Inverter ID / Phase' to make your changes take effect.

AC Status Page

Clicking on the AC icon on the power system status block diagram opens up the status page for the AC Distribution. The AC distribution status tab is shown for an example.

Figure 5.18 AC Status Tab



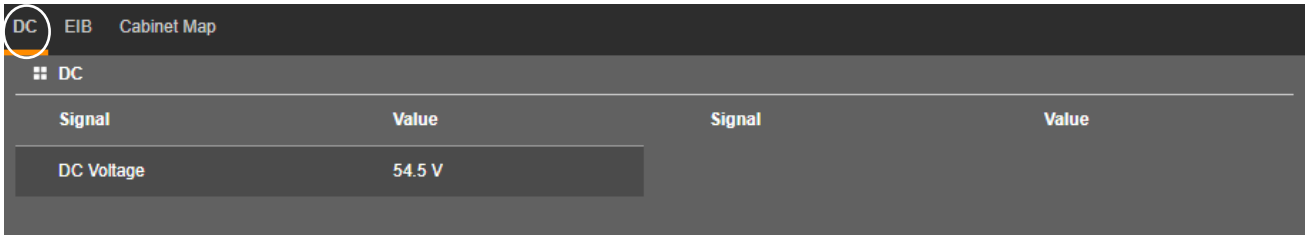
DC Device Group Status Page

Clicking on the DC icon on the power system status block diagram opens up the status page for the DC Device Group. The DC Device Group status page contains multiple tabs (depending on the DC equipment installed in your power system). This includes DC and Cabinet Map. The DC status page tab is shown next for an example.

DC Status Tab

This tab displays status values such as "DC Voltage".

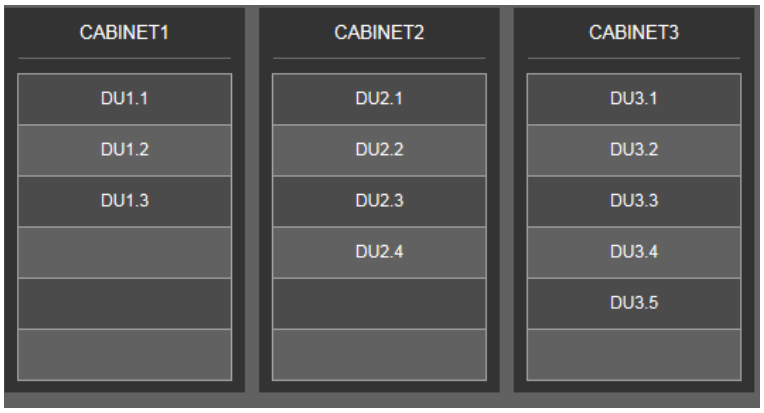
Figure 5.19 DC Device Group Status Tab



Cabinet Map Status Tab (if available)

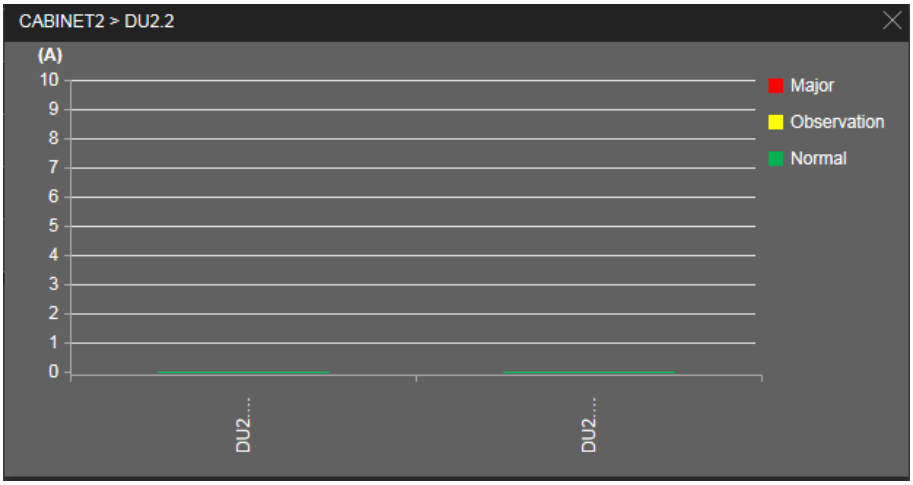
This tab displays the number of distribution cabinets in the system and the DUs in each distribution cabinet.

Figure 5.20 Cabinet Map Status Tab (if available)



Example: Clicking on DU 2.2 in the Cabinet Map Status screen shown in Figure 5.20 displays Figure 5.21. Figure 5.21 shows there are two (2) branch circuits in DU2.2 and the current of the branch circuit is 0 A.

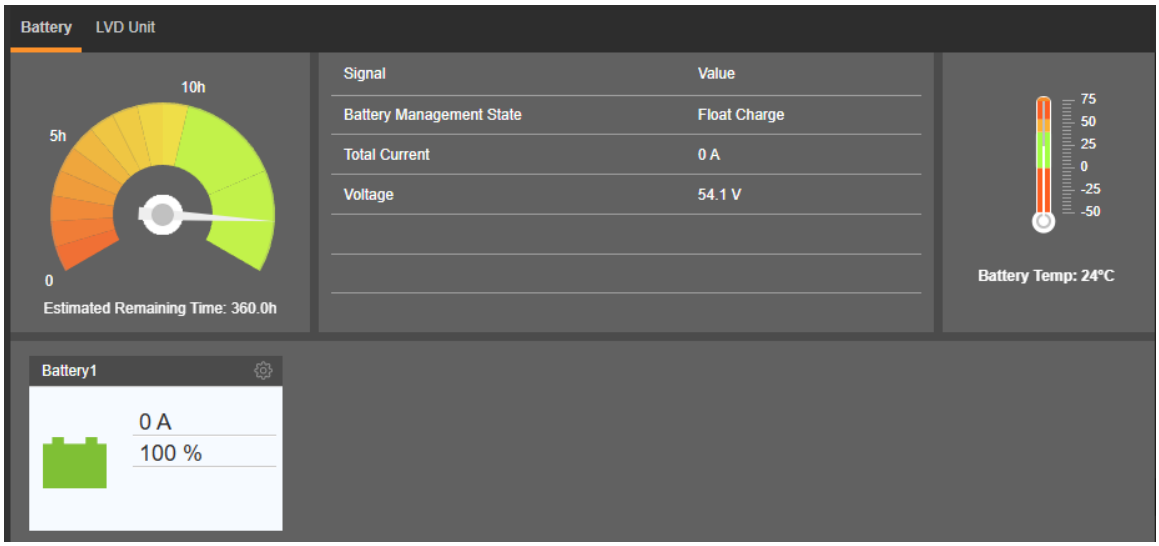
Figure 5.21 Branch Current in DU Screen



Battery Device Group Status Page

Clicking on the battery icon on the power system status block diagram opens the status page for the Battery Device Group. The Battery Device Group status page displays battery status values such as "Battery Management State" and "Battery Temp". The actual display of the Battery Device Group status page is dependent on the NCU configuration and if SMDU or EIB shunts are programmed as battery shunts (see Figure 5.22 for samples). If Lithium-Ion Battery(s) are connected and communicating via RS485, the BMS Battery Icon will appear and clicking on the icon will display status values such as Battery Current, SOC, Cycle Count, and Date of Manufacturing.

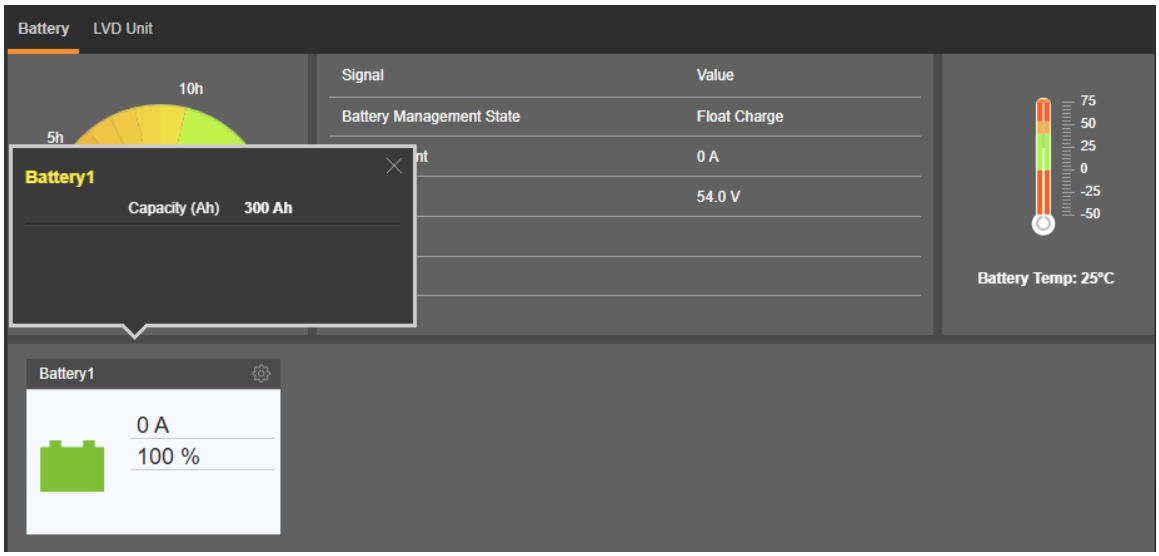
Figure 5.22 Sample Battery Device Group Status Page



Individual Battery Status Page

Displayed on the Battery Device Group status page are the individual batteries installed in the system. Hover the mouse over an individual battery icon to display its status such as "Battery Capacity (Ah)". The actual display of an Individual Battery status page is dependent on the NCU configuration and if SMDU or EIB shunts are programmed as battery shunts (see Figure 5.23 for samples). If Lithium-Ion Battery(s) are connected and communicating via RS485, the BMS Battery Icon will appear and clicking on the icon will display status values such as Battery Current, SOC, Cycle Count, and Date of Manufacturing.

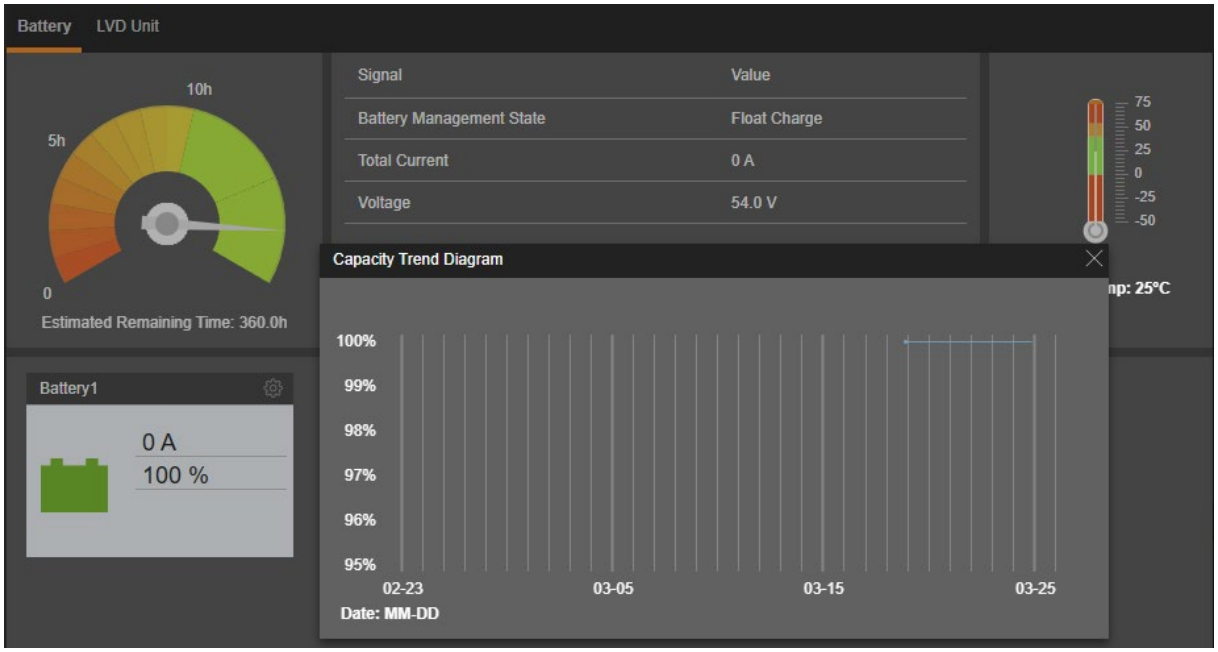
Figure 5.23 Sample Individual Battery Status Page



Individual Battery Capacity Trend Diagram or Info Screen

Displayed on the Battery Device Group status page are the individual batteries installed in the system. Click on an individual battery (Battery 1) to display its "Capacity Trend Diagram" or “info screen”. The actual display of an individual battery capacity trend diagram or info screen is dependent on the NCU configuration. See Figure 5.24 for sample).

Figure 5.24 Sample Individual Battery Capacity Trend Diagram



Individual Battery Settings Page

In the Battery Device Group Status Page Tab, click the settings wheel icon to go to the individual battery settings page. See Figure 5.25. Click Back to go back to the Battery Device Group Status Page Tab. The actual display of an Individual Battery status is dependent on the NCU configuration and if SMDU or EIB shunts are programmed as battery shunts (see Figure 5.26.) If Lithium-Ion Battery(s) are connected and communicating via RS485, the BMS Battery Icon will appear and clicking on the icon will display status values such as Battery Current, SOC, Cycle Count, and Date of Manufacturing.

Figure 5.25 Selecting an Individual Battery Settings Page

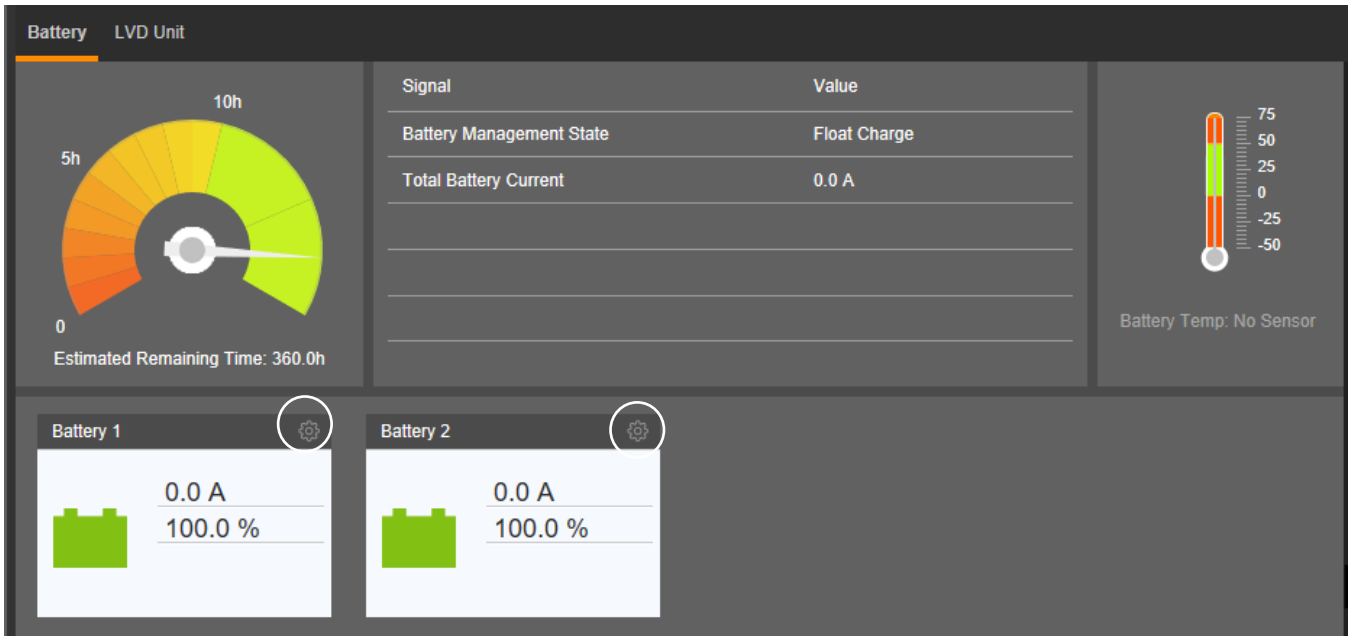
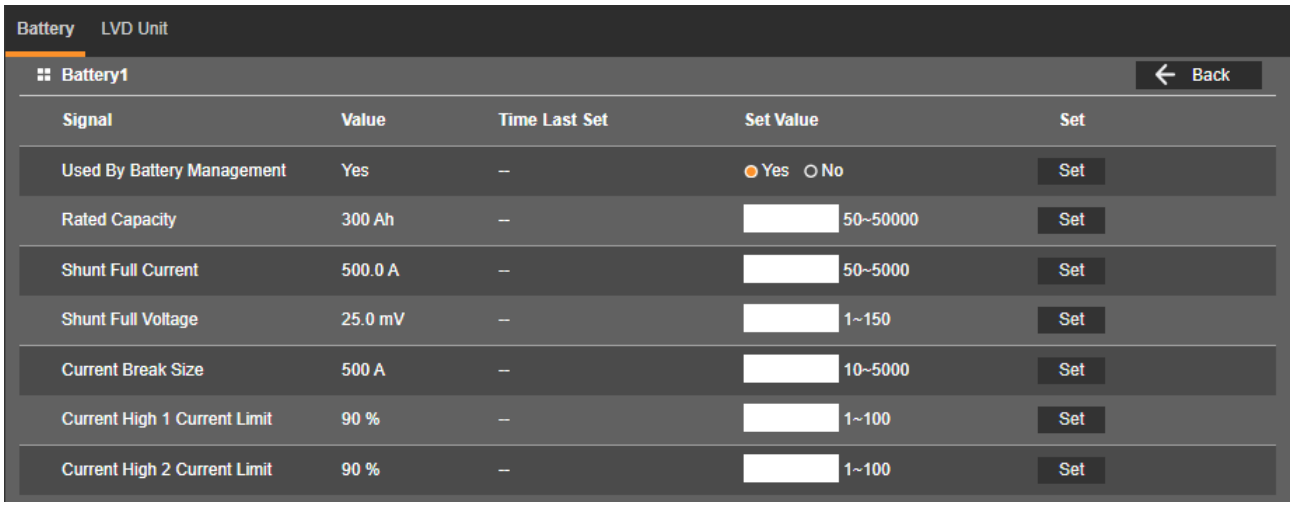


Figure 5.26 Individual Battery Settings Page (Battery #)



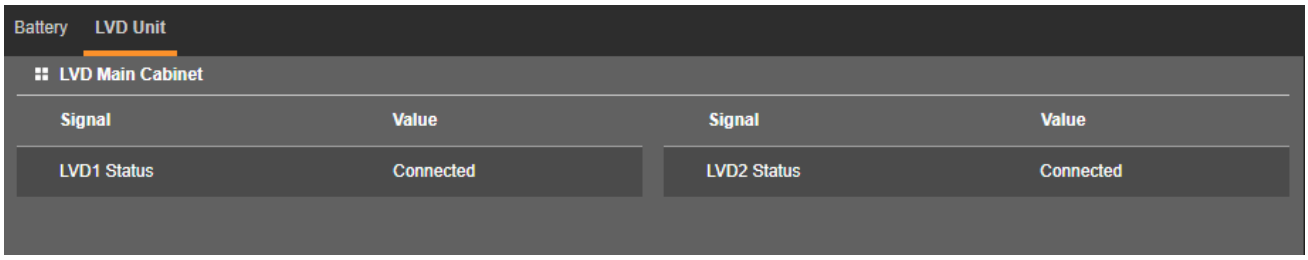
- **Used By Battery Management:** Select Yes to use the battery management feature and No to not use the feature for this battery.
- **Rated Capacity:** Enter the battery string's rated capacity.

NOTE! *The "Rated Capacity" is the total of all the batteries rated capacities connected in parallel.*
Example: Three (3) 200 Ah batteries are connected in parallel and connected to the main system, then "Battery 1" "Rated Capacity" should be set to 600 Ah.

- **Shunt Full Current:** Enter the battery string's shunt current rating.
- **Shunt Full Voltage:** Enter the battery string's shunt voltage.
- **Current Break Size:** Enter the threshold value of current alarm.
- **Current High1 Current Limit:** Enter the high current limit point of current1.
- **Current High2 Current Limit:** Enter the too high current limit point of current1.

LVD Unit Page

Figure 5.27*: LVD Unit Page*



5.8.2 Consumption Map Tab

The Consumption Map tab displays the customers whose loads are being monitored for consumption in a grid list of customer load icons. Click the "🔍" symbol in a load icon to display the consumption details for that customer.

Each load icon shows the customer name and total current.

Green Icon: Customer load current is in normal state.

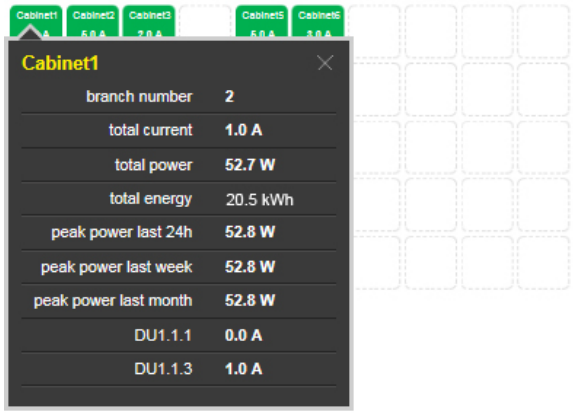
Yellow Icon: Customer load current is larger than Alarm Level 1.

Red Icon: Customer load current is larger than Alarm Level 2.

Grey Icon: Customer load current is 0.

White Icon: Customer load has not been configured.

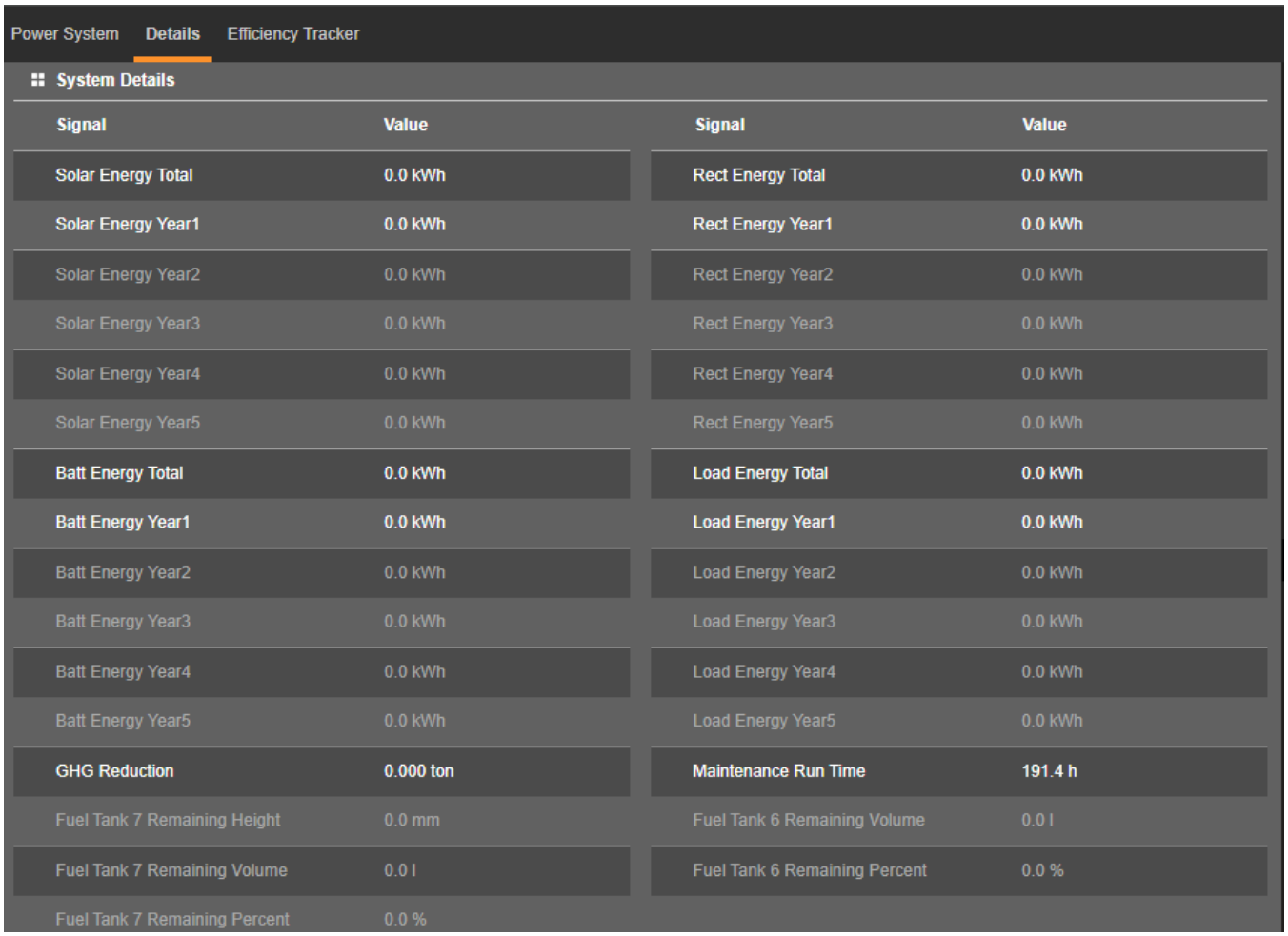
Figure 5.28 Consumption Map Tab



5.8.3 Details Tab

The User Details tab displays additional status entries.

Figure 5.29 Details Tab



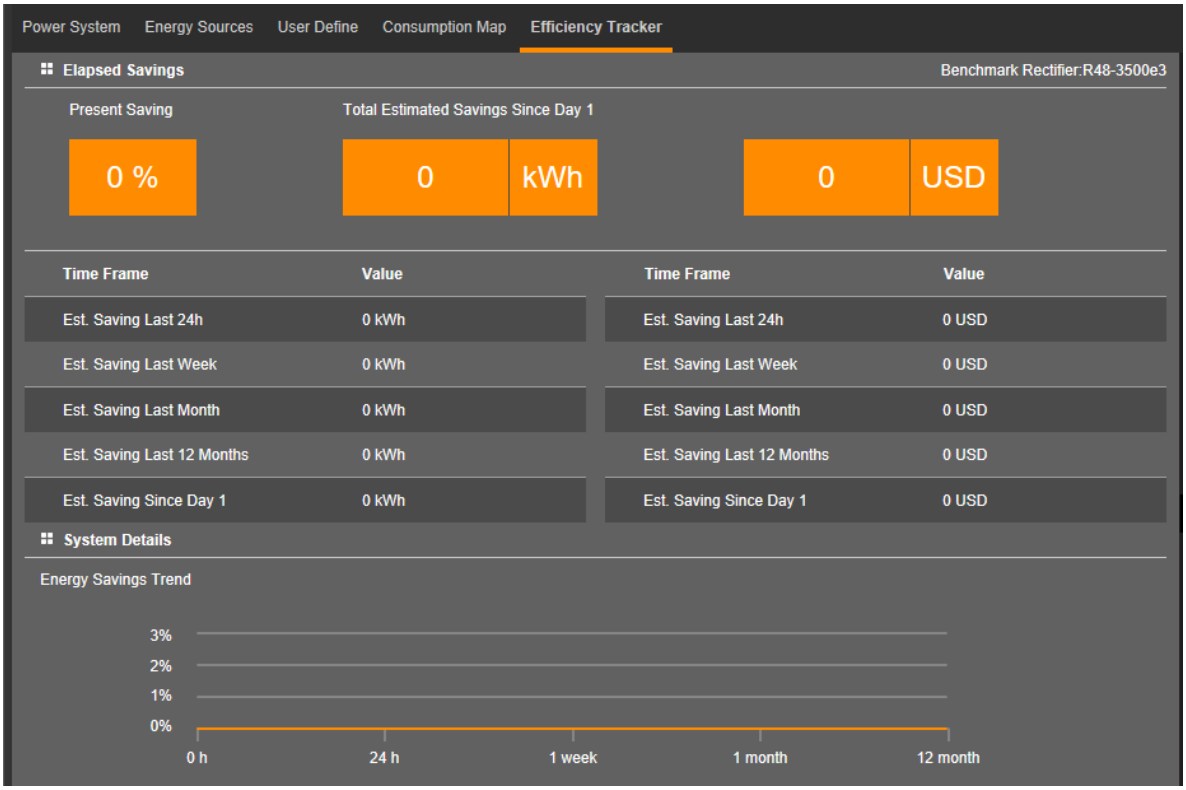
Signal	Value	Signal	Value
Solar Energy Total	0.0 kWh	Rect Energy Total	0.0 kWh
Solar Energy Year1	0.0 kWh	Rect Energy Year1	0.0 kWh
Solar Energy Year2	0.0 kWh	Rect Energy Year2	0.0 kWh
Solar Energy Year3	0.0 kWh	Rect Energy Year3	0.0 kWh
Solar Energy Year4	0.0 kWh	Rect Energy Year4	0.0 kWh
Solar Energy Year5	0.0 kWh	Rect Energy Year5	0.0 kWh
Batt Energy Total	0.0 kWh	Load Energy Total	0.0 kWh
Batt Energy Year1	0.0 kWh	Load Energy Year1	0.0 kWh
Batt Energy Year2	0.0 kWh	Load Energy Year2	0.0 kWh
Batt Energy Year3	0.0 kWh	Load Energy Year3	0.0 kWh
Batt Energy Year4	0.0 kWh	Load Energy Year4	0.0 kWh
Batt Energy Year5	0.0 kWh	Load Energy Year5	0.0 kWh
GHG Reduction	0.000 ton	Maintenance Run Time	191.4 h
Fuel Tank 7 Remaining Height	0.0 mm	Fuel Tank 6 Remaining Volume	0.0 l
Fuel Tank 7 Remaining Volume	0.0 l	Fuel Tank 6 Remaining Percent	0.0 %
Fuel Tank 7 Remaining Percent	0.0 %		

5.8.4 Efficiency Tracker Tab

The system can calculate energy saving for R48-3500e4, R48-3500e3 or R48-3200 and then present saving in kWh based on average load of last 24h, week, month, 12 months since day1.

Elapsed Saving, System Details are displayed on the Efficiency Tracker Web page.

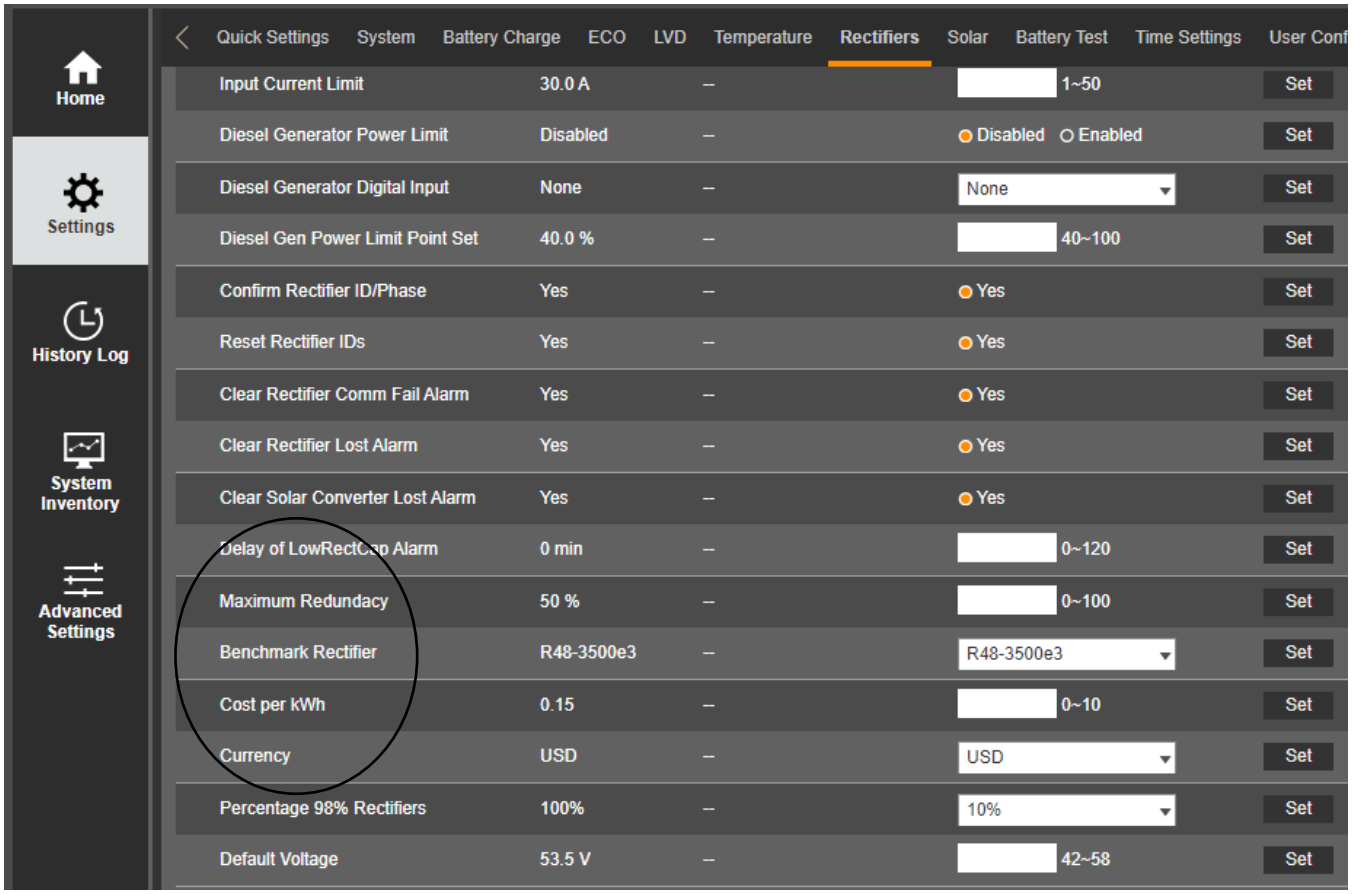
Figure 5.30*: Efficiency Tracker Tab*



Set Related Parameters

Click Settings and then select Rectifiers, set Benchmarks, Cost per kWh, Currency and Percentage 98% Rectifiers. As shown in the following:

Figure 5.31*: Set Related Parameters for Efficiency Tracker*



5.9 Menu Navigation Area

Available menus are displayed in this area. When a menu is clicked on, the system status screen is replaced with the selected menu's screen. Note that there is a menu item named HOME to return to the system status screen.

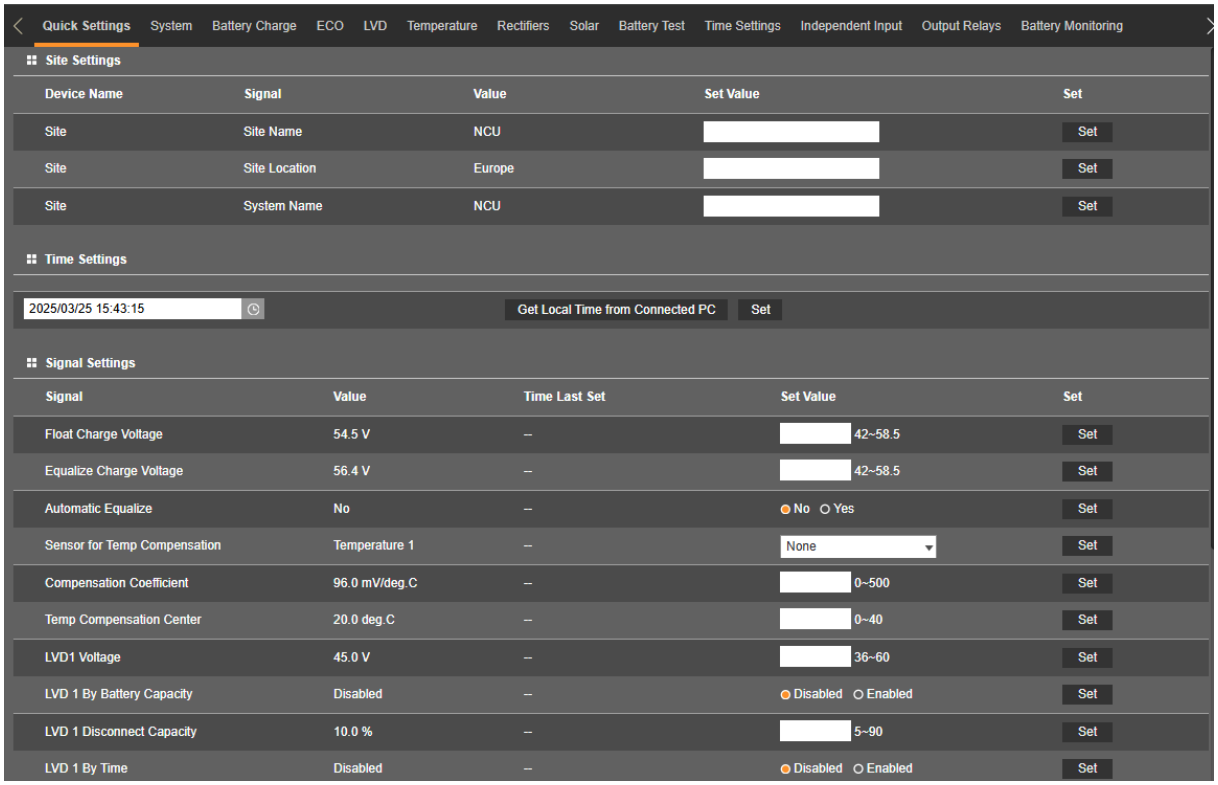
Located at the top of each main menus are tabs to select the various sub-menus. If there are more sub-menus then can be displayed in the window, an arrow appears to navigate to the additional sub-menus.

Figure 5.32 Menu Navigation Area

5.9.1 Settings Menu

The Settings Menu allows you to change (if you have the proper privilege level programmed in your User settings) the settings of the various programmable parameters. Settings are grouped per function. Select a tab in the Settings Menu to change that function's programmable parameters.

Figure 5.33 Settings Menu



Changing Programmable Parameters in the Settings Menu

To change a programmable parameter, select or enter a new value for the parameter then click on “Set” to change the value.

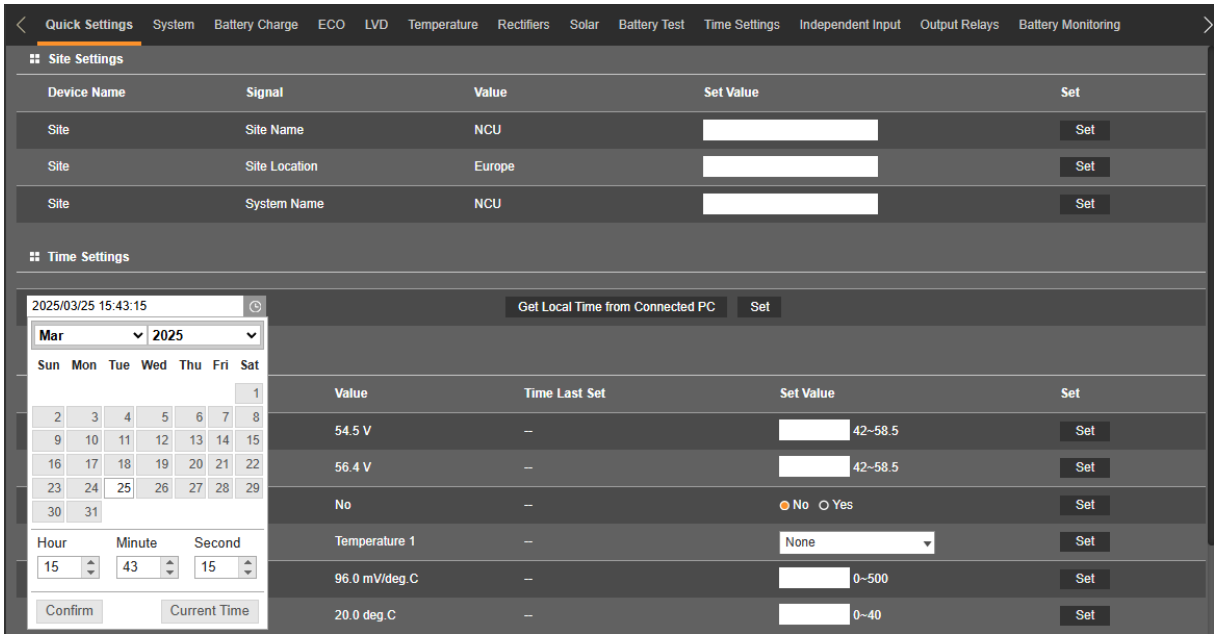
NOTE! *Settings that appear "grayed out" can only be made when the controller is in the "manual control" state. If the controller is set for "automatic" control, change the “Auto/Manual State” setting first to the “Manual” setting.*

Quick Settings Tab Programmable Parameter Descriptions

- **Site Settings:** Enter a "Site Name", "Site Location", and "System Name".
- **Time Settings:** Enter the time or select "Get Local Time from Connected PC".

  In the Time Settings section, click on "Get Local Time from Connected PC" and then “Set” to automatically set the date and time. To manually set the date and time, click on “the clock symbol” and enter the date and time. Then select the “Confirm” button. See Figure 5.34. In the Time Settings section, click on “Set” to save the change.

Figure 5.34 Manual Date and Time Menu



- **Signal Settings:**
  - **Float Charge Voltage:** Float Charge output voltage setting.
  - **Equalize Charge Voltage:** Equalize Charge output voltage setting.
  - **Automatic Equalize:** Choose “Yes” or “No” to automatic equalize.
  - **Sensor for Temp Compensation:** Select "None" for no temperature compensation, or the temperature sensor [None/ Max/ Average/ Temp1/ Temp2] sensing battery temperature for temperature compensation. You can also select Maximum or Average which takes the maximum or average reading of the temperature sensors [any of None/ Max/ Average/ Temp1/ Temp2] set as battery temperature sensors. When set, the following parameters can also be set.
  - **Compensation Coefficient:** Sets the temperature compensation slope or rate of change per ° C above or below the "Temperature Compensation Center" setting. This value is expressed in millivolt per ° C per string (mV/° C/str). For example, for a rate of change of 72 mV/° C/str in a 24-cell 48V nominal battery string, the rate of change is 3 mV per cell.
  - **Temp Comp Center:** Sets the temperature at which the system operates at normal voltage levels.

