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# *Industrial UPS (IUPS)*



## Installation and Operation Manual

This manual is subject to change without notice. You may obtain the newest version of the manual at [www.lamarchemfg.com](http://www.lamarchemfg.com)

## Important Safety Instructions

Before using this equipment, read all manuals and other documents related to this UPS and other equipment connected to this unit. Always have a copy of an IUPS's manual on file nearby, in a safe place; if a replacement copy of a manual is needed, it can be found at [www.lamarchemfg.com](http://www.lamarchemfg.com).

### Electrical Safety



**WARNING:** Hazardous voltages are present at the input of power systems. The output from IUPS and batteries may be low in voltage but can have a very high current capacity that may cause severe or even fatal injury.

When working with any live battery or power system, follow these precautions:

- Never work alone on any live power system, someone should always be close enough to come to your aid
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Wear complete eye protection (with side shields) and clothing protection.
- Always wear gloves and use insulated hand tools.



**WARNING:** Lethal voltages are present within the power system. Parts inside the unit may still be energized even when the unit has been disconnected from the input power. Check with a meter before proceeding. Do not touch any parts that are not insulated.

- A licensed electrician should be used in the installation of any unit.
- Always disconnect the unit from the supply, batteries, and loads before performing maintenance or cleaning.
- Always assume that an electrical connection is live and check the connection relative to the ground.
- Be sure that neither liquids nor any wet material come in contact with any internal components.
- Do not operate this unit outside the input and output ratings listed on the unit nameplate.
- Do not use this unit for any purpose not described in the operation manual.

### Mechanical Safety

- This unit or parts of the unit may get very hot during normal operation, use care when working nearby.
- Do not expose equipment to rain or snow. Always install in a clean, dry location.
- Do not operate the equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- Do not disassemble this unit. Incorrect re-assembly may result in a risk of electric shock or fire.
- If modifications to the enclosure are necessary, such as drilling for conduit fitting, ensure the interior is protected from metal shavings and debris. Additional precautions should be taken to remove any remaining debris from interior of inverter prior to energizing.

### Battery Safety



**WARNING:** Follow all of the battery manufacturer's safety recommendations when working with or around battery systems. DO NOT smoke or introduce a spark or open flame in the vicinity of a battery. Some batteries generate explosive gases during normal battery operation.

- To reduce the risk of arc, connect, and disconnect the battery only when the unit is off.
- If it is necessary to remove the battery connections, always remove the grounded terminal from the battery first.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Always wear rubber gloves, safety glasses, and a rubber-lined vest/apron when working near a battery.
- Have plenty of freshwater and soap nearby in case the battery electrolyte contacts skin, clothing, or eyes.
- If the battery electrolyte contacts skin or clothing, wash immediately with soap and water.
- If the electrolyte enters the eye, immediately flood the eye with running cold water for at least ten (10) minutes and seek medical attention immediately.
- Do not drop metal on a battery. A spark or short-circuit could occur and could cause an explosion.

## Unit Location

- Allow at least 12 inches of free air on all vented surfaces for proper cooling.
- Do not operate this unit in a closed-in area or restrict ventilation in any way.
- Do not set any battery on top of this unit.
- Never allow battery electrolyte to drip on this unit when reading the specific gravity or filling the battery.
- Never place this unit directly above a standard flooded battery. Gases from the battery will corrode and damage equipment.
- A sealed maintenance-free or valve-regulated lead-acid (VRLA) battery may be placed below this equipment.

## Check for Damages

Before unpacking the product, note any damage to the shipping container and take pictures. Unpack the product and inspect the exterior and interior of the product for damage. If any damage is observed, take pictures and contact the carrier immediately to file a damage claim. Contact La Marche for a Return Material Authorization number to have the inverter sent back for evaluation and repair.



**CAUTION:** Failure to properly file a claim for shipping damages or provide a copy of the claim to La Marche, may void warranty service for any physical damages reported for repair.

## Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is damaged/unavailable, make sure the product is packed with at least three inches of shock-absorbing material to prevent shipping damage. *La Marche is not responsible for damage caused by improper packaging of returned products.*

## Inspection Checklist

- Enclosure exterior and interior is not marred or dented
- There are no visibly damaged components
- All internal components are secure
- Printed circuit boards and their connections are firmly seated
- All hardware and connections are tight
- All wire terminations are secure
- All items on packing list have been included

## Handling

Equipment can be very heavy with uneven distribution of weight. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent equipment from being accidentally tipped over or dropped.

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## Model Scope/General Description

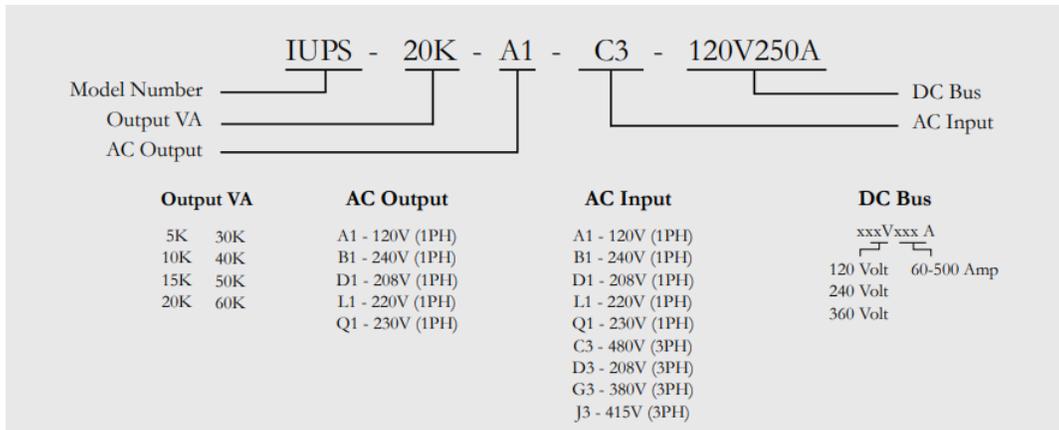
La Marche Industrial double-conversion UPS System is designed using IGBT with digital control to ensure reliability. This UPS system maintains power to critical loads during power outages, brownouts, and power spikes. La Marche Industrial UPS Systems are highly customizable; kVA Rating, Single or Three Phase, Frequency, Charger Size, System and Battery Enclosure Protection, Distribution, and other features. The system's smart controller offers a dynamic color touchscreen mimic panel that displays the power flow through the system and provides visual Alarms and Status indications. This UPS system is equipped with Remote Monitoring, Data Logging, and Battery Test capabilities.



**Figure 1 – IUPS Overview**

## Understanding the Model Number

The IUPS model number is coded to describe the features that are included. Find the model number on the nomenclature nameplate of the enclosure. Follow the chart below to determine the configuration of the IUPS.



## Optional Accessories Included in The Inverter

This IUPS may have been outfitted with a number of optional accessories or option packages. To determine the options included (if any) refer to the cover page of the manual package. If the manual package that is included with the IUPS is no longer available, contact La Marche and provide the model or serial number to receive a list of the included accessories.

# 1 Equipment Handling

## 1.1 Storing the IUPS

If the IUPS is to be stored for more than a few days after delivery, it should be stored within its shipping container. The location chosen for storage should be within an ambient temperature of 32 to 104° F (0 to 40°C) with a non-condensing relative humidity of 0 to 95%.

**NOTE:** Storage should not exceed **2 years due to the limited shelf life** of the filter capacitors when they are not in service.

## 1.2 Moving the IUPS

After careful inspection and upon verification that the IUPS is undamaged, identify the enclosure style and weight of the IUPS. Refer to Table 1 below.

	Output VA	Dimensions (inches) (W x D x H)	Dimensions (mm) (W x D x H)	Weight
IUPS	5kVA – 20kVA	32" x 36" x 82"	812.8 x 914.4 x 2082	1600 lb.
	30kVA – 50kVA	64" x 36" x 82"	1625.6 x 914.4 x 2082	2000 lb.
	60kVA	96" x 36" x 82"	2438.4 x 914.4 x 2082	2200 lb.

**Table 1 – Case and Weight**

# 2 Installation

## 2.1 Mounting the IUPS

When mounting the IUPS, consider the size and weight of the unit. The floor must be able to support the weight of the unit, as well as an additional safety factor. Verify the weight of the IUPS using the table above. The following considerations should be taken:

- The location chosen for the system should be within an ambient temperature range of 32 to 104°F (0 to 40°C) with a non-condensing relative humidity no higher than 95%.
- The IUPS should be mounted in an area free of explosive materials and away from drips and splatter.
- The IUPS utilizes fan-assisted cooling, so a clearance of at least 6 in (152 mm) of free air must be maintained on the top and bottom for cooling air.
- Maintain 36 in (914 mm) or more of clearance at all sides of the system in order to allow for operation and maintenance.
- The bolts or screws used to secure the IUPS should be sufficient length to assure a vibration-free mounting. The preferred fastener is a machine bolt backed with a flat washer, lock washer, and nut.
- All hardware should be corrosion-resistant.

## 2.2 Making the Battery Connections

Before beginning any work inside the IUPS, ensure that all incoming AC/DC power is de-energized and/or isolated. Verify that no voltage is present inside the case by using a voltmeter at all input and output terminals. Assure the IUPS that is being used is the same number and type of cell as the IUPS front nameplate specifications. Select wire size using the table below. This is based on an overload **current of 115%** of the input current listed on the IUPS nameplate.

**NOTE:** Feeder breaker should be sized to match the size of the DC protection used in the IUPS.

Breaker Size (Amps)	AWG Minimum Wire Size for AC/DC Connection	AWG Minimum Wire Size for Grounding
15	#14	#14
20	#12	#12
25	#10	#12
30	#10	#10
40	#8	#10
50	#8	#10
60	#6	#10
70	#6	#8
80	#4	#8
90	#4	#8
100	#4	#8
125	#2	#6
150	#1	#6
175	#1/0	#6
200	#2/0	#6
250	#4/0	#4
300	250 MCM	#4
400	400 MCM	#2
500	600 MCM	#2

**Table 2 – AC/DC & Ground Wire Size Minimum Requirements  
(All wires specified in the table are rated at 90 °C or 194 °F)**

**NOTE:** These are recommended sizes per La Marche Standards. The National Electrical Code (NEC) and Local Wiring Codes must be followed.