- **LVD1 Voltage:** Sets the LVD1 voltage from 36 to 60 V.
- **LVD 1 By Battery Capacity:** Enables or disables LVD 1 By Battery Capacity function.
- **LVD 1 Disconnect Capacity:** Sets LVD 1 Disconnect Capacity value.
- **LVD 1 By Time:** Enables or disables LVD 1 By Time function.
- **LVD1 Time:** Sets the LVD1 time from 1 to 1000 min.
- **LVD2 Voltage:** Sets the LVD2 voltage from 36 to 60 V.
- **LVD 2 By Battery Capacity:** Enables or disables LVD2 By Battery Capacity function.
- **LVD 2 Disconnect Capacity:** Sets LVD 2 Disconnect Capacity value.
- **LVD 2 By Time:** Enables or disables LVD 2 By Time function.
- **LVD2 Time:** Sets the LVD2 time from 1 to 1000 min.
-

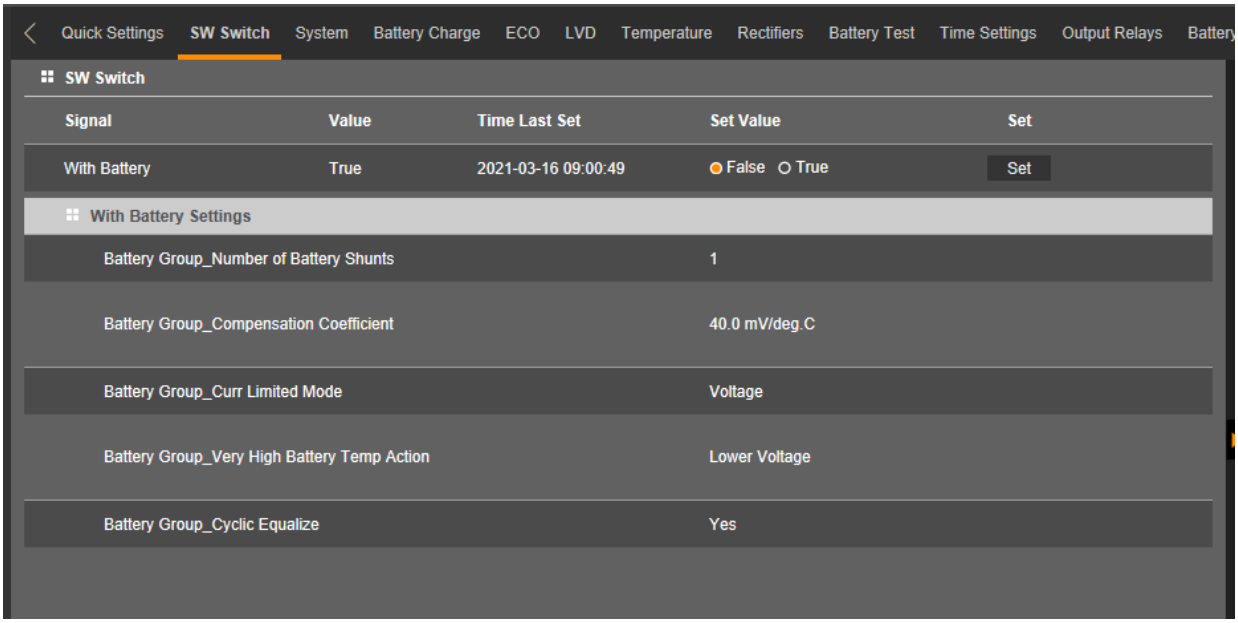
ALERT! The Energy Optimization Mode should NOT be used in systems that operate without batteries.

NOTE! *If the battery is ever disconnected, disable Energy Optimization Mode until the battery is reconnected.*

- **ECO Mode:** Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.
  Load Fluctuation Range: If load fluctuation is less than this value, rectifiers are not turned on or off for Energy Optimization.
  Cycle Period: This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.
  All Rects ON Time: Time all rectifiers are turned on at the end of the “Cycle Period”.
- **Outgoing Alarms Blocked:**
  Normal: Alarms are processed normally.
  Blocked: Forces the alarm relays in the "off" state and blocks alarms from changing the relay state.
- **Auto/Manual State**
  Auto: The controller automatically controls the power system.
  Manual: A User can manually change certain power system control settings. When you return to Auto Mode, any settings changed in Manual Mode are returned to their previous setting (setting before being placed in Manual Mode). This provides a convenient means of making temporary adjustment changes for testing purposes.
- **Batt1 Rated Capacity:** Enter the battery string’s rated capacity.

SW Switch Menu Tab (if available)

Figure 5.35 SW Switch Menu



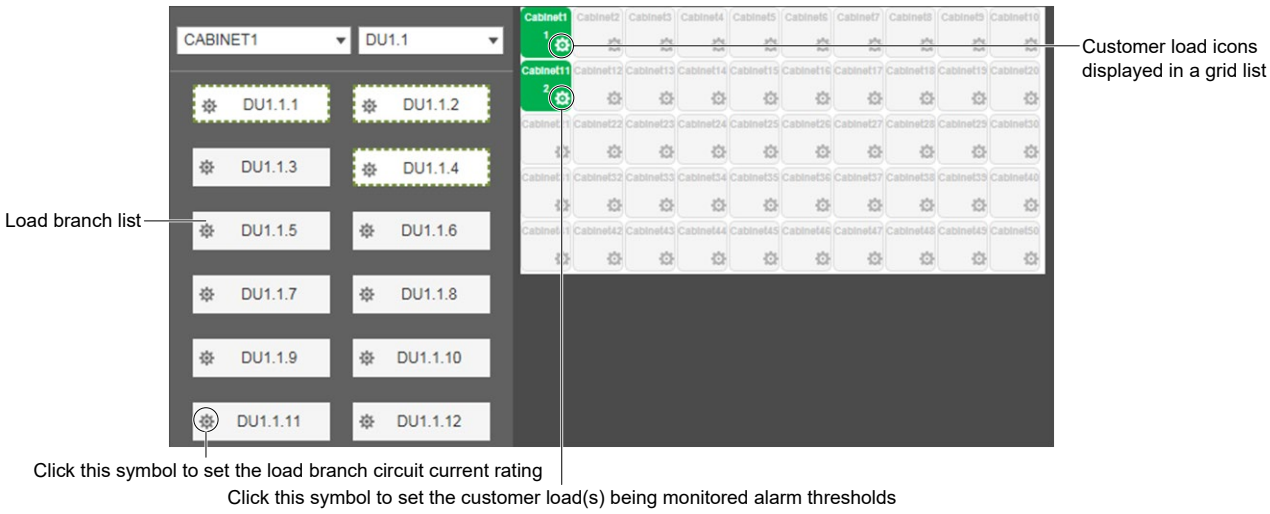
With Battery: Chooses 'With Battery' is False or True.

Set Cabinet Tab Programmable Parameter Descriptions

The Set Cabinet tab is shown in Figure 5.36.

The Set Cabinet tab is divided into two parts. The left part is the load branch list, which will be used to designate the customer load branch circuits to be monitored for consumption. The right part is the customer load icons displayed in a grid list.

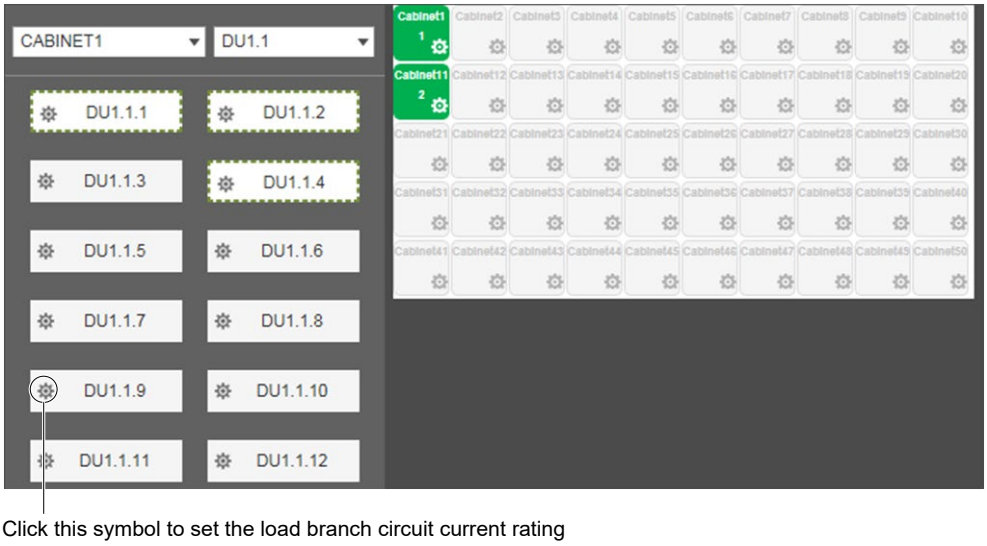
Figure 5.36 Set Cabinet Tab



Setting the Load Branch Circuit Current Rating

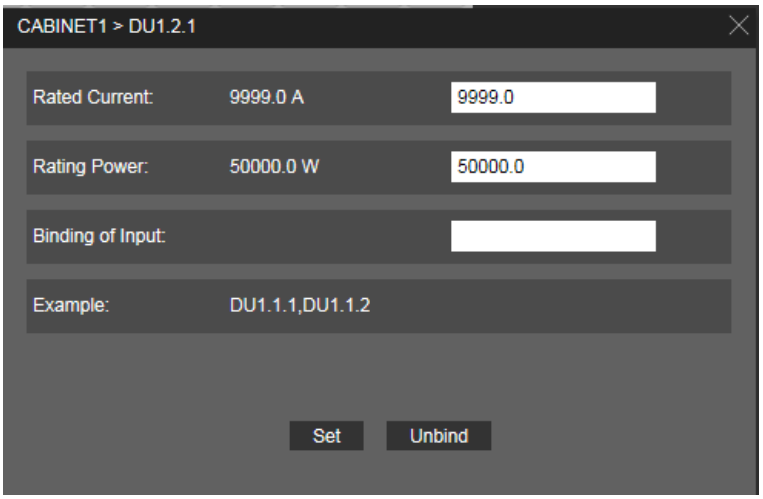
1. Click the ⚙ symbol next to the load branch circuit to be set. See Figure 5.37.

Figure 5.37 Setting the Load Branch Circuit Current Rating-1



2. The following window opens. Enter a value for the branch circuit current rating and click Set.

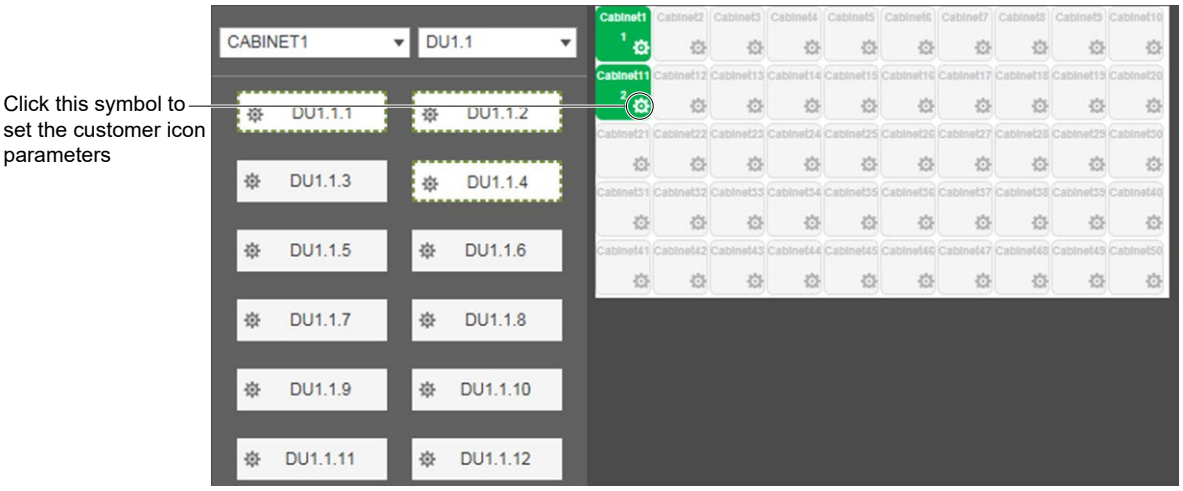
Figure 5.38 Setting the Load Branch Circuit Current Rating-2



Setting the Customer Icons Parameters

1. Click the symbol next to the customer icon to be set. See Figure 5.39.

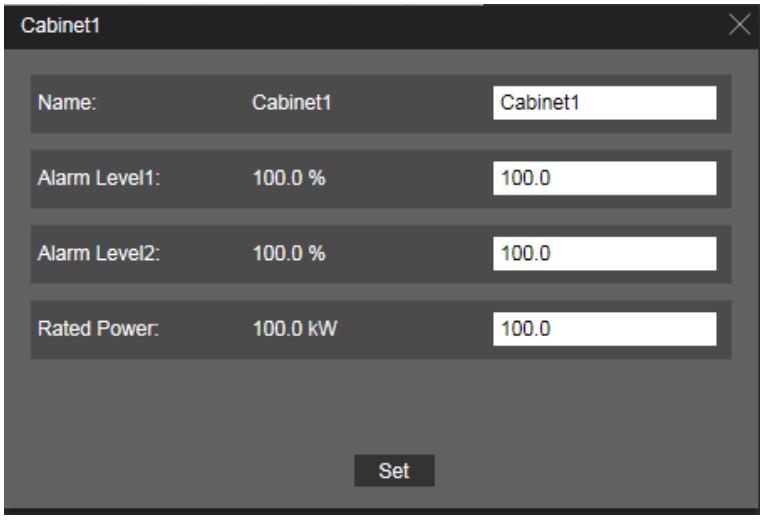
Figure 5.39 Setting the Customer Icons Parameters-1



2. The following window opens. Enter the customer icon parameters and click Set.

- **Name:** The name of the customer.
- **Alarm Level 1:** If the customer load(s) exceeds the percent of the total branch circuit current rating entered for Alarm Level 1, the icon representing the customer load turns yellow, which indicates an observation alarm.
- **Alarm Level 2:** If the customer load(s) exceeds the percent of the total branch circuit current rating entered for Alarm Level 2, the icon representing the customer load turns red, which indicates a major alarm.
    - **Rated Power:** Sets the rated power of the cabinet.

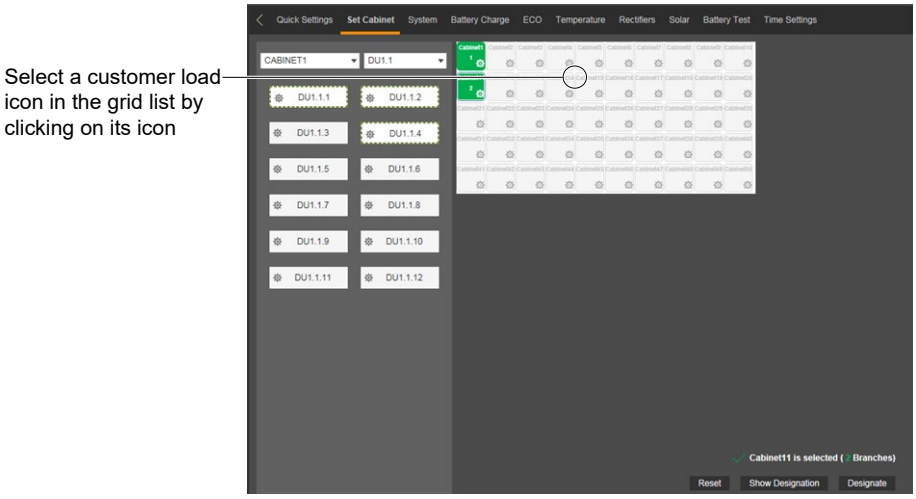
Figure 5.40 Setting the Customer Icons Parameters-2



Designating the Load Branch Circuits Connected to Each Customer's Loads to be Monitored for Consumption

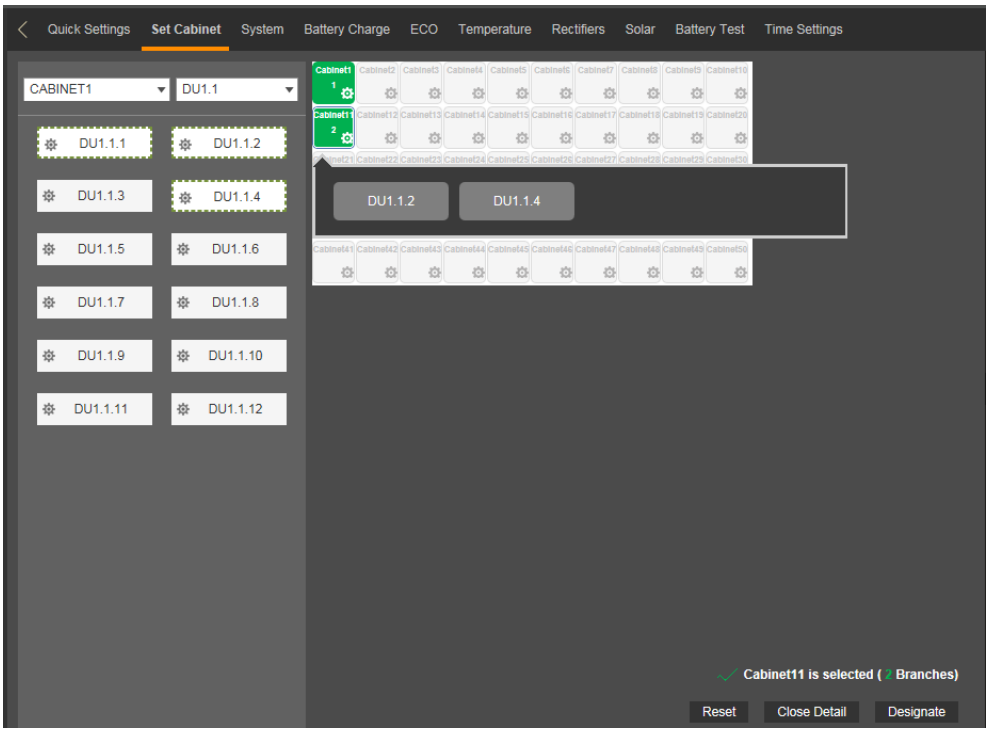
1. Select a customer load icon in the grid list by clicking on its icon.

Figure 5.41 Selecting a Customer Load Icon in the Grid List



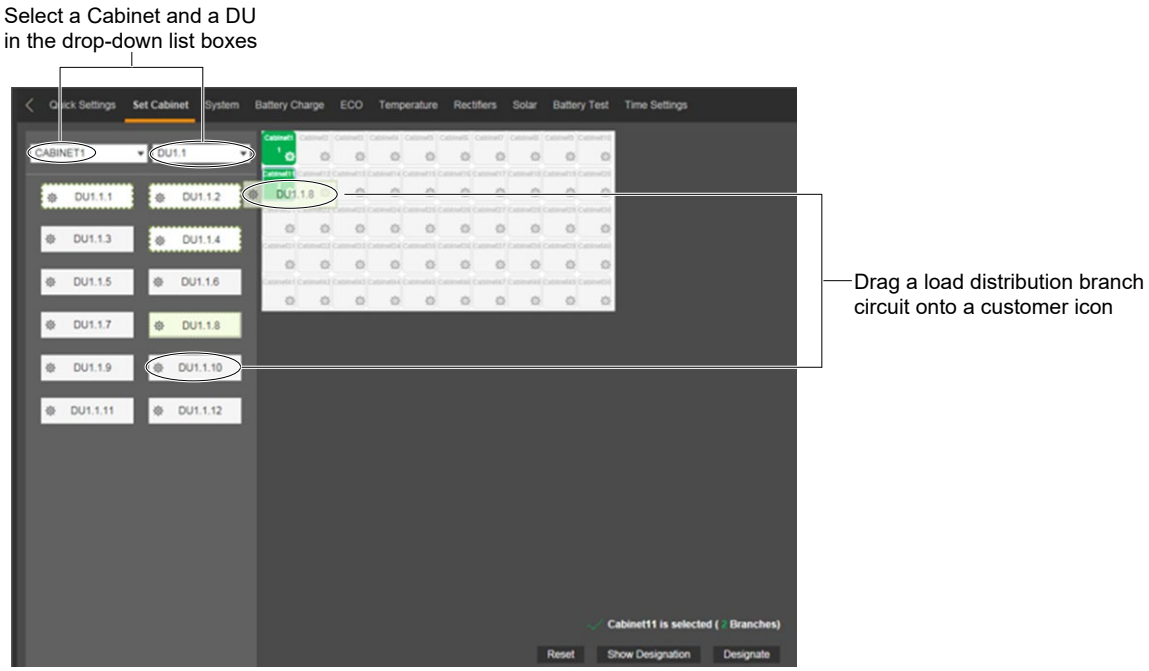
2. Click the "Show Designation" button. The following widow opens.

Figure 5.42 Show Designation Window



3. Select a Cabinet and a DU in the drop-down list boxes. The available load distribution branch circuits are displayed as shown in the following window. Drag one of the displayed load distribution branch circuits from the left side to the selected customer load icon in the grid list displayed on the right side. Once a load distribution branch circuit has been designated, it will become greyed out and cannot be dragged again. You can add up to twenty (20) load distribution branch circuits to a customer load icon.

Figure 5.43 Dragging Branch to the Selected Grid



4. Click the "Designate" button to set the designation.

System Tab Programmable Parameter Descriptions

Power System

- **Reset Maintenance Run Time:** In manual mode, the only selection for " Reset Maintenance Run Time" is Yes. Once Yes is selected and confirmed, the Power System's Maintenance Run Time log is cleared.
- **Clear Energy Accumulated:** Clears the accumulated energy. Once Yes is selected and confirmed, the Energy accumulated is cleared.
- **Auto/Manual State:**

  Auto: The controller automatically controls the power system.

  Manual: A User can manually change certain power system control settings. This provides a convenient means of making temporary adjustment changes for testing purposes.
- **To Auto Delay:** Sets time limit in manual mode. When time has expired the NCU will go back to Auto mode. A delay of 0h, means that NCU will always stay in manual mode.
- **Maintenance Interval:** The maintenance cycle time is the number of days before a Maintenance Alarm is issued.
- **Emergency Stop/ Shutdown:**

  -Disabled: Disables the Emergency Stop and Emergency Shutdown functions.

  -EStop: Enables the Emergency Stop function. (If utilized in the system, an Estop signal shuts down and locks out the system. The system must be manually restarted. Refer to the system instruction manual for restarting procedure.)

-EShutdown: Enables the Emergency Shutdown function. (If utilized in the system, an EShutdown signal shuts down the system. The system automatically restarts when the signal is removed.)

- **Outgoing Alarms Blocked:**

  Normal: Alarms are processed normally.

  Blocked: Forces the alarm relays in the "off" state and blocks alarms from changing the relay state.

- **Over Voltage 1:** Sets the Over Voltage 1 alarm point.
- **Over Voltage 2:** Sets the Over Voltage 2 alarm point.
- **Under Voltage 1:** Sets the Under Voltage 1 alarm point.
- **Under Voltage 2:** Sets the Under Voltage 2 alarm point.
- **System Type:** Sets the system type: Mixed or Inverter Only.
- **High Load Level 1:** Sets the high load level 1 alarm point (alarm point for total rectifier load).
- **High Load Level 2:** Sets the high load level 2 alarm point (alarm point for total rectifier load).
- **Solar Mode:** Sets solar mode as Disabled, RECT-SOLAR, or SOLAR.

  -**Disabled:** Disables the solar mode function.

  -**RECT-SOLAR:** If you have both rectifiers and solar converters in the system, set Solar Mode to “RECT-SOLAR”. In the Battery Settings tab, also set the “Float Charge Voltage (Solar)” parameter to the desired float setting. The parameter “Float Charge Voltage (Rect)” setting MUST be set 0.3 V lower than the “Float Charge Voltage (Solar)” parameter setting for solar converters to operate properly.

  -**SOLAR:** If you have only solar converters in the system, set Solar Mode to “SOLAR”. Reboot the controller after changing setting to SOLAR.

- **Running Way (For Solar):** Sets the running way as RECT First or Solar First.
- **Recharged by Solar:** Enables or disables, the recharge by solar function, which turns off the DG earlier than usual, if available solar energy is enough to fully recharge the batteries.
- **Recharged by Solar Start Time:** Time of day when Complete Recharge by Solar function becomes active.
- **Recharged by Solar Stop Time:** Time of day when Complete Recharge by Solar function becomes inactive.
- **Recharged by Solar Min SOC:** Minimum state of charge that must be reached for the DG to be turned off.
- **Recharged by Solar Min Current Of Load:** Current factor that is used if it is possible to turn off DG. For example, if system load is 20A, “Recharge by Solar Min Current Of Load” is set to 5, then DG will be turned off is solar output current is 100A (5 x 20A) or more.
- **GHG Reduction Coefficient:** Sets the Green House Gas emission reduction factor.
- **Secondary System Address:** Available options are 201, 202, 203. The address to be used when the NCU is set to Secondary NCU.

  System Expansion

  Inactive: Select this option if this is the only NCU controller in the power system.

Primary: Select this option if the power system consists of multiple bays with multiple NCU controllers and this controller is to be the primary controller. Only one NCU controller can be set as the primary controller.

NOTE! *When primary is selected, the NCU will start auto configuring. This process will take more than three (3) minutes.*

Secondary: Select this option if the power system consists of multiple bays with multiple NCU controllers and this controller is to be a secondary controller.

ALERT! DO NOT set the controller to Secondary from the Web Interface. You will not be able to log into the controller after it automatically reboots into secondary mode. Controllers to be designated as secondary controllers need to be set locally via the local keypad and display.

Primary/Secondary Procedure:

Up to four (4) NCU controllers can be connected when a power system requires a greater number of rectifiers than can be controlled by a single NCU controller. One (1) controller is designated as the primary controller, the others as secondary controllers. The rectifiers controlled by the secondary controllers are designated as Rectifier Group 2 through 4 in the menus.

NOTE! *Changing the Rectifier Expansion setting may take more than 3 minutes for the NCU to configure the feature.*

1. Connect the NCU controllers in the multiple bays via the RS485 interface.
2. Set one of the NCU controllers as the primary controller.
3. Set all other NCU controllers as secondary controllers.

ALERT! DO NOT set the controller to Secondary from the Web Interface. You will not be able to log into the controller after it automatically reboots into secondary mode. Controllers to be designated as secondary controllers need to be set locally via the local keypad and display.

4. Set the address of the NCU controllers set as secondary controllers to 201, 202, or 203. Note that each secondary controller must be set to a different address.

- **Reconfig FCUPlus:** Sets the time for reconfigure FCUPlus.
- **Slave Current Limit:** Sets the current limit for the Slave system.
- **Slave Delta Voltage:** Sets the Delta voltage for the Slave system.
- **PowerSplit Contactor Mode:** Enables or disables the power split feature ("master control" indicates the NCU system operates normally and "slave control" indicates the NCU system is a slave system of the existing legacy system).

  Master Controlled: Select this option if this NCU should control when to open LVD.

  Slave Controlled: Select this option if the master NCU should control when to open LVD. This will be indicated via a digital input.

- **Only Monitor BMS and FCUP:** Chooses whether or not to only monitor BMS and FCUP. When this setting is set to yes, only BMS batteries and FCUP will be searched for when doing an auto config, which makes this procedure quicker. If you have other equipment on the RS485 bus, like a Carlo Gavazzi AC meter, this setting needs to be set to No.
- **SSH Enabled:** Enables or disables the SSH protocol.

- **DHCP:** The DHCP function allows the controller to acquire an IP address automatically. This function can only be enabled or disabled via the local display and keypad. If this function is enabled and the acquisition of an IP address fails, an alarm is generated. If the acquisition of an IP address is successful, you need to record the IP address automatically acquired by the controller to access the controller via the Web Interface. This IP address is displayed in the IP Address field below the DHCP setting in the local display menu (Main Menu / Settings Icon / Comm Settings).

AC Equipment

Rectifier AC

- **Nominal Phase Voltage:** Enter the nominal line to neutral voltage (single phase rectifier) or nominal line to line voltage (three phase rectifier).
- **Mains Failure Alarm Threshold 1:** Sets the mains fail alarm 1 value (percent of nominal).
- **Mains Failure Alarm Threshold 2:** Sets the mains fail alarm 2 value (percent of nominal).

Corresponding Alarms:

Low Phase Voltage L1 (Nominal Minus "Mains Failure Alarm 1" Percent of Nominal)

Very Low Phase Voltage L1 (Nominal Minus " Mains Failure Alarm 2" Percent of Nominal)

High Phase Voltage L1 (Nominal Plus " Mains Failure Alarm 1" Percent of Nominal)

Very High Phase Voltage L1 (Nominal Plus "V Mains Failure Alarm 2" Percent of Nominal)

L1 used in the example above, L2 and L3 are similar.

LVD Group

NOTE! *HTD Reconnect Point and HTD Point require a BTRM sensor. The BTRM sensor is the sensor which is used for the High Temperature Disconnect (HTD) Feature.*

- **HTD Reconnect Point:** Sets temperature at which a reconnect will occur following a high temperature disconnect.
- **HTD Point:** Sets high temperature limit at which LVD1 and/or LVD2 contactors will open (disconnect) if the HTD1 and/or HTD2 features are enabled. If this temperature is reached, a disconnect occurs regardless of voltage.
- **LVD3 Enable:** Enables or disables LVD3.

  Relay for LVD3: Selects relay for LVD3.

Fuel Group

Fuel Tank Group

- **OB Fuel Number:** Sets the OB Fuel number.

EIB Equipment

EIB1

- **Shunt # Set As (Not Used, General, Load, Battery):**

  Not Used: Indicates this shunt input is not used.

  General: Indicates the measurement of the shunt will be displayed and will not be added to Total DC Load or Total Battery Load.

  Load: Indicates the measurement of the shunt will be displayed and added to the Total DC Load.

Battery: Indicates the measurement of the shunt will be displayed and added to the Total Battery Load and used with Battery Management.

- **Shunt # Full Current:** Enter the shunt's current rating.
- **Shunt # Full Voltage:** Enter the shunt's voltage rating.
- **Voltage Type:** The EIB assembly provides a total of eight (8) DC voltage inputs for battery block monitoring.

  24 (Block 2): Selects the EIB to monitor up to four (4) 24V battery strings with two (2) 12V blocks per string.

  48 (Block 4): Selects the EIB to monitor up to two (2) 48V battery strings with four (4) 12V blocks per string.

  Mid-Point: Selects the EIB to monitor the midpoint voltage of up to eight (8) battery strings for either 24V or 48V systems.

  Disabled: Disables the battery block monitoring feature.
- **Block In-Use Num:** Number of 12 V battery blocks being used.
- **Block Voltage Diff (12V):** This menu item appears if "24 (Block 2)" or "48 (Block 4)" is selected above. The "Block Voltage Diff (12V)" setting selects the alarm threshold for battery block monitoring. The NCU issues an alarm when any block voltage of any battery string has an abnormal value. The alarm is issued when the difference between any block voltage and a reference voltage is greater than the value of the block voltage difference setting.
- **Block Voltage Diff (Mid):** This menu item appears if "Mid-Point" is selected above. The "Block Voltage Diff (Mid)" setting selects the alarm threshold for battery midpoint monitoring. The NCU issues an alarm when any battery midpoint voltage of any battery string has an abnormal value. The alarm is issued when the difference between any battery midpoint voltage and a reference voltage is greater than the value of the block voltage difference setting.

Battery Charge Tab Programmable Parameter Descriptions

- **Number of Battery Shunts:** Sets the number of battery shunts in the system.
- **Very High Battery Temp Action:**

  Disabled: Disables the Battery Thermal Runaway Management feature.

  Lowering Voltage: Sets the Battery Thermal Runaway Management feature to reducing the output voltage when battery temperature exceeds the Very High BTRM Temperature setting.
- **Very High Temp Voltage:** The voltage to use when battery temperature is very and Very High Battery Temp Action is set to Lowering Voltage.
- **Low Capacity Point:** Battery low capacity alarm set point.
- **Float Charge Voltage:** Float Charge output voltage setting. This setting is visible when solar mode is disabled or battery Current Limit Mode is set to Voltage.
- **Equalize Charge Voltage:** Equalize Charge output voltage setting. This setting is visible when solar mode is disabled or battery Current Limit Mode is set to Voltage.
- **Float Charge Voltage (Solar):** Float Charge output voltage for solar converters. This setting is visible when solar mode is enabled and battery Current Limit Mode is set to Current.
- **Equalize Charge Voltage (Solar):** Equalize Charge output voltage for solar converters. This setting is visible when solar mode is enabled and battery Current Limit Mode is set to Current.

- **Float Charge Voltage (RECT):** Float Charge output voltage for rectifiers. This setting is visible when solar mode is enabled and battery Current Limit Mode is set to Current.
- **Equalize Charge Voltage (RECT):** Equalize Charge output voltage for rectifiers. This setting is visible when solar mode is enabled and battery Current Limit Mode is set to Current.
- **Battery Current Limit:** Maximum battery charging current setting. For example, a value of 0.150C10 means that the charging current is limited to 15% of the battery's nominal capacity.
- **Over Current Setpoint:** Battery over current alarm setting. For example, a value of 0.300C10 means that when the charging current reaches 30% of the battery's nominal capacity, an alarm will be extended.
- **Automatic Equalize:** Enables or disables the Automatic Equalize Charge feature. When enabled, the following parameters can be set.
- **Equalize Start Current:** The system is transferred to Equalize Charge mode when battery charge current exceeds this setting for 3 minutes. For example, a value of 0.060C10 means that an Automatic Equalize is started if the battery charge current is greater than 6% of the battery's nominal capacity.
- **Equalize Start Capacity:** The system is transferred to Equalize Charge mode when remaining battery capacity decreases to this setting.
- **Equalize Stop Current:** When in Equalize Charge mode and the battery charge current decreases below this setting, the equalize charge will continue for the time set in "Equalize Charge Stop Delay Time". After that the system is transferred to Float Charge mode. For example, a value of 0.010C10 means that when the charging current is less than 1% of the battery's nominal capacity, the system returns to the Float mode.
- **Equalize Stop Delay Time:** See "Equalize Charge Stop Current" above.
- **Maximum Equalize Charge Time:** This is the maximum duration, in minutes, that an Automatic Equalize Charge will last regardless of the other settings.
- **Equalize Charge for Test:** Enables or disables the Equalize Charge before battery test feature. When enabled, an equalize charge will be performed before doing a planned battery test.
- **Cyclic Equalize:** Enables or disables cyclic (scheduled) Equalize charging. When enabled, the following parameters can be set.

  Cyclic EQ Charge Start Time: The date and time for first cyclic equalize charge.

  Cyclic Equalize Interval: Cyclic (scheduled) Equalize charging interval.

  Cyclic Equalize Duration: Cyclic (scheduled) Equalize charging duration.
- **Temperature Compensation Center:** Sets the temperature at which the system operates at normal voltage levels.
- **Compensation Coefficient:** Sets the temperature compensation slope or rate of change per ºC above or below the "Temp Compensation Center" setting. This value is expressed in millivolt per ºC per string (mV/ºC/str). For example, for a rate of change of 72 mV/ºC/str in a 24-cell 48V nominal battery string, the rate of change is 3 mV per cell.
- **EQTemp Comp Coefficient:** Sets the Equalize temperature compensation slope or rate of change per ºC.
- **Charging Efficiency:** Sets the charging efficiency value.
- **Curr Limited Mode:** Selects the current limit mode (disabled, current, or voltage).
- **Batt 1 Rated Capacity:** Enter the battery string's rated capacity.

- **Batt 2 Rated Capacity:** Enter the battery string's rated capacity.
- **Equalize/Float Charge Control:** Places the system in Equalize Charge or Float Charge mode.
- **Reset Abnormal Batt Curr Alarm:** Resets an abnormal battery current alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm resets.
- **Reset Battery Capacity:** Resets the battery capacity calculation.
- **Battery Charge Prohibit**: Enables or disables the battery charge prohibit function. When enabled battery charging will be prevented.
- **DI for Charge Prohibit:** Selects the digital input which is used for triggering the battery charge prohibit function.
- **Batt Current Positive Threshold:** Sets the battery current value positive threshold. If measured battery current is between 0A and this threshold it will be replaced by 0A.
- **Batt Current Negative Threshold:** Sets the battery current value negative threshold. If measured battery current is between 0A and this threshold it will be replaced by 0A.
- **Monitor BattCurrImbal:** Enables or disables the monitor battery current imbalance.
- **Deviation Limit:** Sets the Deviation current limit value when Monitor BattCurrImbal is enabled.
- **Allowed Deviation Length:** Sets the allowed Deviation time when Monitor BattCurrImbal is enabled.
- **Alarm Clear Time:** Sets the alarm clear time when Monitor BattCurrImbal is enabled.
- **Min Voltage for BCL:** Sets the minimum voltage for battery charge current limitation function.
- **Action of BattFuseAlm:** Selects the action of battery fuse alarm: Adjust to Min Voltage; Adjust to default Voltage and None.
- **Voltage Adjust Gain:** Sets the voltage adjust gain.
- **Upper Limit:** Sets the upper limit value.
- **Slow Speed Coefficient:** Sets the slow speed coefficient value, the value should be lower than fast speed coefficient.
- **Fast Speed Coefficient:** Sets the fast speed coefficient value, the value should be higher than fast speed coefficient.
- **Cycle Number:** Sets the cycle number.
- **Peak Load Shift Enable:** Enabled or disabled the peak load shift function. When is it active, the rectifiers output voltage will be lowered to “Peak Load Shift Volt” so that the batteries will support some or all of the load.
- **Peak Load Shift Volt:** Rectifier output voltage when peak load shift function is active.
- **Peak Load Shift Batt SOC:** If the battery SOC is below this value, the peak load shift function will not be active.
- **PeakLoad Period1 Start:** Start time for first peak load shift interval.
- **PeakLoad Period1 Stop:** Stop time for first peak load shift interval.
- **PeakLoad Period2 Start** to **PeakLoad Period4 Start**, and **PeakLoad Period2 Stop** to **PeakLoad Period4 Stop**: Additional peak load shift periods.
- **MPPT Input Voltage Threshold:** Sets the MPPT input voltage threshold value.
- **Max Diff Volt of Solar and RECT:** Sets the maximum difference between solar voltage and rectifier voltage.

- **Min Diff Volt of Solar and RECT:** Sets the minimum difference between solar voltage and rectifier voltage.
- **Max Diff With Sys Volt:** Sets the maximum difference from system voltage.
- **Use Soc BMS:** Chooses whether or not to use Soc from battery management system.
- **Use Rated Batt Cap From BMS:** Chooses whether or not to use rated battery capacity from battery management system.
- **Use BMS BCL:** Chooses whether or not to use battery management system for battery charge current limit
- **DG Start SOC Only:** Chooses whether or not DG should start on SOC only.
- **Cold Limit Enable:** Enables or disables cold limit function.
- **Cold Limit Temp Threshold:** Sets the cold limit temperature threshold value.
- **Reduced BCL Point:** Sets the reduced battery charge current limit point when cold limit function is enabled and the temperature is below Cold Limit Temp Threshold.
- **Action of BattFuseAlm:** Choose the action: “Adjust to Min Voltage”,” Adjust to Default Voltage” or “None” for battery fuse alarm.

  Adjust to Min Voltage: Adjust the voltage to minimum voltage.

  Adjust to Default Voltage: Adjust the voltage to default voltage.

ECO Tab Programmable Parameter Descriptions

- **ECO Mode:** Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.

ALERT! The Energy Optimization Mode should NOT be used in systems that operate without batteries.

NOTE! *If the battery is ever disconnected, disable Energy Optimization Mode until the battery is reconnected.*

Best Operating Point: Percent of full load capacity that the rectifiers operate under in the Energy Optimization Mode.

Load Fluctuation Range: If load fluctuation is less than this value, rectifiers are not turned on or off for Energy Optimization.

ECO Mode Capacity Limit: Energy Optimization is disabled if the load is greater than this setting.

Cycle Period: This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.

All Rects ON Time: Time all rectifiers are turned on at the end of the “Cycle Period”.

Turn Off Delay: When the Energy Optimization feature determines a rectifier can be switched off, this is the time delay before the rectifier is turned off.

- **Reset ECO Cycle Alarm:** Resets the ECO Cycle Alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm resets.

LVD Tab Programmable Parameter Descriptions

LVD Unit

- **LVD 1:** Enables or disables LVD 1. When enabled, the following parameters can be set.

LVD 1 By Battery Capacity: Enables or disables LVD 1 By Battery Capacity function.

LVD 1 Disconnect Capacity: Sets the LVD1 disconnect capacity value.

LVD 1 Voltage: LVD 1 low voltage disconnect setting.

LVD 1 Reconnect Voltage: LVD 1 reconnect setting.

LVD 1 Reconnect Delay: Delay time period until LVD 1 reconnects once voltage recovers.

LVD 1 By Time: Enables or disables LVD 1 By Time.

LVD 1 Time: The time period before LVD 1 disconnection once an AC fail condition occurs, when LVD by time is enabled.

LVD 1 Dependency: Select if LVD 1 can disconnect only if LVD2 has disconnected, or none.

LVD1 AC Fail Required to Disconnect: Whether or not AC Failure is needed to disconnect LVD1.

LVD1 AC Required to Reconnect: Whether or not AC presence is needed to reconnect LVD1.

LVD1 Control: Manually connect or disconnect LVD1.

- **LVD 2:** Enables or disables LVD 2. When enabled, the following parameters can be set.

  LVD 2 By Battery Capacity: Enables or disables LVD 2 By Battery Capacity function.

  LVD 2 Disconnect Capacity: Sets the LVD2 disconnect capacity value.

  LVD 2 Voltage: LVD 2 low voltage disconnect setting.

  LVD 2 Reconnect Voltage: LVD 2 reconnect setting.

  LVD 2 Reconnect Delay: Delay time period until LVD 2 reconnects once voltage recovers.

  LVD 2 By Time: Enables or disables LVD 2 By Time.

  LVD 2 Time: The time period before LVD 2 disconnection once an AC fail condition occurs, when LVD by time is enabled.

  LVD 2 Dependency: Select if LVD 2 can disconnect only if LVD 2 has disconnected, or none.

- **LVD 2 AC Fail Required to Disconnect:** Whether or not AC Failure is needed to disconnect LVD2.
- **LVD 2 AC Required to Reconnect:** Whether or not AC presence is needed to reconnect LVD2.
- **LVD 2 Control:** Manually connect or disconnect LVD2.
- **High Temp Disconnect 1:** Enables or disables the High Temperature 1 Disconnect feature. This feature causes LVD1 contactors to open (disconnect) if a high temperature event occurs.
- **High Temp Disconnect 2:** Enables or disables the High Temperature 2 Disconnect feature. This feature causes LVD2 contactors to open (disconnect) if a high temperature event occurs.
- **LVD1 Contactor Type:** Select the type of LVD1 Contactor. This setting should not be changed.
- **LVD2 Contactor Type:** Select the type of LVD2 Contactor. This setting should not be changed.

SMDU 1 LVD

- **LVD 1:** Enables or disables LVD 1. When enabled, the following parameters can be set.

LVD 1 By Battery Capacity: Enables or disables LVD 1 By Battery Capacity function.

LVD 1 Disconnect Capacity: Sets the LVD1 disconnect capacity value.

LVD 1 Voltage: LVD 1 low voltage disconnect setting.

LVD 1 Reconnect Voltage: LVD 1 reconnect setting.