### **DC Connection Procedure**

Select proper size for the DC wires using the table above. If the distance between the inverter’s DC input and the battery/load exceeds 10 feet, use the Power Wiring Guide in Appendix B to minimize the voltage drop across the wire distance.

Assure all AC/DC circuit breakers are open/OFF. Check polarity of DC input cables and verify with multimeter. The positive battery wire should be connected to the BATTERY (+) terminal and the negative battery wire should be connected to the BATTERY (–) terminal.

**NOTE:** It is recommended to use a battery disconnect breaker between the IUPS and battery bank; helpful during battery or IUPS maintenance.

### 2.3 Making the AC Input, AC Bypass & AC Output Connections

A terminal strip is provided for the utility AC input, AC bypass line, and AC output. Before making any connections to the IUPS, ensure that all incoming AC/DC power is de-energized and/or isolated. Verify that no voltage is present inside the IUPS by using a voltmeter at all input and output terminals. Check that the utility and bypass source voltage and frequency matches the voltage and frequency listed on the IUPS nameplate for the utility source and bypass source.

**NOTE:** Feeder breakers should be sized to match the size of the AC protections used in unit.

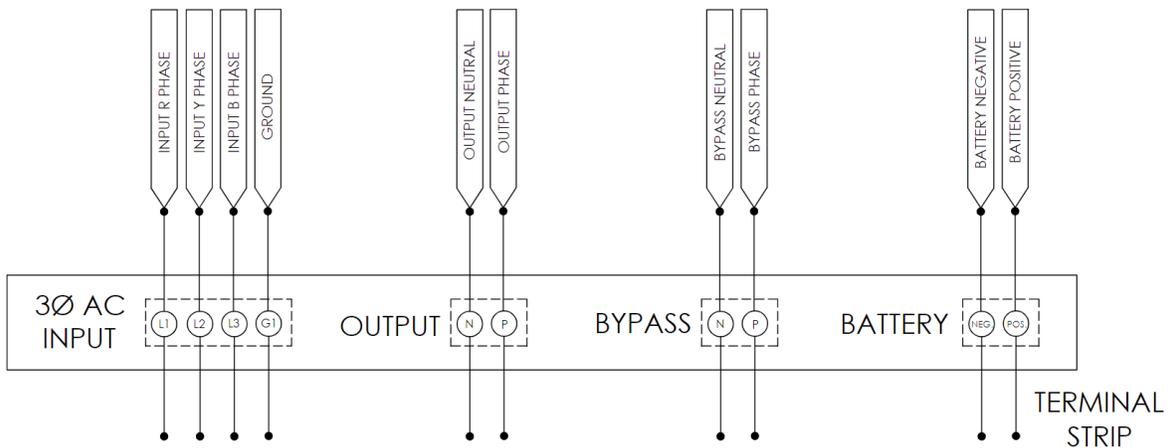
Select wire size for all AC connections using Table 2 based on the circuit breaker size. Connect an adequate earth ground lead (use table on previous page for sizing) to the EARTH terminal.

For 1-phase utility AC input, connect the AC input phase (hot) to the INPUT (P) terminal and the AC input neutral to the INPUT (N) terminal.

For 3-phase utility AC input, connect the 3 AC input phases (hot) to the INPUT (R/Y/B) terminals and the AC input ground to the INPUT (G) terminal.

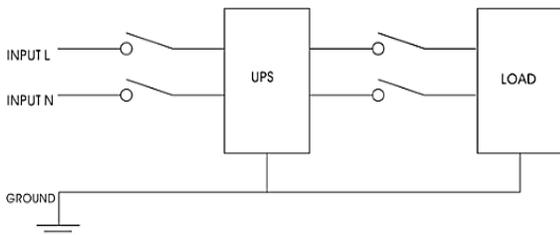
For the AC bypass line, connect the AC bypass line phase (hot) to the BYPASS (P) terminal and the AC bypass line neutral to the BYPASS (N) terminal.

For the AC load, connect the AC load phase (hot) to the OUTPUT (Ø) terminal and the AC load neutral to the OUTPUT (N) terminal.

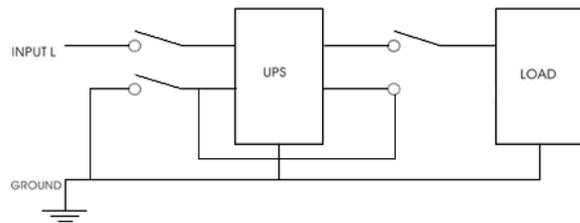


**Figure 2 – Example IUPS Terminals for 3-Phase Input**

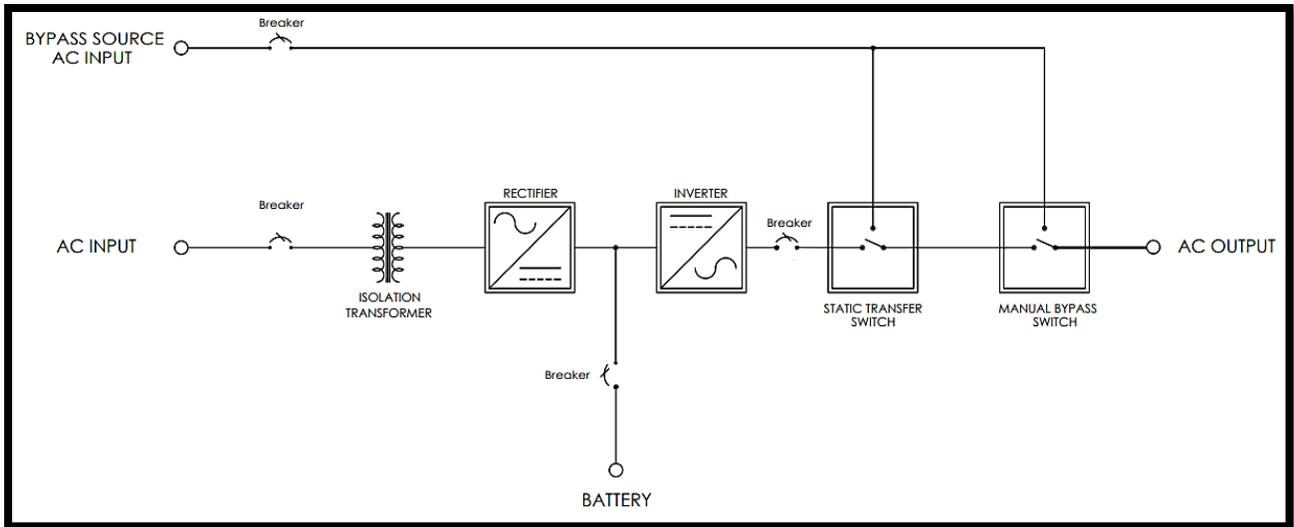
**NOTE:** Assure to perform the power configuration correctly for the incoming AC. Refer to the figures below.



**Figure 3 – Correct Power Configuration**



**Figure 4 – Incorrect Power Configuration**



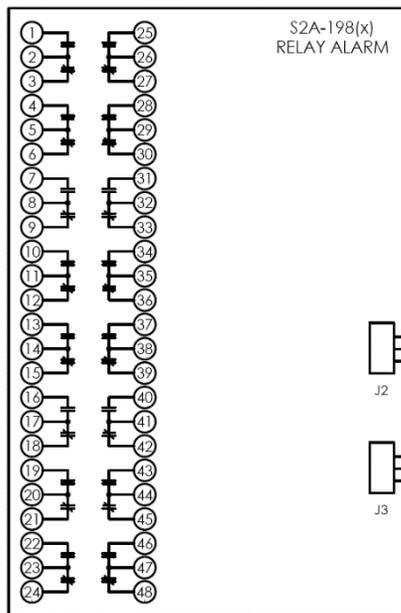
**Figure 5 – Standard IUPS Block Diagram**

## 2.4 Making the Alarm Connections

### 2.4.1 Standard Alarms

The IUPS includes an alarm relay package which allows additional monitoring for the status of the alarms via alarm contacts on the two S2A-198 relay boards. The relay boards each include 8 sets of form "C" contacts which are accessible on terminals 1 through 48. Each alarm is assigned one set of form "C" contacts, enabling the user to connect remote annunciators using the provided terminals. Refer to Figure 6.

If an alarm condition occurs for longer than 5 seconds, the respective alarm relay will activate. When an alarm activates, the specific indicator on the front panel will light, any connected remote annunciators will activate, and the HMI display will activate the respective alarms.



**Figure 6 – User Connections to Alarm Contacts**

<b>Load</b>	Resistive Load (P.F. = 1)
<b>Contact Material</b>	Ag (Au clad)
<b>Maximum Allowed Current</b>	2 A
<b>Max. Operating Voltage and Current</b>	0.5 A at 125 VAC
	0.25 A at 125 VDC
<b>Max. Switching Capacity</b>	2 A at 30 VDC
	62.50 VA
<b>Min. Permissible Load</b>	10 $\mu$ A, 10 mVDC

**Table 3 – Alarm Contact Specifications**

<u>RELAY NO.</u>	<u>RELAY ALARMS PARAMETER</u>	<u>CONDITION</u>
RELAY 1	BATTERY ALARM	BATTERY HIGH ALARM
		BATTERY LOW ALARM
		BATTERY OVER TEMP ALARM
RELAY 2	UPS OVERLOAD ALARM	BYPASS OVERLOAD ALARM
		INVERTER OVERLOAD ALARM
RELAY 3	UPS OVER TEMP ALARM	CHARGER OVER TEMP ALARM
		INVERTER OVER TEMP ALARM
		RECTIFIER OVER TEMP ALARM
		STATIC BYPASS OVER TEMP ALARM
RELAY 4	UTILITY FAIL ALARM	UTILITY ABSENT
		UTILITY FREQ OUT
		UTILITY VOLTAGE LOW PHASE 1
		UTILITY VOLTAGE LOW PHASE 2
		UTILITY VOLTAGE LOW PHASE 3
		UTILITY VOLTAGE HIGH PHASE 1
RELAY 5	RECTIFIER FAIL ALARM	RECTIFIER OFF SHORT CIRCUIT
		RECTIFIER OFF OPEN CIRCUIT
		RECTIFIER OFF OVER HEAT
		RECTIFIER OFF CV HIGH
RELAY 6	INVERTER FAIL ALARM	INVERTER OUTPUT VOLTAGE HIGH
		INVERTER OUTPUT VOLTAGE LOW
		INVERTER OFF OUTPUT VOLTAGE HIGH
		INVERTER OFF OUTPUT VOLTAGE LOW
		INVERTER OFF SHORT CIRCUIT
		INVERTER OFF OPEN CIRCUIT
		INVERTER OFF OVER LOAD
		INVERTER OFF OVER TEMP
		INVERTER OFF BATT LOW
INVERTER OFF BATT HIGH		
RELAY 7	BYPASS FAIL ALARM	BYPASS OFF VOLTAGE LOW
		BYPASS OFF VOLTAGE HIGH
		BYPASS FREQUENCY OUT
		BYPASS OFF OVERLOAD
RELAY 8	BREAKER TRIP ALARM	BYPASS ABSENT
		UTILITY BREAKER TRIP
		BATTERY BREAKER TRIP
		OUTPUT BREAKER TRIP
RELAY 9	COMMUNICATION FAIL	BYPASS BREAKER TRIP
		PERIPHERAL TO MAINS CARD COMM
RELAY 10	HMI FAIL	PERIPHERAL TO STATIC CARD COMM
RELAY 11	SUMMARY FAIL	UTILITY/RECTIFIER FAIL ALARM
		UPS OVERLOAD
		BATT OVER TEMP
RELAY 12	BATTERY TEST ALARM	BATTERY TEST IN PROGRESS
RELAY 13	FAN FAIL ALARM	FAN 1 FAIL
		FAN 2 FAIL
RELAY 14	SYSTEM ON MANUAL BYPASS	MBS SWITCH
RELAY 15	STATIC SWITCH FAIL	SCR FAIL