LVD 1 Reconnect Delay: Delay time period until LVD 1 reconnects once voltage recovers.

LVD 1 By Time: Enables or disables LVD 1 By Time.

LVD 1 Time: The time period before LVD 1 disconnection once an AC fail condition occurs, when LVD by time is enabled.

LVD 1 Dependency: Select if LVD 1 can disconnect only if LVD3 has disconnected, or none.

LVD1 AC Fail Required to Disconnect: Whether or not AC Failure is needed to disconnect LVD1.

LVD1 AC Required to Reconnect: Whether or not AC presence is needed to reconnect LVD1.

LVD1 Control: Manually connect or disconnect LVD1.

- **LVD 3:** Enables or disables LVD 3. When enabled, the following parameters can be set.

  LVD 3 By Battery Capacity: Enables or disables LVD 3 By Battery Capacity function.

  LVD 3 Disconnect Capacity: Sets the LVD3 disconnect capacity value.

  LVD 3 Voltage: LVD 3 low voltage disconnect setting.

  LVD 3 Reconnect Voltage: LVD 3 reconnect setting.

  LVD 3 Reconnect Delay: Delay time period until LVD 3 reconnects once voltage recovers.

  LVD 3 By Time: Enables or disables LVD 3 By Time.

  LVD 3 Time: The time period before LVD 3 disconnection once an AC fail condition occurs, when LVD by time is enabled.

  LVD 3 Dependency: Select if LVD 1 can disconnect only if LVD3 has disconnected, or none.

  LVD3 AC Fail Required to Disconnect: Whether or not AC Failure is needed to disconnect LVD3.

  LVD3 AC Required to Reconnect: Whether or not AC presence is needed to reconnect LVD3.

  LVD3 Control: Manually connect or disconnect LVD3.

Temperature Tab Programmable Parameter Descriptions

- **Ambient Temperature Sensor:** Sets the temperature sensor which displays the ambient temperature on the Web Interface's Homepage. Note that this temperature sensor MUST be set as an ambient temperature sensor. Select "None", or the temperature sensor (System T1, System T2, System T3, IB2 T1, IB2 T2, EIB T1, EIB T2, SMTemp1 T1 …, SMTemp1 T8, SMTemp8 T1 …, SMTemp8 T8). You can also select Maximum or Average which takes the maximum or average reading of the temperature sensors (any of System T1, System T2, System T3, IB2 T1, IB2 T2, EIB T1, EIB T2, SMTemp1 T1 …, SMTemp1 T8, SMTemp8 T1 …, SMTemp8 T8) set as ambient temperature sensors. When set to any value except "none", the following parameters can be set.

  High Ambient Temperature Level: Allows you to set an ambient temperature High alarm point.

  Low Ambient Temperature Level: Allows you to set an ambient temperature low alarm point.

Very High Ambient Temperature Level: Allows you to set an ambient temperature Very High alarm point.

- **System Temperature 1:** Sets this temperature sensor to None, Battery, or Ambient.
- **System Temperature 2:** Sets this temperature sensor to None, Battery, or Ambient.
- **System Temperature 3:** Sets this temperature sensor to None, Battery, or Ambient.
- **IB2 Temperature 1:** Sets temperature port 1 on the IB2 board to None, Battery, or Ambient.
- **IB2 Temperature 2:** Sets temperature port 2 on the IB2 board to None, Battery, or Ambient.
- **EIB Temperature 1:** Sets temperature port 1 on the EIB board to None, Battery, or Ambient.
- **EIB Temperature 2:** Sets temperature port 2 on the EIB board to None, Battery, or Ambient.
- **Sensor for Temp Compensation:** Select "None" for no temperature compensation, or the temperature sensor (None/ Max/ Average/ Temp1/ Temp2) sensing battery temperature for temperature compensation. You can also select Maximum or Average which takes the maximum or average reading of the temperature sensors (None/ Max/ Average/ Temp1/ Temp2) set as battery temperature sensors. When used with an SM-BRC, you can select to average the SM-BRC temperature sensor readings (Average SMBRC setting).

  Very High Compensation Temperature: Allows you to set a Very High Compensation Temperature alarm point.

  High Compensation Temperature: Allows you to set a High Compensation Temperature alarm point.

  Low Compensation Temperature: Allows you to set a Low Compensation Temperature alarm point.

- **BTRM Temp Sensor:** Sets the BTRM (Battery Thermal Runaway Management) temperature sensor. Note that this temperature sensor MUST be set as a battery temperature sensor. Select "None", or the temperature sensor (System T1, System T2, System T3, IB2 T1, IB2 T2, EIB T1, EIB T2, SMTemp1 T1 …, SMTemp1 T8, SMTemp8 T1 …, SMTemp8 T8). You can also select Maximum or Average which takes the maximum or average reading of the temperature sensors (any of System T1, System T2, System T3, IB2 T1, IB2 T2, EIB T1, EIB T2, SMTemp1 T1, …, SMTemp1 T8, SMTemp8 T1, …, SMTemp8 T8) set as battery temperature sensors. When used with an SM-BRC, you can select to average the SM-BRC temperature sensor readings. When set to any value except “none”, the following parameters can be set.

NOTE! *The BTRM sensor is the sensor which is used for the High Temperature Disconnect (HTD) Feature.*

Rectifiers Tab Programmable Parameter Descriptions

- **Rectifier Current Limit:** The output current limit point that is sent to all rectifiers when in Auto Mode. Sets the output current limit point for all rectifiers when in Manual Mode.
- **Voltage Trim:** The voltage level that is sent to all rectifiers when in Auto Mode. Sets voltage level for all solar rectifiers when in Manual Mode.
- **High Voltage Limit:** Sets the High Voltage Shutdown point for all rectifiers.
- **Restart on Overvoltage Enabled:** Enables or disables the Overvoltage Shutdown Restart feature for all rectifiers.
- **Restart Time on Overvoltage:** When the Overvoltage Shutdown Restart feature is enabled and the output exceeds the high voltage limit, the rectifiers restart after this time expires.
- **Sequence Start Interval:** Sets the sequence start interval (time period between starting each rectifier in the system).
- **Walk-In:** Enables or disables the start-up walk-in feature for all rectifiers. When enabled, the following parameters can be set.

Walk- In Time: Sets the start-up walk-in time when the “Walk-In” setting above is set to enabled.

- **Input Current Limit:** Sets the Input Current Limit point for all rectifiers.
- **Diesel Power Limitation:** Enables or disables the Diesel Power Limitation feature. This feature limits rectifier output power to a percentage of maximum when AC input is supplied by a diesel-alternator set.
- **Diesel Generator Digital Input:** Sets DI for Diesel Power Limitation feature.
- **Diesel Gen Power Limit Point Set:** Sets, as a percentage, the maximum output power at which rectifiers can operate when: (1) the Diesel Power Limit feature is enabled and (2) a digital input signal is received from the connected diesel-alternator set.
- **Confirm Rect Position/Phase:** Confirms the position and input phase for all rectifiers. This must be done after you have renumbered and/or assigned AC phases to the rectifiers to confirm that you have completed the operation.
- **Reset Rectifier IDs:** The only selection for "Reset Rectifier IDs" is Yes. Once Yes is selected and confirmed, the individual Rectifier Position/ID and Phase will be restored to default.
- **Clear Rectifier Comm Fail Alarm:** Clears a rectifier communication fail alarm.
- **Reset Rectifier Lost Alarm:** Resets a rectifier lost alarm.
- **Clear Solar Converter Lost Alarm:** Clears a solar converter lost alarm.
- **Delay of LowRectCap Alarm:** Sets the delay of low rectifier capacity value as alarm threshold.
- **Maximum Redundacy:** Sets the maximum redundancy value.
- **Benchmark Rectifier:** Select the benchmark rectifier: R48-3500E3, R48-3200,96%,95%,94%,93%,92%,91%,90% and so on.
- **Cost per kWh:** Sets the cost per kWh value.
- **Currency:** Select the currency: USD, CNY, EUR, GBP and RUB.
- **Percentage 98% Rectifier:** Sets the percentage of rectifiers with 98% efficiency in the system.
- **Default Voltage:** Sets the default voltage, this will be used by rectifiers if controller is not communicating with the rectifiers.
- **Delta Voltage for Rect Enable:** Enables or disables Delta Voltage for rectifier.
- **Delta Voltage for Rect:** Sets the Delta Voltage for rectifier.

Solar Tab Programmable Parameter Descriptions

- **Solar Converter Current Limit:** The output current limit point that is sent to all solar converters when in Auto Mode. Sets the output current limit point for all solar converters when in Manual Mode.

NOTE! *Can only be made when the controller is in the "manual control" state. If the controller is set for "automatic" control, change the “Auto/Manual State” setting first to the “Manual” setting.*

- **Solar Converter Trim:** The voltage level that is sent to all solar converters when in Auto Mode. Sets voltage level for all solar converters when in Manual Mode.
- **DC On/Off Control:** Temporarily turns the DC output on or off for all solar converters when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.

- **Solar Converter LED Control:** Temporarily sets whether or not a solar converter's local power indicator blinks when the controller is communicating with the solar converter when the controller is in Manual mode. Setting returns to original when controller is returned to the Auto mode.
- **Fan Speed Control:** Sets the fan speed for all solar converters.
- **Clear Solar Converter Lost Alarm:** Clears a solar converter lost alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Confirm Solar Converter ID:** After changing solar converter ID assignments, use this menu item to confirm the change. The only selection is Yes. Once Yes is selected and confirmed, the ID setting of all solar converters is updated.
- **Reset Solar Converter IDs:** Resets the solar converter IDs after they have been previously changed and confirmed. The only selection is Yes. Once Yes is selected and confirmed, the NCU resets the solar converter IDs by reassigning ID numbers.
- **High Voltage Shutdown Limit:** Sets the High Voltage Shutdown point for all solar converters.
- **HVSD Restart Time:** When the Overvoltage Shutdown Restart feature is enabled and the output exceeds the high voltage limit, the rectifiers restart after this time expires.
- **Walk-In:** Enables or disables the start-up walk-in feature for all rectifiers. When enabled, the following parameters can be set.
- **Walk-In Time:** Sets the start-up walk-in time when the "Walk-In" setting above is set to enabled.
- **Restart on HVSD:** Enables or disables the Overvoltage Shutdown Restart feature for all solar converters.
- **Sequence Start Interval:** Sets the sequence start interval (time period between starting each rectifier in the system).
- **Clear Solar Converter Comm Fail Alarm:** Clears a solar converter communication fail alarm.
- **Solar Failure Min Time:** The time before a "Solar Communication Failure" alarm occurs. Adjustable from 0 to 7 days with default setting of 3 days. A "0" setting sets a Solar Communication Failure alarm to occur immediately after the event occurs.
- **Default Voltage:** Sets the default voltage, this will be used by solar converters if controller is not communicating with the solar converters.
- **Delta Voltage for MPPT Enable:** Enables or disables Delta Voltage for MPPT.
- **Delta Voltage for MPPT:** Sets the Delta Voltage for MPPT.
- **Solar Converters Off by Voltage:** Enables or disables Solar Converters Off by Voltage function.
- **Solar Converters Off Voltage:** When system voltage is below this setting, the solar converters will be switched off.
- **Solar Converters On Voltage:** When system voltage is above this setting, the solar converters will be switched on.
- **Solar Converters Off by DI:** Enables or disables Solar Converters Off by DI function.
- **Solar Converters Off DI:** When the selected DI becomes active, the solar converters will be switched off.

Battery Test Tab Programmable Parameter Descriptions

- **AC Fail Test:** Enables or disables starting a battery discharge test during an AC input failure condition.
- **Constant Current Test:** Enables or disables a Constant Current Battery Discharge Test. During this test, the controller automatically adjusts the rectifiers' output voltage to maintain the battery discharge current at a preset value (Constant Current Test Current). When enabled, the following parameters can be set.

Constant Current Test Current: Constant current setting for a Constant Current Battery Discharge Test.

- **Test Voltage Level:** System output voltage setting during a battery discharge test.
- **End Test Voltage:** This is the "end of test voltage level" for battery discharge tests. A battery discharge test will end if battery voltage decreases to this setting.
- **End Test Time:** This is the "end of test time period" for battery discharge tests. A battery discharge test will end if this time period is exceeded.
- **End Test Capacity:** This is the "end of test remaining battery capacity" for battery discharge tests. A battery discharge test will end if remaining battery capacity decreases to this setting. For example, a value of 0.700C10 means that when the discharging current reaches 70% of the battery's nominal capacity, the battery test is ended.
- **Record Threshold:** Every time the battery voltage is changed more than this threshold, a new line is stored in the battery test log.
- **Lowest Capacity for Battery Test:** The lowest allowed battery capacity before executing a battery test.
- **Battery Test Control:** Stops or starts battery test control.
- **Reset Bad Battery Alarm:** Resets a bad battery alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Clear Battery Test Fail Alarm:** Clears a battery test fail alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Reset Discharge Curr Imbalance:** Clears a discharge current imbalance alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Planned Test Enable:** Enables or Disables the planned test function.
- **Test Interval:** Sets the test interval time.
- **Periodic BDT Start Time:** Sets the periodic battery discharge test start time.
- **Guard Period:** During this period before a planned battery test, no Major or Critical alarms and no manual battery test is allowed. If that should happen, the battery test will be re-scheduled according to the Test Interval.
- **Initial Test Date:** Sets the initial test date for battery discharge test.
- **Next BDT Date:** The next test date for battery discharge test. This for information only.

Time Settings Tab Programmable Parameter Descriptions

See also “Changing the Date and Time” on page 27.

- **Specify Time**
  - **Get Local Time from Connected PC:** Allows you to automatically set the time. When selected, the controller will get the same time as the connected PC.
  - **Date & Time:** Allows you to manually set the date and time.
- **Local Zone (for synchronization with time servers):** When selected, the controller will get the local zone automatically or you can enter the zone.

- **Get time automatically from the following servers.**
  - When selected, the controller will get the time from the selected time server. The controller will also adjust the time per the "Local Zone" setting.

Independent Input

Input Current: Enables or disables the independent DC current.

Shunt Current: Sets the shunt current value.

Shunt Voltage: Sets the shunt voltage value.

Output Relays Tab Programmable Parameter Descriptions

Relay IB1-DO1 Normal State to IB1-DO8 Normal State, and Relay IB0-DO1 Normal State to Relay IB0-DO4 Normal State: Choose Energized or Non-Energized for DO Normal state.

Relay IB1-DO1 to Relay IB1-DO8, and Relay IB0-DO1 to Relay IB0-DO4: Choose Energized or Non-Energized for relay output.

Battery Monitoring Tab Programmable Parameter Descriptions

Voltage Type: The EIB provides a total of eight (8) DC voltage inputs for battery block monitoring.

- **24 (Block 2):** Selects the EIB to monitor up to four (4) 24V battery strings with two (2) 12V blocks per string.
- **48 (Block 4):** Selects the EIB to monitor up to two (2) 48V battery strings with four (4) 12V blocks per string.
- **Mid Point:** Selects the EIB to monitor the midpoint voltage of up to eight (8) battery strings for either 24V or 48V systems.
- **Disabled:** Disables the battery block monitoring feature.

Number of Used Blocks: Number of 12V battery blocks being used.

Block Voltage Diff(12V): This menu item appears if “24 (Block 2)” or “48 (Block 4)” is selected above. The “Block Voltage Diff” setting selects the alarm threshold for battery block monitoring. The NCU issues an alarm when any block voltage of any battery string has an abnormal value. The alarm is issued when the difference between any block voltage and a reference voltage is greater than the value of the block voltage difference setting.

Number of Batteries per SMBAT: Sets the batteries number for each SMBAT.

Inverter Tab Programmable Parameter Descriptions

- **Output Voltage Level:** with options 200V, 208V, 220V, 230V, 240V. This setting is only available when inverters have been switched off.
- **Output Frequency:** with options 50 Hz or 60 Hz. This setting is only available when inverters have been switched off.
- **DC Low Voltage Off:** If the DC voltage is above this level inverters will be switched off.
- **DC Low Voltage On:** If the DC voltage is above this level inverters will be switched on.
- **DC High Voltage Off:** If the DC voltage is above this level inverters will be switched off.
- **DC High Voltage On:** If the DC voltage is below this level inverters will be switched on.
- **Inv Primary Input Power:** Selects the inverter primary power source mode: AC Mode, DC Mode or DC only.
- **Inverters LED Control:** Selects the inverter LED control ways: Stop Flashing or All Flashing.
- **Switch On/Off:** Switches all inverters On or Off.

- **Fan Speed:** Selects the fan speed: Automatic Speed/Full Speed.
- **Clear Inverter Lost Alarm:** Clears an Inverter lost alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Confirm Inverter ID/Phase:** Confirms the inverter ID. The only selection is Yes. Once Yes is selected and confirmed, the Inverter ID is confirmed.
- **Clear Inverter Comm Fail Alarm:** Clears an Inverter communication fail alarm. The only selection is Yes. Once Yes is selected and confirmed, the alarm clears.
- **Reset Inverter IDs:** Resets the inverter IDs. The only selection is Yes. Once Yes is selected and confirmed, the inverter IDs resets.
- **Clear Fault:** Clears fault. The only selection is Yes. Once Yes is selected and confirmed, the fault clears.
- **Reset Energy:** Reset energy. The only selection is Yes. Once Yes is selected and confirmed, the energy resets.
- **Quantity Of Inverters:** Set the quantity of expected inverters.
- **Redundancy:** Set the redundancy. For example, if you set number of expected inverters to 6 and redundancy to 1, this means that you need 5 inverters to support the load and one is redundant/spare. When there are 6 inverters in the system there is no alarm. If there are 5 inverters, then you will get alarm "Redundancy Lost".If there are 4 inverters you will get alarm "Redundancy Lost+1".

5.9.2 History Log Menu

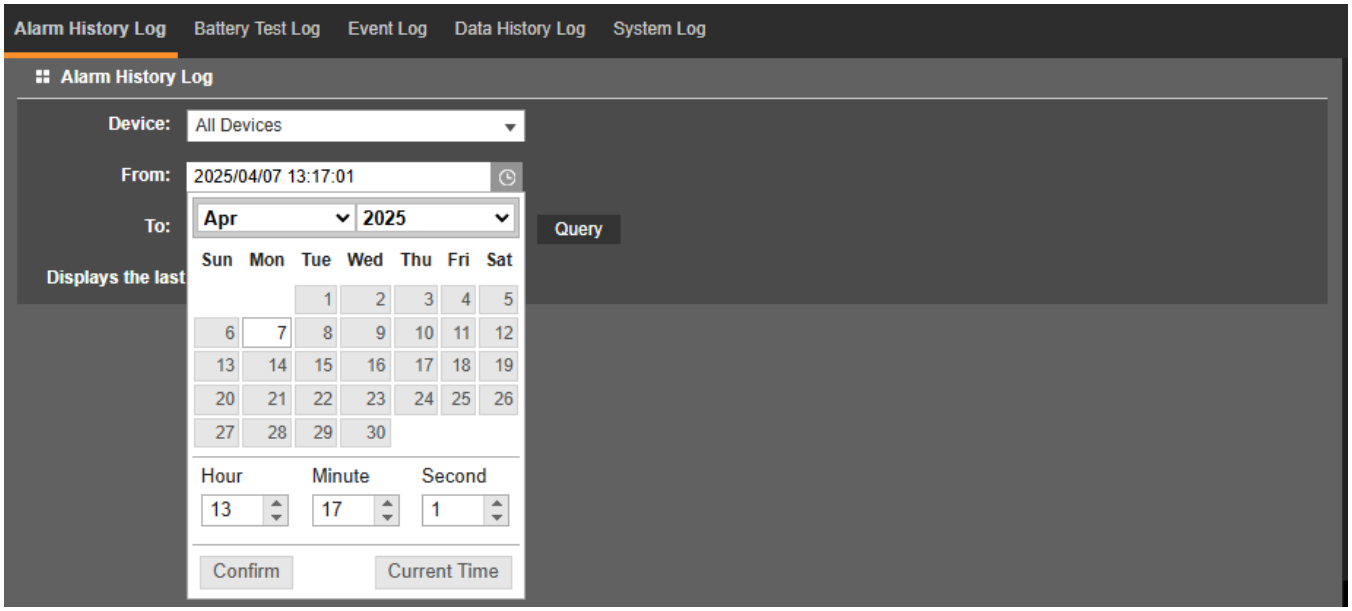
The History Log Menu allows you to view and save the various logs available in the NCU.

Alarm History Log Tab

Select Device and Time

Select the "Device" to query from the drop-down list box. Select the "from" and "to" time.

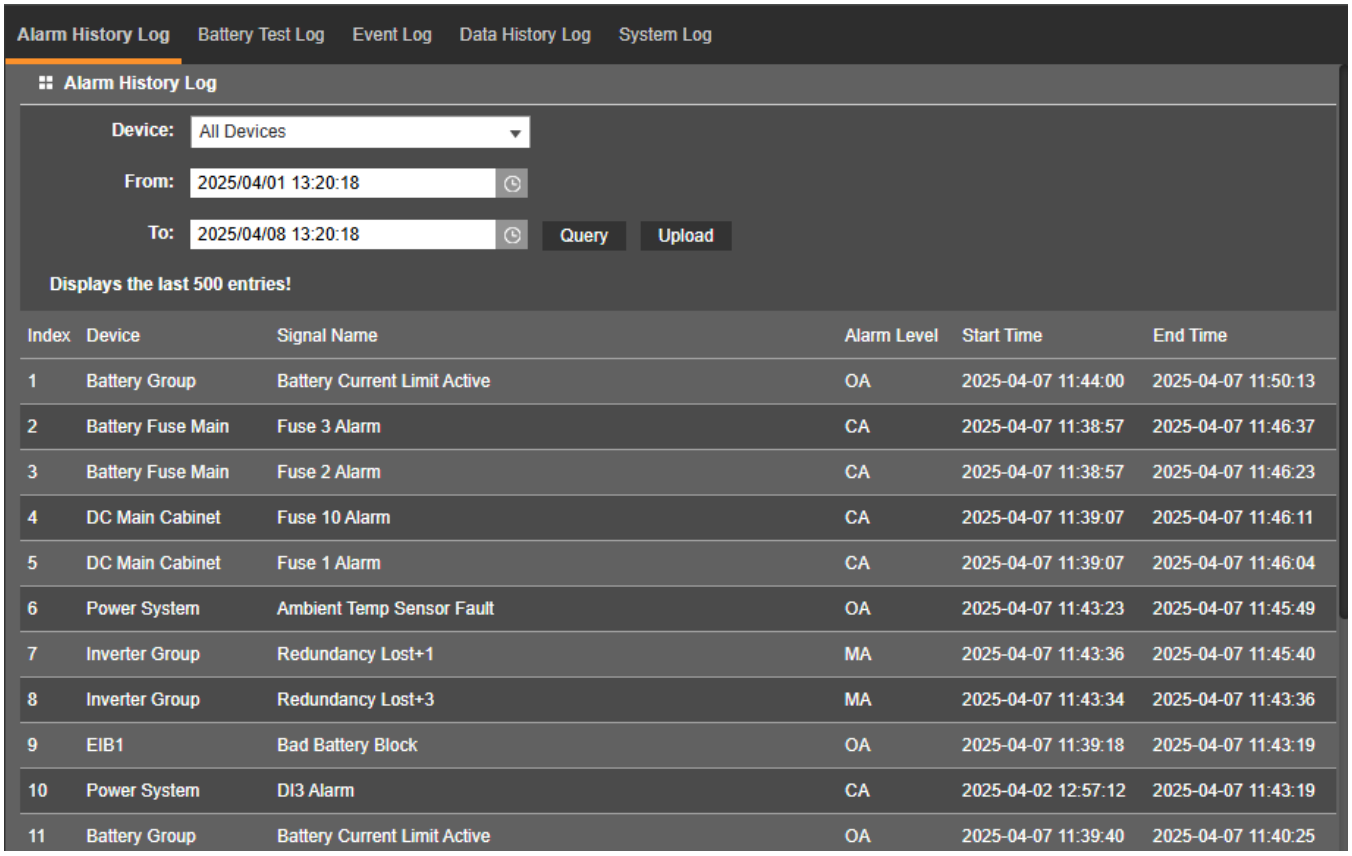
Figure 5.44 Alarm History Log Device and Time Selection



Query Alarm History Log

Click “Query” to query for alarms within selected time slot. The Web page displays the last 500 entries.

Figure 5.45 Alarm History Log Query

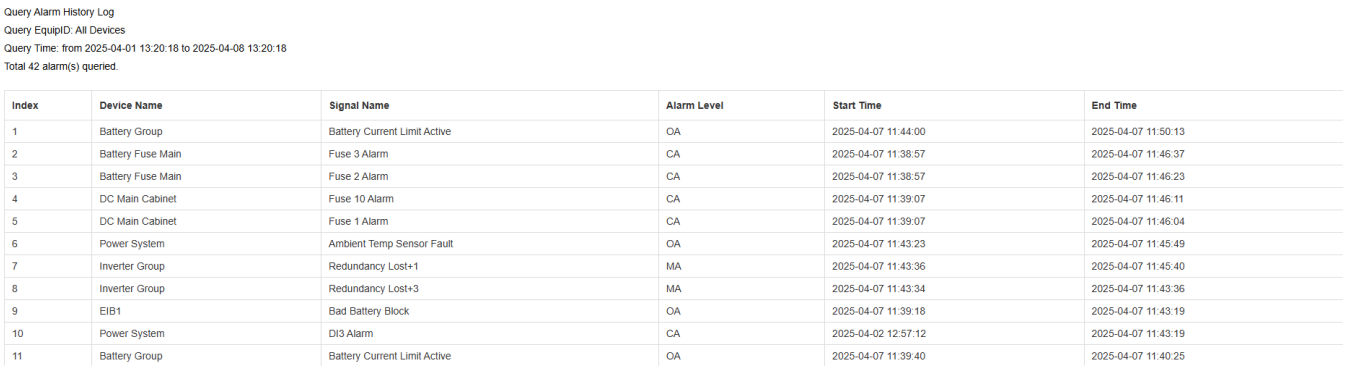


Index	Device	Signal Name	Alarm Level	Start Time	End Time
1	Battery Group	Battery Current Limit Active	OA	2025-04-07 11:44:00	2025-04-07 11:50:13
2	Battery Fuse Main	Fuse 3 Alarm	CA	2025-04-07 11:38:57	2025-04-07 11:46:37
3	Battery Fuse Main	Fuse 2 Alarm	CA	2025-04-07 11:38:57	2025-04-07 11:46:23
4	DC Main Cabinet	Fuse 10 Alarm	CA	2025-04-07 11:39:07	2025-04-07 11:46:11
5	DC Main Cabinet	Fuse 1 Alarm	CA	2025-04-07 11:39:07	2025-04-07 11:46:04
6	Power System	Ambient Temp Sensor Fault	OA	2025-04-07 11:43:23	2025-04-07 11:45:49
7	Inverter Group	Redundancy Lost+1	MA	2025-04-07 11:43:36	2025-04-07 11:45:40
8	Inverter Group	Redundancy Lost+3	MA	2025-04-07 11:43:34	2025-04-07 11:43:36
9	EIB1	Bad Battery Block	OA	2025-04-07 11:39:18	2025-04-07 11:43:19
10	Power System	DI3 Alarm	CA	2025-04-02 12:57:12	2025-04-07 11:43:19
11	Battery Group	Battery Current Limit Active	OA	2025-04-07 11:39:40	2025-04-07 11:40:25

Upload Alarm History Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 5.46 Alarm History Log Upload



Query Alarm History Log
Query EquipID: All Devices
Query Time: from 2025-04-01 13:20:18 to 2025-04-08 13:20:18
Total 42 alarm(s) queried.

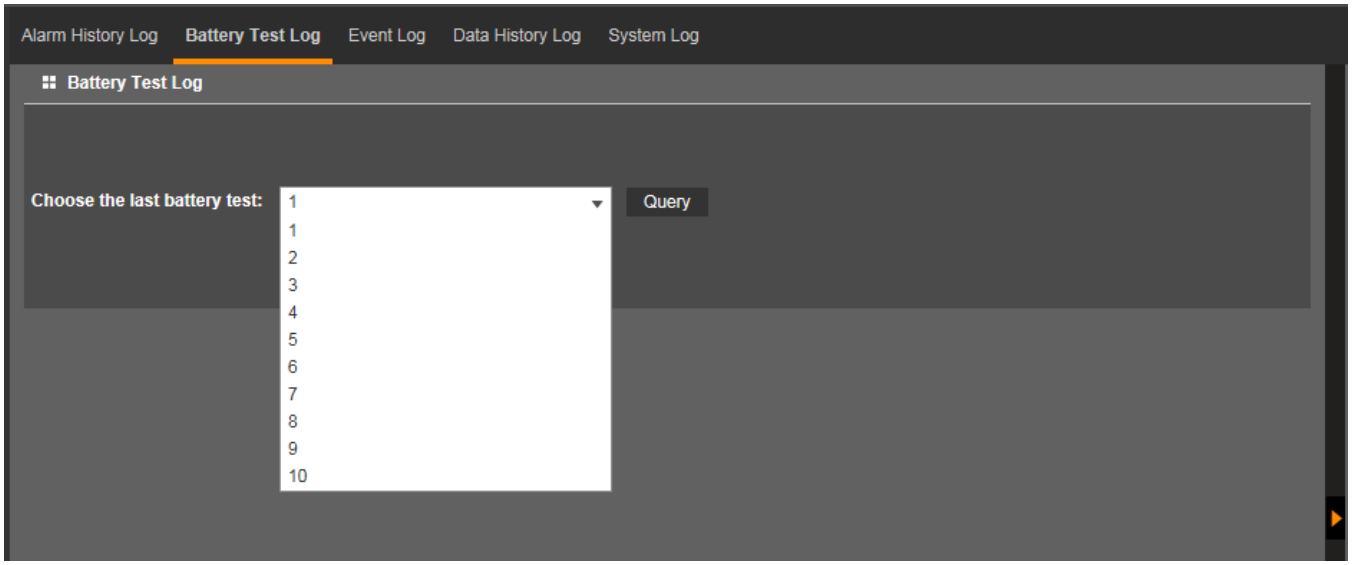
Index	Device Name	Signal Name	Alarm Level	Start Time	End Time
1	Battery Group	Battery Current Limit Active	OA	2025-04-07 11:44:00	2025-04-07 11:50:13
2	Battery Fuse Main	Fuse 3 Alarm	CA	2025-04-07 11:38:57	2025-04-07 11:46:37
3	Battery Fuse Main	Fuse 2 Alarm	CA	2025-04-07 11:38:57	2025-04-07 11:46:23
4	DC Main Cabinet	Fuse 10 Alarm	CA	2025-04-07 11:39:07	2025-04-07 11:46:11
5	DC Main Cabinet	Fuse 1 Alarm	CA	2025-04-07 11:39:07	2025-04-07 11:46:04
6	Power System	Ambient Temp Sensor Fault	OA	2025-04-07 11:43:23	2025-04-07 11:45:49
7	Inverter Group	Redundancy Lost+1	MA	2025-04-07 11:43:36	2025-04-07 11:45:40
8	Inverter Group	Redundancy Lost+3	MA	2025-04-07 11:43:34	2025-04-07 11:43:36
9	EIB1	Bad Battery Block	OA	2025-04-07 11:39:18	2025-04-07 11:43:19
10	Power System	DI3 Alarm	CA	2025-04-02 12:57:12	2025-04-07 11:43:19
11	Battery Group	Battery Current Limit Active	OA	2025-04-07 11:39:40	2025-04-07 11:40:25

Battery Test Log Tab

Select Battery Test Number

Select the Battery Test Log to query from the drop-down list box. Battery test #1 is the most recent.

Figure 5.47 Battery Test Log Number Selection

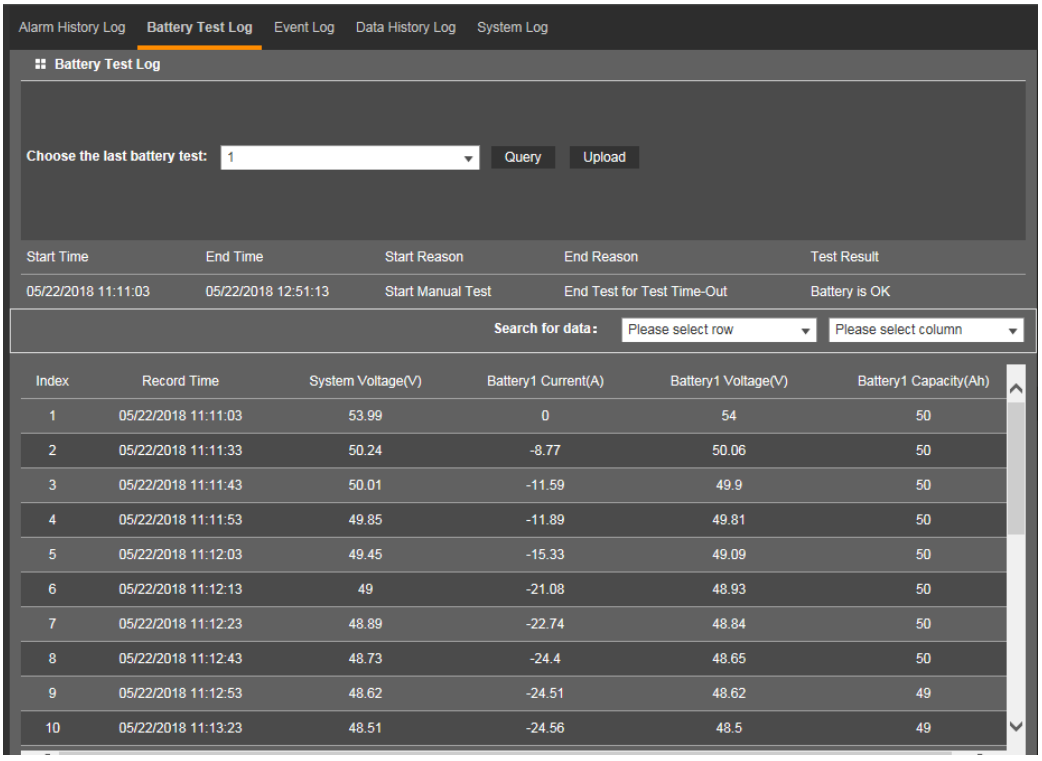


Query Selected Battery Test

Click “Query” to query the selected battery test. The Web page displays up to ten (10) battery tests.

NOTE! *Battery tests in which battery voltage changed less than the Record Threshold setting are not recorded.*

Figure 5.48 Battery Test Log Query



Upload Battery Test Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 5.49 Battery Test Log Upload

Query Battery Test Log
Start time: 05-22-2018 11:11:03
End time : 05-22-2018 12:51:13
Start reason : Start Manual Test
End reason : End Test for Test Time-Out
Test result : Battery is OK

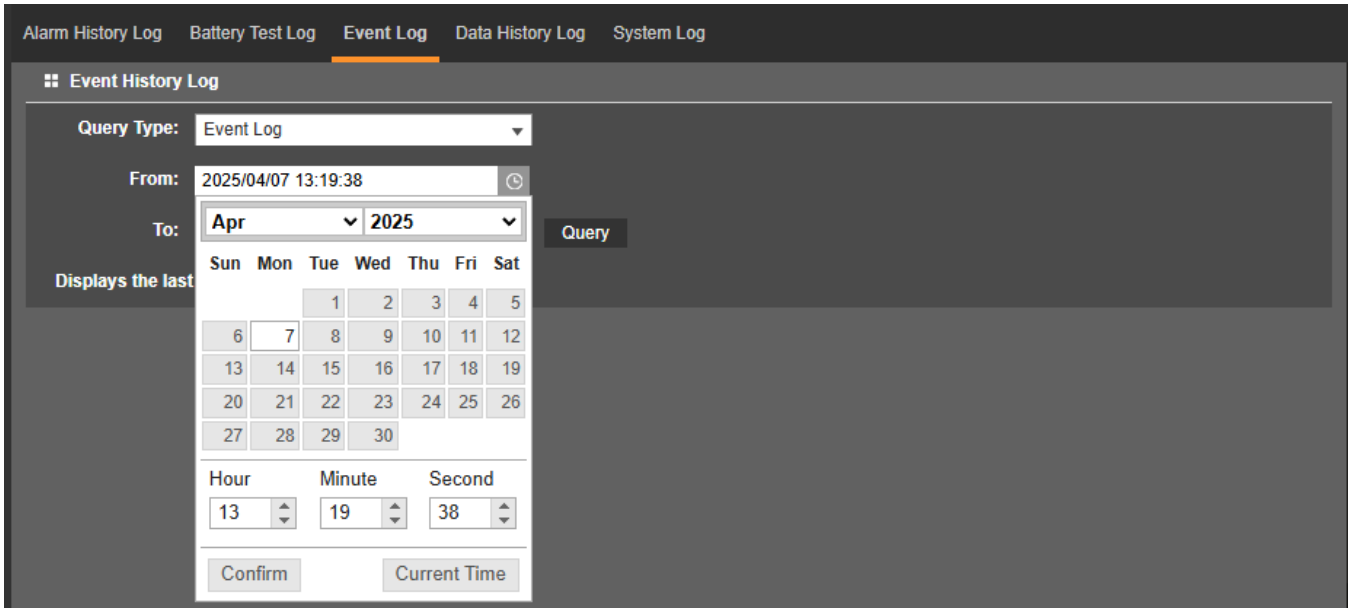
Index	Record Time	System Voltage(V)	Battery1 Current(A)	Battery1 Voltage(V)	Battery1 Capacity(Ah)
1	05-22-2018 11:11:03	53.99	0.00	54.00	50
2	05-22-2018 11:11:33	50.24	-8.77	50.06	50
3	05-22-2018 11:11:43	50.01	-11.59	49.90	50
4	05-22-2018 11:11:53	49.85	-11.89	49.81	50
5	05-22-2018 11:12:03	49.45	-15.33	49.09	50
6	05-22-2018 11:12:13	49.00	-21.08	48.93	50
7	05-22-2018 11:12:23	48.89	-22.74	48.84	50
8	05-22-2018 11:12:43	48.73	-24.40	48.65	50
9	05-22-2018 11:12:53	48.62	-24.51	48.62	49
10	05-22-2018 11:13:23	48.51	-24.56	48.50	49
11	05-22-2018 11:14:02	48.41	-24.63	48.43	49
12	05-22-2018 11:16:33	48.29	-25.86	48.31	48

Event Log Tab

Select Time

Select the "from" and "to" time.

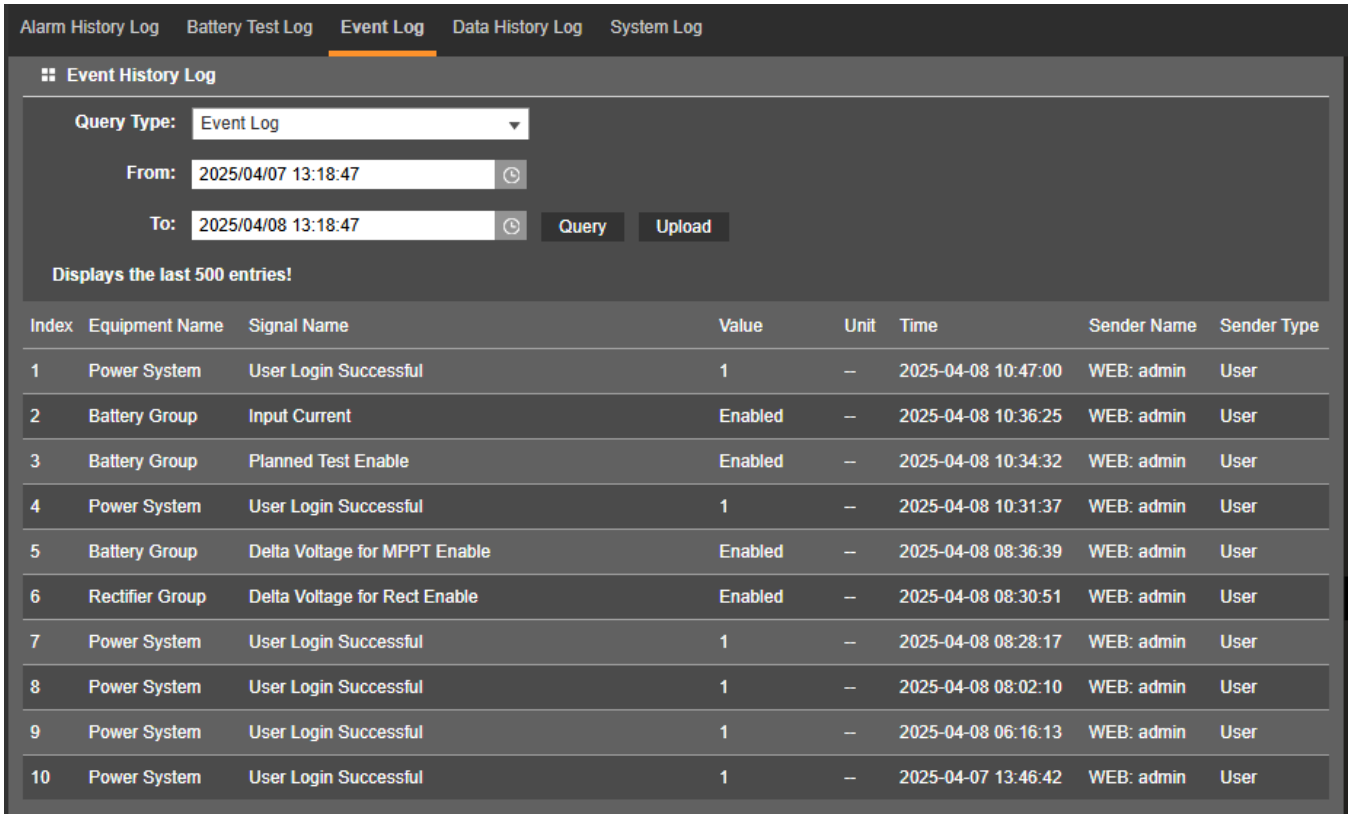
Figure 5.50 Event Log Time Selection



Query Event Log

Click “Query” to query the Event Log. The Web page displays the last 500 entries.

Figure 5.51 Event Log Query

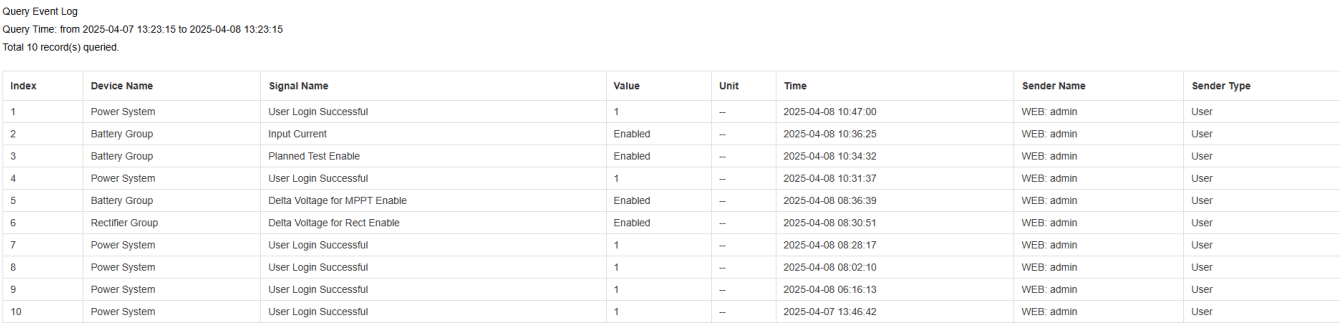


Index	Equipment Name	Signal Name	Value	Unit	Time	Sender Name	Sender Type
1	Power System	User Login Successful	1	--	2025-04-08 10:47:00	WEB: admin	User
2	Battery Group	Input Current	Enabled	--	2025-04-08 10:36:25	WEB: admin	User
3	Battery Group	Planned Test Enable	Enabled	--	2025-04-08 10:34:32	WEB: admin	User
4	Power System	User Login Successful	1	--	2025-04-08 10:31:37	WEB: admin	User
5	Battery Group	Delta Voltage for MPPT Enable	Enabled	--	2025-04-08 08:36:39	WEB: admin	User
6	Rectifier Group	Delta Voltage for Rect Enable	Enabled	--	2025-04-08 08:30:51	WEB: admin	User
7	Power System	User Login Successful	1	--	2025-04-08 08:28:17	WEB: admin	User
8	Power System	User Login Successful	1	--	2025-04-08 08:02:10	WEB: admin	User
9	Power System	User Login Successful	1	--	2025-04-08 06:16:13	WEB: admin	User
10	Power System	User Login Successful	1	--	2025-04-07 13:46:42	WEB: admin	User

Upload Event Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 5.52 Event Log Upload



Query Event Log
Query Time: from 2025-04-07 13:23:15 to 2025-04-08 13:23:15
Total 10 record(s) queried.

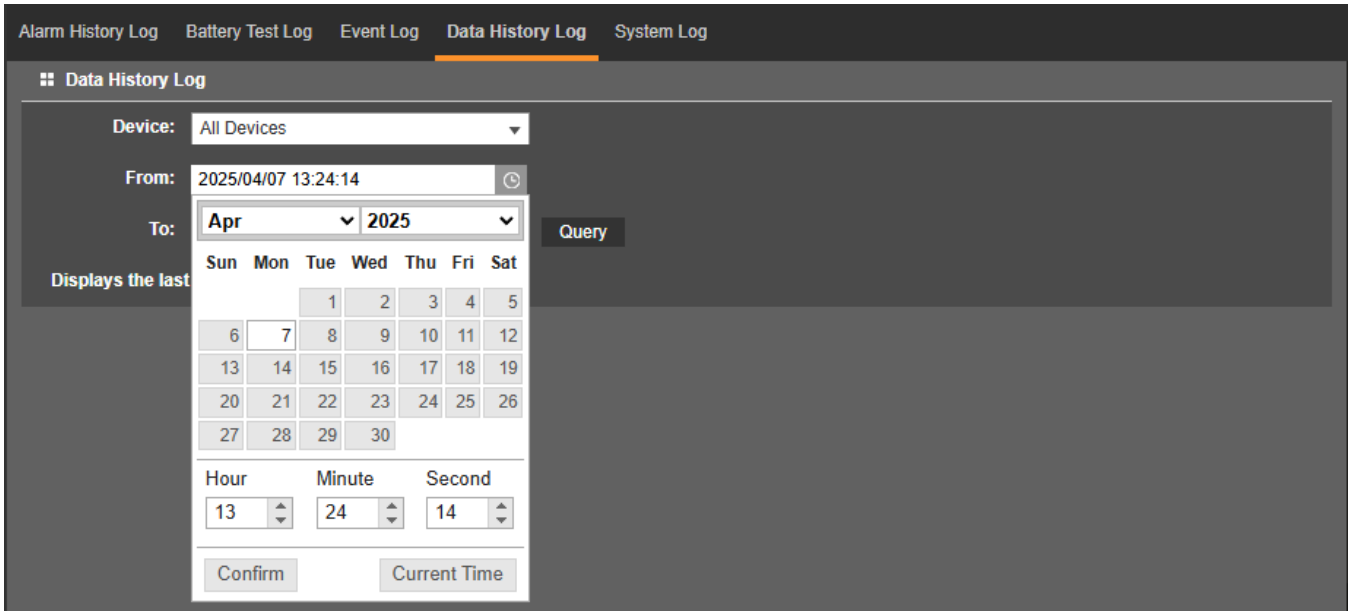
Index	Device Name	Signal Name	Value	Unit	Time	Sender Name	Sender Type
1	Power System	User Login Successful	1	--	2025-04-08 10:47:00	WEB: admin	User
2	Battery Group	Input Current	Enabled	--	2025-04-08 10:36:25	WEB: admin	User
3	Battery Group	Planned Test Enable	Enabled	--	2025-04-08 10:34:32	WEB: admin	User
4	Power System	User Login Successful	1	--	2025-04-08 10:31:37	WEB: admin	User
5	Battery Group	Delta Voltage for MPPT Enable	Enabled	--	2025-04-08 08:36:39	WEB: admin	User
6	Rectifier Group	Delta Voltage for Rect Enable	Enabled	--	2025-04-08 08:30:51	WEB: admin	User
7	Power System	User Login Successful	1	--	2025-04-08 08:28:17	WEB: admin	User
8	Power System	User Login Successful	1	--	2025-04-08 08:02:10	WEB: admin	User
9	Power System	User Login Successful	1	--	2025-04-08 06:16:13	WEB: admin	User
10	Power System	User Login Successful	1	--	2025-04-07 13:46:42	WEB: admin	User

Data History Log Tab

Select Device and Time

Select the "Device" to query from the drop-down list box. Select the "from" and "to" time.

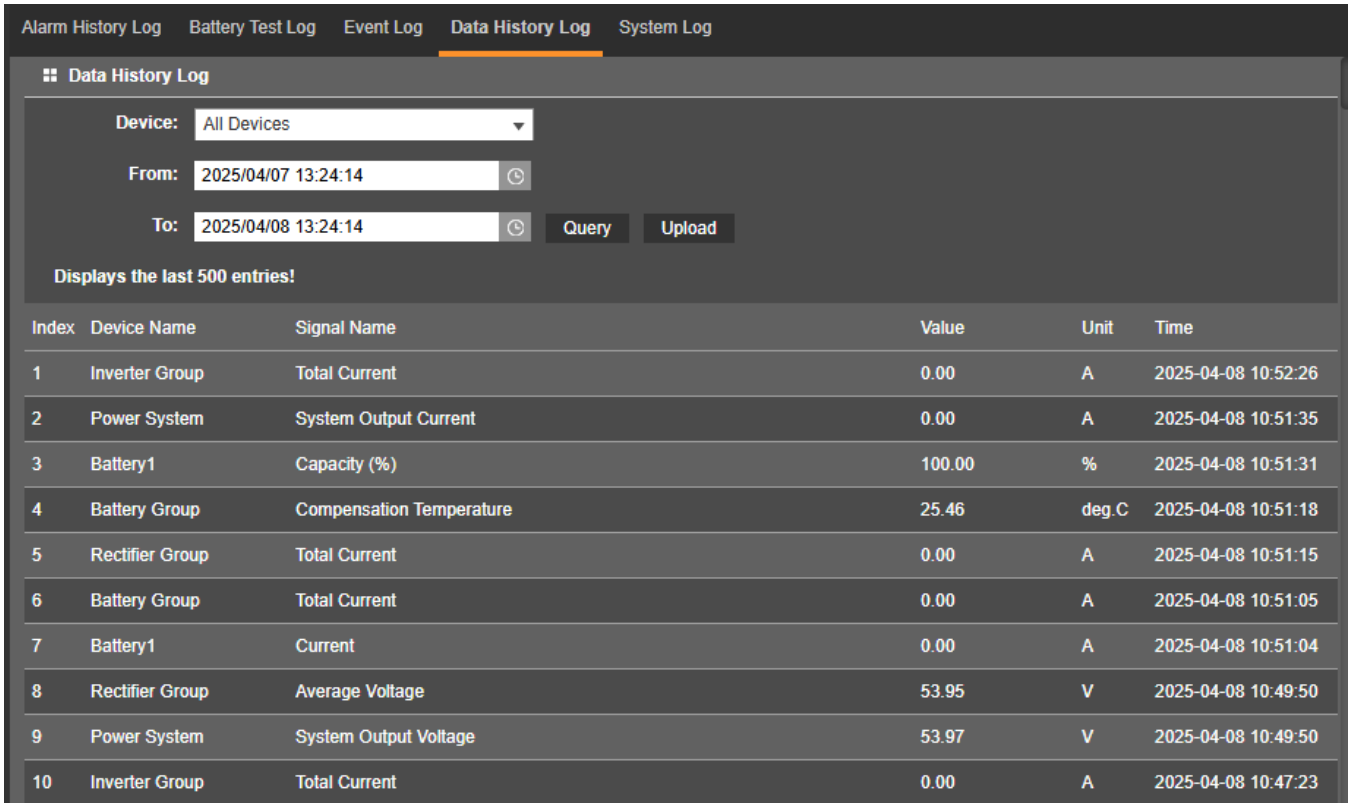
Figure 5.53 Data History Log Device and Time



Query Data History Log

Click “Query” to query for Date History within selected time slot. The Web page displays the last 500 entries.

Figure 5.54 Data History Log Query



Index	Device Name	Signal Name	Value	Unit	Time
1	Inverter Group	Total Current	0.00	A	2025-04-08 10:52:26
2	Power System	System Output Current	0.00	A	2025-04-08 10:51:35
3	Battery1	Capacity (%)	100.00	%	2025-04-08 10:51:31
4	Battery Group	Compensation Temperature	25.46	deg.C	2025-04-08 10:51:18
5	Rectifier Group	Total Current	0.00	A	2025-04-08 10:51:15
6	Battery Group	Total Current	0.00	A	2025-04-08 10:51:05
7	Battery1	Current	0.00	A	2025-04-08 10:51:04
8	Rectifier Group	Average Voltage	53.95	V	2025-04-08 10:49:50
9	Power System	System Output Voltage	53.97	V	2025-04-08 10:49:50
10	Inverter Group	Total Current	0.00	A	2025-04-08 10:47:23

Upload Data History Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

Figure 5.55 Data History Log Upload

Query Data History Log
Query EquipID: All Devices
Query Time: from 2025-04-07 13:25:51 to 2025-04-08 13:25:51
Total 2455 record(s) queried.

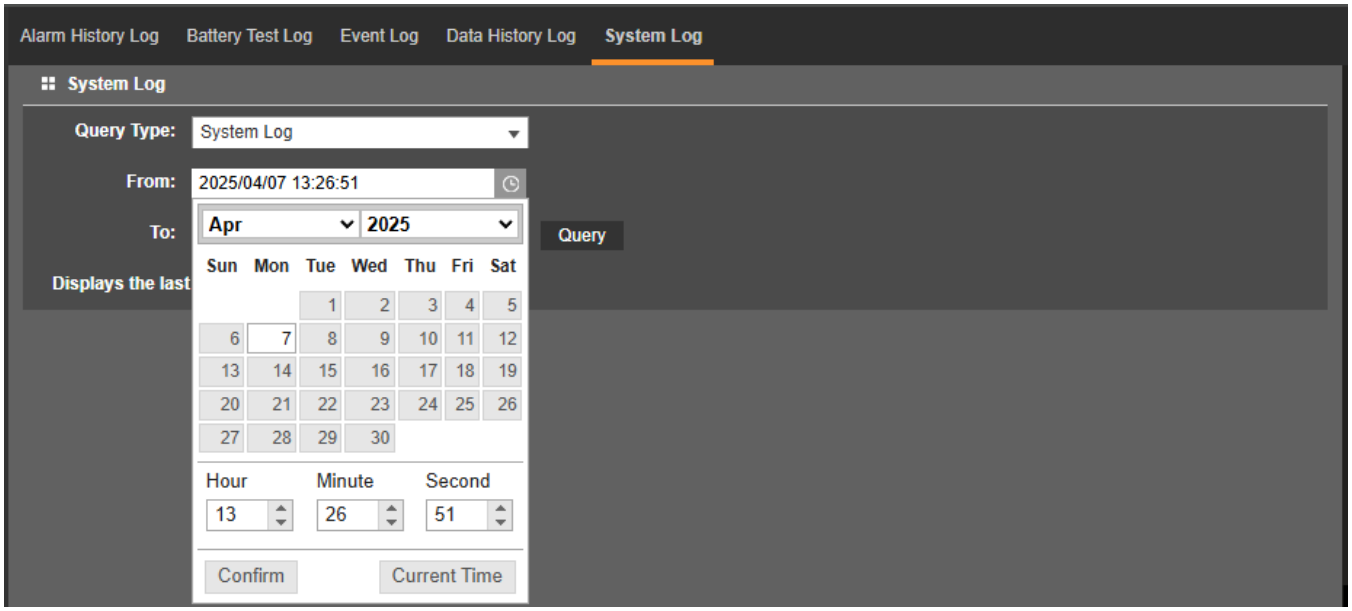
Index	Device Name	Signal Name	Value	Unit	Time
1	Inverter Group	Total Current	0.00	A	2025-04-08 10:52:26
2	Power System	System Output Current	0.00	A	2025-04-08 10:51:35
3	Battery1	Capacity (%)	100.00	%	2025-04-08 10:51:31
4	Battery Group	Compensation Temperature	25.46	deg.C	2025-04-08 10:51:18
5	Rectifier Group	Total Current	0.00	A	2025-04-08 10:51:15
6	Battery Group	Total Current	0.00	A	2025-04-08 10:51:05
7	Battery1	Current	0.00	A	2025-04-08 10:51:04
8	Rectifier Group	Average Voltage	53.95	V	2025-04-08 10:49:50
9	Power System	System Output Voltage	53.97	V	2025-04-08 10:49:50
10	Inverter Group	Total Current	0.00	A	2025-04-08 10:47:23

System Log Tab

Select Time

Select the "from" and "to" time.

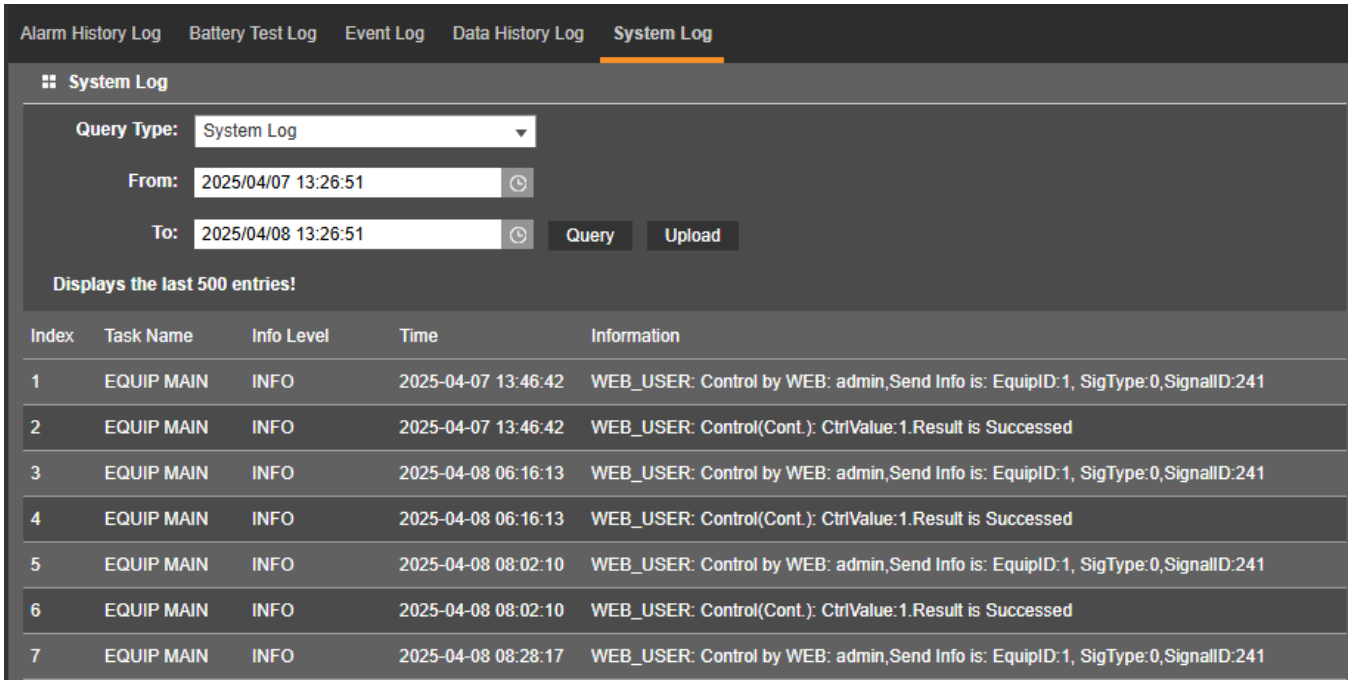
Figure 5.56 System Log Time Selection



Query System Log

Click “Query” to query the System Log. The Web page displays the last 500 entries.

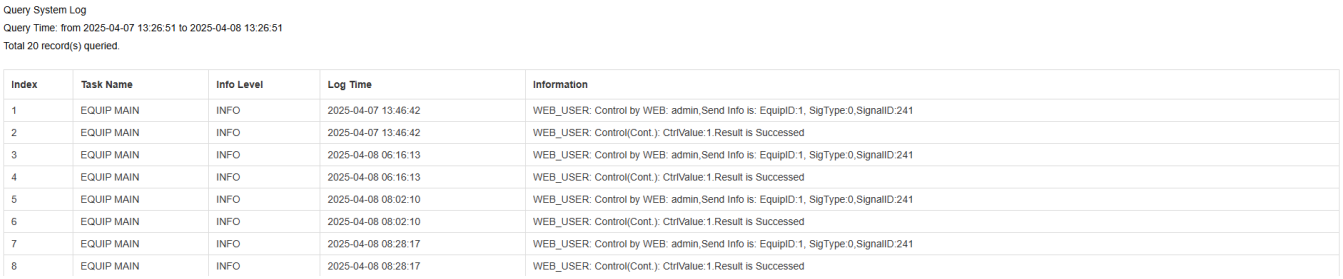
Figure 5.57 System Log Query



Upload System Log

Click “Upload” to open the log into another window. You can then save the log as an .html (Web page) or .txt (text) file.

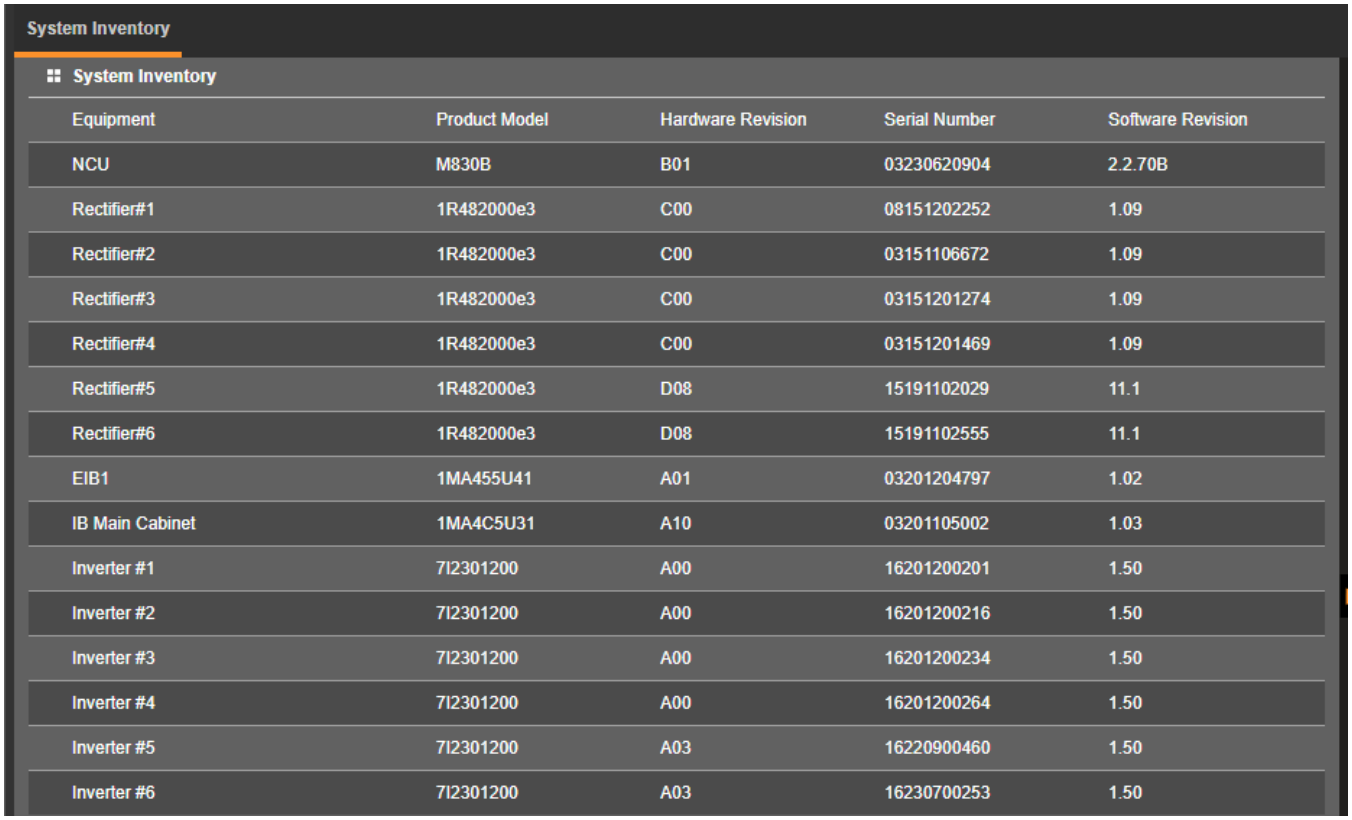
Figure 5.58 System Log Upload



5.9.3 System Inventory Menu

The System Inventory Menu allows you to view product information of the intelligent devices (i.e. rectifiers, converters, Inverters, SMDUs, IB, etc.) connected to the controller.

Figure 5.59 System Inventory Menu



Equipment	Product Model	Hardware Revision	Serial Number	Software Revision
NCU	M830B	B01	03230620904	2.2.70B
Rectifier#1	1R482000e3	C00	08151202252	1.09
Rectifier#2	1R482000e3	C00	03151106672	1.09
Rectifier#3	1R482000e3	C00	03151201274	1.09
Rectifier#4	1R482000e3	C00	03151201469	1.09
Rectifier#5	1R482000e3	D08	15191102029	11.1
Rectifier#6	1R482000e3	D08	15191102555	11.1
EIB1	1MA455U41	A01	03201204797	1.02
IB Main Cabinet	1MA4C5U31	A10	03201105002	1.03
Inverter #1	7I2301200	A00	16201200201	1.50
Inverter #2	7I2301200	A00	16201200216	1.50
Inverter #3	7I2301200	A00	16201200234	1.50
Inverter #4	7I2301200	A00	16201200264	1.50
Inverter #5	7I2301200	A03	16220900460	1.50
Inverter #6	7I2301200	A03	16230700253	1.50

5.9.4 Advanced Settings Menu

The Advanced Settings Menu allows you to change (if you have the proper privilege level programmed in your User settings) the settings of the various advanced programmable parameters. Settings are grouped per function. Select a tab in the Advanced Settings Menu to change those functions programmable parameters.

Ethernet Tab

You can configure the controller's network parameters.

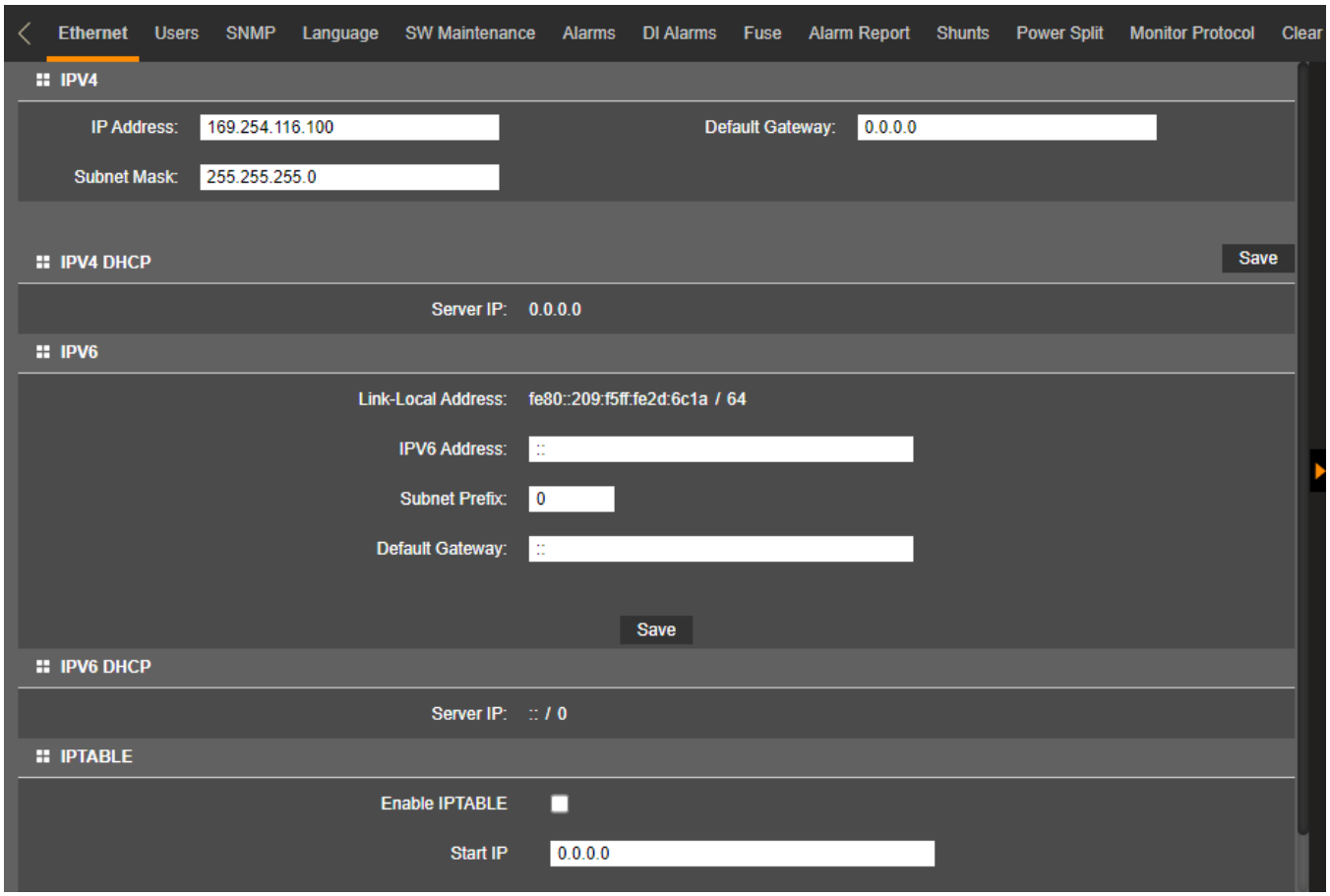
- IPv4: IP Address, Subnet Mask, and Default Gateway.
- IPv6: IPv6 Address, IPv6 Prefix, and IPv6 Gateway.
- IPTABLE: By default, the IP TABLE function is disabled, tick the table behind 'Enable IP TABLE', this will enable 10 IP addresses and grant them permission to access NCU's webpage starting from the Start IP entered by user.

  Example if Start IP is 10.116.56.101, then IPs from 10.116.56.101 to 10.116.56.110 will have to ability to access the NCU's webpage

After modifying the network parameters, click "Save" to validate the change made to the parameters.

NOTE! *After changing the IP Address, you will need to login again with the new IP address.*

Figure 5.60 Ethernet Tab



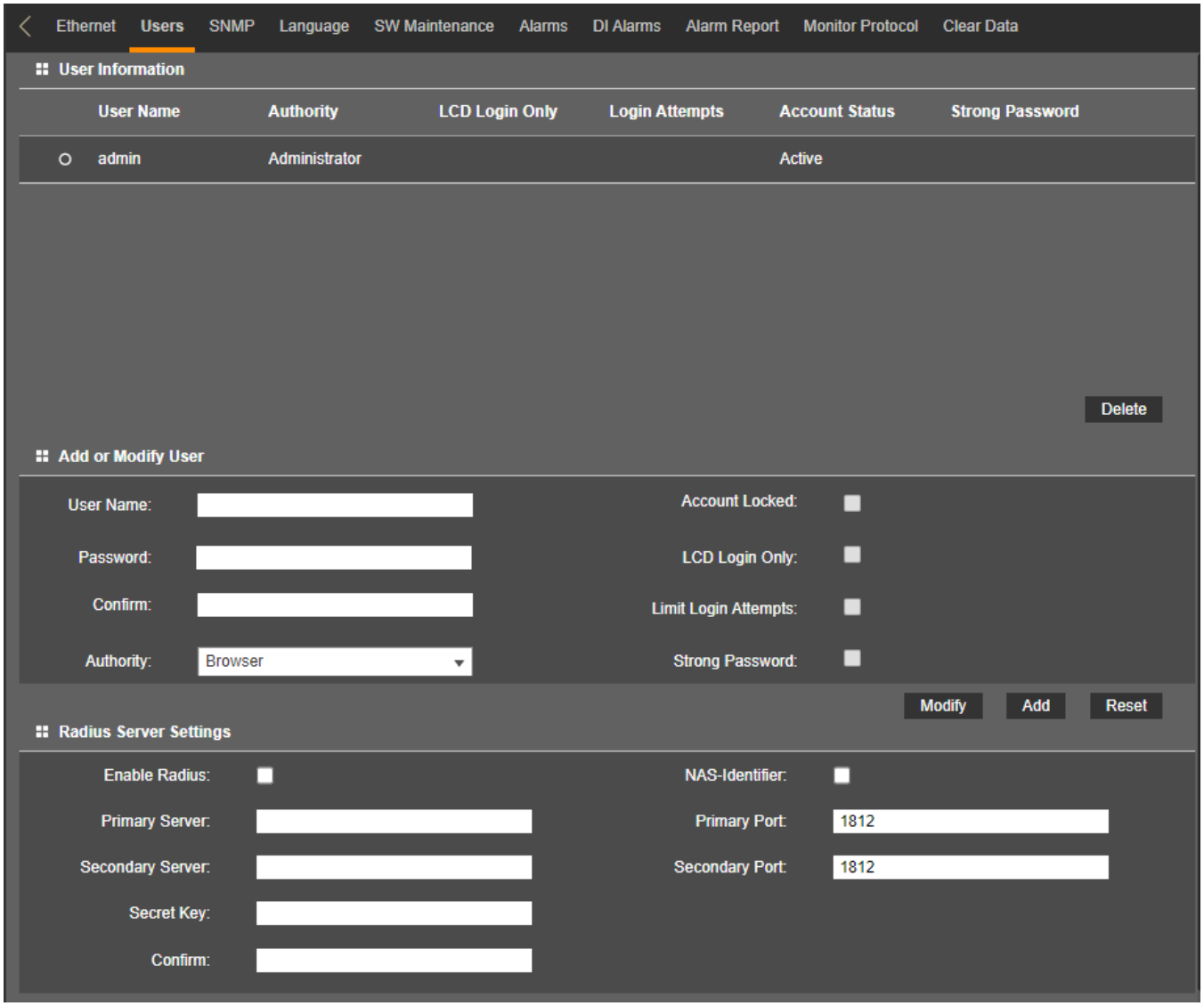
Users Tab

You can add, edit, and delete Users. These are the Users that can log onto the controller both locally (local display access) or remotely using the Web Interface.

- A maximum of sixteen (16) Users can be set up in the NCU.
- A maximum of five (5) Users can access the NCU at the same time.

You can also enable the radius server feature (see “Radius Server Feature” on page 9) and enter the radius server parameters.

Figure 5.61 Users Tab



Adding a User

1. Enter the User's Name in the "User Name" field.

   User Name: Eight (8) characters maximum; the valid characters are 0-9, a-z, A-Z, and _.

2. Enter a password for this User in the "Password" field.

   Password: Thirteen (13) characters maximum; the valid characters are 0-9, a-z, A-Z, and _. Passwords must be at least six (6) characters long.

3. Re-enter the password for this User in the "Re-enter Password" field.

4. Select the privilege of the User from those listed in the "Privilege" drop-down list box. See "Web Interface User Privilege Levels" on page 150 for a description. See also "Passwords and Privilege Levels" on page 19.

5. Check the following boxes as applicable for this User.

   a) Account Locked: An Admin privilege User can check this box to make an Inactive user account Active again. See "Limit Login Attempts" below.

   b) LCD Access Only: When this option is checked, the associated User can only login using the LCD (cannot login via the web).

   c) Limit Login Attempts: When this option is checked, the associated account will be locked and account status will become Inactive after the user crosses 100 failed attempts to login within its Active status duration, the account can be unlocked by an Admin privilege user only using the "Account Locked" checkbox (see "Account Locked" above).

   d) Strong Password: When this option is checked, a strong password will be required for this User. A strong password is at least 16 characters long, and the password should contain at-least one upper case, one lower case alphabet, one numerical and one special character in its password string.

6. Click the "Add" button to add the User.

NOTE! *To reset the form (i.e. to start over) and erase all information entered, click on the "Reset" button.*

Modifying an Existing User

1. Select the User to be modified from those listed in the "User Information" list.

2. Modify the parameters of this User.

3. Click the "Modify" button to modify the parameters of this User to the new settings.

NOTE! *To reset the form (i.e. to start over) and erase all information entered, click on the "Reset" button.*

Deleting a User

1. Select the User to be deleted from those listed in the "User Information" list.

2. Click the "Delete" button to delete this User.

Web Interface User Privilege Levels

Users are programmed with a “privilege level” (see Table 5.1). Each privilege level gives a User Web access to specific menus, as shown in Table 5.2. A User has access to his/her level menus, plus all menus of the lesser privilege levels.

Table 5.1 User Privilege Levels

Access Level (Privilege Level)	Default User Name and Password	Authority
Level A (Browser)	none set	The User can only read (browse) information in the menus.
Level B (Operator)	none set	The User has access to the system "Manual Mode Control Settings" menus.
Level C (Engineer)	none set	The User has access to the system "Settings" menus.
Level D (Administrator)	admin, 12345678	The User has full access to all menus; including downloading the "SettingParam.tar" file, updating the OS application, and modify/add/delete Users.

Table 5.2 Authority Level

Web Interface Tab	Signal	Manual Mode	Authority Level Required - Web	Authority Level Required - LCD
Settings / System	Under Voltage 1 (V)	--	Engineer	Operator
	Under Voltage 2 (V)	--	Engineer	Operator
	Over Voltage 1 (V)	--	Operator	Operator
	Over Voltage 2 (V)	--	Engineer	Operator
	System Current Alarm (A)	--	Engineer	not available
	High Load Level 1 (%)	--	Engineer	not available
	High Load Level 2 (%)	--	Engineer	not available
	Relay Test (type)	--	Engineer	not available
	Relay Test Time (sec)	--	Engineer	not available
	Main Ambient Temp Sensor (select from list)	--	Engineer	not available
	Fail Safe Mode (enable/disable)	--	Engineer	not available
	Rectifier Expansion (disable or type)	--	Engineer	Operator
	Power Split Mode (enable/disable)	--	Operator	not available
	Power Split Current Limit (%)	--	Engineer	not available
	Delta Voltage (V)	--	Engineer	not available
	Outgoing Alarms Blocked (normal/blocked)	--	Engineer	Operator
	Estop/EShutdown (disable or type)	--	Operator	not available
	Audible Alarm (on/off/time)	--	Engineer	Operator
	Auto/Manual State (auto/manual)	--	Operator	Operator
	Manual Mode Time Limit (hr)	--	Operator	not available
	Maintenance Cycle (enable/disable)	--	Engineer	Operator
	Clear Maintenance Run Time (yes)	Yes	Operator	not available
	LCD Rotation (0deg/90deg/big screen)	--	Engineer	Operator
	HTD Point (deg)	--	Operator	Operator
	HTD Reconnect Point (deg)	--	Operator	Operator
	Time Display Format (format)	--	Engineer	not available
	Temperature Format (C or F)	--	Engineer	not available

Web Interface Tab	Signal	Manual Mode	Authority Level Required - Web	Authority Level Required - LCD
	System Alarm Function CR,CR/MJ,CR/MJ/OB)	--	Engineer	not available
	AC Generator Function	--	Engineer	not available
	Manual AC Generator Run	--	Engineer	not available
	AC Generator Start Voltage	--	Engineer	not available
	AC GEN Start Batt Capacity	--	Engineer	not available
	DI for AC Generator	--	Engineer	not available
	Site Has AC Utility Power	--	Engineer	not available
Settings / Battery	Equalize/Float Charge (Float/Equalize)	--	Operator	Operator
	Float Charge Voltage (V)	--	Engineer	Operator
	Equalize Voltage (V)	--	Engineer	Operator
	NCU Battery 1 Shunt (yes or no)	--	Engineer	Operator
	Batt# Rated Capacity (AHr)	--	Engineer	Operator
	Reset Battery Capacity (Yes)	--	Operator	Operator
	Number of Battery Fuses (0 to 6)	--	Operator	not available
	Calculate Battery Current (yes or no)	--	Engineer	not available
	Temp Comp Sensor (select from list)	--	Engineer	Operator
	Comp Temp High2 (deg)	--	Engineer	not available
	Comp Temp High1 (deg)	--	Engineer	not available
	Comp Temp Low (deg)	--	Engineer	not available
	Temp Comp Center (deg)	--	Engineer	Operator
	Temp Comp Coefficient (mV/deg)	--	Engineer	Operator
	Temp Comp Voltage Clamp (enable/disable)	--	Engineer	Operator
	Temp Comp Max Voltage (V)	--	Engineer	Operator
	Temp Comp Min Voltage (V)	--	Engineer	Operator
	BTRM Temp Sensor (select from list)	--	Engineer	not available
	BTRM Temp High2 (deg)	--	Engineer	not available
	BTRM Temp High1 (deg)	--	Engineer	not available
	BTRM Action (disable/lower voltage)	--	Engineer	not available
	BTRM Voltage (V)	--	Engineer	not available
	Low Capacity Point (%)	--	Engineer	not available
	Curr Limited Mode (yes or no)	--	Engineer	Operator
	Battery Current Limit (# x C10)	--	Engineer	Operator
	Over Current Limit (# x C10)	--	Engineer	Operator
	Automatic Equalize (yes or no)	--	Engineer	Operator
	Equalize Stop Current (# x C10)	--	Engineer	not available
	Equalize Stop Time Delay (min)	--	Engineer	not available
	Maximum Equalize Charge (min)	--	Engineer	not available
	Cyclic Equalize (yes or no)	--	Engineer	not available
	Cyclic Equalize Start Time (date and time)	--	Engineer	not available
	EIB-# Voltage Type (disable or type)	--	Operator	not available
	EIB-# Block In-Use Num (0 to 8)	--	Operator	not available
	Charging Efficiency (%)	--	Engineer	not available

Web Interface Tab	Signal	Manual Mode	Authority Level Required - Web	Authority Level Required - LCD
	Time to ##C10 Discharge (10 values in hr)	--	Engineer	not available
	Clear Abnormal Bat Current (yes)	--	Operator	Operator
Settings / ECO	ECO Mode (enable/disable)	--	Operator	Operator
	Load Fluctuation Range (%)	--	Engineer	Operator
	System Energy Saving Point (%)	--	Engineer	not available
	Cycle Period (hr)	--	Engineer	Operator
	All Rects On Time (min)	--	Engineer	Operator
	Turn Off Delay (min)	--	Engineer	not available
	Clear Cycle Alarm (yes)	--	Engineer	Operator
Settings / LVD	LVD 1 & 2 (enable/disable)	--	Operator	Operator
	LVD 1 & 2 Mode (voltage/time)	--	Operator	Operator
	LVD 1 & 2 Disconnect Voltage (V)	--	Operator	Operator
	LVD 1 & 2 Reconnect Voltage (V)	--	Operator	Operator
	LVD 1 & 2 Reconnect Delay (min)	--	Operator	not available
	LVD 1 & 2 Time (min)	--	Operator	Operator
	LVD 1 & 2 Dependency (none/LVD1/LVD2/LVD3)	--	Operator	not available
	LVD 1 & 2 High Temp Disconnect (enable/disable)	--	Operator	Operator
	LVD Contactor Type (bi/mono/mono w-sample)	--	Operator	not available
	LVD 1 & 2 Control (connected/disconnected)	Yes	Operator	Operator
Settings / Temp Probes	## Temp# (none/ambient/battery)	--	Operator	not available
	## Temp# High2 (deg)	--	Engineer	not available
	## Temp# High1 (deg)	--	Engineer	not available
	## Temp# Low (deg)	--	Engineer	not available
Settings / Inverters	DC Low Voltage Off	--	Engineer	not available
	DC Low Voltage On	--	Engineer	not available
	DC High Voltage Off	--	Engineer	not available
	DC High Voltage On	--	Engineer	not available
	Primary Input Power	--	Engineer	not available
	Output On/Off Control (on all or off all)	Yes	Operator	not available
	LED Control (stop or all flashing)	Yes	Operator	not available
	Fan Speed Control (auto or full)	--	Operator	not available
	Confirm Inverter ID/Feed (yes)	--	Operator	not available
	Reset Inverter IDs (yes)	--	Operator	not available
	Clear Inverter Lost Alarm (yes)	--	Operator	not available
	Clear Inverter Comm Fail Alarm (yes)	--	Operator	not available
	Clear All Invt Comm Fail Alarm (yes)	--	Operator	not available
	Clear Fault (yes)	--	Operator	not available
Settings / Rectifiers	Current Limit (enable/disable)	--	Operator	Operator
	Current Limit Point (A)	--	Engineer	Operator
	HVSD (enable/disable)	--	Operator	not available
	HVSD Limit (V)	--	Engineer	not available
	Restart on HVSD (enable/disable)	--	Engineer	not available