**Table 4 – Alarm Relay Assignment and Definitions**

**NOTE:** The logic of all alarm relays is Energize on Failure.

## Alarm Connection Procedure

Before making any connections to the IUPS, ensure that the AC Power is off at the main breaker box and that all of the IUPS's breakers are open/off. Verify that no voltage is present by using a voltmeter at all input and output terminals.

If it is desired that the annunciator be active until the alarm triggers, connect the annunciator leads to the **NC** and **C** contacts of the desired alarm. If it is desired that the annunciator be activated after the alarm triggers, connect the annunciator leads to the **NO** and **C** contacts of the desired alarm.

## 2.5 Making the Temperature Compensation Connection

The battery's Float and Equalize voltages are specified at a nominal temperature of 25°C (77°F). However, a battery's charging requirements change with cell temperature. If the battery temperature deviates by more than a few degrees Celsius from nominal, temperature compensation should be used to optimize the charger output for battery life.

As the battery temperature increases above 25°C, the charging voltage must decrease to maintain the target Float current. If the battery temperature decreases below 25°C, the charging voltage must increase to maintain the target Float current.

The IUPS temperature compensation rate can easily be adjusted in the Configuration tab under System Setting/Battery section from 1mV/°C/cell to 5mV/°C/cell. The temperature compensation considers 25°C as the nominal ambient temperature and adjusts the voltage level based on the difference between the actual temperature and 25°C. The battery manufacturer should be consulted for the proper temperature compensation slope, as well as the Float and Equalize voltage set points.

**Example:** *Temperature Compensation rate has been set to 3mV/°C/cell, with 60 Lead Acid cells, and the probe reads 40°C.*

- *The temperature deviation is  $(25-40) = -15^{\circ}\text{C}$*
- *$3\text{mV} \times -15^{\circ}\text{C} \times 60 \text{ cells} = -2.7\text{V}$ .*
- *Therefore, the charger's output voltage will then be 2.7V less than the set point voltage at the nominal 25°C.*

An external temperature probe is standard and will compensate for overall ambient temperature changes if the batteries and charger are in the same room.

## Temperature Compensation Connection Procedure

Before making any connections to the IUPS, ensure that the AC Power is off at the main breaker box and that all of the IUPS's breakers are open/off. Verify that no voltage is present by using a voltmeter at all input and output terminals.

Simply connect the red probe wire to the positive (+) Temp Comp terminal and the black probe wire to the negative (-) Temp Comp terminal.

## 3 User Interface

### 3.1 Manual Bypass Switch (MBS)

Whenever it is required to run IUPS on the bypass source; verify if the system is ready for manual bypass by checking the source sync state on the header of the HMI display. If the display reads "In Sync," the user may turn the manual bypass rotary switch (MBS) from the UPS position to the Bypass position. System running on manual bypass will power the load directly from the bypass and will not travel through the static switch. The load will not operate on the inverter or static switch until the operator turns the MBS to the UPS position. Below are the different MBS selections:

- **UPS Mode:** The IUPS output is dependent on the static switch, prioritizing inverter over bypass.
- **Test Mode:** The IUPS output is being supplied by the bypass source and allows for troubleshooting.
- **Bypass Mode:** The IUPS output is being supplied by the bypass source and allows for servicing.

### 3.2 Breakers

All breakers in the system connect power from the different sources to the IUPS system. The status of the breakers can be seen on the HMI display either from the alarm window or main screen. Below are the definitions of the provided breakers:

- **Input Breaker:** The breaker which connects the utility source to the rectifier.
- **Battery Breaker:** The breaker which connects the battery to the rectifier and inverter.
- **Bypass Breaker:** The breaker which connects the bypass source to the MBS.
- **Inverter Output Breaker:** The breaker which connects the inverter output to the static switch.

### 3.3 Display

The display is a capacitive touch type which allows the user to perform the following:

1. Turn the inverter ON/OFF using a touch icon on the home page.
2. View important parameters like input/output/bypass voltage, frequency, power, load%, type of fault (if any trigger), the status of a system like IUPS running on mains or bypass or battery source, etc.
3. Personalize (i.e. set their name and password, location, write a small note) the system.
4. Save and configure data logging (power output, power input, load%) of the last 30 days.
5. Set various parameters as desired.
6. Collect and view stored data logs using a USB drive.

For details on all the features, refer to Section 5.

## **4 Operation**

### **4.1 Checking the Installation**

All equipment is shipped from the factory fully checked and adjusted based on the model number. Do not make any adjustments unless the equipment has been powered-up and the settings have been determined to be incorrect.

Before attempting to start up the IUPS, check and verify that all connections are correct. Check that all terminations and contacts are tightened securely. Check that the transformer is set for the correct input voltage and that the input frequency matches the nameplate of the system. Check that the battery voltage matches the DC input voltage on the nameplate of the system.

### **4.2 Starting/Stopping the IUPS**

Once proper connections are established, the IUPS may be energized. For proper starting and stopping of the IUPS, follow the procedures below:

#### **Starting the IUPS Procedure**

STEP 1: Assure all connections are correctly wired.

STEP 2: Confirm all of the IUPS circuit breakers are open/off and MBS is set to UPS.

STEP 3: Close the Battery Breaker.

STEP 4: Close the Input AC Breaker; the IUPS should ramp up and the HMI display should energize.

STEP 5: On the HMI display, set the Inverter ON/OFF switch to ON.

STEP 6: Close the Inverter Output Breaker.

STEP 7: Close the Bypass Breaker.

#### **Stopping the IUPS Procedure**

STEP 1: On the HMI display, set the Inverter ON/OFF switch to OFF by navigating to the following menu:

Configuration → Inverter → Inverter OFF/RESET

STEP 2: Open all the IUPS AC breakers.

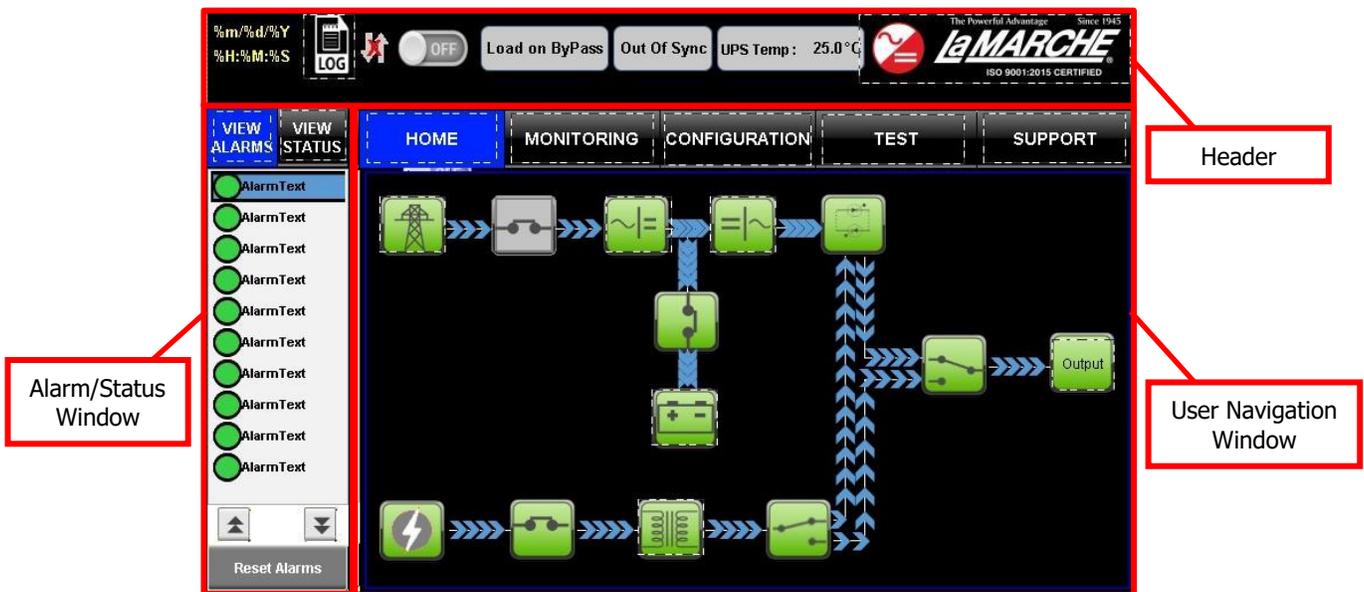
STEP 3: Open all the IUPS DC breakers.

## 5 HMI Display

HMI display is used to run the UI of IUPS. When the IUPS is powered up, the HMI starts with the logo of La Marche as shown below, followed by the main screen after 2 seconds:

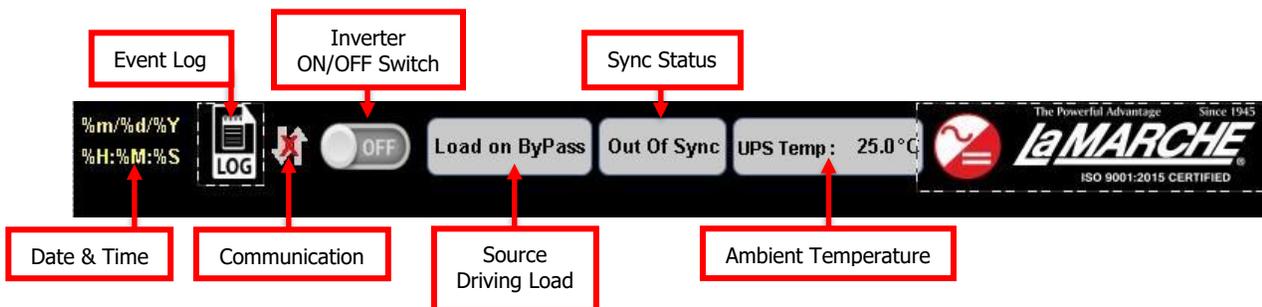


The main page is divided into 3 parts:



### 5.1 Header

The header is further divided into 7 components as explained below with functions:

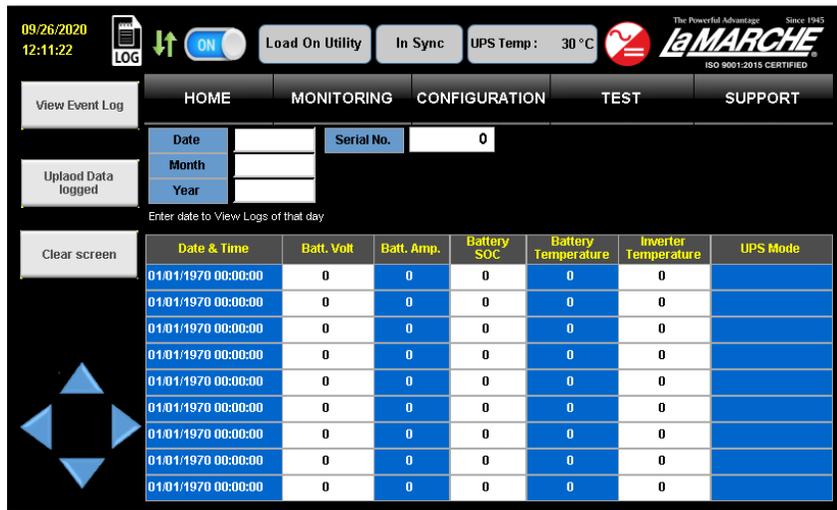


### 5.1.1 Date and Time

This shows the set current date and time. In case time is incorrect, it may be changed in the System Details under the Configuration tab. Refer to Section 5.3.3.1. As it is not connected to any network, it will not be updated to the standard time. It is advised to set the time when the IUPS is powered up for the first time.

### 5.1.2 Event Log

The Event Log icon allows the user to view the occurring events. The IUPS utilizes the user-installed USB drive to log the events, such as triggered alarms, state changes, or faults. Pressing the Event Log icon will open the data logging window, as shown below.



The data log will store the following information under a new Serial Number in the occurrence of an event:

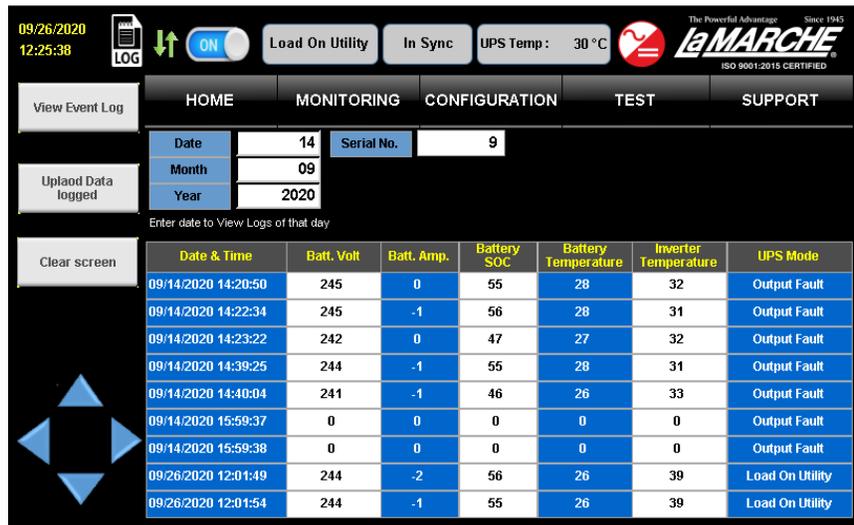
- Date & Time (Time Stamp)
- Battery Voltage
- Battery Amps
- Battery SOC
- Battery Temperature
- Inverter Temperature
- UPS Mode (Source Driving Load)
- Utility Phase 1 Voltage
- Utility Phase 2 Voltage
- Utility Phase 3 Voltage
- Utility Phase 1 Current
- Utility Phase 2 Current
- Utility Phase 3 Current
- Utility Phase 1 Frequency
- Utility Phase 2 Frequency
- Utility Phase 3 Frequency
- Utility Power (Not Available)
- Utility Energy (Active Power in Watts)
- Rectifier Voltage
- Rectifier Current
- Inverter Voltage
- Inverter Current
- Inverter Frequency
- Bypass Voltage
- Bypass Frequency
- Event Name

**NOTE:** The USB drive must be installed before powering up the IUPS in order for the data logging feature to function. Removing the USB drive will halt the data logging.

Below are the types of events which the IUPS will create a data log:

- If rectifier state has changed (EX: Rectifier has been shut off due to user or fault)
- If inverter state has changed (EX: Inverter has been shut off due to user or fault).
- If bypass source status has changed (EX: Bypass source has been shut off due to user or fault).
- If state of manual bypass switch has changed.
- If state of inverter output breaker has changed.
- If state of battery breaker has changed.
- If fan becomes faulty.
- If load source has changed.

The data logging window displays the logs of the date entered in the text boxes by the user. In order to view the logs, the user must enter the Date, Month, Year, and Serial Number in the corresponding text boxes. Afterwards, the Upload Data Log icon must be pressed to load the data log on-screen. Below is an example of the data log and the information provided:



### 5.1.3 Communication Icon

The Communication Icon shows the communication status of the HMI display with the IUPS, it has 2 indications:

Icon	Description
	Communication is absent
	Communication is present

### 5.1.4 Inverter On/Off Switch

The Inverter On/Off Switch icon on the HMI header is a switch which has 2 states, ON or OFF. It indicates whether the inverter section of the IUPS is on or off. This icon only allows the state of the switch to be changed from OFF to ON, which powers up the inverter in the IUPS.

To turn OFF the inverter, the user must enter the Configuration window, enter the password, press the Inverter icon under System Setting, and press the the ON icon.

Icon	Description
	Inverter is OFF
	Inverter is ON

### 5.1.5 Source Driving Load

The Source Driving Load textbox provides information on which source is currently driving the AC load. The messages have a priority assigned in order to display the most critical information in the event of an output fault; 1 and 2. Messages with priority 1 will overwrite any priority 2 message on the textbox. Below are the different messages shown and their priority:

Source of Load	Priority	Description
Output Fault	1	Output Failure
Load On Manual Bypass	2	Load Is Being Driven by Bypass Source (MBS set to Bypass)
Load On Bypass		Load Is Being Driven by Bypass Source (MBS set to UPS)
Load On Utility		Load Is Being Driven by Utility Source
Load On Battery		Load Is Being Driven by Battery Source

### 5.1.6 Sync Status

The Sync Status textbox indicates the sync status of the inverter output and the bypass supply. It has two possible messages:

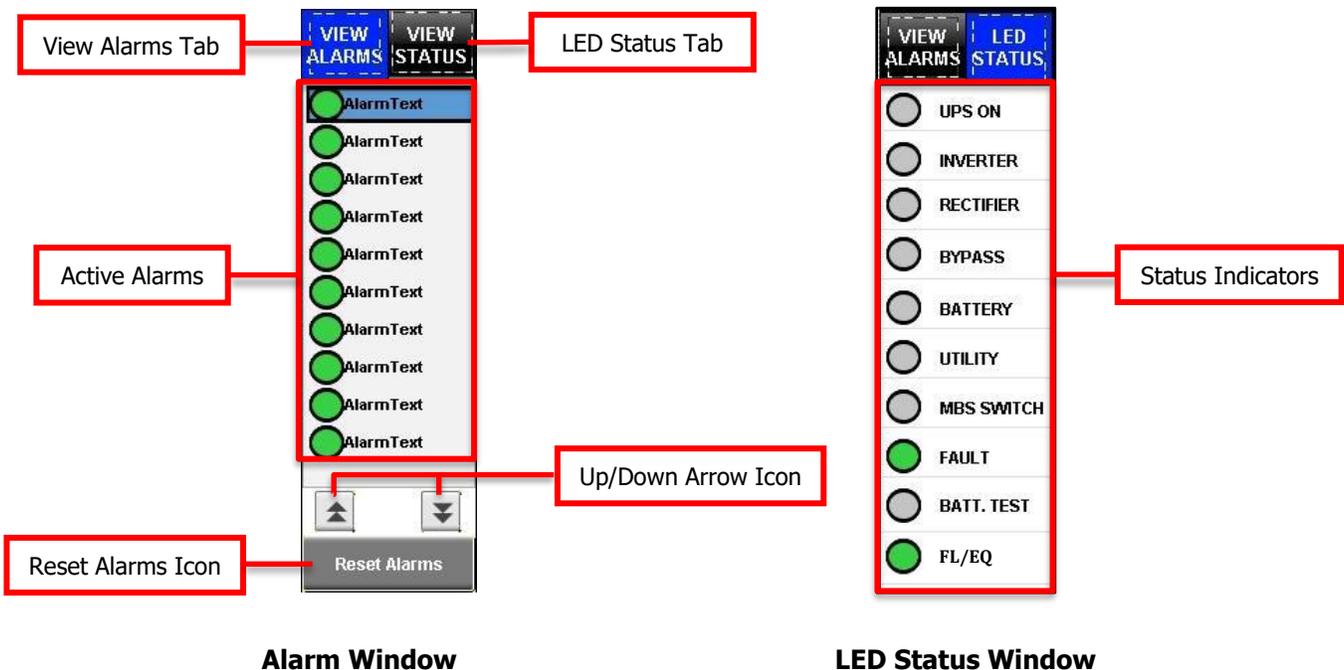
Message	Description
In Sync	Inverter and Bypass Output are in Sync
Out of Sync	Inverter and Bypass Output are not in Sync

### 5.1.7 Ambient Temperature

The Ambient Temperature textbox shows the ambient temperature of the IUPS in degrees Celsius.