Web Interface Tab	Signal	Manual Mode	Authority Level Required - Web	Authority Level Required - LCD
	HVSD Restart Time (sec)	--	Engineer	not available
	Walk-in (enable/disable)	--	Engineer	Operator
	Walk-in Time (sec)	--	Engineer	Operator
	Sequence Start Interval (sec)	--	Engineer	Operator
	Nominal AC Voltage (V)	--	Operator	Operator
	Mains Failure Alarm Limit 1 (%)	--	Operator	Operator
	Mains Failure Alarm Limit 2 (%)	--	Operator	Operator
	Turn On When AC Over (yes or no)	--	Engineer	not available
	Input Current Limit (A)	--	Engineer	not available
	Mix HE Power (derated/non-derated)	--	Engineer	not available
	Diesel Generator Power Limit (enable/disable)	--	Operator	not available
	Rectifier Trim (V)	Yes	Operator	not available
	DC On/Off Control (on all or off all)	Yes	Operator	not available
	AC On/Off Control on all or off all)	Yes	Operator	not available
	Rectifiers LED Control (stop or all flashing)	Yes	Operator	not available
	Fan Speed Control (auto or full)	--	Operator	not available
	Confirm Rectifier ID/Feed (yes)	--	Operator	not available
	Reset Rectifier IDs (yes)	--	Operator	not available
	Clear Cycle Alarm (yes)	--	Operator	not available
	Clear Rectifier Lost Alarm (yes)	--	Operator	Operator
	Clear Rect Comm Fail Alarm (yes)	--	Operator	Operator
Settings / Battery Test	Battery Test Control (stop/start)	--	Operator	Operator
	AC Fail Test (enable/disable)	--	Engineer	not available
	Constant Current Test (enable/disable)	--	Engineer	not available
	Constant Current Test (A)	--	Engineer	not available
	Short Test (enable/disable)	--	Engineer	not available
	Short Test Cycle (days)	--	Engineer	not available
	Short Test Time (min)	--	Engineer	not available
	Short Test Max Difference (# X C10)	--	Engineer	not available
	Test Voltage Level (V)	--	Engineer	Operator
	End Test Voltage (V)	--	Engineer	Operator
	End Test Time (min)	--	Engineer	Operator
	End Test Capacity (%)	--	Engineer	Operator
	Record Threshold (V)	--	Engineer	Operator
	Number of Planned Tests (0 to 12)	--	Engineer	not available
	Clear Bad Battery Alarm (yes)	--	Operator	Operator
	Clear Battery Test Fail Alarm (yes)	--	Operator	Operator
	Clear Discharge Curr Imbalance (yes)	--	Operator	Operator
Advanced Settings / Ethernet	IPV4 - IP Address	--	Administrator	Operator
	IPV4 - Subnet Mask	--	Administrator	Operator
	IPV4 - Default Gateway	--	Administrator	Operator
	IPV4 - DHCP Server IP	--	Administrator	Operator

Web Interface Tab	Signal	Manual Mode	Authority Level Required - Web	Authority Level Required - LCD
	IPV6 - Link Local Address	--	Administrator	Operator
	IPV6 - IPV6 Address	--	Administrator	Operator
	IPV6 - Subnet Prefix	--	Administrator	Operator
	IPV6 – Default Gateway	--	Administrator	Operator
	IPV6 DHCP – Server IP	--	Administrator	Operator
Advanced Settings / Users	User Information (delete command)	--	Administrator	not available
	Add or Modify User – User Name	--	Administrator	not available
	Add or Modify User – Privilege	--	Administrator	not available
	Add or Modify User – Confirm	--	Administrator	not available
Advanced Settings / SNMP	Accepted Trap Level (not used/all/major/critical)	--	Administrator	not available
	NMSV2 Configuration - delete command	--	Administrator	not available
	NMSV2 Configuration – NMS IP	--	Administrator	not available
	NMSV2 Configuration – Public Community	--	Administrator	not available
	NMSV2 Configuration – Private Community	--	Administrator	not available
	NMSV2 Configuration – Trap (enable/disable)	--	Administrator	not available
	NMSV3 Configuration – delete command	--	Administrator	not available
	NMSV3 Configuration – User Name	--	Administrator	not available
	NMSV3 Configuration – Priv Password DVS	--	Administrator	not available
	NMSV3 Configuration – Auth Password MD5	--	Administrator	not available
	NMSV3 Configuration –Trap (enable/disable)	--	Administrator	not available
	NMSV3 Configuration – Trap IP	--	Administrator	not available
	NMSV3 Configuration – Trap Security Level	--	Administrator	not available
Advanced Settings / Language	Local Language (select)	--	Administrator	Operator
Advanced Settings / SW Maintenance	Auto Config	--	Administrator	Operator
	Restore Factory Defaults	--	Administrator	Operator
	Retrieve SettingParam.tar	--	Administrator	not available
	Upload/Download	--	Administrator	Operator
Advanced Settings / Alarms	New Alarm Level	--	Administrator	not available
	New Relay Number	--	Administrator	not available
Advanced Settings / DI Alarms	Signal Full Name	--	Administrator	not available
	Signal Abbreviated Name	--	Administrator	not available
	New Alarm Level	--	Administrator	not available
	New Relay Number	--	Administrator	not available
	New Alarm State	--	Administrator	not available
Advanced Settings / DO (Relay)	Relay Test (enable/disable)	--	Administrator	not available
	Relay Test Time (sec)	--	Administrator	not available
	Each Relay (energize/de-energize)	--	Administrator	not available
	Signal Full Name	--	Administrator	not available
Advanced Settings / Shunts	Set type (Not Used/General/load/Battery/Source)	--	Administrator	not available
	Signal Full Name	--	Administrator	not available
	Signal Abbreviated Name	--	Administrator	not available

Web Interface Tab	Signal	Manual Mode	Authority Level Required - Web	Authority Level Required - LCD
	Full Scale Current (A)	--	Administrator	not available
	Full Scale Voltage (mV)	--	Administrator	not available
	Break Value (A)	--	Administrator	not available
	High 1 Curr Limit Alarm (A)	--	Administrator	not available
	High 1 Curr Alarm Severity (NA/OB/MJ/CR)	--	Administrator	not available
	High 1 Curr Alarm Relay	--	Administrator	not available
	High 2 Curr Limit Alarm (A)	--	Administrator	not available
	High 2 Curr Alarm Severity (NA/OB/MJ/CR)	--	Administrator	not available
	High 2 Curr Alarm Relay	--	Administrator	not available
Advanced Settings / Fuse	Signal Full Name	--	Administrator	not available
	Signal Abbreviated Name	--	Administrator	not available
Advanced Settings / Alarm Report	SMTP – Email To	--	Administrator	not available
	SMTP – Server IP	--	Administrator	not available
	SMTP – Server Port	--	Administrator	not available
	SMTP – Email From	--	Administrator	not available
	SMTP – Privilege (enable/disable)	--	Administrator	not available
	SMTP – SMTP Account	--	Administrator	not available
	SMTP – SMTP Password	--	Administrator	not available
	SMTP – Alarm Report Level (none/all/MJ-CR/CR)	--	Administrator	not available
	SMS – Cell Phone Number 1	--	Administrator	not available
	SMS – Cell Phone Number 2	--	Administrator	not available
	SMS – Cell Phone Number 3	--	Administrator	not available
	SMS – Alarm Report Level (none/all/MJ-CR/CR)	--	Administrator	not available
Advanced Settings / Power Split	Power Split Mode (enable/disable)	--	Administrator	not available
	LVD# Equipment	--	Administrator	not available
	LVD# Signal Type	--	Administrator	not available
	LVD# Signal Name	--	Administrator	not available
	BATTERY_TEST Equipment	--	Administrator	not available
	BATTERY_TEST Signal Type	--	Administrator	not available
	BATTERY_TEST Name	--	Administrator	not available
	EQUALIZE_CHARGE Equipment	--	Administrator	not available
	EQUALIZE_CHARGE Signal Type	--	Administrator	not available
	EQUALIZE_CHARGE Name	--	Administrator	not available
Advanced Settings / Monitor Protocol	Protocol (EEM/YDN23/Modbus/T1)	--	Administrator	not available
	Modbus – Protocol Type	--	Administrator	not available
	Modbus – Protocol Media	--	Administrator	not available
	Modbus – Self Address	--	Administrator	not available
Advanced Settings / Clear Data	Alarm History	--	Administrator	Browser
	Data History	--	Administrator	not available
	Event Log	--	Administrator	not available
	Battery Test Log	--	Administrator	not available

Radius Server Settings

Enter the following radius server settings as applicable.

1. Enable Radius: Check this box to enable the radius server authentication feature. The M830B will check the radius server for password authentication.
2. NAS-Identifier: Check this box to use the Site Name as the NAS-Identifier. If checked, the “Site Name” programmed into the M830B is sent as the NAS-identifier in the authorization request.
3. Primary Server: The IP address of the primary radius server.
4. Primary Port: The port number on the primary radius server used to access the radius interface (default 1812).
5. Secondary Server: The IP address of the secondary radius server (optional). The M830B will authenticate using the secondary server if the primary server in unreachable.
6. Secondary Port: The port number on the secondary radius server used to access the radius interface (default 1812) (optional). The M830B will authenticate using the secondary server if the primary server in unreachable.
7. Secret Key: A secret key phrase (1 to 31 alphanumeric characters; all ASCII characters valid). This secrete key phrase is sent to the radius server with the authorization request, so the server knows it is a valid request.
8. Confirm: Re-enter the Secret Key to confirm it was typed correctly. The “Secrete Key” entry and “Confirm” entry must match.
9. Click the "Save" button to save the radius server settings.

SNMP Tab

Configures SNMP V2 and V3 parameters.

Accepted Trap Level Parameter Description

- **Accepted Trap Level:** Sets SNMP V2 and V3 trap level.

Adding an Entry

1. Enter the parameters in the parameter fields.
2. Click the "Add" button to add the entry.

NOTE! *To reset the form (i.e. to start over) and erase all information entered, click on the “Reset” button.*

Modifying an Existing Entry

1. Select the Entry to be modified from those listed at the top of the screen.
2. Modify the parameters.
3. Click the "Modify" button to modify the parameters for this Entry.

NOTE! *To reset the form (i.e., to start over) and erase all information entered, click on the “Reset” button.*

Deleting an Entry

1. Select the Entry to be deleted from those listed at the top of the screen.
2. Click the "Delete" button to delete this Entry.

NMSV2 Configuration Description (Network Management System)

Configures SNMP Version 1 and 2 parameters.

You can configure the following parameters.

- **NMS IP:** The permitted IP to access the NMSV2 agent. Check the IPV6 box when entering an IPV6 address.
- **Public Community:** The public community string.
- **Private Community:** The private community string.
- **Trap Enabled:** Trap function enabled or disabled.

NOTE! *Only listed IP Addresses will have SNMP access.*

NOTE! *To reset the form (i.e., to start over) and erase all information entered, click on the "Reset" button.*

Figure 5.62 SNMP - NMSV2 Configuration (cont'd on next page)

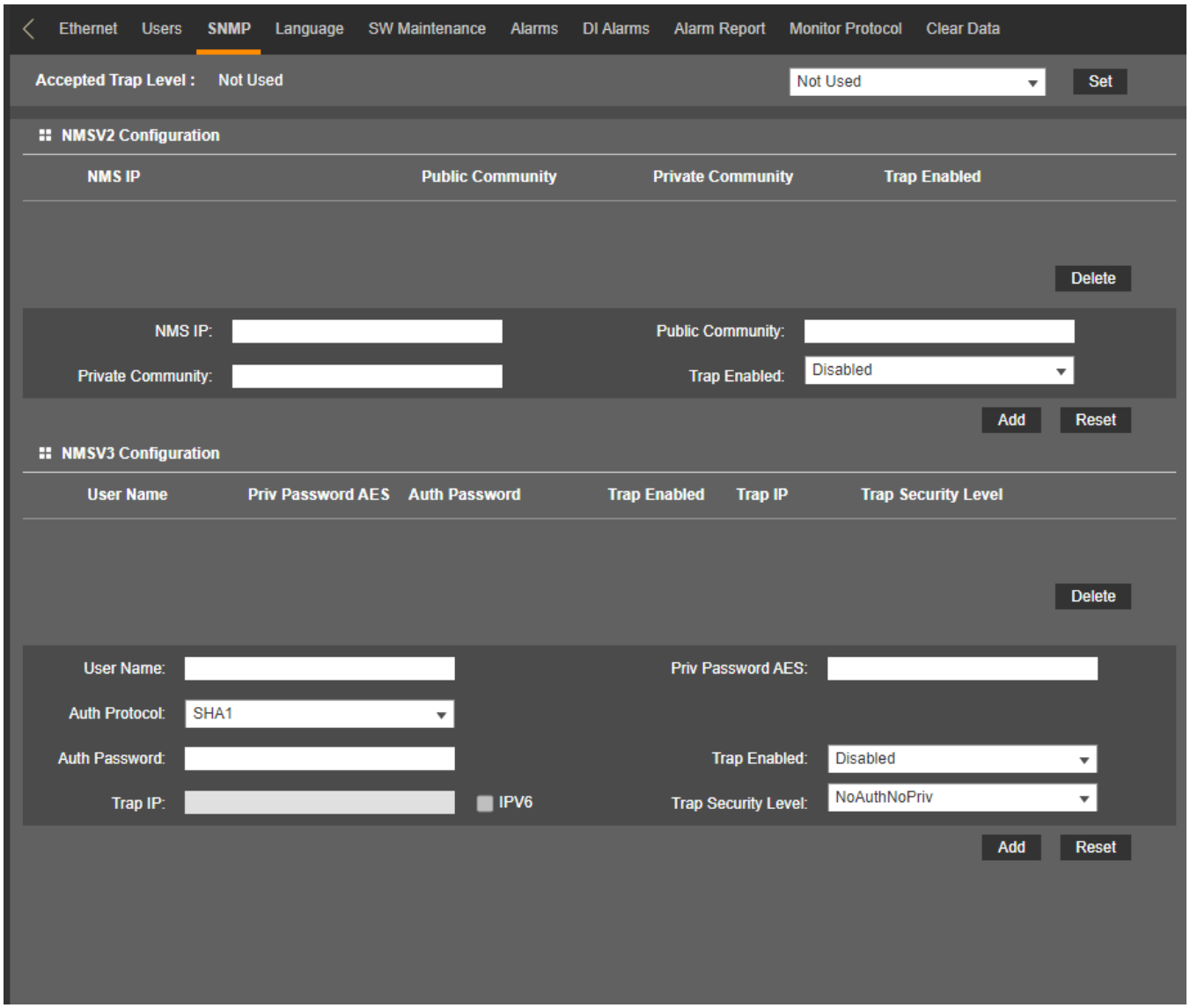
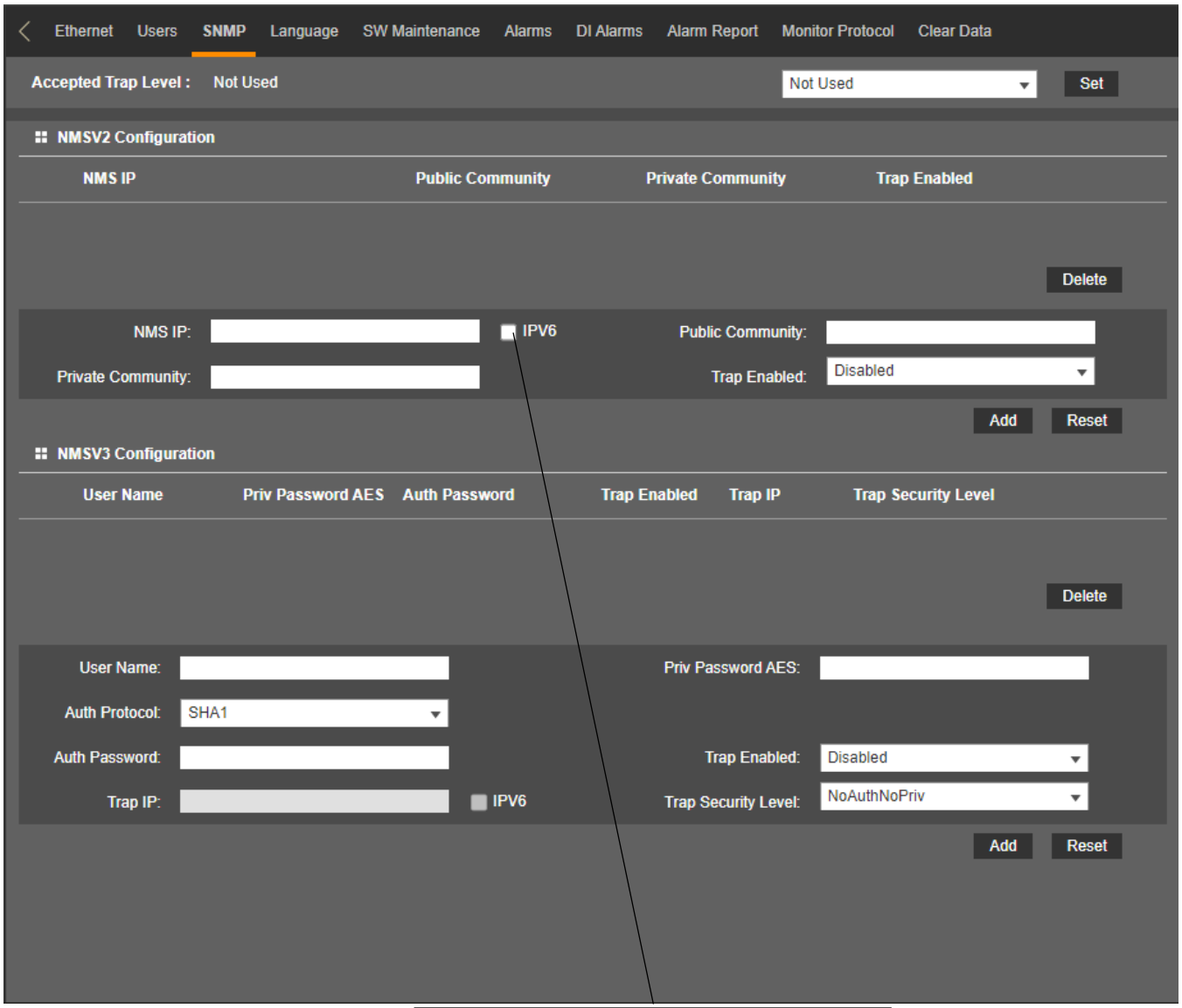


Figure 5.62 SNMP - NMSV2 Configuration (cont'd from previous page)



IPV6 checkbox appears once you start typing an NMS IP. Check the IPV6 box when entering an IPV6 address.

NMSV3 Configuration Description (Network Management System)

Configures SNMP Version 3 parameters.

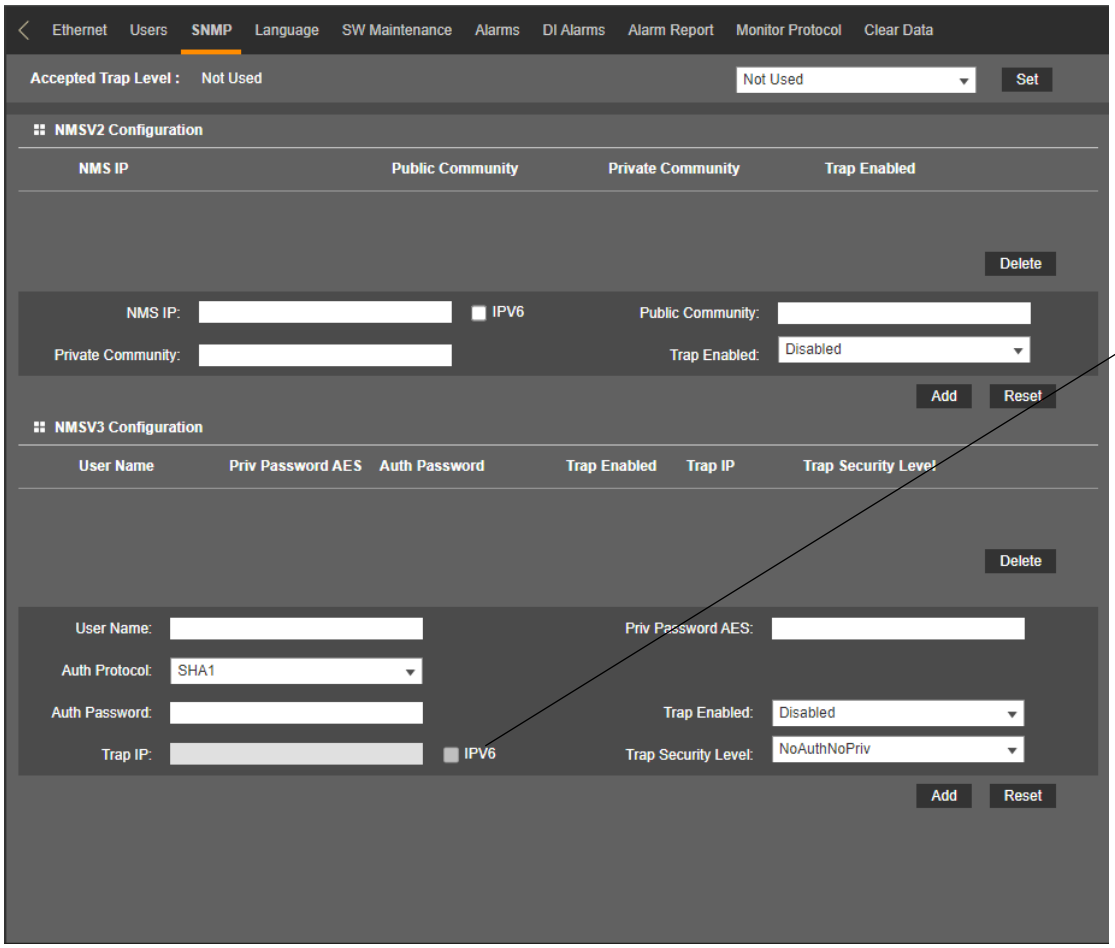
You can configure the following parameters.

- **Use Name:** The permitted User to access the NMSV3 agent.
- **Priv Password AES:** The privacy AES password used to encrypt the data.
- **Auth Protocol:** Selects the authorization protocol: SHA1 or MD5.
- **Auth Password:** The authorization password used to encrypt the digital signature.
- **Trap Enabled:** Trap function enabled or disabled.
- **Trap IP:** The IP to which the trap is sent. Check the IPV6 box when entering an IPV6 trap address.
- **Trap Security Level:** The SNMP v3 data security level (NoAuthNoPriv, AuthNoPriv, or AuthPriv).
  - **NoAuthNoPriv:** SNMP messages are sent without authentication and without privacy.
  - **AuthNoPriv:** SNMP messages are sent with authentication but without privacy.
  - **AuthPriv:** SNMP messages are sent with authentication and with privacy.

NOTE! *For SNMP v3, the security level for Get/Set/Walk operations is set to "AuthPriv" and cannot be adjusted.*

NOTE! *Controller must be reset after configuration of initial SNMP v3 User (Advanced Settings Menu / SW Maintenance Tab / Restore Factory Defaults / Reboot Controller).*

Figure 5.63 SNMP - NMSV3 Configuration



Language Tab

The local display and Web Interface always has an English language option. Multiple local languages are also supported. One local language option is displayed at a time with the English language option. To select another local language option to display, use the Web Interface Language Tab (see Figure 5.64).

You can select from the following local languages: Spanish and French. Once you select a new local language, the controller is automatically rebooted to make the selected local language valid.

See Figure 5.65 to change the language the local display and Web Interface uses.

Figure 5.64 Language Tab

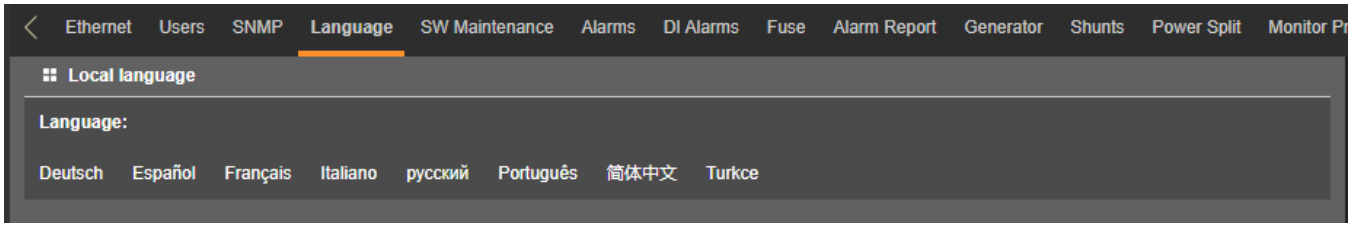
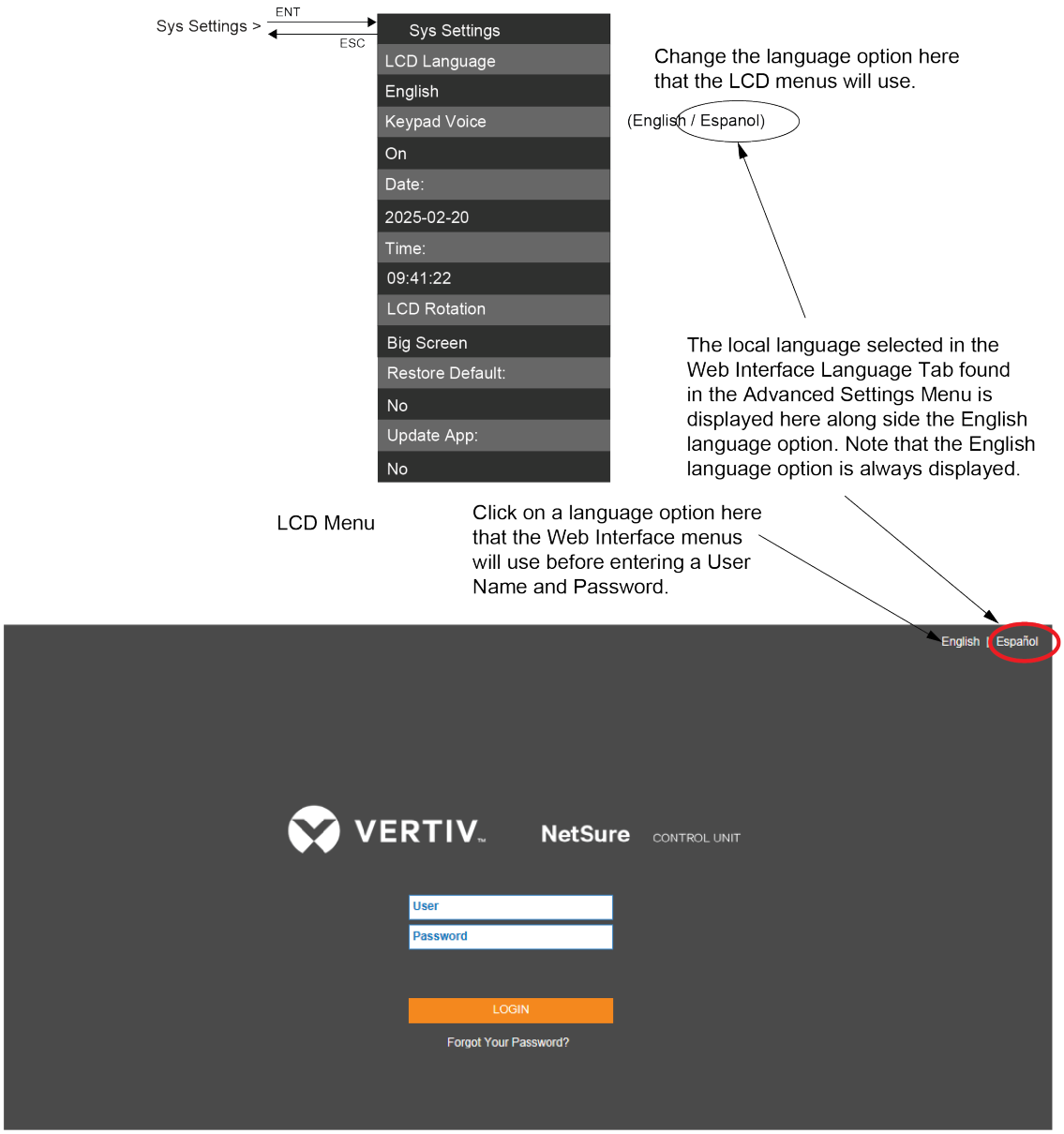


Figure 5.65 Selecting the Local Language for the Local Display and Web Interface Menus

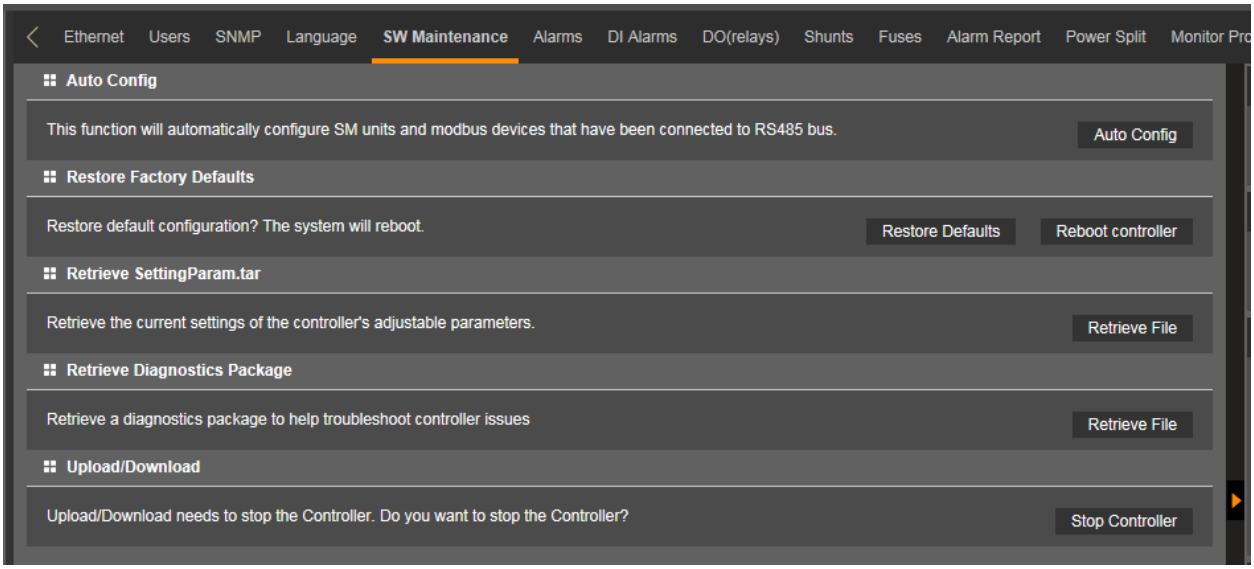


Web Interface Login Screen

SW Maintenance Tab

Allows you to perform software maintenance procedures.

Figure 5.66 SW Maintenance Tab

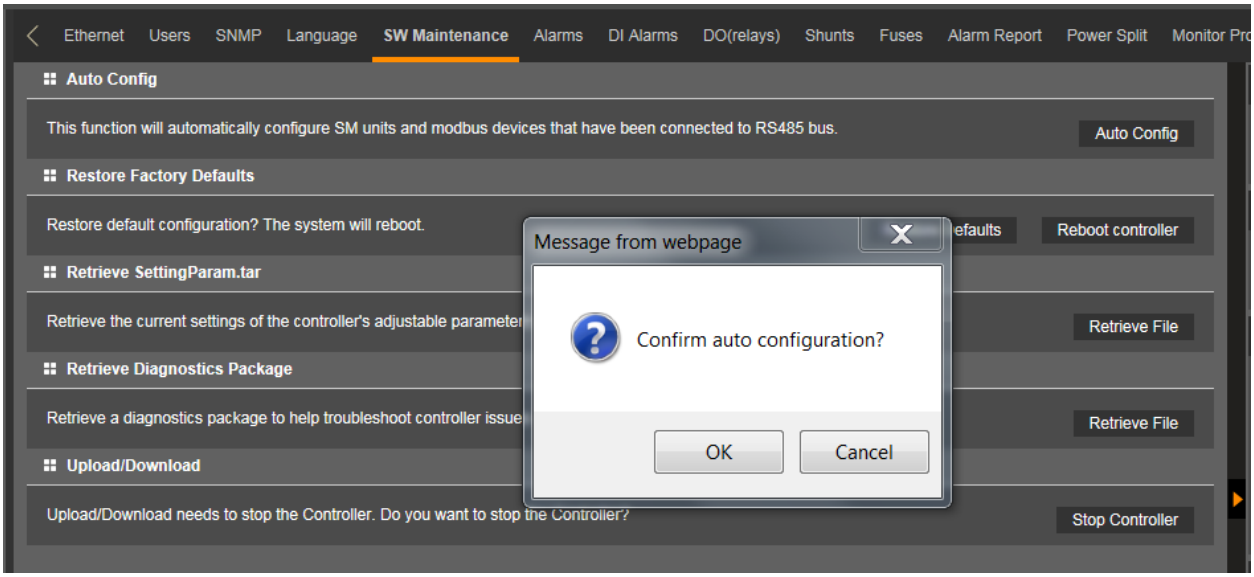


Auto Config Procedure

The auto configuration feature scans the system for intelligent equipment connected to controller via the RS485 BUS (such as Supervisory Modules and Modbus Devices) and configures these into the controller automatically.

To start the auto configuration process, click on the "Auto Config" button.

Figure 5.67 Auto Config



Restore Factory Default Configuration Procedure

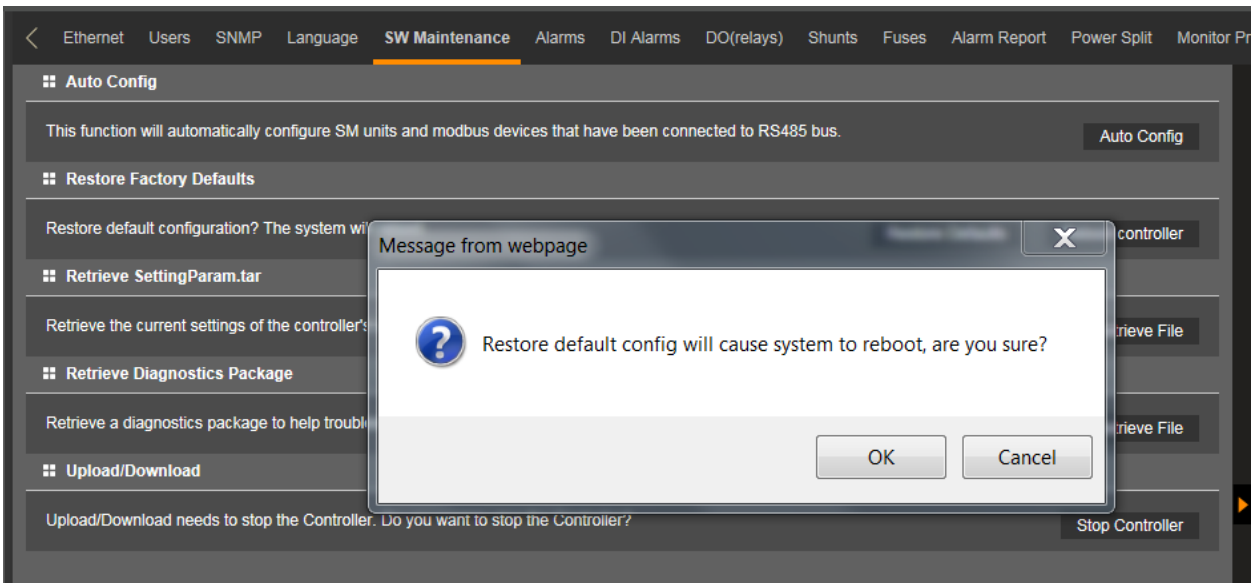
This procedure is used to restore all changes made to the NCU to factory defaults.

Procedure

ALERT! When this procedure is performed, the controller's existing configuration and parameter settings will be lost. The "SettingParam.tar" file is deleted. Before restoring the factory default configuration, if you have made changes to the NCU, save the "SettingParam.tar" file (see "Backing Up the NCU Configuration" on page 38).

1. Click on the "Restore Defaults" button.

Figure 5.68 Restore Factory Defaults



2. Click "OK" to confirm to overwrite the existing "SettingParam.tar" file in memory with the stored "SettingParam.tar" file.
3. The controller will automatically reboot. All settings WILL BE restored to the defaults of the stored "SettingParam.tar" file.

NOTE! *After rebooting, you must exit your browser and re-login to see any changes made.*

NOTE! *SOME SYSTEMS REQUIRE CHANGES TO THE NCU CONFIGURATION DURING FINAL TEST BEFORE BEING SHIPPED.* These systems are *supplied with a USB memory device that contains a "SettingParam.tar" file as shipped. If provided, the "SettingParam.tar" file has a seven-digit UIN (Unique Identification Number) preceding the "SettingParam.tar" filename. The UIN identifies a "SettingParam.tar" file for use with a specific system. This file can be used to restore your system to the configuration as shipped. Refer to "Reloading a Backed-Up NCU Configuration" on page 38 to reload the supplied "SettingParam.tar" file.*

TO RESTORE THESE SYSTEMS TO THE NCU CONFIGURATION AS SHIPPED, RESTORE DEFAULTS AS DESCRIBED ABOVE; THEN RELOAD THE SUPPLIED "SETTINGPARAM.TAR" FILE.

Retrieve "SettingParam.tar" File Procedure

See also “Backing Up the NCU Configuration” on page 38.

A file named “SettingParam.tar” is automatically created/appended by the controller whenever a User (or the factory at the time of shipment) makes changes to the NCU via the local display or Web Interface. This file can be saved to your computer so you can restore any custom settings you may have made.

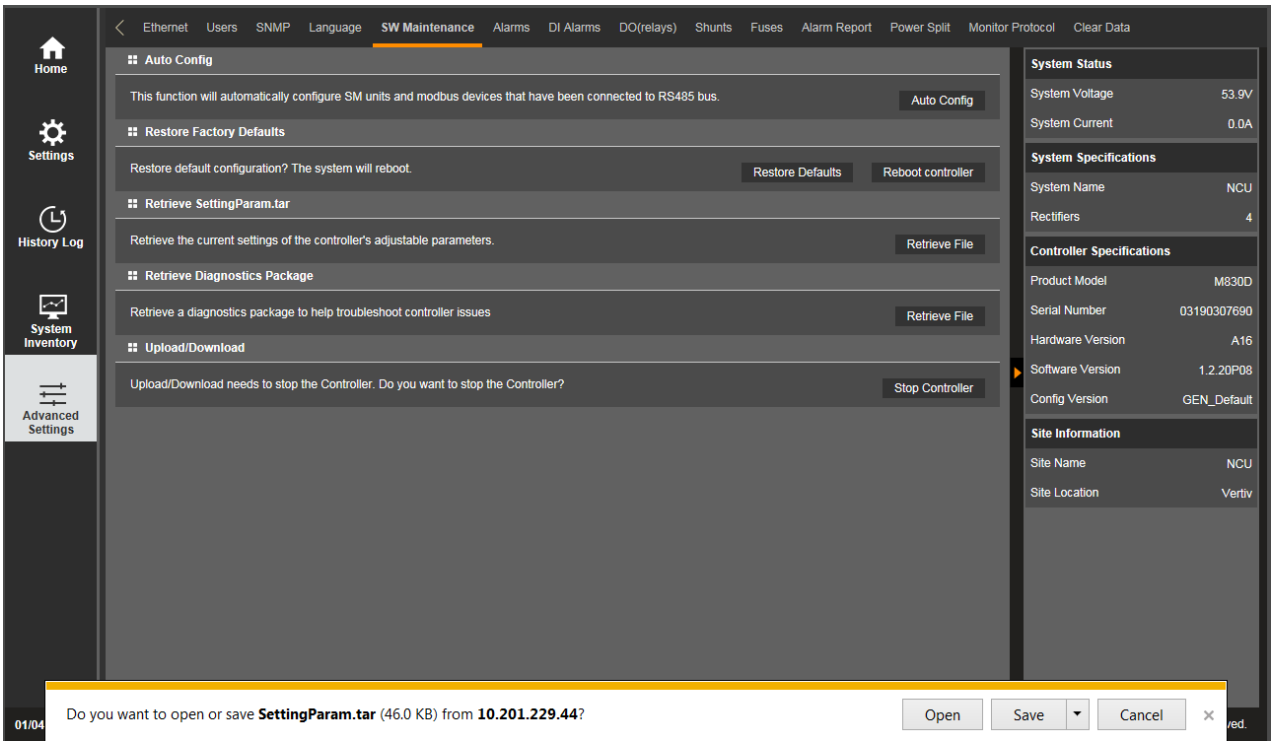
NOTE! *It is strongly recommended that you save a copy of the “SettingParam.tar” file whenever you customize any parameter settings. Then, if you ever replace the controller or perform a "Restore Defaults" procedure, you can restore your customized settings by downloading the previously saved “SettingParam.tar” file back into the controller.*

Prior to changing settings, ensure the current "SettingParam.tar" files are backed up. After making changes, create new backup files.

Procedure

1. Click on the “Retrieve File” button to save the file named "SettingParam.tar" to your computer. Select where you want the file to be copied to on your computer.
2. To aid in file management, you may change the name of the “SettingParam.tar” file to differentiate it from other "SettingParam.tar" files saved. The new name can use alpha and numeric characters preceding the original “SettingParam.tar” name (the end of the new file name must always be “SettingParam.tar”; for example, an acceptable filename would be “seville4SettingParam.tar”).

Figure 5.69 Retrieve "SettingParam.tar" File



Upload/Download Procedure

See also “Backing Up the NCU Configuration” on page 38, “Reloading a Backed-Up NCU Configuration” on page 38, and “Upgrading the NCU Using an Application ("All") Package” on page 39.

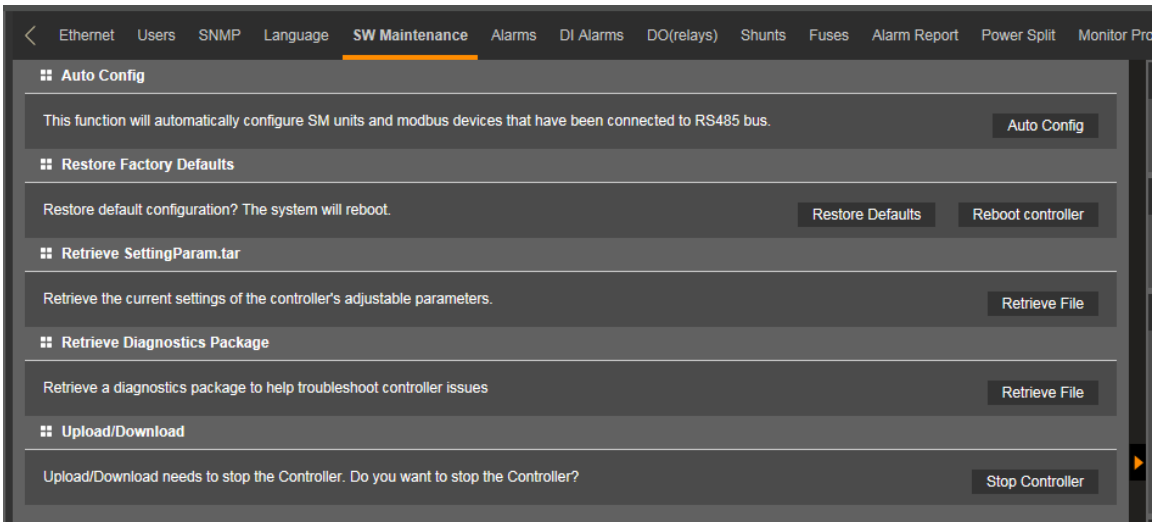
You can download (from your computer into the controller) a configuration package, application ("All") package, language package (filename of each has a tar or tar.gz extension), or “SettingParam.tar file”.