## 5.2 Alarm & LED Status Window

This section of the main page is divided into 2 parts: Alarm window and LED Status window.



### 5.2.1 Alarm Window

The Alarm window allows the user to view the alarms currently active in the IUPS, as well as reset all the alarms. To view the alarms, press the View Alarms tab and a list of the active alarms will be shown. The arrow icons may be pressed to scroll through the list of alarms if it exceeds the window area. Below is an example layout:

Alarms displayed in these windows have been listed below.

Alarm Name	Description
Battery High	High Battery Voltage
Battery Low	Low Battery Voltage
Battery Over Temp	High Battery Temperature
Bypass Overload	High Bypass Current
Inverter Overload	High Inverter Current
Charger Over Temp	High Rectifier Temperature
Inverter Over Temp	High Inverter Temperature
Rectifier Over Temp	High Rectifier Temperature
Static Over Temp	High Static Switch SCR Temperature
Utility Absent	Utility Source is Absent
Utility Freq. Out	Utility Source Frequency Out of Range
Utility Vol Low P1	Low Phase 1 Utility Voltage
Utility Vol Low P2	Low Phase 2 Utility Voltage
Utility Vol Low P3	Low Phase 3 Utility Voltage
Utility Vol High P1	High Phase 1 Utility Voltage
Utility Vol High P2	High Phase 2 Utility Voltage
Utility Vol High P3	High Phase 3 Utility Voltage
Charger Off Short CKT	Charger Shutdown due to Short Circuit
Charger Off Open CKT	Charger Shutdown due to Open Circuit
Charger Off Overheat	Charger Shutdown due to Overtemperature
Charger Off Batt High	Charger Shutdown due to High Battery Voltage
Inverter Voltage High	High Inverter Output Voltage
Inverter Voltage Low	Low Inverter Output Voltage
Inverter Off Short CKT	Inverter Shutdown due to Short Circuit
Inverter Off Open CKT	Inverter Shutdown due to Open Circuit
Inverter Off Overload	Inverter Shutdown due to Overload
Inverter Off Over Temp	Inverter Shutdown due to Inverter Overtemperature
Inverter Off Batt Low	Inverter Shutdown due to Low Battery Voltage
Inverter Off Batt High	Inverter Shutdown due to High Battery Voltage
Bypass Voltage Low	Low Bypass Voltage
Bypass Voltage High	High Bypass Voltage
Bypass Freq Out	Bypass Frequency Out of Range
Bypass Overload	High Bypass Current
Bypass Absent	Bypass Source is Absent
Utility Breaker Trip	AC Input Breaker tripped
Battery Breaker Trip	Battery Breaker tripped
Output Breaker Trip	Inverter Output Breaker tripped
Bypass Breaker Trip	Bypass Breaker tripped
Main Card Comm Error	Communication failure between mains & peripheral card
Static Card Comm Error	Communication failure between static & peripheral card
Fan1 Fail	Inverter upper fan is not working properly
Fan2 Fail	Inverter lower fan is not working properly
UPS on Manual Bypass	MBS set on Manual Bypass
Static Switch Fail	Static switch fault
Inverter Off Volt High	Inverter Shutdown due to High Inverter Voltage
Inverter Off Volt Low	Inverter Shutdown due to Low Inverter Voltage

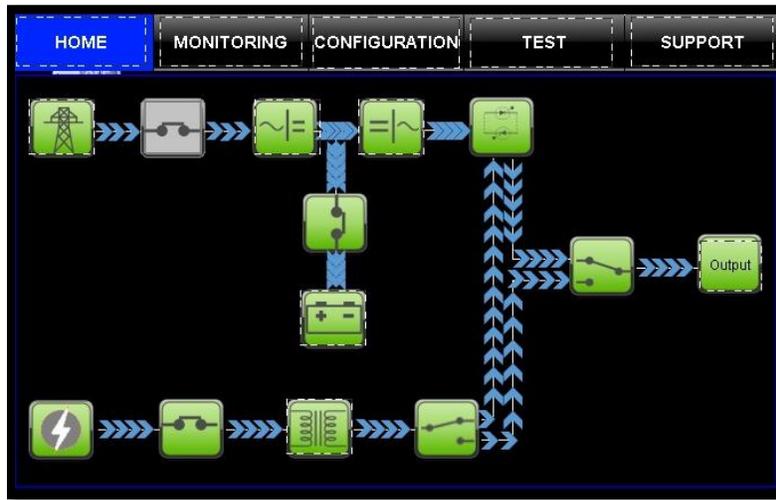
## 5.2.2 LED Status Window

The LED Status window displays the status of various sections of the IUPS. Below is a table listing the available indicators and their description:

LED Status Name	Color	Description
UPS ON	Green	Output voltage is under normal condition
	Red	IUPS fault due to output load or source fault
	Grey	Communication fault
Inverter	Green	Inverter is under normal condition
	Red	Inverter output fault
	Grey	Inverter switch is OFF or Communication fault
Rectifier	Green	Rectifier is under normal condition
	Red	Rectifier fault
	Grey	Rectifier communication fault
Bypass	Green	bypass source is under normal condition
	Red	Bypass section issue
	Grey	Bypass source is absent or Communication fault
Battery	Red	Low/high battery voltage
	Grey	Battery is not connected or Communication fault
	Blinking Green	Battery charging in process or Battery is fully charged
Utility	Green	Utility voltage/frequency is under normal condition
	Red	Utility voltage/frequency out of range
	Grey	Utility is absent or Communication fault
	Green	MBS switch on Bypass
Manual Bypass Switch	Grey	MBS switch on UPS
	Green	Communication is OK
Fault	Red	Communication fault
	Grey	No active battery test
Batt. Test	Blinking Green	Battery test under progress
	Green	Battery test passed
	Red	Battery test fail
	Green	Rectifier on Float Mode
Float/Equalize	Orange	Rectifier on Equalize Mode

### 5.3 User Navigation Window

The User Navigation window is divided into 5 parts: Home, Monitoring, Configuration, Test, and Support. The User Navigation window also displays the status of the IUPS in terms of the sources, breakers, and the power flow.



#### 5.3.1 Home Tab

The Home Window shows the status of IUPS in the form of different icons, as well as by animating Power Flow.

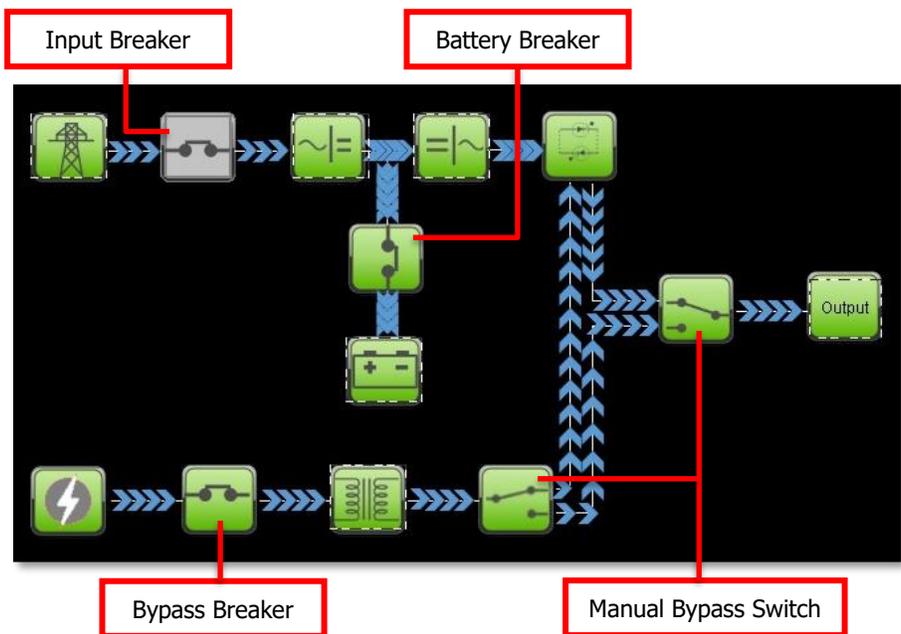
##### 5.3.1.1 Module Icons

The module icons show the status of their respective module in the form of various colors. The module icons are as follows: Utility, Rectifier, Inverter, Static Switch, Output, Battery, Bypass Source, Bypass Isolation Transformer.

Icon	Color	Description
Utility	Grey	HMI unable to read status (Communication Lost)
	Red	Low/High/Absent Utility Voltage or Utility Frequency Out of Range
		Utility Voltage & Frequency is Ok
Rectifier	Grey	HMI unable to read status (Communication Lost) or Utility is absent
	Red	Utility Icon is red or Rectifier is turned off by IUPS
		Utility Voltage & Frequency is Ok
Battery	Grey	HMI unable to read status (Communication Lost) or Open Battery Breaker
	Red	Low/High Battery Voltage or High Battery Temperature
		Battery Voltage within range, Closed Contactor & Closed Battery Breaker
Static Switch	Grey	HMI unable to read status (Communication Lost)
	Red	Static switch is turned OFF by UPS
		Static Switch is ON

Icon	Color	Description
Bypass Source	Grey	HMI unable to read status (Communication Lost)
	Red	Low/High/Absent Bypass Voltage or Bypass frequency is out of range
		Bypass Voltage, Current & Frequency in range
Bypass Isolation Transformer	Grey	HMI unable to read status (Communication Lost) or Open Bypass Breaker
	Red	Bypass Source Icon is red and the Bypass breaker is closed
		Bypass Voltage, Current & Frequency in range
Inverter	Grey	HMI unable to read status (Communication Lost) or Inverter On/Off switch in the HMI header is OFF
	Red	Inverter switch in the HMI header is in ON state and the inverter is in OFF state
		Inverter is ON
	Orange	Inverter Overload, Inverter Overtemperature, Low/High Battery Voltage, High Battery Temperature alarm
Output	Grey	HMI unable to read status (Communication Lost)
	Red	Output Voltage fault or Open Output Breaker
		Output Voltage is within expected limits and the Output Breaker is closed

Other icons left on the home screen are the breaker and switch icons which are described and explained below:

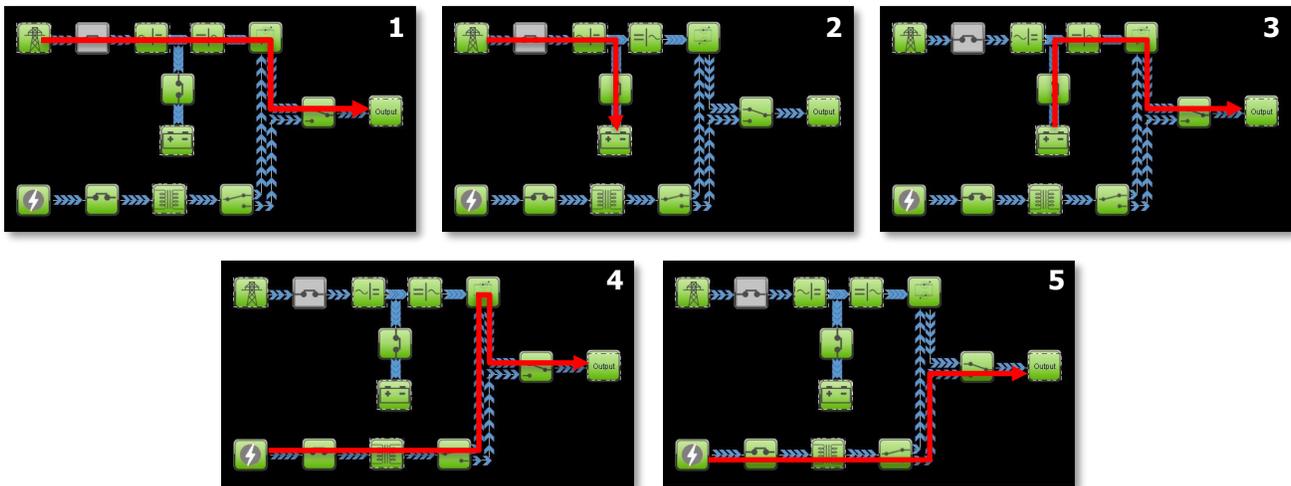


Icon	Color	Description
Input Breaker	Red	Open AC Input Breaker
	Green	Closed AC Input Breaker
	Grey	HMI unable to read status (Communication Lost)
Battery Breaker	Red	Open Battery Breaker
	Green	Closed Battery Breaker
	Grey	HMI unable to read status (Communication Lost)
Bypass Breaker	Red	Open Bypass Breaker
	Green	Closed Bypass Breaker
	Grey	HMI unable to read status (Communication Lost)
Manual Bypass Switch		MBS Switch on UPS
		MBS Switch on Manual Bypass
	Green	Bypass Source is present
	Red	Bypass Source is absent
	Grey	HMI unable to read status (Communication Lost) or Open Bypass breaker

**NOTE:** The Inverter Output Breaker does not have a module icon on the HMI display.

### 5.3.1.2 Power Flow

The home screen also shows Power Flow with animation. The Power Flow is divided into 5 paths and below is the description.



Path	Figure	Description
Mains to Output	1	Utility in range, Rectifier is ON, Inverter is ON, Static Switch on Inverter, MBS in UPS Mode, Output Breaker is closed and Output is OK
Mains to Battery	2	Utility in range, Rectifier is ON, Battery Contactor is closed and Battery is in range
Battery to Output	3	Rectifier is OFF, Battery Contactor is closed, Battery in range, Inverter is ON, Static switch on Inverter, MBS in UPS Mode, Output Breaker is closed and Output is OK
Bypass to Output Through Static Switch	4	Bypass in range, Static switch on Bypass, MBS in UPS Mode, Output Breaker is closed and Output is OK
Bypass to Output Through Manual Bypass	5	Bypass in range, MBS in Manual Bypass Mode, and the Output Breaker is closed

### 5.3.2 Monitoring Tab

The Monitoring tab allows the user to view important parameters of the IUPS. These parameters are broadly divided into 6 sections: Utility, Battery, Inverter, Bypass, UPS Output, and System.

HOME	MONITORING	CONFIGURATION	TEST	SUPPORT
<b>UTILITY</b>		<b>BATTERY</b>		<b>INVERTER</b>
	Ph - 1	Ph - 2	Ph - 3	Unit
Voltage	0	0	0	Volt
Current	0.0	0.0	0.0	Amp.
Frequency	0.0	0.0	0.0	Hz.
Apparent Power	0.000			KVA
Active Power	0.000			KW
Breaker	ABC			
Voltage	0.0			Volt
Current	0.0			Amp
Frequency	0.0			Hz
Inverter Temp.	00.0			°C
<b>BYPASS</b>		<b>UPS OUTPUT</b>		<b>SYSTEM</b>
Voltage	0			Model No.
Frequency	0.0			Name/ID
Current	0			Location
Breaker	ABC			Serial No.
Source	Load on Battery			
Voltage	0			
Current	0			
Frequency	0.0			
Active Power	0.0			
Apparent Power	0.0			
Power Factor	0.00			

On the touch of any of the sections under the Monitoring tab, the respective pop up appears. Below are sections in detail.

#### 5.3.2.1 Utility Section

The Utility screen displays parameters relating to the utility source. Below is the Utility screen, which appears after pressing on the Utility box on-screen when in the Monitoring tab. The description of each parameter is also shown below:

UTILITY				
	Ph - 1	Ph - 2	Ph - 3	Unit
Voltage	0	0	0	Volt
Current	0	0	0	Amp.
Frequency	0.0	0.0	0.0	Hz.
Apparent Power	0			KVA
Active Power	0			KW

Parameters	Description	Units
Voltage	Utility Voltage per Phase	Volts
Current	Utility Current per Phase	Amps
Frequency	Utility Frequency per Phase	Hz
Apparent Power		
Active Power	Utility Active Power per Phase	KW

### 5.3.2.2 Battery Section

The Battery screen displays parameters relating to the battery. Below is the Battery screen, which appears after pressing on the Battery box on-screen when in the Monitoring tab. The description of each parameter is also shown below:

The screenshot shows a screen titled "BATTERY" with a back arrow. It contains the following parameters and units:

Voltage	0	Volt
Current	0.0	Amp
Disch. Elap. time	0	min
Removed Ah	0	
SOC	0	%
Ah Rating	0	
Battery Temp.	0	°C
Last Test Date	%m/%d/%Y %H:%M:%S	
Last Test Result	ABC	CT
Breaker	ABC	

Parameter	Description	Unit
Voltage	Battery Voltage	Volts
Current	Battery Current (+ if Charging, – if Discharging)	Amps
Discharge Elapsed Time	Time since Battery began Discharging	Minutes
Removed AH	Amp-hours Used Since Full Charge	Ah
SOC	Battery State of Charge	%
Ah Rating	Battery Amp-hour Rating (Set in The Configuration)	Ah
Battery Temperature	Battery Temperature (via Temp Comp Probe)	°C
Last Test Date		
Last Test Result		
Breaker	Battery Breaker Status	Closed/Open

### 5.3.2.3 Inverter Section

The Inverter screen displays parameters relating to the inverter. Below is the Inverter screen, which appears after pressing on the Inverter box on-screen when in the Monitoring tab. The description of each parameter is also shown below:

← INVERTER		
Voltage	0	Volt
Current	0	Amp
Frequency	0.0	Hz
Inverter Temp.	0	°C

Parameter	Description	Unit
Voltage	Inverter Output Voltage	Volts
Current	Inverter Output Current	Amps
Frequency	Inverter Output Frequency	Hz
Inverter Temperature	Inverter Temperature (via internal probe)	°C

### 5.3.2.4 Bypass Section

The Bypass screen displays parameters relating to the bypass source. Below is the Bypass screen, which appears after pressing on the Bypass box on-screen when in the Monitoring tab. The description of each parameter is also shown below:

← BYPASS		
Voltage	0	Volt
Current	0	Amp
Frequency	0.0	Hz
Breaker	ABC	

Parameter	Description	Unit
Voltage	Bypass Source Voltage	Volts
Current	Bypass Source Current	Amps
Frequency	Bypass Source Frequency	Hz
Breaker	Bypass Breaker Status	Open/Closed

### 5.3.2.5 UPS Output Section

The UPS Output screen displays parameters relating to the UPS output. Below is the UPS Output screen, which appears after pressing on the UPS Output box on-screen when in the Monitoring tab. The description of each parameter is also shown below:

The screenshot shows a screen titled "UPS OUTPUT" with a back arrow. It displays the following parameters and values:

Source	ABC
Voltage	0 Volt
Current	0 Amp
Frequency	0.0 Hz
Active Power	0.0 KW
Apparent Power	0.0 KVA
Power Factor	0.00

Parameter	Description	Unit
Source	Source Driving the Load	
Voltage	UPS Output Voltage	Volts
Current	UPS Output Current	Amps
Frequency	UPS Output Frequency	Hz
Active Power	UPS Output Active Power	KW
Apparent Power		
Power Factor	UPS Output Power Factor	

### 5.3.2.6 System Section

The System screen displays parameters relating to the IUPS system. Below is the System screen, which appears after pressing on the System box on-screen when in the Monitoring tab. The description of each parameter is also shown below:

The screenshot shows a screen titled "SYSTEM" with a back arrow. It displays the following parameters and values:

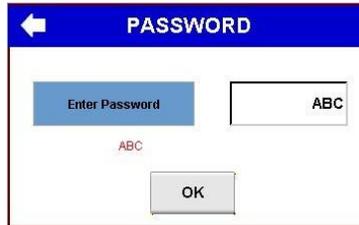
Model No.	ABC
Name/ID	ABC
Location	ABC
Serial No.	ABC

Parameter	Description
Model Number	IUPS Factory Model Number
Name/ID	System Name
Location	IUPS Location Name
Serial Number	IUPS Factory Serial Number

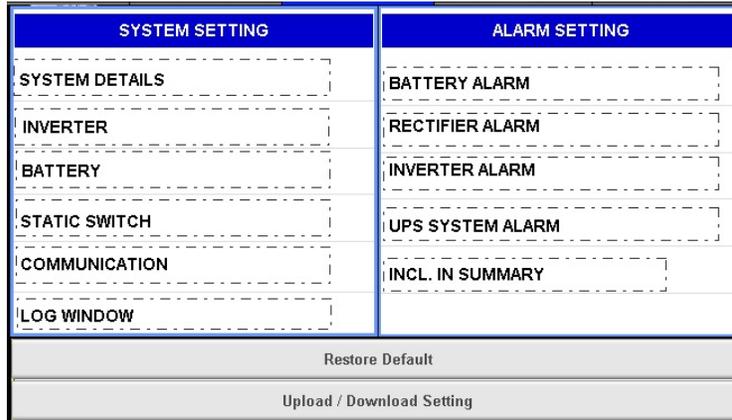
### 5.3.3 Configuration Tab

The Configuration tab contains all the user settings for IUPS. The Configuration section of the IUPS is password-protected. Once the Configuration tab is pressed, the password dialog box will appear as shown below and will request the password to gain access. The default password is 1188 and is customizable through the Configuration section.