You can upload (from the controller to your computer) a configuration package or language package.

Procedure

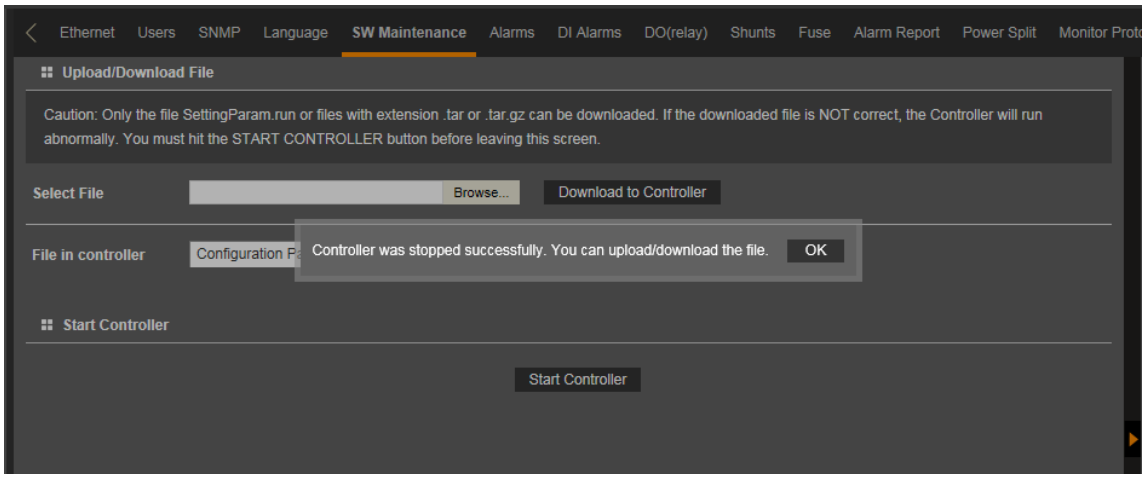
1. To upload or download a file, you need to shut down the controller first. When you select the SW Maintenance Tab, click on the “Stop Controller” button.

Figure 5.70 Upload/Download - Stop Controller



2. The following window opens.

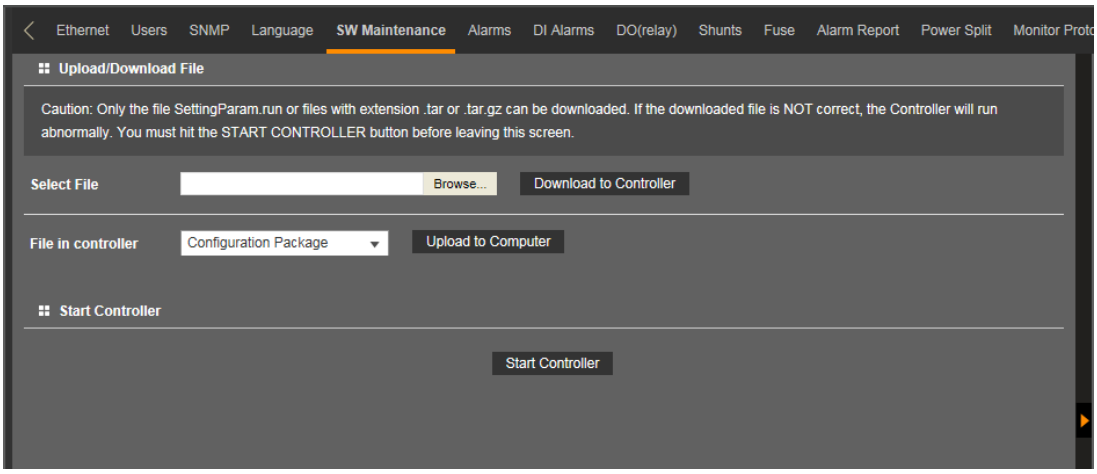
Figure 5.71 Upload/Download --Controller Stopped



3. Click "OK".

4. The following window opens.

Figure 5.72 Upload/Download File



ALERT! Never navigate from this Web page without first clicking on "Start Controller". If you do, you will not have Web access. A manual system reset is required to restore Web access.

5. To download (from your computer into the controller) a configuration package, application ("All") package, language package, or a "SettingParam.tar" file; click the "Browse..." button and navigate to the folder where the file to download is located. Select the file to be downloaded and then click the "Download to Controller" button. Click "Start Controller" to restart the controller with the downloaded file installed.

   To **upload** a file to your computer, select "Configuration Package" or "Language Package" from the "File in Controller" drop-down list box, and click on the "Upload to Computer" button to save the file to your computer. Select where you want the file to be copied to on your computer. Click "Start Controller" to restart the Controller.

NOTE! *A Configuration Package is a package of files containing all the default parameter settings and any User changes to alarm severity levels, relay assignments, signal names and site information. Note that the Configuration Package is part of the "SettingParam.tar" file and does not typically need to be downloaded separately.*

NOTE! *An Application "All" package file has both the application (software) and configuration package and is usually supplied for an application upgrade.*

NOTE! *A Language Package is a package of files containing all the default names of the parameters in two languages. Typically these would be in English and Spanish. The language package cannot be changed by the User. Consult Vertiv if a different language package is required.*

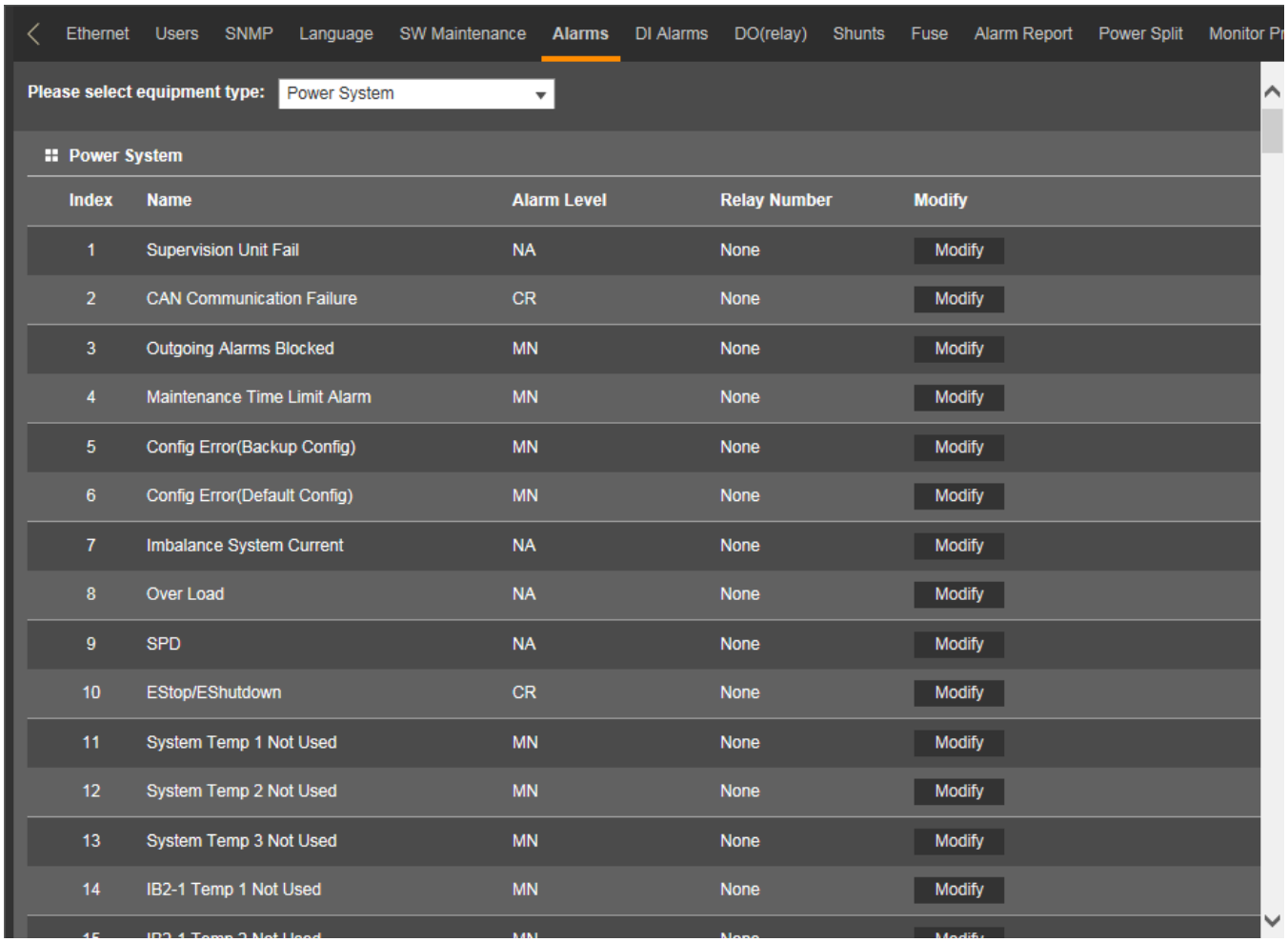
NOTE! *A file named "SettingParam.tar" is automatically created/appended by the Controller whenever a User (or the factory at the time of shipment) makes changes to the NCU via the local display or Web Interface. This file also contains the Configuration Package described above.*

Alarms Tab

NOTE! *This list is dynamic and will only show you the equipment that you have in your system.*

- Allows you to define the alarm level for each alarm.
- Allows you to map alarms to the alarm relays.

Figure 5.73 Alarms Tab

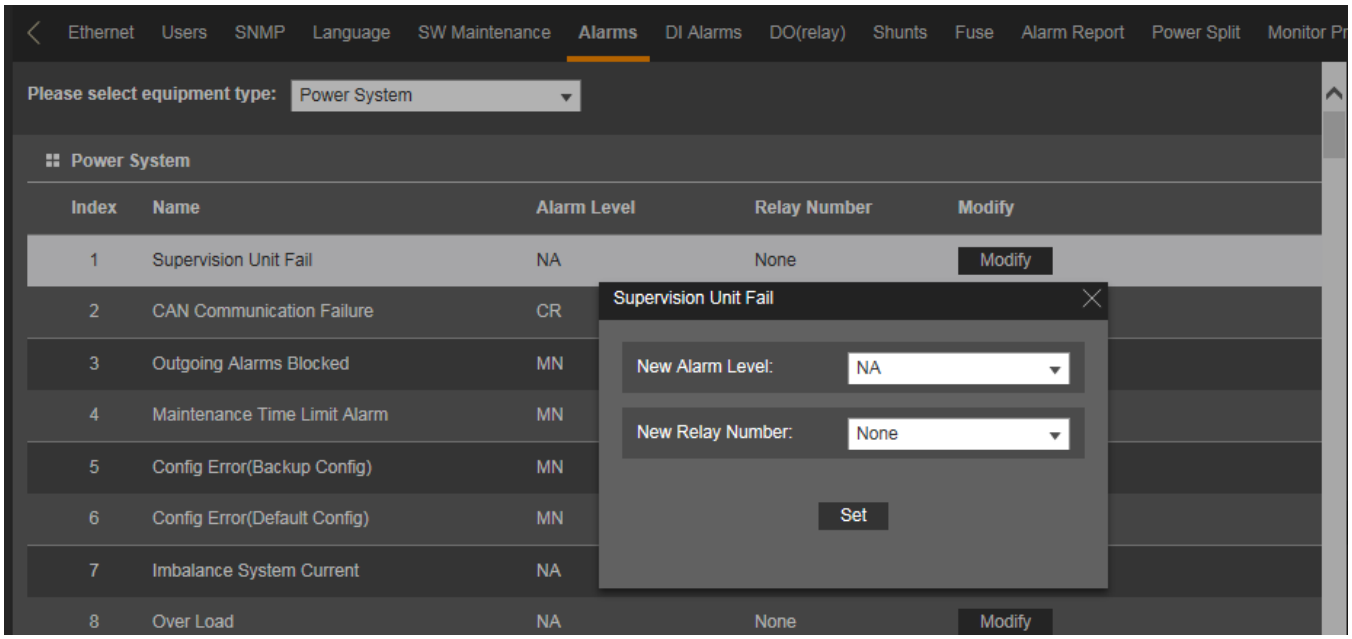


Procedure

1. Select the equipment type to display the alarms associated to it. Also displayed is the alarm level and alarm relay number assigned to this alarm.
2. To modify the alarm level and/or alarm relay number, click on the “Modify” button for that alarm signal.
3. The following window opens. Select the New Alarm Level and/or New Relay Number and click on “Set”.

   “None” means there is no related relay number.

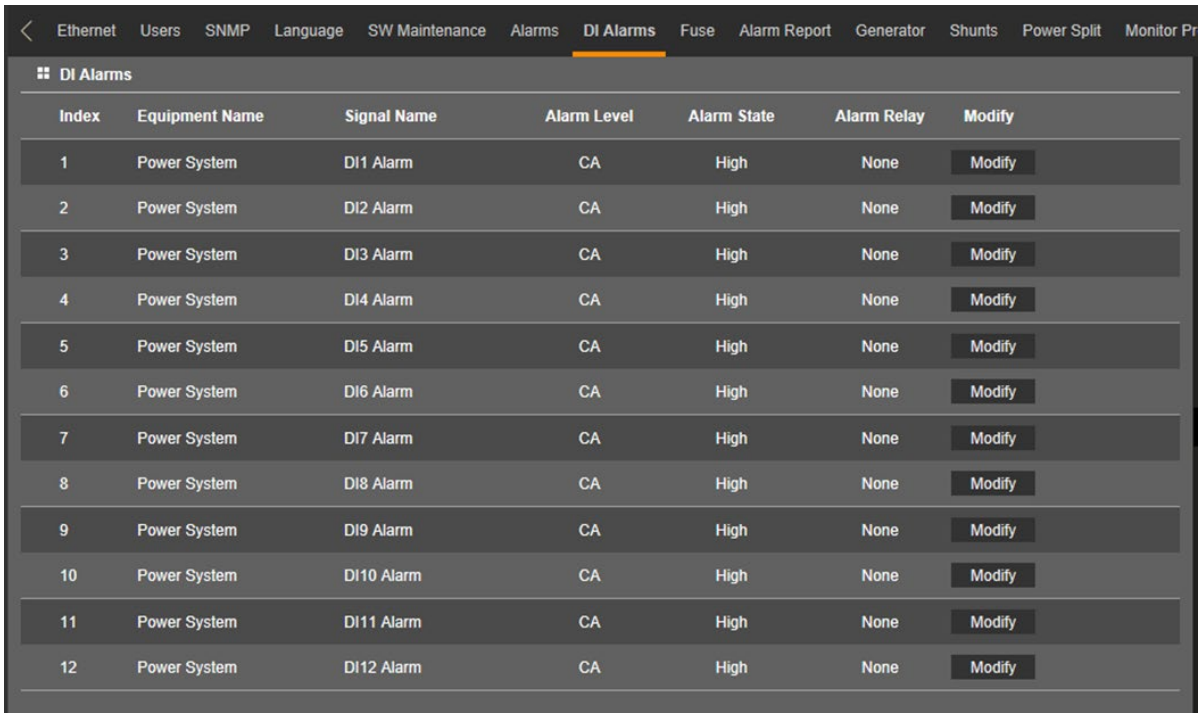
Figure 5.74 Setting Alarm Level / Relay Number



DI Alarms Tab

- Allows you to change the digital input alarm signal full name (name displayed in the Web Interface menus).
- Allows you to change the digital input alarm signal abbreviation name (name displayed in the local display menus).
- Allows you to define the alarm level for each digital input alarm.
- Allows you to map the digital input alarms to the alarm relays.
- Allows you to set the alarm state for the digital inputs (high or low).

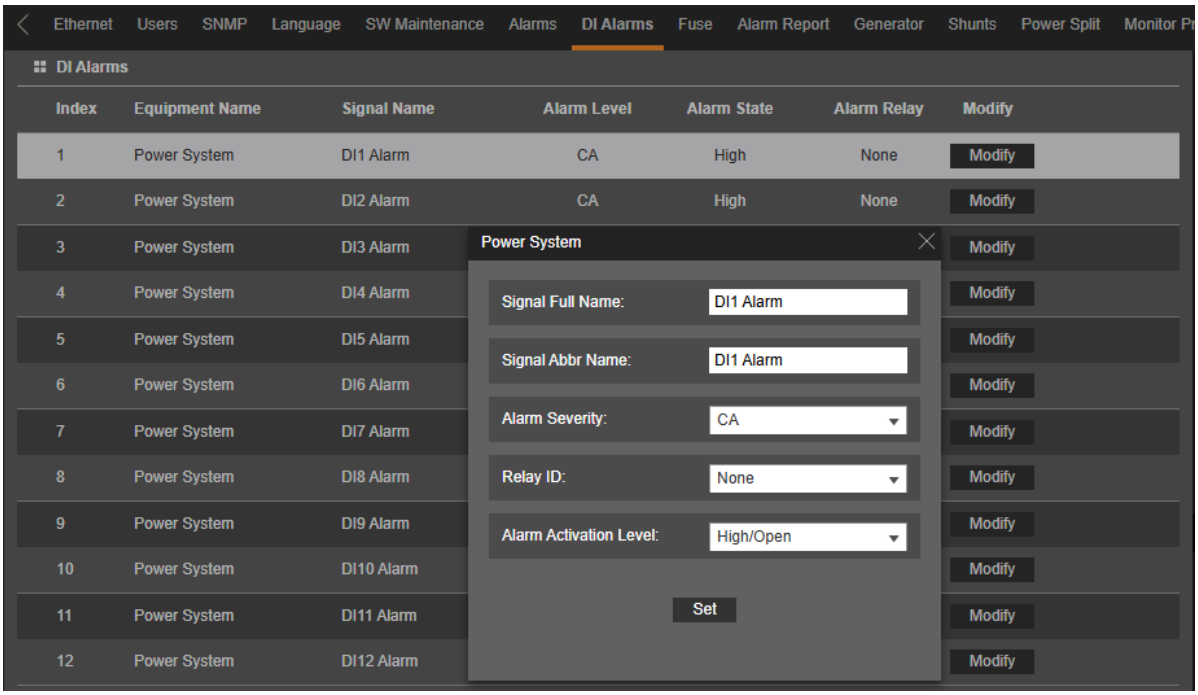
Figure 5.75 DI Alarm Tab



Procedure

1. To modify the digital input alarm parameters, click on the “Modify” button for that digital input alarm signal.
2. The following window opens.

Figure 5.76 Setting DI Alarm



3. Change the following parameters as desired and click on “Set”.
    - **Signal Full Name:** Name displayed in the Web Interface menus.
    - **Signal Abbr Name:** Name displayed in the local display menus.

New Alarm Level: Alarm level for this digital input alarm.

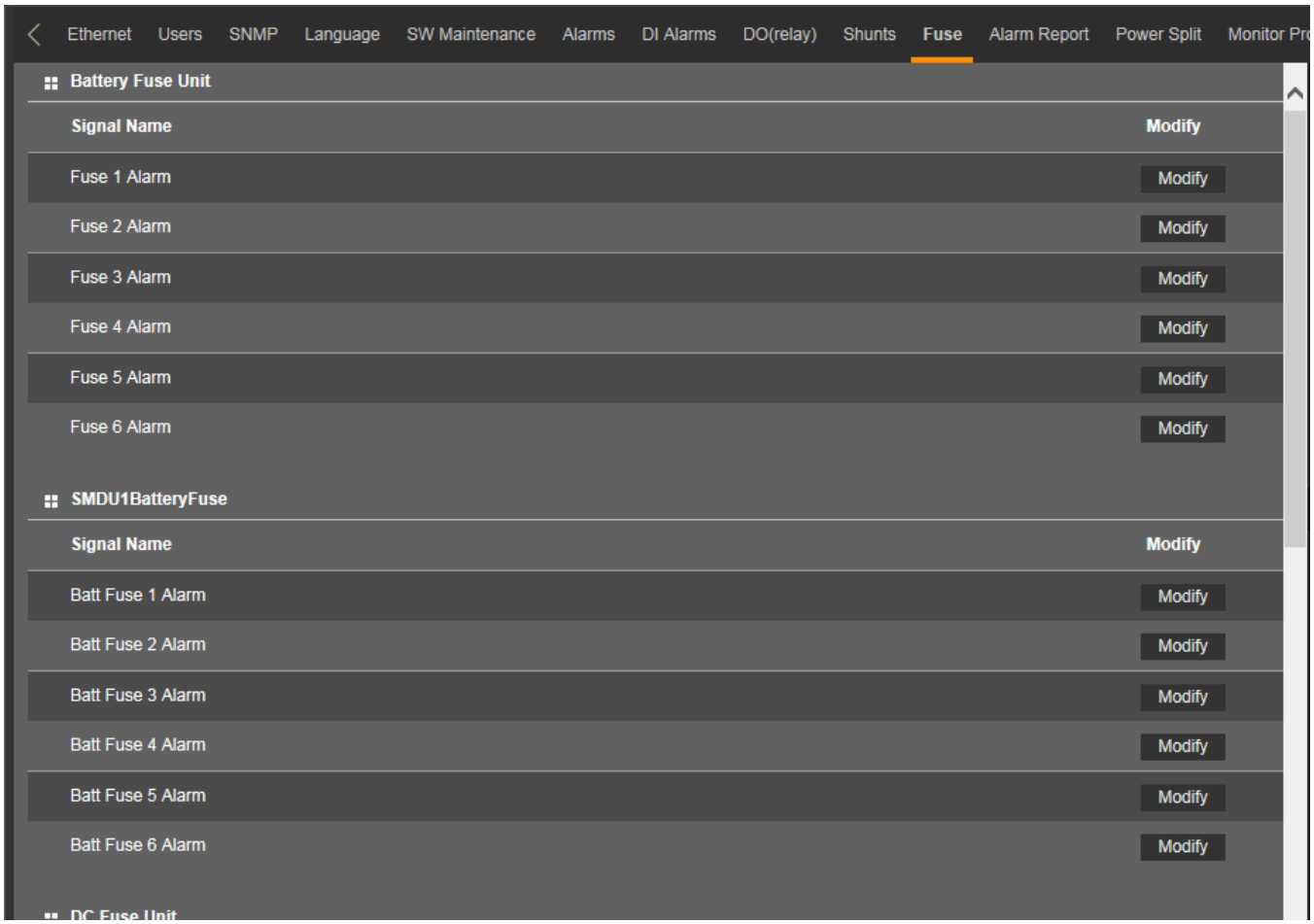
New Relay Number: Select a relay number to map to this digital input alarm.
“None” means there is no related relay number.

- **New Alarm State:** Select high or low to set the alarm state for the digital input.

Fuses Tab

- Allows you to change the fuse full name (name displayed in the Web Interface menus).
- Allows you to change the fuse abbreviation name (name displayed in the local display menus).

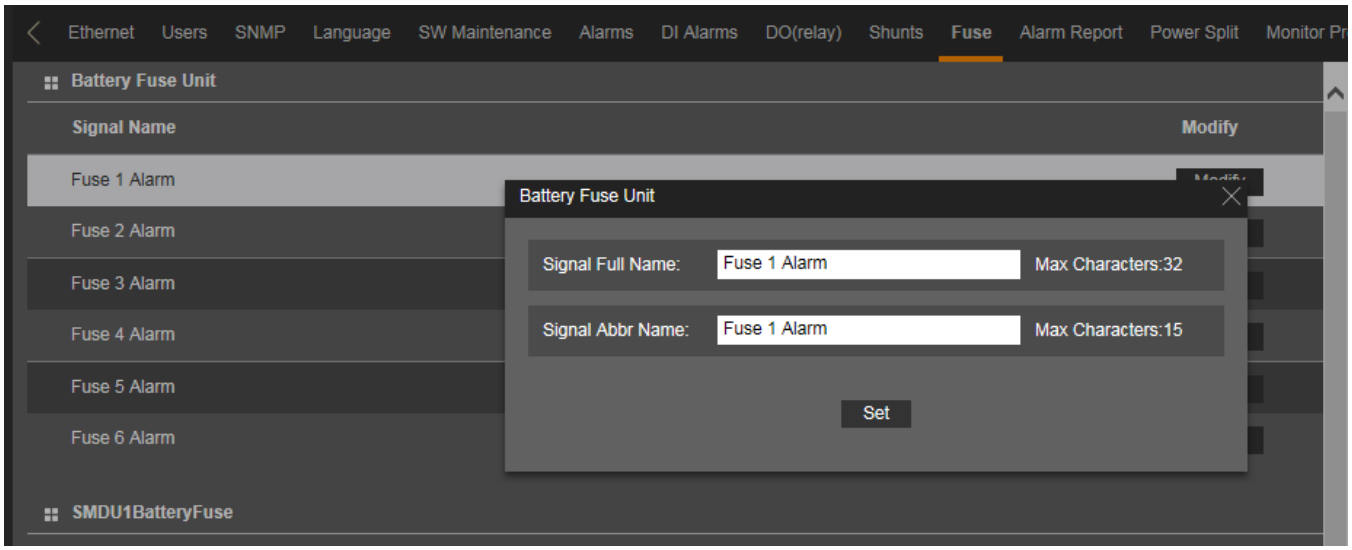
Figure 5.77 Fuse Tab



Procedure

1. To change the fuse name, click on the “Modify” button for that fuse.
2. The following window opens.

Figure 5.78 Changing Fuse Names



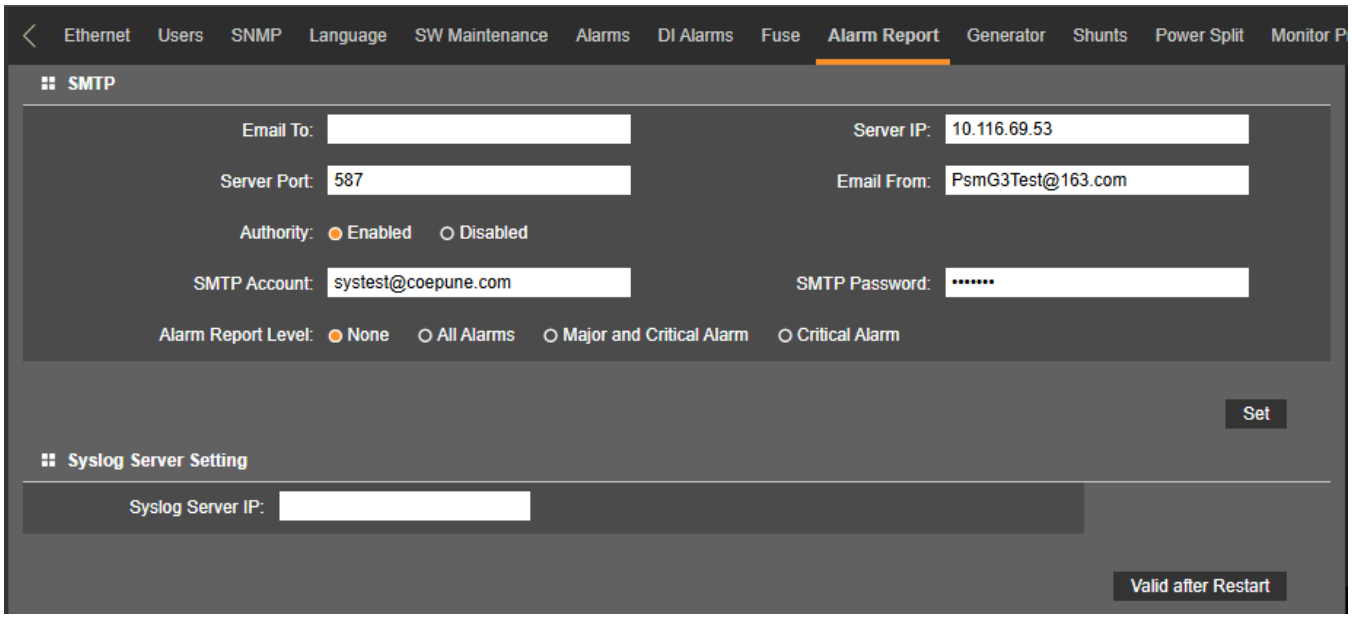
3. Change the following parameters as desired and click on “Set”.
   - **Signal Full Name:** Name displayed in the Web Interface menus.
   - **Signal Abbr Name:** Name displayed in the local display menus.

Alarm Report Tab

- In the SMTP section, you can set the Alarm Report Feature.
- In the SMS section, you can set cell phone number for receiving alarm reports and the alarm report level.

NOTE! *A GSM modem must be connected to the USB port of the NCU for SMS functionality.*

Figure 5.79 Alarm Report Tab



Alarm Report Feature

Set the following parameters.

- **Email To:** Valid email recipient to receive alarm reports.
- **Server IP:** IPV4 Server address. Obtain from your IT department.
- **Server Port**: Server port. Obtain from your IT department.
- **Email From:** The NCU or Site email address. Will be displayed in the email from field of the received email.
- **Authority:** Select Enabled (if email authentication is required) or Disabled as required (see your IT department). When enabled, set the following parameters.
  - **SMTP Account:** SMTP account number. Obtain from your IT department.
  - **SMTP Password:** SMTP password. Obtain from your IT department.
- **Alarm Report Level:** Select the level of alarm reports you want to receive.

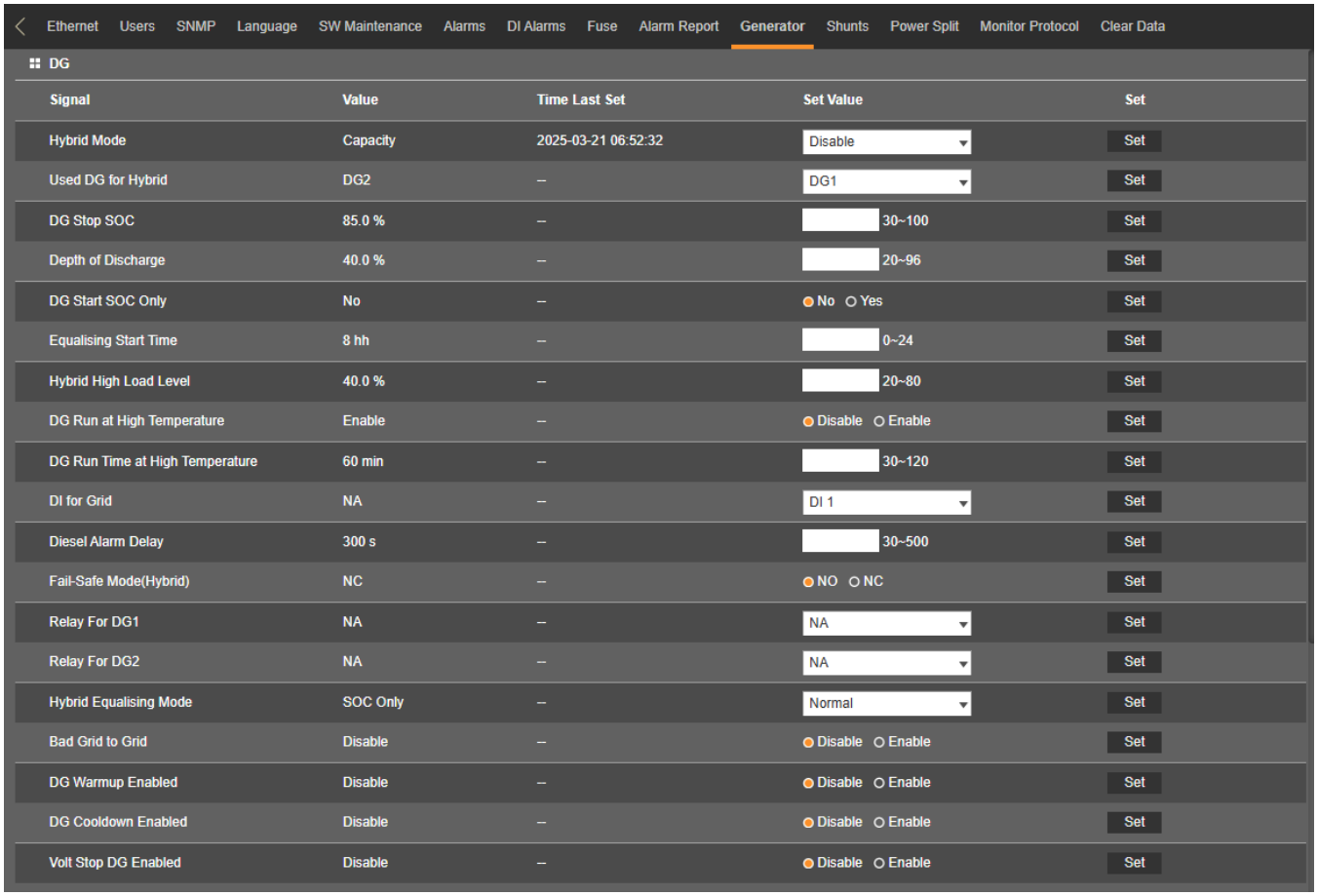
Syslog Server Setting

- **Syslog Server IP:** Sets the server IP address for receiving system log.

Generator Tab

If you have a special configuration with this feature, you can set the various generator related parameters.

Figure 5.80 Generator Tab



Signal	Value	Time Last Set	Set Value	Set
Hybrid Mode	Capacity	2025-03-21 06:52:32	Disable	Set
Used DG for Hybrid	DG2	--	DG1	Set
DG Stop SOC	85.0 %	--	30~100	Set
Depth of Discharge	40.0 %	--	20~96	Set
DG Start SOC Only	No	--	No Yes	Set
Equalising Start Time	8 hh	--	0~24	Set
Hybrid High Load Level	40.0 %	--	20~80	Set
DG Run at High Temperature	Enable	--	Disable Enable	Set
DG Run Time at High Temperature	60 min	--	30~120	Set
DI for Grid	NA	--	DI 1	Set
Diesel Alarm Delay	300 s	--	30~500	Set
Fail-Safe Mode(Hybrid)	NC	--	NO NC	Set
Relay For DG1	NA	--	NA	Set
Relay For DG2	NA	--	NA	Set
Hybrid Equalising Mode	SOC Only	--	Normal	Set
Bad Grid to Grid	Disable	--	Disable Enable	Set
DG Warmup Enabled	Disable	--	Disable Enable	Set
DG Cooldown Enabled	Disable	--	Disable Enable	Set
Volt Stop DG Enabled	Disable	--	Disable Enable	Set

Changing Programmable Parameters in the Generator Tab

To change a programmable parameter, select or enter a new value for the parameter then click on “Set” to change the value.

Generator Tab Programmable Parameter Descriptions

- **Hybrid Mode:** Refer to “Hybrid Control Function (Supporting Generator, Solar and Wind Energy Input, and Optimization”) on page 9 for more information on the Hybrid Mode.

  Disable, Capacity, or Fixed Daily: Sets the Hybrid Mode or disables the function.

- **Used DG for Hybrid:** Chooses DG for the hybrid function.
- **DG Stop SOC:** Sets the SOC when DG stop.
- **Depth of Discharge:** Sets the Depth of Discharge (DOD).
- **DG Start SOC Only:** Chooses whether DG should start SOC only.
- **Equalizing Start Time:** Sets the time of day for equalize start.
- **Discharge Start Time:** Sets the start time for discharging, this is for cyclic mode.

- **Discharge Duration:** Sets the time for discharge duration, this is for cyclic mode.
- **Hybrid High Load Level:** Sets the hybrid high load point.
- **DG Run at High Temperature:** Enables or disables diesel generator operation in the high temperature condition.
- **DG Run Time at High Temperature:** Sets the diesel generator run time in the high temperature condition.
- **DI for Grid:** Sets the digital input for grid detection. If this digital input is activated, the DG will be stopped.
- **Diesel Alarm Delay:** Sets diesel alarm delay.
- **Fail Safe Mode (Hybrid):** Tells the controller the fail-safe mode of the relay contacts connected to start the generator(s) (either normally open or normally close).
- **Relay For DG1:** Sets relay for DG1.
- **Relay For DG2:** Sets relay for DG2.
- **Hybrid Equalizing Mode:** Selects hybrid equalizing mode: Normal, SOC Only or Volt Only.
- **Bad Grid to Grid:** Enables bad grid to grid function.

  Bad Grid Delay Time: Sets the bad grid delay time.

  Bad Grid Soc Threshold: Sets the Bad Grid Soc Threshold.
- **DG Warmup Enabled:** Enables or disables the DG Warmup function.
- **DG Cooldown Enabled:** Enables or disables the DG cooldown function.
- **Rect On Soc Threshold:** If battery SOC is below this threshold, then no DG warmup will be done.
- **Rect On Volt Threshold:** If voltage is below this threshold, then no DG warmup will be done.

  DG Noload Time: Sets the DG Noload time.
- **Volt Stop DG Enabled:** Enables or disables the stop DG by voltage function.

  Stop DG Voltage: Sets the voltage value to stop DG.

  DG Test Enabled: Enables DG test function. The NCU schedules the generator to run every x days. It can prove the generator works and recharge the generator's starter battery.

  DG Test Start Time: Sets the DG test start time.

  DG Schedule Test Period: Sets the time for DG Schedule test period.

  DG Test Run-Time: Sets the run-time for DG test.

  Delay of DG Test Operation: Sets the delay time for DG test operation.

  DG Only: Selects Whether it is DGOnly or DG+Grid..

  Clear DG Test Alarm: Selects whether to clear DG test alarm, the only option is Yes.
- **Hybrid Shift Enabled by Volt:** Enables or disables the hybrid shift by voltage function.

  DG Stop Point 1 Volt to Point 4 Volt: Sets the voltage value for DG stop point 1 to point 4.

DG Stop Point 1 Start Time: Sets the start time for DG stop point 1.

DG Stop Point 1 Stop Time: Sets the stop time for DG stop point 1.

- **Hybrid Shift Enabled by SOC:** Enables or disables the hybrid shift by SOC function.

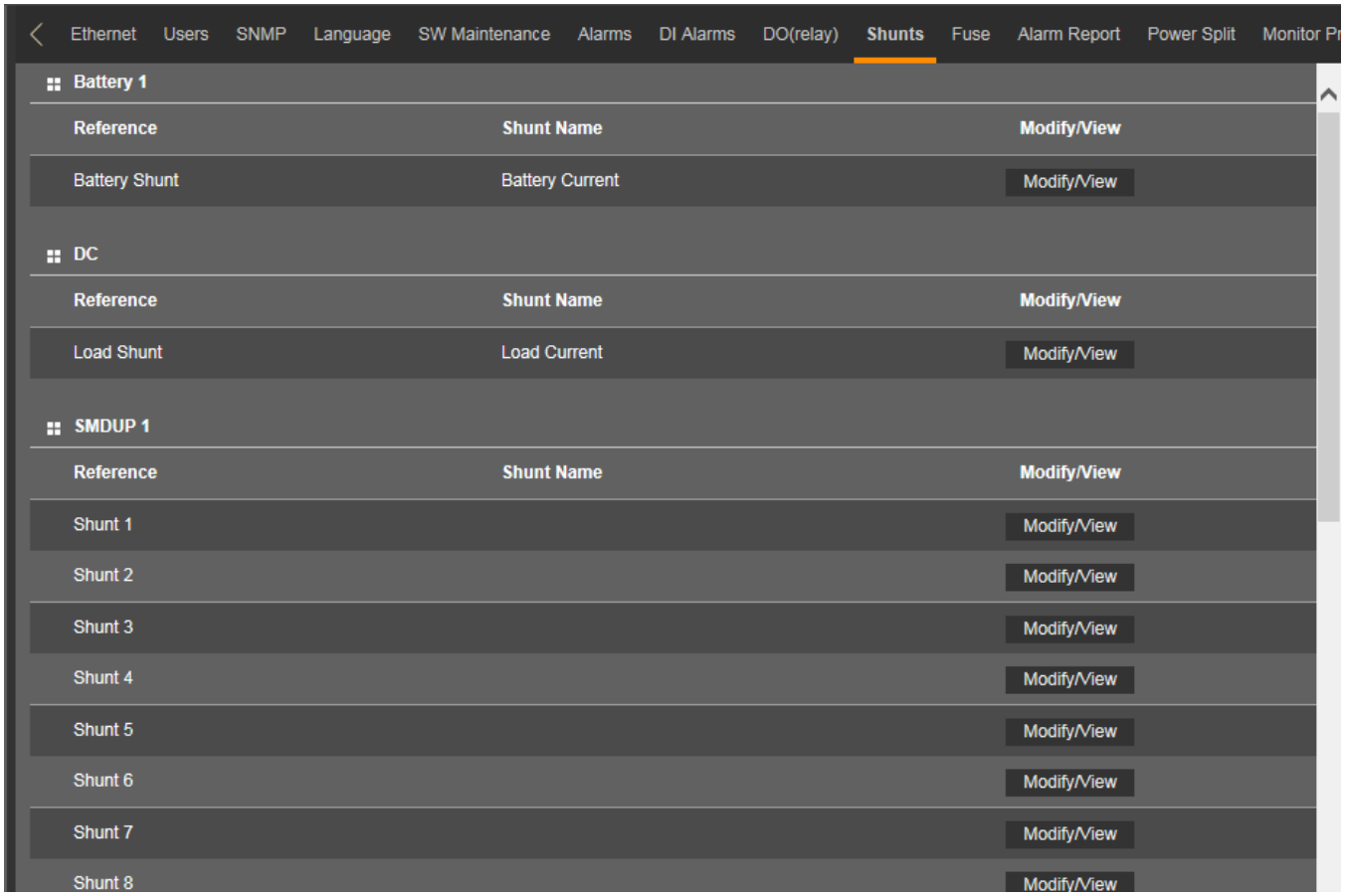
  DG Stop Point 1 SOC to Point 4 SOC: Sets the SOC value for DG stop point 1 to point 4.

- **DG Stop BMS 1 Start Time:** Sets the start time for DG stop BMS 1.
- **DG Stop BMS 1 Stop Time:** Sets the stop time for DG stop BMS 1.

Shunts Tab

- Allows you to change the shunts signal full name (name displayed in the Web Interface menus).
- Allows you to change the shunts signal abbreviation name (name displayed in the local display menus).
- Allows you to set the shunts parameters.