To enter the password, press the blank text box and use the on-screen keyboard to type the password. Afterwards, press the Enter key on the on-screen keyboard and the OK icon.

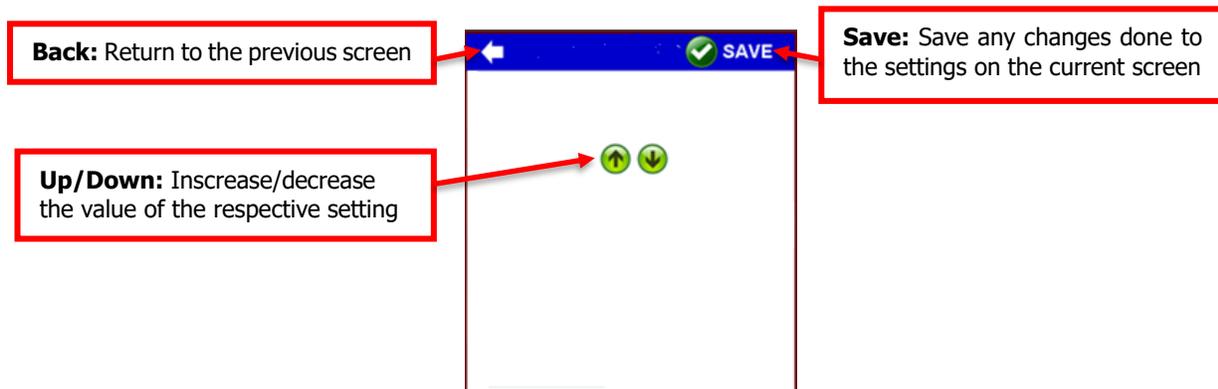


The Configuration tab is divided broadly into 4 parts: System Settings, Alarm Settings, Restore Default, and Upload/Download Settings.



#### 5.3.3.1 System Setting

The System Setting section contains the user settings of IUPS. The System Setting has the following subsections: System Details, Inverter, Battery, Static Switch, Communication, and Log Window. Each section has a respective pop-up on touch and the settings would appear to the user. Each pop-up will have few functions in common which is explained below.



### System Details

Pressing the System Details icon on the Configuration tab will have the below pop-up appear. It contains basic settings of the system as listed and explained in the table.

Parameter	Unit	Valid Values	Default Value	Description
Name/ID	NA	Char string		System Name (displaying purposes)
Location	NA	Char string		System Location (displaying purposes)
Date and Time	DD/MM/YYYY-HH:MM: AM/PM	--	--	HMI date and time
Display Timeout	Hours	1-60	5	Screen Saver Mode Time Delay At 0, screen saver is disabled
Password	NA	4-Digit Numeric String	1188	Set Password for IUPS configuration
Output Breaker Option		Yes/No		Select if Output Breaker is/isn't used in IUPS

### Inverter

Pressing the Inverter icon on the Configuration tab will have the below pop-up appear. It contains Inverter settings as listed and explained in the table.

Parameter	Unit	Valid Values	Default Value	Steps	Description
Output Voltage	AC Volts	110-130	120	10	Inverter Output Voltage
Output Frequency	Hz	50-60	60	Check box	Inverter Output Frequency
Inverter OFF/RESET		OFF only			Inverter ON/OFF switch to power off inverter output

## Battery

Pressing the Battery icon on the Configuration tab will have the below pop-up appear. It contains Battery settings as listed and explained in the table below. It also contains the settings of High DC Shutdown and Low DC Shutdown alarm. This pop-up has two pages. To view the next page, press the Next icon. To view the previous page, press the Back icon.

Parameter	Unit	Valid Values	Default Value	Steps	Description	Relay No. Activated
Battery Type	-	NiCad/LA	LA	Check box	Battery type	-
Battery Cell	-	58-60L, 92-98N	60L, 96N	1	Number of battery cells to be charged	-
Battery Capacity	Ah	10-250	110	1	Battery amp-hour rating	-
No. of Strings	-	1-10	1	1	Number of battery banks	-
Current Limit	Amps	6-30	10	1	Maximum allowable output current	-
Float Voltage	Volt/Cell	2.12-2.30L, 1.39-1.45N	2.25L, 1.40N	0.01	Float Charging Voltage	-
Equalize Voltage	Volt/Cell	2.25-2.40L, 1.5-1.60N	2.33L, 1.55N	0.01	Equalize Charging Voltage	-
Equalize Timer	Hour	1-24	8	1	Equalize mode running time	-
Equalize Mode	-	P1, P2, P3, P4	P1	Check box	P1: Equalize mode activated manually via HMI P2: Equalize mode auto-activated every 7 days P3: Equalize mode auto-activated every 14 days P4: Equalize mode auto-activated every 28 days	-
Start Equalize Cycle	-	-	-	-	Manual equalize mode start	-
Remote Equalize	-	ENABLE, DISABLE	ENABLE	Check box	Enable/disable remote equalize	-
Temp. Comp. Rate	mV/°C/Cell	1-5	3	1	The rate at which charging voltage will increase or decrease depending on the temperature	-
Low DC Voltage Inverter Shutdown	Volt/Cell	1.60-1.85L, 0.95-1.10N	1.75L, 1.00N	0.01	Minimum allowable DC voltage for inverter to shut down	6 & 11
High DC Voltage System Shutdown	Volt/Cell	2.40-2.75L, 1.45-1.80N	2.50L, 1.65N	0.01	Maximum allowable DC voltage for inverter to shut down	6 & 11

**NOTE:** L/LA – Lead Acid, N – NiCad.

## Static Switch

Pressing the Static Switch icon on the Configuration tab will have the below pop-up appear. It contains Static Switch settings as listed and explained in the table below:

Parameter	Unit	Valid Values	Default Value	Description	Relay No. Activated
Output voltage high limit	% (+)	5-20	10	Maximum acceptable output voltage before it is deemed unavailable. Static switch will transfer to alternate source.	-
Output voltage low limit	% (-)	-20-(-5)	-10	Minimum acceptable output voltage before it is deemed unavailable. Static switch will transfer to alternate source.	-
Inverter voltage high limit	%(+)	0-10	10	Maximum acceptable inverter voltage before it is deemed unavailable. Static switch will transfer to bypass source if available.	6 & 11
Inverter voltage low limit	% (-)	-10-0	-5	Minimum acceptable inverter voltage before it is deemed unavailable. Static switch will transfer to bypass source if available.	6 & 11
Bypass Voltage High Limit	% (+)	0-15	10	Maximum acceptable bypass voltage before it is deemed unavailable. Static switch will transfer to inverter source if available.	7
Bypass Voltage Low Limit	% (-)	-20-0	-5	Minimum acceptable bypass voltage before it is deemed unavailable. Static switch will transfer to inverter source if available.	7
Inverter Frequency Range	% (±)	1-5	5	Acceptable inverter frequency range before it is deemed unavailable. Static switch will transfer to bypass source if available.	-
Bypass Frequency Range	% (±)	1-5	5	Acceptable bypass frequency range before it is deemed unavailable. Static switch will transfer to inverter source if available.	7
Out of Sync	Deg.(+)	0-10	5	Maximum allowable amount of degrees the two sources may have in difference in order for the sources to be considered out of phase.	-
Transfer Delay	Seconds	0-60	20	Time delay the IUPS will attempt to retransfer from the bypass source back to the inverter source.	-

Parameter	Unit	Valid Values	Default Value	Description	Relay No. Activated
Output Voltage High Limit	% (+)	5-20	10	Maximum acceptable output voltage before it is deemed unavailable. Static switch will transfer to alternate source.	-
Output Voltage Low Limit	% (-)	-20-(-5)	-10	Minimum acceptable output voltage before it is deemed unavailable. Static switch will transfer to alternate source.	-
Inverter Voltage High Limit	%(+)	0-10	10	Maximum acceptable inverter voltage before it is deemed unavailable. Static switch will transfer to bypass source if available.	6 & 11
Inverter Voltage Low Limit	% (-)	-10-0	-5	Minimum acceptable inverter voltage before it is deemed unavailable. Static switch will transfer to bypass source if available.	6 & 11
Bypass Voltage High Limit	% (+)	0-15	10	Maximum acceptable bypass voltage before it is deemed unavailable. Static switch will transfer to inverter source if available.	7
Bypass Voltage Low Limit	% (-)	-20-0	-5	Minimum acceptable bypass voltage before it is deemed unavailable. Static switch will transfer to inverter source if available.	7
Inverter Frequency Range	% (±)	1-5	5	Acceptable inverter frequency range before it is deemed unavailable. Static switch will transfer to bypass source if available.	-
Bypass Frequency Range	% (±)	1-5	5	Acceptable bypass frequency range before it is deemed unavailable. Static switch will transfer to inverter source if available.	7
Out of Sync	Deg.(+)	0-10	5	Maximum allowable amount of degrees the two sources may have in difference in order for the sources to be considered out of phase.	-
Transfer Delay	Seconds	0-60	20	Time delay the IUPS will attempt to retransfer from the bypass source back to the inverter source.	-

### Communication

Pressing the Communication icon on the Configuration tab will have the below pop-up appear. It contains Communication settings as listed and explained in the table below:

Parameter	Valid Values	Default Value	Steps
Address	1-255	1	1
Baud Rate	9600, 14400, 115200	9600	Drop Down Selection
Parity	EVEN, ODD, NONE	NONE	Drop Down Selection
Stop Bits	1, 1.5, 2	1	Drop Down Selection