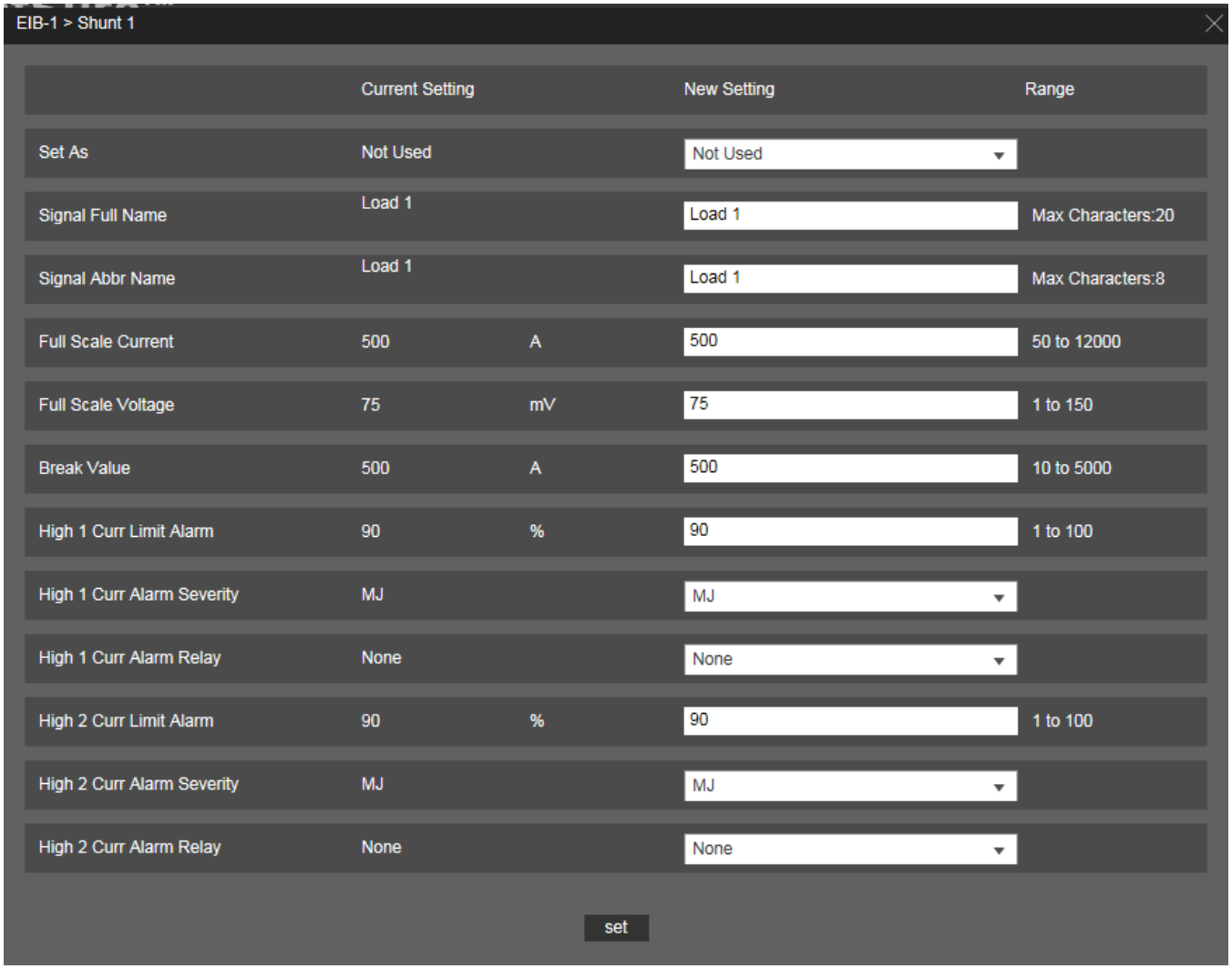
Figure 5.81 Shunts Tab



Procedure

1. To modify the shunt parameters, click on the “Modify/View” button for that shunt.
2. The following window opens.

Figure 5.82 Setting Shunt Parameters



3. Change the following parameters as desired and click on “Set”.

   For Battery Shunts:

   - Note that for battery shunts, the Set As option is not displayed.

   For DC Shunts:

   - **Set As (Yes, No):**
     - **Yes:** Indicates this shunt input is used.
     - **No:** Indicates this shunt input is not used.

   For EIB and SMDU Shunts:

- **Set As (Not Used, General, Load, Battery, Source):**

  - **Not Used:** Indicates this shunt input is not used.
  - **General:** Indicates the measurement of the shunt will be displayed and will not be added to Total DC Load or Total Battery Load.
  - **Load:** Indicates the measurement of the shunt will be displayed and added to the Total DC Load.
  - **Battery:** Indicates the measurement of the shunt will be displayed and added to the Total Battery Load and used with Battery Management.
  - **Source:** Indicates the measurement of the shunt will be displayed as source current and will be added to other sources.

For SMDU+ Shunts:

- **Set As (Enabled, Disabled):**

  - **Enabled:** Indicates this shunt input is used.
  - **Disabled:** Indicates this shunt input is not used.

- **Signal Full Name:** Name displayed in the Web Interface menus.
- **Signal Abbr Name:** Name displayed in the local display menus.
- **Full Scale Current:** Enter the value of the shunt's full current rating.
- **Full Scale Voltage:** Enter the value of the shunt's full-scale voltage (at rated current).
- **Break Value:** Enter the value desired as the reference for the high current alarms (typically the rating of the breakers or fuses fed by the shunt, if applicable).
- **High 1 Curr Limit Alarm:** Enter the percentage value of the "Break Value" for alarm.

High 1 Curr Alarm Severity: Alarm level for this alarm.

High 1 Curr Alarm Relay: Select a relay number to map to this alarm.
“None” means there is no related relay number.

- **High 2 Curr Limit Alarm:** Enter the percentage value of the "Break Value" for alarm.

High 2 Curr Alarm Severity: Alarm level for this alarm.

High 2 Curr Alarm Relay: Select a relay number to map to this alarm.
“None” means there is no related relay number.

Power Split Tab

You can configure the advanced power split parameters and associated digital input signals. Refer to “Power Split Feature” on page 8 and “Power Split Feature” on page 40 for more information on the Power Split feature.

Figure 5.83 Power Split Tab

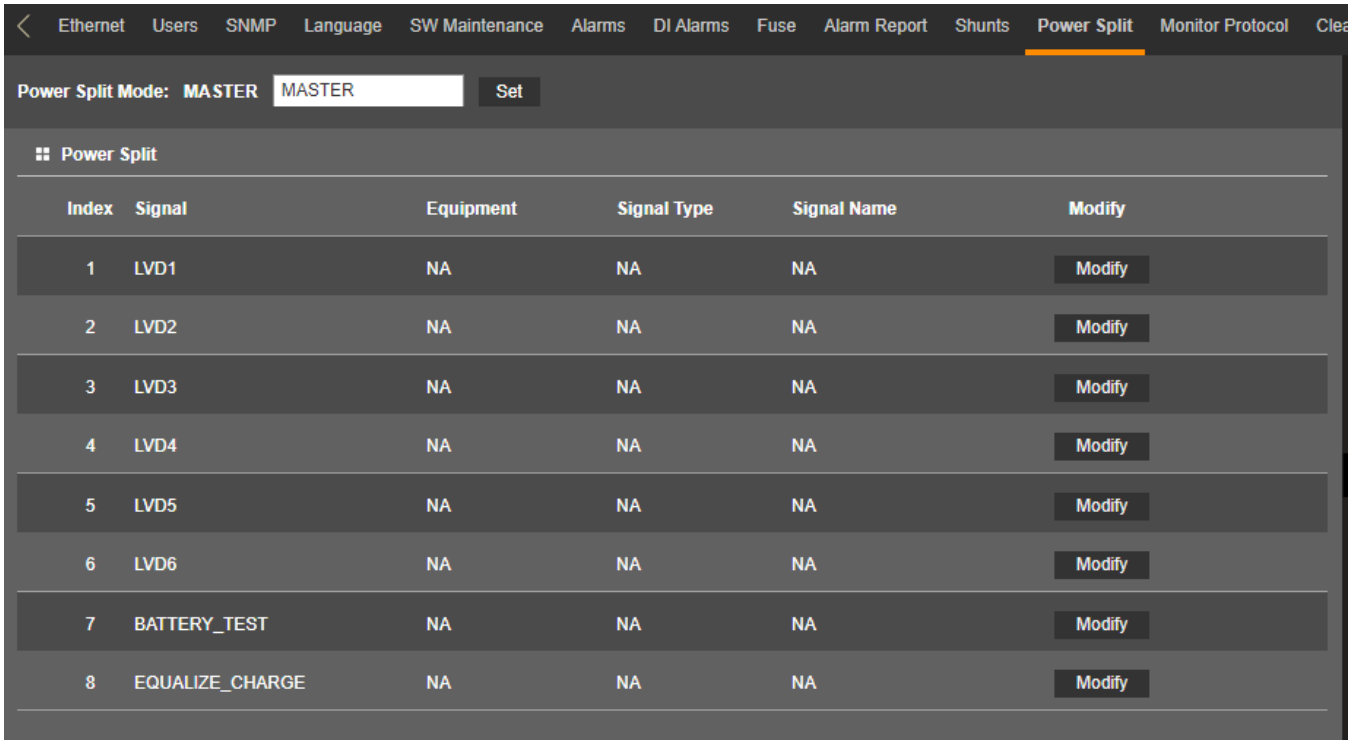
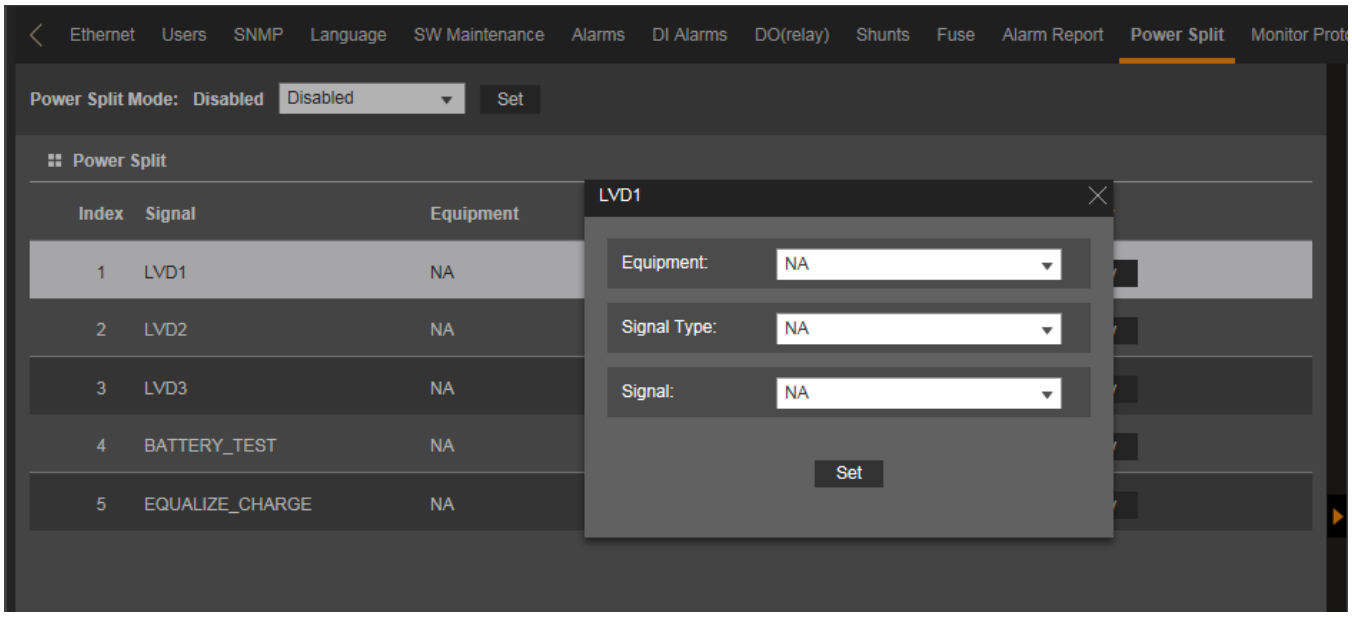


Figure 5.84 Power Split Settings



Procedure

1. Select the power split mode (enabled or disabled). Click on SET.

Low Voltage Disconnect Functions

If low voltage disconnect functions are to be used in a power split configuration, they must be implemented in the existing power system and signals from its control unit must be connected to the NCU.

1. For LVD1, LVD2, and/or LVD3; click on the “Modify” button and select the NCU digital inputs connected to the low voltage disconnect control circuits.

   - Set “Equipment” to the NCU device connected to the existing power system low voltage disconnect control circuit.
   - Set “Signal Type” to “Sample”.
   - Set “Signal” to the digital input on the NCU device selected in “Equipment” above connected to the existing power system low voltage disconnect control circuit.

Battery Test Function

If the battery test function is to be used in a power split configuration, battery test must be implemented in the existing power system and a test signal from its control unit must be connected to the NCU.

1. For BATTERY_TEST, click on the “Modify” button and select the NCU digital input connected to the existing systems battery test control circuit.

   - Set “Equipment” to the NCU device connected to the existing power masterattery test control circuit.
   - Set “Signal Type” to “Sample”.
   - Set “Signal” to the digital input on the NCU device selected in “Equipment” above connected to the existing power masterattery test control circuit.

Equalize Charge Function

If the equalize charge function is to be used in a power split configuration, equalize charge must be implemented in the existing power system and an equalizing signal from its control unit must be connected to the NCU.

1. For EQUALIZE_CHARGE, click on the “Modify” button and select the NCU digital input connected to the existing systems equalize control circuit.

   - Set “Equipment” to the NCU device connected to the existing power system equalize control circuit.
   - Set “Signal Type” to “Sample”.
   - Set “Signal” to the digital input on the NCU device selected in “Equipment” above connected to the existing power system equalize control circuit.

Monitor Protocol Tab

You can select "EEM", "YDN23", or "Modbus" as the protocol. To make the new protocol valid, click the “Valid after Restart" button.

Figure 5.85 Monitor Protocol Tab

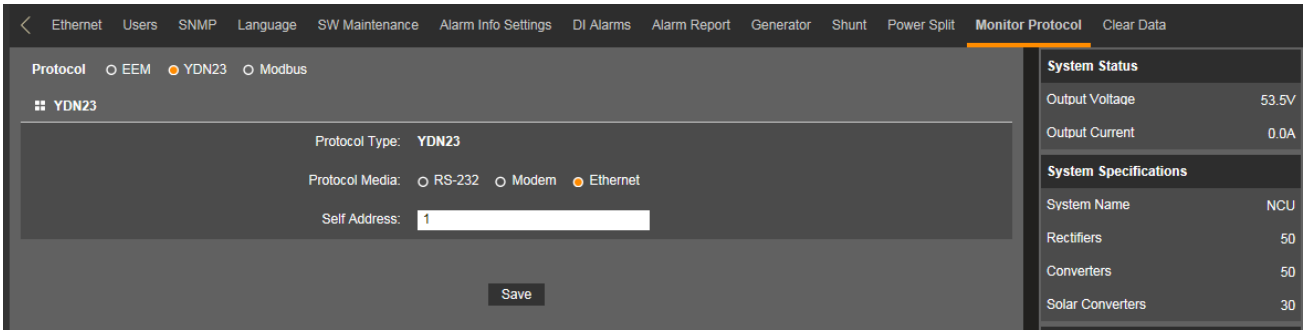
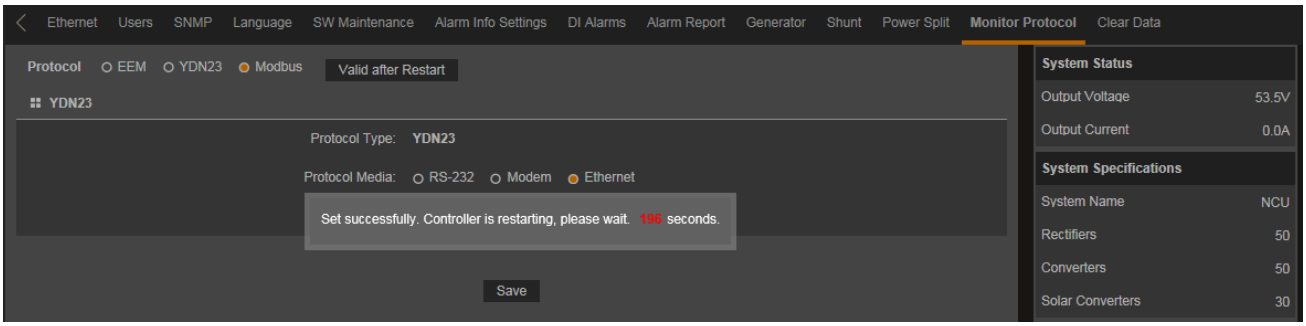


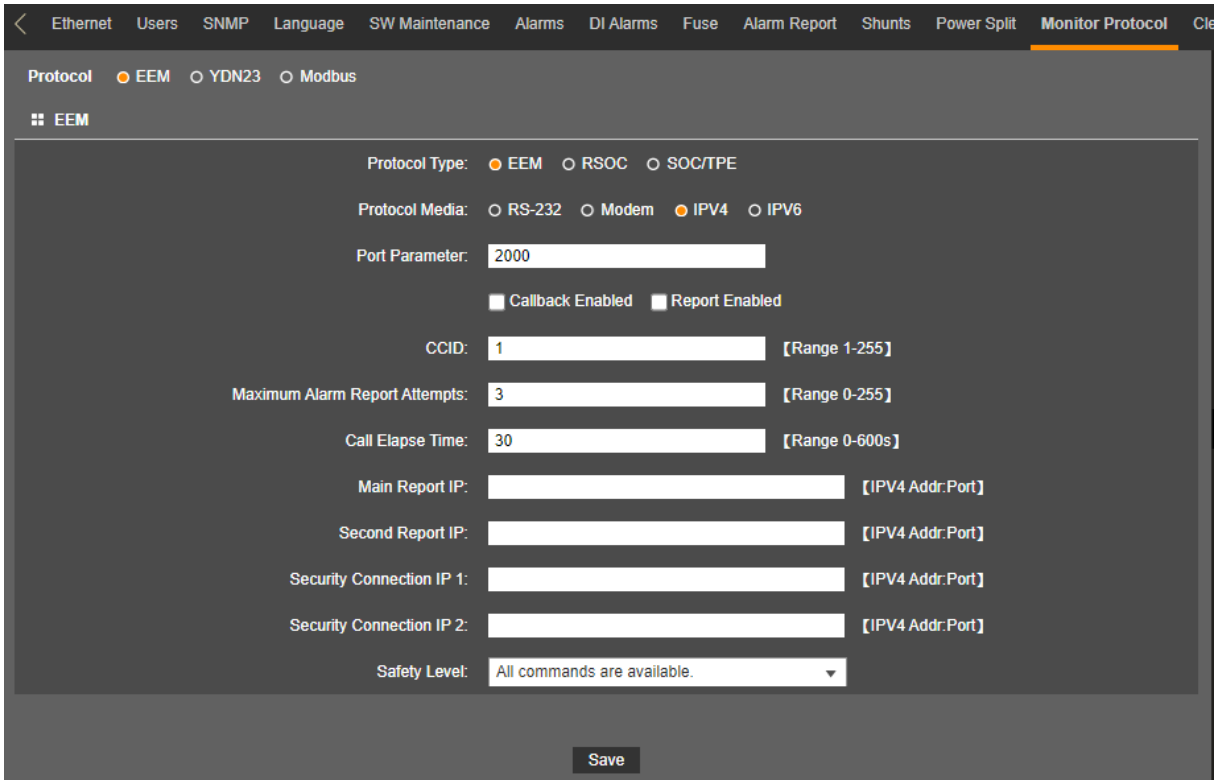
Figure 5.86 Valid after Restart



EEM Protocol

You can set EEM protocol parameters.

Figure 5.87 EEM Protocol

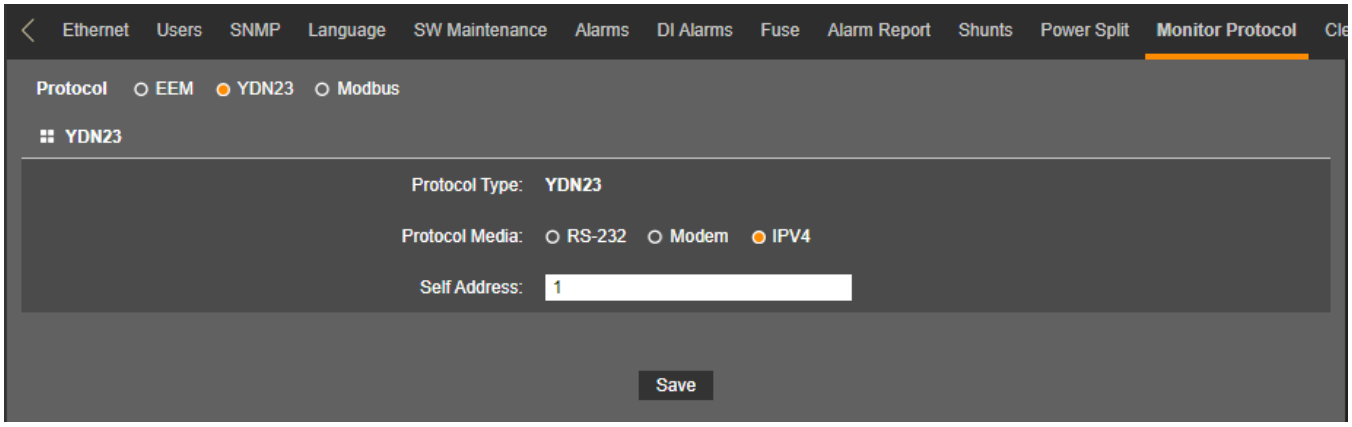


- **Protocol Type:** Select EEM, RSOC, or SOC/TPE per site requirements.
- **Protocol Media:** Select RS-232, Modem, IPV4, or IPV6 per site requirements.
- **Port Parameter:** Enter the port parameters per site requirements.
- **Callback Enabled:** Select per site requirements.
- **Report Enabled:** Select per site requirements.
- **CCID:** Enter value per site requirements.
- **Maximum Alarm Report Attempts:** Enter value per site requirements.
- **Call Elapse Time:** Enter value per site requirements.
- **Main Report IP:** Sets the main report IP.
- **Second Report IP:** Sets the second report IP.
- **Security Connection IP1:** Sets the Security Connection IP1.
- **Security Connection IP2:** Sets the Security Connection IP2.
- **Safety Level:** Select per site requirements.

YDN23 Protocol

You can set YDN23 protocol parameters.

Figure 5.88 YDN23 Protocol

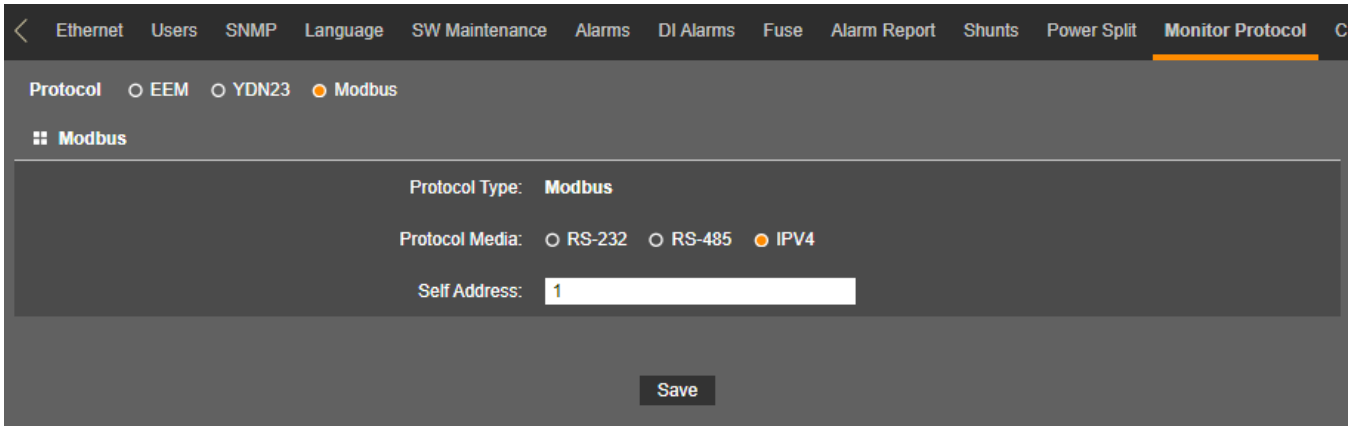


- **Protocol Media:** Select RS-232, Modem, or IPV4 per site requirements.
- **Self Address:** Enter the parameter per site requirements.

Modbus Protocol

You can set Modbus protocol parameters.

Figure 5.89 Modbus Protocol

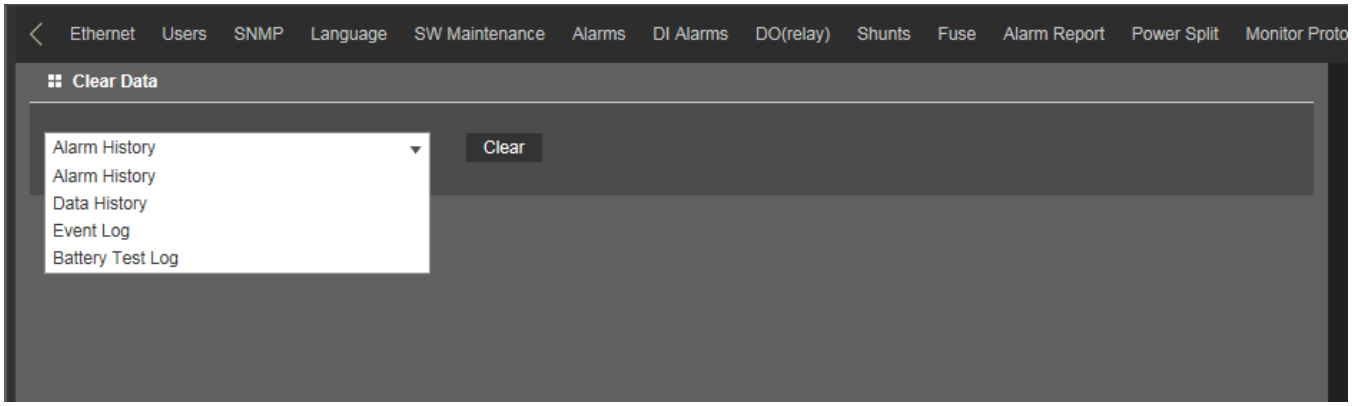


- **Protocol Media:** Select RS-232, Modem, or IPV4 per site requirements.
- **Self Address:** Enter the parameter per site requirements.

Clear Data Tab

Select the data log to be cleared from those listed in the drop-down list box. Click on the “Clear” button to clear the corresponding data.

Figure 5.90 Clear Data



6 Accessing the Controller via a Network Management System (NMS)

6.1 General

The controller has an SNMP agent function.

Users can use a Network Management System (NMS) to perform the following operations:

- Query the operation status and input/output signals of the devices connected to the controller.
- Browse the active alarms.
- Set the float voltage.
- Set the battery current limit.
- Read Ah Battery Capacity
- Set Battery Equipment Rated Capacity

When the controller generates alarms, the SNMP agent can be configured to notify the NMS through TRAPS automatically.

6.2 NMS Supported by SNMP Agent

SNMP is a technology used for network management. The technology is based on implementing an information base called MIB (Managed Information Base). This MIB contains parameters that are of interest from a management perspective. All LAN connected equipment that supports SNMP also supports a default MIB called MIB-II.

The SNMP Agent responds to requests received via the SNMP protocol and also actively sends TRAPS to a specified manager when certain MIB values change state. This is used to actively inform a manager when an alarm situation is recognized.

6.2.1 NMS Supported by SNMP v2

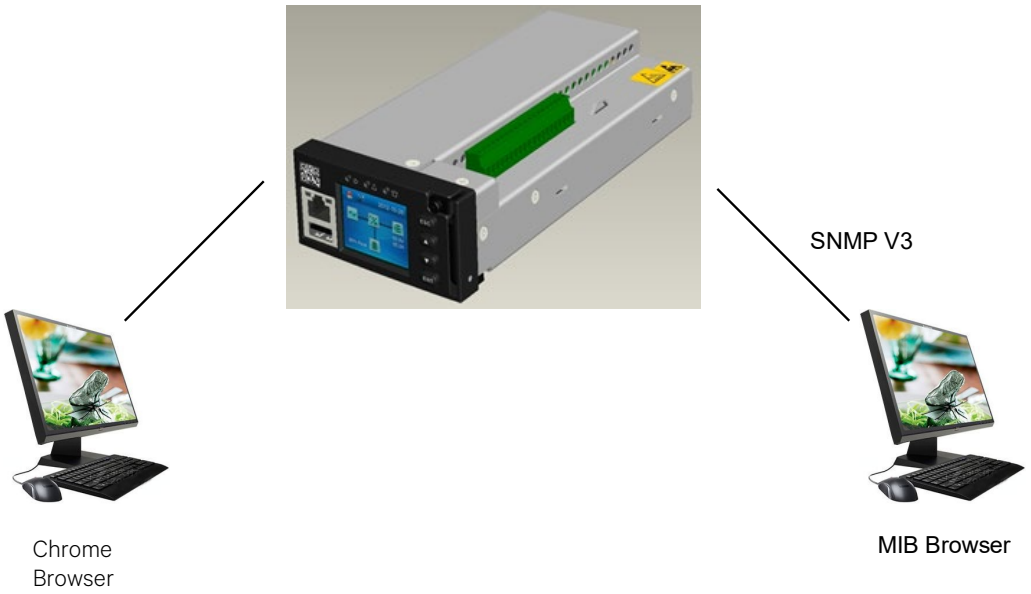
The SNMP agent of the controller supports SNMPv2.

All the NMS that supports SNMPv2c can be used to access the controller. The NMS includes HP OpenView, IBM NetView, Novell ManageWise, SunNet Manager, and so on.

6.2.2 NMS Supported by SNMP v3

The NCU has SSL and SNMP V3 function, which makes the NCU more powerful and more secure.

With SSL, you can browse/set the Webpage with https. If your site requires secure HTTP and you were furnished with an NCU configuration with secure HTTP, enter https:// and the controller's IP address and press **ENTER**. Data is encrypted in the transmission. You can also browse/set the MIB library with SNMP v3. Data is also encrypted in the transmission.



6.3 MIB Installation

6.3.1 Installation

The Controller's MIB is named "NETSURE-MIB-047". Contact your Vertiv representative for the location on the Web to download the MIB file.

Use the MIB loading function of the NMS to load the MIB database. Refer to the User Manual provided with the NMS for the detailed loading method.

6.3.2 Contents of the Controller's MIB

The contents of the MIB supported by the controller's SNMP agent and the OID are listed in Table 6.1. For the details, refer to the MIB file named " NETSURE-MIB-047.mib ".

6.4 Accessing the Controller through an NMS

6.4.1 Apply Administrative Privilege

In order to use the NMS to manage the devices connected to the controller, the administrative authority needs to be applied for the NMS, that is, add the NMS information to the access list of SNMP agent.

Add NMS through Web Browser

Refer to "NMSV2 Configuration Description (Network Management System)" on page 158 and "NMSV3 Configuration Description (Network Management System)" on page 161 for the method of adding NMS.

6.5 ESR Configure

The EEM Protocol is used for communication between the Main Computer and the controller. The Main Computer is the computer superior to the NCU (the client of the NCU). On this page, all parameters needed for communication with a main EEM computer are to be set.

User Information Configuration: On this page, Users, their privilege and password are configured.

Time Synchronization: On this page, the system time and date are to be set.

Automatic time synchronization from time servers can also be configured.

Table 6.1 Contents of the Controller's MIB

Identification Group		
identManufacturer	The name of the equipment manufacturer.	R
identModel	The manufacturers model designation of the power system.	R
identControllerFirmwareVersion	The firmware (software) version of the controller.	R
identName	The name of the power plant. This object should be set by the administrator.	R/W
identSNMPCfgVer	The SNMP configuration version.	R
identSerialNumber	The serial number of this controller.	R
identHWerVersion	The Hardware version of the controller.	R
identSiteLocation	The Site Location of the controller.	R/W
identControllerConfigVer	The Configuration Version for the controller.	R
identMacID	The MAC ID for the controller.	R
identSystemName	The System Name for the controller.	R/W
identProductModel	The Product Model of the controller.	R
identCriticalAlarms	Number of active critical alarms.	R
identPrimaryIp	Primary IP of the controller.	R
identNTPMode	NTP mode of the controller. MANUAL - NTP is disabled NTP - NTP is enabled	R
identSystemDateTime	System date and Time of the controller.	R/W
identLocalZone	Local Time zone for the controller, as a positive or negative offset from GMT. Format hh:mm.	R
System Group		
systemStatus	Status of the complete plant (highest alarm). One of... (1) unknown - status has not yet been defined (2) normal - there are no activated alarms (3) warning - OA, lowest level of 'abnormal' status (4) minor - A3 (5) major - MA (6) critical - CA, highest level of 'abnormal' status (7) unmanaged (8) restricted (9) testing (10) disabled	R
systemVoltage	System voltage, stored as mV.	R
systemCurrent	System current, stored as mA.	R
systemUsedCapacity	Used capacity, stored as percentage of the total capacity.	R
Battery Group		
psBatteryVoltage	Battery voltage, stored as mV, including positive or negative sign.	R
psTotalBatteryCurrent	Battery current, stored as mA, including positive or negative sign.	R
psLowestBatteryCapacity	Calculated capacity, stored as milli % of the total capacity. Lowest available capacity for multiple battery strings.	R
psBatteryNominalCapacity	Nominal installed capacity, stored as mAh.	R

Battery Table		
psBatteryTable	Battery table.	R
psBatteryEntry	Battery measurement table entry.	R
psBatteryIndex	Automatically generated index object.	R
psBatteryCurrent	Battery current in amps.	R
psBatteryName	Battery shunt name.	R
psBatteryCapacityAh	Capacity, stored as Ah	R
psBatteryCapacityPer	State of charge, stored as %	R
psBatteryRatedCapacity	Rated capacity, stored as mAh	R
BMS Table		
psBmsEntry	BMS Measurement Table Entry.	R
psBmsIndex	Automatically generated index object.	R
psBmsVoltage	BMS voltage in mV.	R
psBmsCurrent	BMS Current in mA.	R
psBmsRatedCapacity	BMS rated capacity, in mAh.	R
psBmsStateOfCharge	BMS State Of Charge in percent.	R
psBmsCapacity	BMS capacity in Ah.	R
psBmsAverageTemperature	BMS cell average temperature, stored as 0.001 Celsius degree.	R
psBmsAmbientTemperature	BMS ambient temperature, stored as 0.001 Celsius degree.	R
psBmsProductNumber	BMS Product Number	R
psBmsHWVersion	BMS Hardware Version	R
psBmsSWVersion	BMS Software Version	R
psBmsSerialNumber	BMS Serial Number	R
psBmsDOManfacturer	BMS Date Of Manufacture	R
psBmsChargeCurrentLimit	BMS Current limit in A	R
Input Group		
psInputLineAVoltage	The AC Line 1 voltage, stored as mV.	R
psInputLineBVoltage	The AC Line 2 voltage, stored as mV.	R
psInputLineCVoltage	The AC line C voltage, stored as mV.	R
psTemperature Group		
psTemperature1	The first route temperature, stored as 0.001 Celsius degree.	R
psTemperature2	The second route temperature, stored as 0.001 Celsius degree.	R
Temperature Table		
psTemperatureTable	Temperature measurement table.	R
psTemperatureEntry	Temperature measurement table entry.	R
psTemperatureIndex	Temperature sensor number.	R
psTemperatureMeasurement	Temperature value in centigrade.	R
psTemperatureName	Configured temperature sensor name.	R
psTemperatureType	Temperature sensor Type. (1) none (2) ambient (3) battery	R

psTemperatureAlarmStatus	Temperature sensor Alarm Status. (1) high (2) low (3) fail (4) none	R
psStatusCommunication	The status of communication with the Power System. (1) unknown (2) normal (3) interrupt indicates some errors occurred between Power System and agent	R
Battery Mode		
psStatusBatteryMode	The status of battery modes. FloatCharging (2), ShortTest (3), BoostChargingForTest (4), MnualTesting (5), PlanTesting (6), ACFailTesting (7), ACFail (8), ManualBoostCharging (9), AutoBoostCharging (10), CyclicBoostCharging (11), MasterBoostCharging (12), MasterBateryTesting (13).	R
SM Series Group		
psSMACNumber	The number of SM AC module.	R
psSMBATNumber	The number of SM BAT module.	R
psSMIONumber	The number of SM IO module.	R
Rectifier Group		
psNumberOfInstalledRectifiers	Number of rectifiers.	R
psNumberOfRectifiersCommunicating	Number of rectifiers communicating.	R
psRectifiersUsedCapacity	Used capacity, stored as % of the total capacity.	R
Rectifier Table		
psRectifierTable	Table holding information about individual rectifier.	R
psRectifierEntry	An entry (conceptual row) in the rectifier info table.	R
psRectifierIndex	Automatically generated index object.	R
PsRectifierProductNumber	Rectifier product number.	R
PsRectifierHWVersion	Rectifier hardware revision.	R
psRectifierSWVersion	Rectifier software revision.	R
psRectifierSerialNumber	Rectifier serial number.	R
psRectifierCurrent	Rectifier current, stored as mA.	R
psRectifierIdent	Rectifier physical location identifier.	R
psRectifierFail	The type of alarm change. One of... (1) Activated (2) Deactivated	R
psRectifierTotalCurrent	Total output current, stored as mA.	R

The Distribution		
psTotalLoadCurrent	Total load current, stored as mA.	R
Distribution Load Table		
psDistributionLoadTable	Table of shunts configured as loads.	R
psDistributionLoadEntry	Distribution measurement table entry	R
psDistributionLoadIndex	Automatically generated index object.	R
psDistributionLoadCurrent	Distribution current, stored as mA.	R
psDistributionLoadName	Distribution name.	R
Distribution General Table		
psDistributionGeneralTable	Distribution Table.	R
psDistributionGeneralEntry	Distribution measurement table entry.	R
psDistributionGeneralIndex	Automatically generated index object.	R
psDistributionGeneralCurrent	Distribution current, stored as mA.	R
psDistributionGeneralName	Distribution name.	R
Converter Group		
numberOfInstalledConverters	Number of converters.	R
numberOfConvertersCommunicating	Number of converters communicating.	R
convertersUsedCapacity	Used capacity, stored as % of the total capacity.	R
psConverterVoltage	Converter voltage in mV.	R
psTotalConverterCurrent	Total converter current in mA.	R
Converter Table		
psConverterTable	Table holding information about individual converters.	R
psConverterEntry	An entry (conceptual row) in the converter info table.	R
psConverterIndex	Automatically generated index object.	R
psConverterProductNumber	Converter product number.	R
psConverterHWVersion	Converter hardware revision.	R
psConverterSWVersion	Converter software revision.	R
psConverterSerialNumber	Converter serial number.	R
psConverterCurrent	Converter current, stored as mA.	R
psConverterIdent	Converter physical location identifier.	R
psConverterFail	The type of alarm change. (1) activated (2) deactivated	R
Control Group		
controlBatteryTest	Control battery test, start (1), stop (0).	R/W
controlRelay8	Control relay8, close (1), open (0).	R/W
controlRelay7	Control relay7, close (1), open (0).	R/W
controlRelay6	Control relay6, close (1), open (0).	R/W
controlRelayTest	Control relay test, auto (2), manual (1), disabled (0).	R/W
controlEqualizeCharge	Control battery equalize charge, start (1), stop (0).	R/W
restartNCU	Restarts the NCU. Default value is 123. Write of any number will restart the NCU	R/W

Equipment Signal Table		
psEquipmentSignalTable	Table of indexed equipment signal values.	R
equipmentSignalTableEntry	An entry (conceptual row) in the equipment signal table.	R
psEquipmentSignalTableEntryIndex	The unique sequence number of this equipment signal.	R
psEquipmentSignalValue	Indexed equipment signal value.	R
SMDUH Table **SMDUH Current Table**		
psSMDUHCurrentTable	Table holding information about SMDUH currents.	R
psSMDUHCurrentEntry	An entry (conceptual row) in the SMDUHTable.	R
psSMDUHCurrentIndex	Automatically generated index object.	R
psSMDUHCurrent1	SMDUH Current 1, stored as mA.	R
PsSMDUHCurrent2	SMDUH Current 2, stored as mA.	R
PsSMDUHCurrent3	SMDUH Current 3, stored as mA.	R
PsSMDUHCurrent4	SMDUH Current 4, stored as mA.	R
PsSMDUHCurrent5	SMDUH Current 5, stored as mA.	R
PsSMDUHCurrent6	SMDUH Current 6, stored as mA.	R
PsSMDUHCurrent7	SMDUH Current 7, stored as mA.	R
PsSMDUHCurrent8	SMDUH Current 8, stored as mA.	R
PsSMDUHCurrent9	SMDUH Current 9, stored as mA.	R
psSMDUHCurrent10	SMDUH Current 10, stored as mA.	R
psSMDUHCurrent11	SMDUH Current 11, stored as mA.	R
psSMDUHCurrent12	SMDUH Current 12, stored as mA.	R
psSMDUHCurrent13	SMDUH Current 13, stored as mA.	R
psSMDUHCurrent14	SMDUH Current 14, stored as mA.	R
psSMDUHCurrent15	SMDUH Current 15, stored as mA.	R
psSMDUHCurrent16	SMDUH Current 16, stored as mA.	R
psSMDUHCurrent17	SMDUH Current 17, stored as mA.	R
psSMDUHCurrent18	SMDUH Current 18, stored as mA.	R
psSMDUHCurrent19	SMDUH Current 19, stored as mA.	R
PsSMDUHCurrent20	SMDUH Current 20, stored as mA.	R
SMDUH Power Table		
psSMDUHPowerTable	Table holding information about SMDUH power.	R
psSMDUHPowerEntry	An entry (conceptual row) in the SMDUHPowerTable.	R
psSMDUHPowerIndex	Automatically generated index object.	R
psSMDUHPower1	SMDUH Power 1, stored as W.	R
psSMDUHPower2	SMDUH Power 2, stored as W.	R
psSMDUHPower3	SMDUH Power 3, stored as W.	R
psSMDUHPower4	SMDUH Power 4, stored as W.	R
psSMDUHPower5	SMDUH Power 5, stored as W.	R
psSMDUHPower6	SMDUH Power 6, stored as W.	R
psSMDUHPower7	SMDUH Power 7, stored as W.	R
psSMDUHPower8	SMDUH Power 8, stored as W.	R

psSMDUHPower9	SMDUH Power 9, stored as W.	R
psSMDUHPower10	SMDUH Power 10, stored as W.	R
psSMDUHPower11	SMDUH Power 11, stored as W.	R
psSMDUHPower12	SMDUH Power 12, stored as W.	R
psSMDUHPower13	SMDUH Power 13, stored as W.	R
psSMDUHPower14	SMDUH Power 14, stored as W.	R
psSMDUHPower15	SMDUH Power 15, stored as W.	R
psSMDUHPower16	SMDUH Power 16, stored as W.	R
psSMDUHPower17	SMDUH Power 17, stored as W.	R
psSMDUHPower18	SMDUH Power 18, stored as W.	R
psSMDUHPower19	SMDUH Power 19, stored as W.	R
psSMDUHPower20	SMDUH Power 20, stored as W.	R
SMDUH Energy Table		
psSMDUHEnergyTable	Table holding information about SMDUH energy counters.	R
psSMDUHEnergyEntry	An entry (conceptual row) in the SMDUHEnergyTable.	R
psSMDUHEnergyIndex	Automatically generated index object.	R
psSMDUHTotalEnergy1	SMDUH Total Energy 1, stored as Wh.	R
PsSMDUHTotalEnergy2	SMDUH Total Energy 2, stored as Wh.	R
PsSMDUHTotalEnergy3	SMDUH Total Energy 3, stored as Wh.	R
PsSMDUHTotalEnergy4	SMDUH Total Energy 4, stored as Wh.	R
PsSMDUHTotalEnergy5	SMDUH Total Energy 5, stored as Wh.	R
PsSMDUHTotalEnergy6	SMDUH Total Energy 6, stored as Wh.	R
PsSMDUHTotalEnergy7	SMDUH Total Energy 7, stored as Wh.	R
PsSMDUHTotalEnergy8	SMDUH Total Energy 8, stored as Wh.	R
PsSMDUHTotalEnergy9	SMDUH Total Energy 9, stored as Wh.	R
psSMDUHTotalEnergy10	SMDUH Total Energy 10, stored as Wh.	R
psSMDUHTotalEnergy11	SMDUH Total Energy 11, stored as Wh.	R
psSMDUHTotalEnergy12	SMDUH Total Energy 12, stored as Wh.	R
psSMDUHTotalEnergy13	SMDUH Total Energy 13, stored as Wh.	R
psSMDUHTotalEnergy14	SMDUH Total Energy 14, stored as Wh.	R
psSMDUHTotalEnergy15	SMDUH Total Energy 15, stored as Wh.	R
psSMDUHTotalEnergy16	SMDUH Total Energy 16, stored as Wh.	R
psSMDUHTotalEnergy17	SMDUH Total Energy 17, stored as Wh.	R
psSMDUHTotalEnergy18	SMDUH Total Energy 18, stored as Wh.	R
psSMDUHTotalEnergy19	SMDUH Total Energy 19, stored as Wh.	R
PsSMDUHTotalEnergy20	SMDUH Total Energy 20, stored as Wh.	R
SMDUH2 Table		
SMDUH2 Current A Table		
psSMDUHHCurrentATable	Table holding information about SMDUH2 currents.	R
psSMDUHHCurrentEntry	An entry (conceptual row) in the SMDUH2Table.	R
psSMDUHHCurrentIndex	Automatically generated index object.	R
psSMDUHHCurrent1	SMDUH2 Current 1, stored as mA.	R
PsSMDUHHCurrent2	SMDUH2 Current 2, stored as mA.	R

PsSMDUHHCurrent3	SMDUH2 Current 3, stored as mA.	R
PsSMDUHHCurrent4	SMDUH2 Current 4, stored as mA.	R
PsSMDUHHCurrent5	SMDUH2 Current 5, stored as mA.	R
PsSMDUHHCurrent6	SMDUH2 Current 6, stored as mA.	R
PsSMDUHHCurrent7	SMDUH2 Current 7, stored as mA.	R
PsSMDUHHCurrent8	SMDUH2 Current 8, stored as mA.	R
PsSMDUHHCurrent9	SMDUH2 Current 9, stored as mA.	R
psSMDUHHCurrent10	SMDUH2 Current 10, stored as mA.	R
psSMDUHHCurrent11	SMDUH2 Current 11, stored as mA.	R
psSMDUHHCurrent12	SMDUH2 Current 12, stored as mA.	R
psSMDUHHCurrent13	SMDUH2 Current 13, stored as mA.	R
psSMDUHHCurrent14	SMDUH2 Current 14, stored as mA.	R
psSMDUHHCurrent15	SMDUH2 Current 15, stored as mA.	R
psSMDUHHCurrent16	SMDUH2 Current 16, stored as mA.	R
psSMDUHHCurrent17	SMDUH2 Current 17, stored as mA.	R
psSMDUHHCurrent18	SMDUH2 Current 18, stored as mA.	R
psSMDUHHCurrent19	SMDUH2 Current 19, stored as mA.	R
PsSMDUHHCurrent20	SMDUH2 Current 20, stored as mA.	R
SMDUH2 Current B Table		
psSMDUHHCurrentBTable	Table part B holding information about SMDUH2 currents.	R
psSMDUHHCurrentBEntry	An entry (conceptual row) in the SMDUH2Table.	R
psSMDUHHCurrentBIndex	Automatically generated index object.	R
psSMDUHHCurrent21	SMDUH2 Current 21, stored as mA.	R
psSMDUHHCurrent22	SMDUH2 Current 22, stored as mA.	R
psSMDUHHCurrent23	SMDUH2 Current 23, stored as mA.	R
psSMDUHHCurrent24	SMDUH2 Current 24, stored as mA.	R
psSMDUHHCurrent25	SMDUH2 Current 25, stored as mA.	R
psSMDUHHCurrent26	SMDUH2 Current 26, stored as mA.	R
psSMDUHHCurrent27	SMDUH2 Current 27, stored as mA.	R
psSMDUHHCurrent28	SMDUH2 Current 28, stored as mA.	R
psSMDUHHCurrent29	SMDUH2 Current 29, stored as mA.	R
PsSMDUHHCurrent30	SMDUH2 Current 30, stored as mA.	R
PsSMDUHHCurrent31	SMDUH2 Current 31, stored as mA.	R
PsSMDUHHCurrent32	SMDUH2 Current 32, stored as mA.	R
PsSMDUHHCurrent33	SMDUH2 Current 33, stored as mA.	R
PsSMDUHHCurrent34	SMDUH2 Current 34, stored as mA.	R
PsSMDUHHCurrent35	SMDUH2 Current 35, stored as mA.	R
PsSMDUHHCurrent36	SMDUH2 Current 36, stored as mA.	R
PsSMDUHHCurrent37	SMDUH2 Current 37, stored as mA.	R
PsSMDUHHCurrent38	SMDUH2 Current 38, stored as mA.	R
PsSMDUHHCurrent39	SMDUH2 Current 39, stored as mA.	R
PsSMDUHHCurrent40	SMDUH2 Current 40, stored as mA.	R
SMDUH2 Power A Table		
psSMDUHHPowerATable	Table holding information about SMDUH2 power.	R

psSMDUHHPowerEntry	An entry (conceptual row) in the SMDUHHPowerTable.	R
psSMDUHHPowerIndex	Automatically generated index object.	R
psSMDUHHPower1	SMDUH2 Power 1, stored as W.	R
psSMDUHHPower2	SMDUH2 Power 2, stored as W.	R
psSMDUHHPower3	SMDUH2 Power 3, stored as W.	R
psSMDUHHPower4	SMDUH2 Power 4, stored as W.	R
psSMDUHHPower5	SMDUH2 Power 5, stored as W.	R
psSMDUHHPower6	SMDUH2 Power 6, stored as W.	R
psSMDUHHPower7	SMDUH2 Power 7, stored as W.	R
psSMDUHHPower8	SMDUH2 Power 8, stored as W.	R
psSMDUHHPower9	SMDUH2 Power 9, stored as W.	R
psSMDUHHPower10	SMDUH2 Power 10, stored as W.	R
psSMDUHHPower11	SMDUH2 Power 11, stored as W.	R
psSMDUHHPower12	SMDUH2 Power 12, stored as W.	R
psSMDUHHPower13	SMDUH2 Power 13, stored as W.	R
psSMDUHHPower14	SMDUH2 Power 14, stored as W.	R
psSMDUHHPower15	SMDUH2 Power 15, stored as W.	R
psSMDUHHPower16	SMDUH2 Power 16, stored as W.	R
psSMDUHHPower17	SMDUH2 Power 17, stored as W.	R
psSMDUHHPower18	SMDUH2 Power 18, stored as W.	R
psSMDUHHPower19	SMDUH2 Power 19, stored as W.	R
psSMDUHHPower20	SMDUH2 Power 20, stored as W.	R
SMDUH2 Power B Table		
psSMDUHHPowerBTable	Table part B holding information about SMDUH2 power values.	R
psSMDUHHPowerBEntry	An entry (conceptual row) in the SMDUH2Table.	R
psSMDUHHPowerBIndex	Automatically generated index object.	R
psSMDUHHPower21	SMDUH2 Power 21, stored as W.	R
psSMDUHHPower22	SMDUH2 Power 22, stored as W.	R
psSMDUHHPower23	SMDUH2 Power 23, stored as W.	R
psSMDUHHPower24	SMDUH2 Power 24, stored as W.	R
psSMDUHHPower25	SMDUH2 Power 25, stored as W.	R
psSMDUHHPower26	SMDUH2 Power 26, stored as W.	R
psSMDUHHPower27	SMDUH2 Power 27, stored as W.	R
psSMDUHHPower28	SMDUH2 Power 28, stored as W.	R
psSMDUHHPower29	SMDUH2 Power 29, stored as W.	R
psSMDUHHPower30	SMDUH2 Power 30, stored as W.	R
psSMDUHHPower31	SMDUH2 Power 31, stored as W.	R
psSMDUHHPower32	SMDUH2 Power 32, stored as W.	R
psSMDUHHPower33	SMDUH2 Power 33, stored as W.	R
psSMDUHHPower34	SMDUH2 Power 34, stored as W.	R
psSMDUHHPower35	SMDUH2 Power 35, stored as W.	R
psSMDUHHPower36	SMDUH2 Power 36, stored as W.	R
psSMDUHHPower37	SMDUH2 Power 37, stored as W.	R
psSMDUHHPower38	SMDUH2 Power 38, stored as W.	R

psSMDUHHPower39	SMDUH2 Power 39, stored as W.	R
psSMDUHHPower40	SMDUH2 Power40, stored as W.	R
SMDUH2 Energy A Table		
psSMDUHHEnergyTable	Table holding information about SMDUH2 energy counters.	R
psSMDUHHEnergyEntry	An entry (conceptual row) in the SMDUH2EnergyTable.	R
psSMDUHHEnergyIndex	Automatically generated index object.	R
psSMDUHHTotalEnergy1	SMDUH2 Total Energy 1, stored as Wh.	R
PsSMDUHHTotalEnergy2	SMDUH2 Total Energy 2, stored as Wh.	R
PsSMDUHHTotalEnergy3	SMDUH2 Total Energy 3, stored as Wh.	R
PsSMDUHHTotalEnergy4	SMDUH2 Total Energy 4, stored as Wh.	R
PsSMDUHHTotalEnergy5	SMDUH2 Total Energy 5, stored as Wh.	R
PsSMDUHHTotalEnergy6	SMDUH2 Total Energy 6, stored as Wh.	R
PsSMDUHHTotalEnergy7	SMDUH2 Total Energy 7, stored as Wh.	R
PsSMDUHHTotalEnergy8	SMDUH2 Total Energy 8, stored as Wh.	R
PsSMDUHHTotalEnergy9	SMDUH2 Total Energy 9, stored as Wh.	R
psSMDUHHTotalEnergy10	SMDUH2 Total Energy 10, stored as Wh.	R
psSMDUHHTotalEnergy11	SMDUH2 Total Energy 11, stored as Wh.	R
psSMDUHHTotalEnergy12	SMDUH2 Total Energy 12, stored as Wh.	R
psSMDUHHTotalEnergy13	SMDUH2 Total Energy 13, stored as Wh.	R
psSMDUHHTotalEnergy14	SMDUH2 Total Energy 14, stored as Wh.	R
psSMDUHHTotalEnergy15	SMDUH2 Total Energy 15, stored as Wh.	R
psSMDUHHTotalEnergy16	SMDUH2 Total Energy 16, stored as Wh.	R
psSMDUHHTotalEnergy17	SMDUH2 Total Energy 17, stored as Wh.	R
psSMDUHHTotalEnergy18	SMDUH2 Total Energy 18, stored as Wh.	R
psSMDUHHTotalEnergy19	SMDUH2 Total Energy 19, stored as Wh.	R
PsSMDUHHTotalEnergy20	SMDUH2 Total Energy 20, stored as Wh.	R
SMDUH2 Energy B Table		
psSMDUHHEnergyBTable	Table part B holding information about SMDUH2 energy counters.	R
psSMDUHHEnergyBEntry	An entry (conceptual row) in the SMDUH2Table.	R
psSMDUHHEnergyBIndex	Automatically generated index object.	R
PsSMDUHTotalEnergy21	SMDUH2 Total Energy 21, stored as Wh.	R
PsSMDUHTotalEnergy22	SMDUH2 Total Energy 22, stored as Wh.	R
PsSMDUHTotalEnergy23	SMDUH2 Total Energy 23, stored as Wh.	R
PsSMDUHTotalEnergy24	SMDUH2 Total Energy 24, stored as Wh.	R
PsSMDUHTotalEnergy25	SMDUH2 Total Energy 25, stored as Wh.	R
PsSMDUHTotalEnergy26	SMDUH2 Total Energy26, stored as Wh.	R
PsSMDUHTotalEnergy27	SMDUH2 Total Energy 27, stored as Wh.	R
PsSMDUHTotalEnergy28	SMDUH2 Total Energy 28, stored as Wh.	R
PsSMDUHTotalEnergy29	SMDUH2 Total Energy 29, stored as Wh.	R
PsSMDUHTotalEnergy30	SMDUH2 Total Energy 30, stored as Wh.	R
PsSMDUHTotalEnergy31	SMDUH2 Total Energy 31, stored as Wh.	R
PsSMDUHTotalEnergy32	SMDUH2 Total Energy 32, stored as Wh.	R
PsSMDUHTotalEnergy33	SMDUH2 Total Energy 33, stored as Wh.	R
PsSMDUHTotalEnergy34	SMDUH2 Total Energy 34, stored as Wh.	R

PsSMDUHTotalEnergy35	SMDUH2 Total Energy 35, stored as Wh.	R
PsSMDUHTotalEnergy36	SMDUH2 Total Energy 36, stored as Wh.	R
PsSMDUHTotalEnergy37	SMDUH2 Total Energy 37, stored as Wh.	R
PsSMDUHTotalEnergy38	SMDUH2 Total Energy 38, stored as Wh.	R
PsSMDUHTotalEnergy39	SMDUH2 Total Energy 39, stored as Wh.	R
PsSMDUHTotalEnergy40	SMDUH2 Total Energy 40, stored as Wh.	R
Solar Converter		
numberOfInstalledSolarConverters	Number of solar converters, stored as integer.	R
numberOfSolarConvertersCommunicating	Number of solar converters communicating, stored as integer.	R
solarConvertersUsedCapacity	Used capacity, stored as milli % of the total capacity.	R
solarConvertersTotalCurrent	Total output current, stored as mA.	R
solarConvertersTotalPower	Total output power, stored as W.	R
psSolarConverterTable	Table holding information about individual solar converters.	R
psSolarConverterEntry	An entry (conceptual row) in the solarConverterTable.	R
psSolarConverterIndex	Automatically generated index object.	R
psSolarConverterProductNumber	Solar Converter Product Number.	R
psSolarConverterHWVersion	Solar Converter Hardware Revision.	R
psSolarConverterSWVersion	Solar Converter Software Revision.	R
psSolarConverterSerialNumber	Solar Converter Serial Number.	R
psSolarConverterInputVoltage	Solar Converter Input Voltage, stored as mV.	R
psSolarConverterInputCurrent	Solar Converter Input Current, stored as mA.	R
psSolarConverterOutputCurrent	Solar Converter Output Current, stored as mA.	R
psSolarConverterOutputPower	Solar Converter Output Power, stored as mW.	R
Setting Group **System Settings**		
settingUnderVoltageLevel1	Under voltage 1 stored as mV	R/W
settingUnderVoltageLevel2	Under voltage 2 stored as mV	R/W
settingOverVoltageLevel1	Over voltage 1 stored as mV	R/W
settingOverVoltageLevel2	Over voltage 2 stored as mV	R/W
Charge Settings		
settingFloatVoltage	Float voltage stored as mV	R/W
settingEqualizeChargeVoltage	Equalize charge voltage stored as mV	R/W
settingTempCompensationCoefficient	Coefficient for battery temperature compensation stored as micro V	R/W
settingTempCompensationCenter	Center point for battery temperature compensation stored as milli degree C	R/W
settingBatteryCurrentLimit	Battery charge current limit stored as thousandths of C10	R/W
settingMinVoltBCL	Minimum voltage for battery current limitation, stored as mV	R/W
settingPLSEnable	Enable / disable of peak load shifting function	R/W
settingPLSVolt	Voltage level for rectifiers when peak load shift is active. Stored as mV	R/W
settingPLSBattSOC	Minimum SOC level to run peak load shift. Stored as milli %	R/W
settingPLSStart1	Start time 1 for peak load shift. Stored as seconds since midnight. E.g. 3 AM = 10800 seconds.	R/W
settingPLSStop1	Stop time 1 for peak load shift. Stored as seconds since midnight.	R/W
settingPLSStart2	Start time 2 for peak load shift. Stored as seconds since midnight.	R/W
settingPLSStop2	Stop time 2 for peak load shift. Stored as seconds since midnight.	R/W

Rectifier Settings		
settingECOModeEnable	Setting for ECO mode function. 0 - disabled, 1 - enabled.	R/W
settingECOModeFluctRange	Setting for ECO mode allowed fluctuation range, stored as %.	R/W
settingECOModeCycleTime	Setting for ECO mode cycle period, stored as hours.	R/W
settingECOModeOnTime	Setting for ECO mode all rectifers on time, stored as minutes.	R/W
settingECOModeDelay	Setting for ECO mode switch off delay, stored as minutes.	R/W
settingRectDefaultVolt	Rectifier default voltage stored as mV	R/W
settingWalkInEnable	Enable of function WALK In.	R/W
settingWalkInTime	WALK In time, stored as minutes.	R/W
psSolarSettings		
settingMaxDiffVoltMPPTRECT	Maximum voltage difference between solar converters and rectifiers, stored as mV	R/W
settingMinDiffVoltMPPTRECT	Minimum voltage difference between solar converters and rectifiers, stored as mV	R/W
settingMPPTDefaultVolt	Solar converter default voltage stored as mV	R/W
Battery Test Settings		
settingBatteryTestVoltage	Setting for rectifier voltage during battery test, stored as mV.	R/W
settingBatteryTestEndVoltage	Setting for voltage level at which battery test will be stopped, stored as mV.	R/W
settingBatteryTestEndTime	Setting for time at which battery test will be stopped, stored as minutes.	R/W
LVD Settings		
settingLVD1Voltage	Setting for voltage level at which contactor 1 will be opened, stored as mV.	R/W
settingLVD1ByCapacity	Enable / disable of LVD1 by capacity	R/W
settingLVD1Capacity	Setting for capacity level at which LVD1 will be opened, stored as milli %.	R/W
settingLVD1ByTime	Enable / disable of LVD1 by time	R/W
settingLVD1Time	Setting for time after mains failure when LVD1 will be opened, stored as minutes.	R/W
settingLVD2Voltage	Setting for voltage level at which contactor 2 will be opened, stored as mV.	R/W
settingLVD2ByCapacity	Enable / disable of LVD2 by capacity	R/W
settingLVD2Capacity	Setting for capacity level at which LVD2 will be opened, stored as milli %.	R/W
settingLVD2ByTime	Enable / disable of LVD2 by time	R/W
settingLVD2Time	Setting for time after mains failure when LVD2 will be opened, stored as minutes.	R/W
settingLVD3Voltage	Setting for voltage level at which contactor 3 will be opened, stored as mV.	R/W
settingLVD3ByCapacity	Enable / disable of LVD3 by capacity	R/W
settingLVD3Capacity	Setting for capacity level at which LVD3 will be opened, stored as milli %.	R/W
settingLVD3ByTime	Enable / disable of LVD3 by time	R/W
settingLVD3Time	Setting for time after mains failure when LVD3 will be opened, stored as minutes.	R/W
settingLVD4Voltage	Setting for voltage level at which contactor 4 will be opened, stored as mV.	R/W
settingLVD4ByCapacity	Enable / disable of LVD4 by capacity	R/W
settingLVD4Capacity	Setting for capacity level at which LVD4 will be opened, stored as milli %.	R/W
settingLVD4ByTime	Enable / disable of LVD4 by time	R/W
settingLVD4Time	Setting for time after mains failure when LVD4 will be opened, stored as minutes.	R/W
settingLVD5Voltage	Setting for voltage level at which contactor 5 will be opened, stored as mV.	R/W
settingLVD5ByCapacity	Enable / disable of LVD5 by capacity	R/W
settingLVD5Capacity	Setting for capacity level at which LVD5 will be opened, stored as milli %.	R/W
settingLVD5ByTime	Enable / disable of LVD5 by time	R/W
settingLVD5Time	Setting for time after mains failure when LVD5 will be opened, stored as minutes.	R/W

settingLVD6Voltage	Setting for voltage level at which contactor 6 will be opened, stored as mV.	R/W
settingLVD6ByCapacity	Enable / disable of LVD6 by capacity	R/W
settingLVD6Capacity	Setting for capacity level at which LVD6 will be opened, stored as milli %.	R/W
settingLVD6ByTime	Enable / disable of LVD6 by time	R/W
settingLVD6Time	Setting for time after mains failure when LVD6 will be opened, stored as minutes.	R/W
Generator Settings		
settingDOD	Setting for depth of discharge, stored as milli %.	R/W
settingStopSOC	Setting for state of charge when diesel generator should stop, stored as milli %.	R/W
settingStartSOCOnly	Enable / disable of start on SOC only	R/W
settingStopVoltEnable	Enable / disable stop diesel generator on voltage	R/W
settingStopVolt	Setting for voltage level at which diesel generator will be stopped, stored as mV.	R/W
settingHybridEqMode	Hybrid equalising mode	R/W
settingDGStopPointEnable	Enable of Hybrid Shift by Volt	R/W
settingDGStop1Voltage	Hybrid Shift Stop Point 1 Volt, stored as mV	R/W
settingDGStopPoint1StartTime	Start time 1 for voltage hybrid shift. Stored as seconds since midnight. E.g. 3 AM = 10800 seconds.	R/W
settingDGStopPoint1StopTime	Stop time 1 for voltage hybrid shift. Stored as seconds since midnight.	R/W
settingDGStop2Voltage	Hybrid Shift Stop Point 2 Volt, stored as mV	R/W
settingDGStopPoint2StartTime	Start time 2 for voltage hybrid shift. Stored as seconds since midnight.	R/W
settingDGStopPoint2StopTime	Stop time 2 for voltage hybrid shift. Stored as seconds since midnight.	R/W
settingHybridShiftEnabledbySOC	Enable of Hybrid Shift by SOC	R/W
settingSOCStopDGSetting1	Hybrid Shift Stop Point 1 SOC, stored as milli %	R/W
settingSOCStopDGStartTime1	Start time 1 for SOC hybrid shift. Stored as seconds since midnight. E.g. 3 AM = 10800 seconds.	R/W
settingSOCStopDGStopTime1	Stop time 1 for SOC hybrid shift. Stored as seconds since midnight.	R/W
settingSOCStopDGSetting2	Hybrid Shift Stop Point 2 SOC, stored as milli %	R/W
settingSOCStopDGStartTime2	Start time 2 for SOC hybrid shift. Stored as seconds since midnight.	R/W
settingSOCStopDGStopTime2	Stop time 2 for SOC hybrid shift. Stored as seconds since midnight.	R/W
Temperature Settings		
settingVeryHighBatteryTemperature	Level for very high battery temperature alarm stored as degree C	R/W
settingHighBatteryTemperature	Level for high battery temperature alarm stored as degree C	R/W
settingLowBatteryTemperature	Level for low battery temperature alarm stored as degree C	R/W
settingVeryHighAmbientTemperature	Level for very high ambient temperature alarm stored as degree C	R/W
settingHighAmbientTemperature	Level for high ambient temperature alarm stored as degree C	R/W
settingLowAmbientTemperature	Level for low ambient temperature alarm stored as degree C	R/W
Output Information		
outputDCVoltage	Output DC voltage stored as mV	R
outputDCCurrent	Output DC current stored as mA	R
outputDCPower	Output DC power stored as W	R
Inverter group		
numberOfInstalledInverters	number of Inverters, stored as integer.	R
numberOfInvertersCommunicating	number of inverters communicating, stored as integer.	R
invertersUsedCapacity	sed capacity, stored as % of the total capacity.	R

Inverter Table		
psInverterEntry	An entry (conceptual row) in the inverterInfoTable.	R
psInverterIndex	Automatically generated index object.	R
psInverterVoltage	Inverter Output Voltage, stored as mV.	R
psInverterCurrent	Inverter Output Current, stored as mA.	R
psInverterFrequency	Inverter Output Frequency, stored as mHz.	R
psInverterIdent	Inverter physical location identifier.	R
psInverterProductNumber	Inverter Product Number.	R
psInverterHWVersion	Inverter Hardware Revision.	R
psInverterSWVersion	Inverter Software Revision.	R
psInverterSerialNumber	Inverter Serial Number.	R
Consumption Map Info Table		
psConsuMapInfoEntry	An entry (conceptual row) in the psConsuMapInfoTable.	R
psConsuMapInfoIndex	Automatically generated index object.	R
psCabinetName	Name of the cabinet.	R
psBranchNum	Total number of branch designated to the cabinet.	R
psTotalCurrent	Total current of the cabinet, stored as mA.	R
psTotalPower	Total power of the cabinet, stored as mW.	R
psTotalEnergy	Total energy of the cabinet, stored as Wh.	R
psPeakPowerLast24H	Peak power of the cabinet in last 24H, stored as mW.	R
psPeakPowerLastWeek	Peak power of the cabinet in last week, stored as mW.	R
psPeakPowerLastMonth	Peak power of the cabinet in last month, stored as mW.	R
psLoadBranchName1	Load branch 1 name	R
psLoadBranchCurrent1	Load branch 1 current, stored as mA	R
psLoadBranchName2	Load branch 2 name	R
psLoadBranchCurrent2	Load branch 2 current, stored as mA	R
psLoadBranchName3	Load branch 3 name	R
psLoadBranchCurrent3	Load branch 3 current, stored as mA	R
.....		R
psLoadBranchName20	Load branch 20 name	R
psLoadBranchCurrent20	Load branch 20 current, stored as mA	R
Energy Counters		
totalRectifierEnergy	Total rectifier energy, stored as Wh.	R
rectifierEnergyYear1	Rectifier energy for year 1, stored as Wh.	R
rectifierEnergyYear2	Rectifier energy for year 2, stored as Wh.	R
rectifierEnergyYear3	Rectifier energy for year 3, stored as Wh.	R
rectifierEnergyYear4	Rectifier energy for year 4, stored as Wh.	R
rectifierEnergyYear5	Rectifier energy for year 5, stored as Wh.	R
totalSolarEnergy	Total solar converter energy, stored as Wh.	R
solarEnergyYear1	Solar converter energy for year 1, stored as Wh.	R
solarEnergyYear2	Solar converter energy for year 2, stored as Wh.	R
solarEnergyYear3	Solar converter energy for year 3, stored as Wh.	R
solarEnergyYear4	Solar converter energy for year 4, stored as Wh.	R

solarEnergyYear5	Solar converter energy for year 5, stored as Wh.	R
totalBatteryEnergy	Total battery energy, stored as Wh.	R
batteryEnergyYear1	Battery energy for year 1, stored as Wh.	R
batteryEnergyYear2	Battery energy for year 2, stored as Wh.	R
batteryEnergyYear3	Battery energy for year 3, stored as Wh.	R
batteryEnergyYear4	Battery energy for year 4, stored as Wh.	R
batteryEnergyYear5	Battery energy for year 5, stored as Wh.	R
totalLoadEnergy	Total load energy, stored as Wh.	R
loadEnergyYear1	Load energy for year 1, stored as Wh.	R
loadEnergyYear2	Load energy for year 2, stored as Wh.	R
loadEnergyYear3	Load energy for year 3, stored as Wh.	R
loadEnergyYear4	Load energy for year 4, stored as Wh.	R
loadEnergyYear5	Load energy for year 5, stored as Wh.	R
Miscellaneous		
independentInputCurrent	Independent input current, stored as mA	R
greenHouseGasReduction	Amount of GHG reduction, stored as kilos	R
psFuelTable	Table holding information about fuel sensors.	R
psFuelEntry	An entry (conceptual row) in the fuelSensorInfoTable.	R
psFuelIndex	Automatically generated index object.	R
psFuelHeight	Fuel Tank Height, stored as micrometer.	R
psFuelVolume	Fuel Tank Volume, stored as millilitre.	R
psFuelPercent	Fuel Tank Percentage, stored as milli %.	R
Alarm Trap Counter		
alarmLastTrapNo	The sequence number of last submitted alarm trap, also last row in alarmTrapTable.	R
Active Alarm Table		
alarmActiveAlarmTable	Table holding information about the currently active alarms.	R
activeAlarmEntry	An entry (conceptual row) in the alarm trap table.	R
alarmIndex	The unique sequence number of this alarm trap.	R
alarmTime	Date and time when event occurred (local time), including timezone if supported by controller.	R
alarmStatusChange	The type of alarm change. One of… (1) activated (2) deactivated	R
alarmSeverity	The severity of the alarm. One of… (1) warning - OA, lowest level of alarm severity (2) minor - A3 (3) major - MA (4) critical - CA, highest level of alarm severity	R
alarmDescription	Free-text description of alarm.	R
alarmType	Alarm type, i.e. an integer specifying the type of alarm.	R

Events/Traps		
alarmTrap	An alarm trap is sent when an alarm occurs (activated) or returns to normal state (deactivated). Alarm traps are logged in alarmTrapTable. Variables in this trap: * alarmIndex The unique sequence number of this alarm trap. * alarmTime Date and time when event occurred (local time), including timezone if supported by controller. * alarmStatusChange (1) activated or (2) deactivated. * alarmSeverity Integer describing the severity of the alarm. * alarmDescription Free-text description of alarm. * alarmType Integer indicating type of alarm.	--
alarmActiveTrap	An alarm trap is sent when an alarm occurs (activated). Variables in this trap: * alarmTime Date and time when event occurred (local time), including timezone if supported by controller. * alarmSeverity Integer describing the severity of the alarm. * alarmDescription Free-text description of alarm. * alarmType Integer indicating type of alarm.	--
alarmCeaseTrap	An alarm trap is sent when an alarm returns to normal state (clear, deactivated). Variables in this trap: * alarmTime Date and time when event occurred (local time), including timezone if supported by controller. * alarmSeverity Integer describing the severity of the alarm. * alarmDescription Free-text description of alarm. * alarmType Integer indicating type of alarm.	--

In Table 6.1, R means OID is read-only (GET), and R/W means OID can be read and modified (GET/SET).

7 Replacement Procedures

7.1 NCU Replacement

DANGER! Follow all "Important Safety Instructions" found in the documentation provided with the system the NCU Controller is installed in.

ALERT! *NCU CONTROLLER HANDLING.*
Installation or removal of the NCU Controller requires careful handling. To avoid possibility of NCU Controller damage from static discharge, a static wrist strap grounded through a one megohm resistor should always be worn when handling the NCU Controller. ESD-protective packaging material must also be used when carrying/shipping the NCU Controller.

NOTE! *Depending on your network security settings, when you remove a device that is connected to your network and assign the same IP address to the replacement device, you may not be allowed to communicate with the replacement device over the network. Contact your network administrator for assistance.*

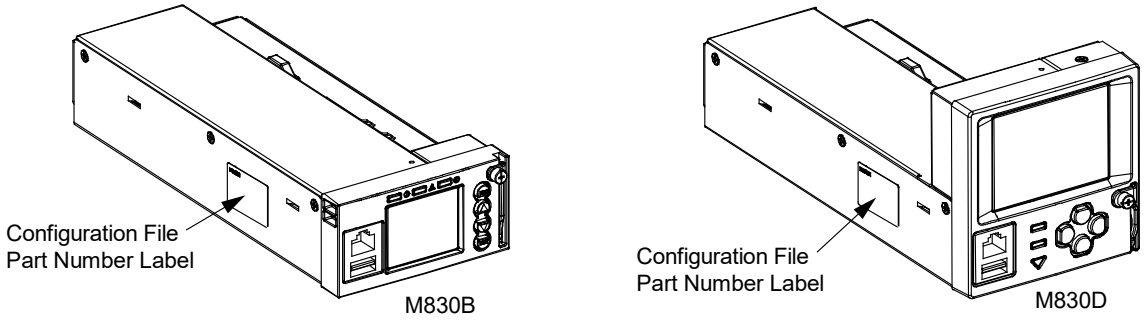
NOTE! *The controller does not turn off any relay when the controller is reset/replaced. If the relay is active when the controller is reset/replaced, it will stay active whether or not the alarm condition still exists. If possible, the alarm condition should be cleared before the controller is reset/replaced. If the alarm is not cleared, after starting the controller, it may be necessary to manually trigger an alarm condition to clear all alarm relays.*

The NCU is hot swappable. It can be removed and installed with the system operating and without affecting the output bus.

Procedure

1. Before performing this procedure, ensure the replacement NCU contains the same configuration file as the existing NCU. Refer to the Configuration File Part Number Label on the side of the replacement NCU for the Configuration Part Number (see Figure 7.1). If the existing controller is operational, navigate the menus to view its configuration file (MAIN SCREEN / ESC).

Figure 7.1 NCU Configuration Label Location



Performing this procedure may activate external alarms. Do one of the following. If possible, disable these alarms. If these alarms cannot be easily disabled, notify the appropriate personnel to disregard any future alarms associated with this system while this procedure is being performed.

Connect an approved grounding strap to your wrist. Attach the other end to a suitable ground.

Loosen the captive fastener securing the latch mechanism to the front of the NCU to be replaced. Pull the latch mechanism away from the NCU (this will retract the latch mechanism located on the bottom of the NCU). This unlocks the NCU from the shelf. Refer to Figure 7.2.

Slide the NCU Controller completely from the shelf.

Loosen the captive fastener securing the latch mechanism to the front of the replacement NCU. Pull the latch mechanism away from the NCU (this will retract the latch mechanism located on the bottom of the NCU).

Slide the NCU completely into its mounting position.

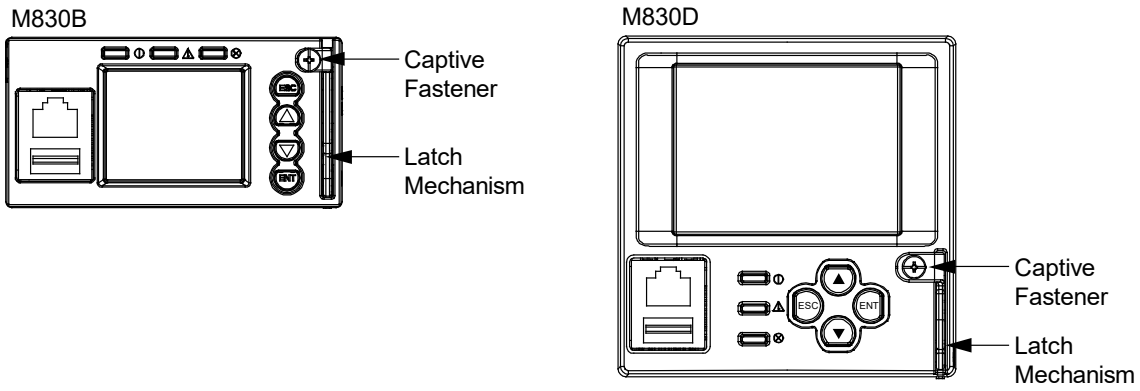
Push the latch mechanism into the front panel of the NCU, and secure by tightening the captive fastener. This locks the NCU securely to the shelf.

Wait for the controller to finish booting and verify that the complete system operates normally.

Enable the external alarms or notify appropriate personnel that this procedure is finished.

Ensure that there are no local or remote alarms active on the system.

Figure 7.2 Latch Mechanism on the NCU



8 NCU Digital Input and Relay Output Connections

8.1 NCU Digital Input Connections

The NCU provides four (4) digital inputs for alarms/events. Screw-pressure type connections are provided. Wire size range is 28 AWG to 16 AWG. Recommended torque for these connections is 0.19 N-m (1.7 in-lbs.). Refer to Figure 8.1 for connector location and pinouts.

Note that some digital inputs may be factory wired to the system.

8.2 NCU Relay Output Connections

The NCU provides four (4) sets of Form-C alarm relay dry contact outputs for connection of remote alarms. Relay contacts are rated for 60 W: 2 A @ 30 VDC or 1 A @ 60 VDC. Screw-pressure type connections are provided. Wire size range is 28 AWG to16 AWG. Recommended torque for these connections is 0.19 N-m (1.7 in-lbs.). Refer to Figure 8.1 for connector location and pin-outs.

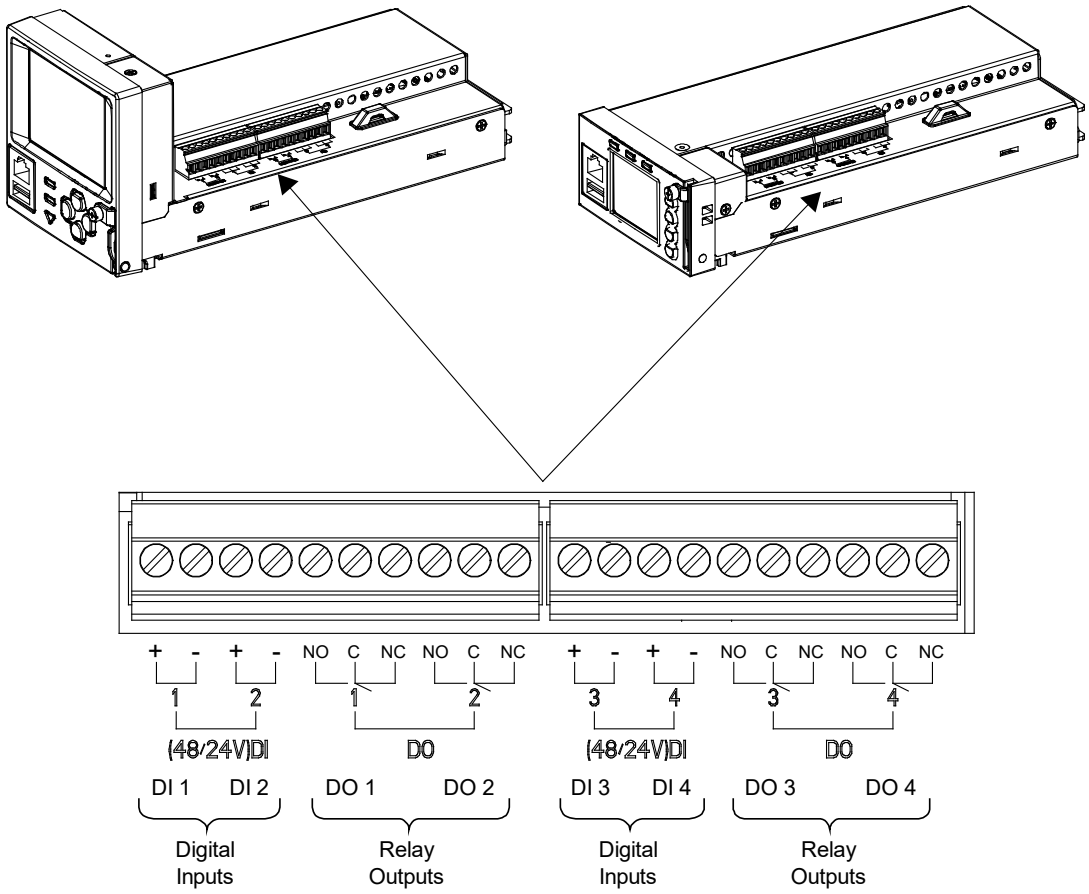
Each relay is user configurable for alarm conditions. Alarm relay contacts can be connected to other monitoring equipment.

Note that some relay outputs may be factory wired to the system.

8.3 IB2 (Controller Interface Board) and EIB (Controller Extended Interface Board)

One or more IB2 (Controller Interface Board) and/or EIB (Controller Extended Interface Board) may be connected to the NCU. The IB2 and EIB provide additional digital inputs and relay outputs. Note that some digital inputs and/or relay outputs may be factory wired to the system. Refer to your Power System documentation for IB2 and EIB connections and specifications.

Figure 8.1 NCU Digital Input and Relay Output Connections



9 Specifications

Input Voltage Range: 19 VDC to 60 VDC.

Power Consumption, Maximum: 18 W.

Operating Temperature Range: -40 °C to +70 °C (-40 °F to +158 °F).

Relative Humidity: Capable of operating in an ambient relative humidity range of 0% to 90%, non-condensing.

Environment: The controller is recommended to be used in Pollution of Degree 2. Pollution Degree 2 applies where there is only non-conductive pollution that might temporarily become conductive due to occasional condensation (such as the office - environment).

Dimensions (H x W x D):

- **Model M830B:**43.4 mm x 86 mm x 208 mm
  1.65" x 3.41" x 8.33"
- **Model M830D:**86.2 mm × 87 mm × 208 mm
  3.41" x 3.42" x 8.33"

Weight: < 1 kg (2.2 lbs).

Front Panel Display:

- **Model M830B:** 128 x 160 Pixels TFT LCD
- **Model M830D:** 320 x 240 Pixels TFT LCD

Indicators:

- Status (Green)
- Minor Alarm (Yellow)
- Critical / Major Alarm (Red)

Local and Remote Access Passwords: Refer to "Passwords and Privilege Levels" on page 19.

Inputs and Outputs: Connection points provided on controller interface board(s) mounted in the system. Refer to your system documentation.

IB2 and EIB (Controller Interface Board) Ratings:

- **Digital Input Ratings:**
  - Maximum Voltage Rating: 60 VDC.
  - Active High: > 19 VDC.
  - Active Low: < 1 VDC.
- **Relay Ratings:**
  - Steady State: 0.5 A @ 60 VDC; 1.0 A @ 30 VDC.
  - Peak: 3 A @ 30 VDC.

Factory Default Setpoints: Refer to the Configuration Drawing (C-drawing) furnished with your system for a list of factory default values.

Safety and Standards Compliance:

- Electrical: IEC 60950-1, EN 60950-1, UL 60950-1
- EMC: EN 300 386, 2001 Class B; FCC Part 15, Class B
- Environmental: CE; NEBS Level 3
- GR-3108 Class 2 Compliant

System Voltage Monitoring (Float / Equalize) Accuracy: <±0.1 VDC, over the range of 0 VDC to +30 VDC and 0 VDC to -60 VDC and from +15 °C to +30 °C.

Temperature sensor Accuracy:

- Calibration Error (-25 °C to +105 °C): ±2 °C
- Nonlinearity (-25 °C to +105 °C): 0.4 °C

NCU Temperature sensor Input Accuracy (-10 °C to +65 °C): ±2 °C

Modbus Southbound Sampling Rate: Four (4) second sampling rate.

Rectifiers: The NCU supports sixty (60) rectifiers on Can Bus A.

Solar Converters: The NCU supports sixty (60) solar converters on Can Bus A.

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