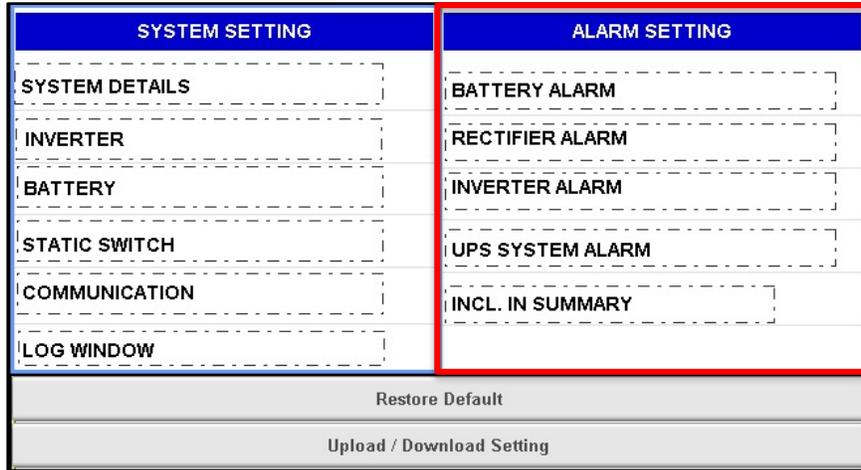
### Log Window

Pressing the Log Window icon on the Configuration tab will have the below pop-up appear. It contains Log Window settings as listed and explained in the table below:

Parameter	Unit	Valid Values	Default Value	Steps	Description
Event Log Status		Enable/Disable	Enable		Enable or disable event logging by timer
Logging Interval	Hrs.	1-60	5	1	Time interval after which data would be logged in the event log
Erase All Logs					Erase all event logs

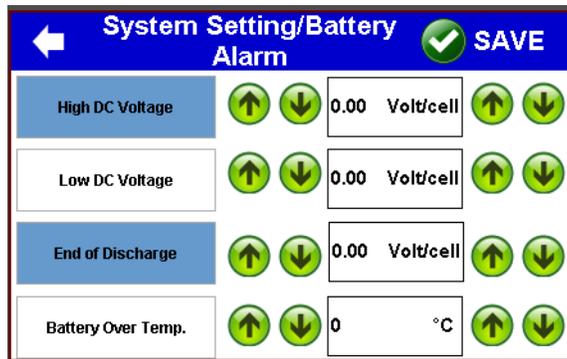
### 5.3.3.2 Alarm Setting

The Alarm Setting section includes all the configurable alarm settings. The Alarm Setting has the following subsections: Battery Alarms, Rectifier Alarms, Inverter Alarms, UPS System Alarms, and Included in Summary. Each section has a respective pop-up on touch and the settings would appear to the user as explained below.



#### Battery Alarm

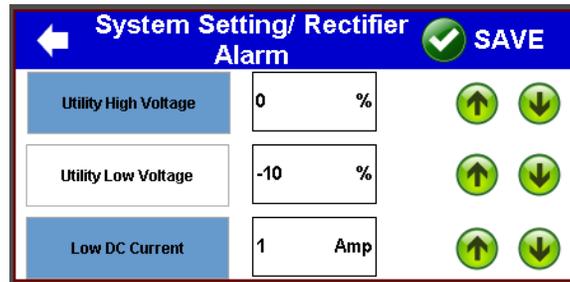
The Battery alarm section contains settings of alarms related to the Battery. On touch, a pop-up menu appears as below:



Parameter	Unit	Valid Values	Default Value	Steps	Description	Relay No. Activated
High Voltage	Volt/Cell	2.20-2.70L 1.44-1.76N	2.45L, 1.60N	0.01	Battery High Voltage Alarm Threshold (Rectifier and Inverter will shutdown)	1 & 6
Low Voltage	Volt/Cell	1.78-2.18L, 1.08-1.78N	1.98L-1.20N	0.01	Battery Low Voltage Alarm Threshold	1
End of Discharge	Volt/Cell	1.60-1.85L, 0.95-1.10N	1.75L, 1.00N	0.01	Battery End of Discharge Alarm Threshold (Rectifier and Inverter will shutdown)	6
Battery Over Temp.	°C	50-90	60	1	Battery Over Temperature Alarm Threshold	1 & 11

### ***Rectifier Alarm***

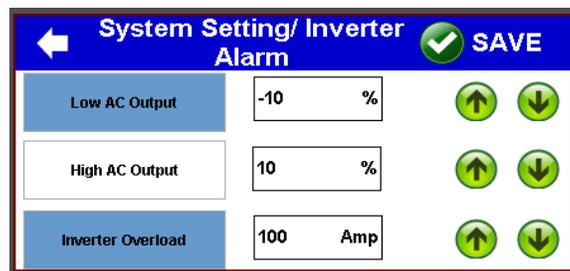
The rectifier alarm section contains settings of alarms related to the Rectifier. On touch, a pop-up menu appears as below:



Parameter	Unit	Valid Values	Default Value	Steps	Description	Relay No. Activated
Utility High Voltage	%	1 to 10	10	1	Utility High Voltage Alarm Threshold	4 & 11
Utility Low Voltage	%	-20 to -1	-10	1	Utility Low Voltage Alarm Threshold	4 & 11
Low DC Current	Amps	0 to 2.0	1	0.1	Low DC Current Alarm Threshold	-

### ***Inverter Alarm***

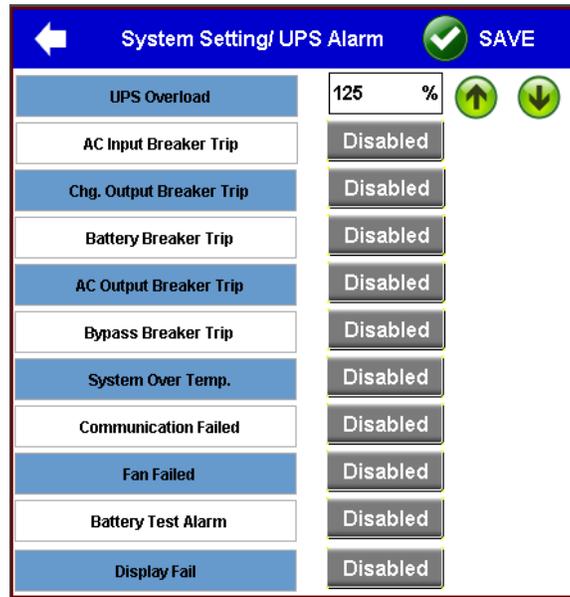
The Inverter Alarm section contains settings of alarms related to the Inverter. On touch, a pop up appears. The section is explained below.



Parameter	Unit	Valid Values	Default Value	Description	Relay No. Activated
Low AC Output	%	-5 to -15	-10	Inverter Output Voltage Low Alarm Threshold	6
High AC Output	%	5-10	10	Inverter Output Voltage High Alarm Threshold	6
Inverter Overload	%	70-115	100	Inverter Current Overload Alarm Threshold	2 & 11

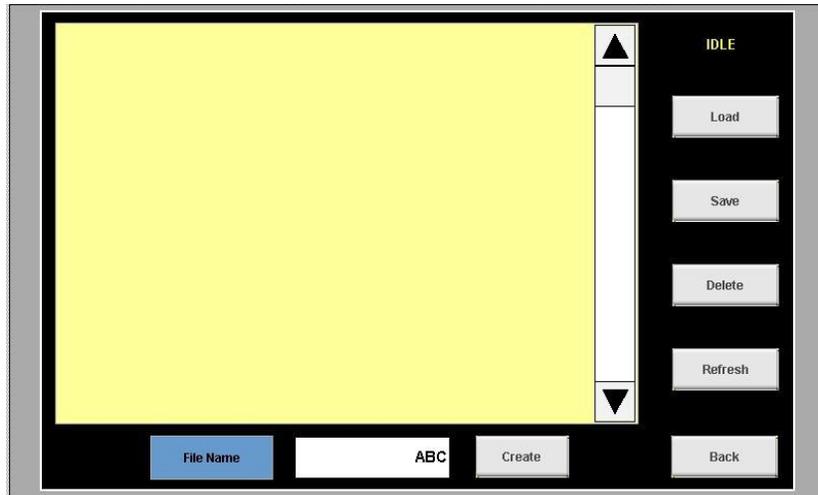
### UPS System Alarm

UPS System alarms contain the setting of relay alarms connected to UPS and are provided for external indicators or alarms to be connected. On touch, a pop up appears. The section is explained below.



Parameter	Valid Values	Default Value	Description	Relay No. Activated
UPS Overload	70-135%	125%	UPS (Inverter/Bypass) Current Overload Alarm Threshold	2 & 11
AC Input Breaker Trip	Enable / Disable	Enable	AC Input Breaker Open/Trip Alarm Enable	8
Battery Breaker Trip	Enable / Disable	Disable	Battery Breaker Open/Trip Alarm Enable	8
AC Output Breaker Trip	Enable / Disable	Disable	AC Output Breaker Open/Trip Alarm Enable	8
Bypass Breaker Trip	Enable / Disable	Disable	Bypass Breaker Open/Trip Alarm Enable	8
System Over Temp.	Enable / Disable	Enable	UPS (Inverter/Rectifier) Over Temperature Alarm Enable	3
Comm. Failed	Enable / Disable	Enable	Peripheral to Mains/Static Switch Board Comm. Fail Alarm Enable	9
Fan Failure	Enable / Disable	Enable	Fan 1 & 2 Failure Alarm Enable	13
Battery Test Alarm				
HMI Display Fail	Enable / Disable	Enable	HMI Display to IUPS Communication Failure Alarm Enable	10





- **Directory Display:** Displays a list of saved configuration files on the connected USB drive.
- **Load:** Loads the configuration file saved on the connected USB drive.
- **Save:** Creates a configuration file of the current settings and stores the file on the connected USB drive.
- **Delete:** Deletes the currently selected configuration file.
- **Refresh:** Refreshes the directory display to show a list of saved configuration files on the connected USB drive.
- **Back:** Closes the Upload/Download Setting screen.
- **File Name:** The name of the configuration file to be created.
- **Create:** Creates a configuration file of the current settings and stores the file in the connected USB drive.

Loading and saving configuration files can be done by connecting a USB drive to the back of the HMI display; accessible by opening the front panel. Once connected, press the Refresh icon and a list of all configuration files stored in the USC drive will appear on the Directory Display.

To load, save, or delete a configuration file, press the desired configuration file shown on the Directory Display and then press the desired function.

To create a configuration file of the current IUPS settings, press the white textbox beside the File Name icon to type a name for the configuration file using the pop-up keyboard. Once the file name has been typed, press the Create icon to create the configuration file.

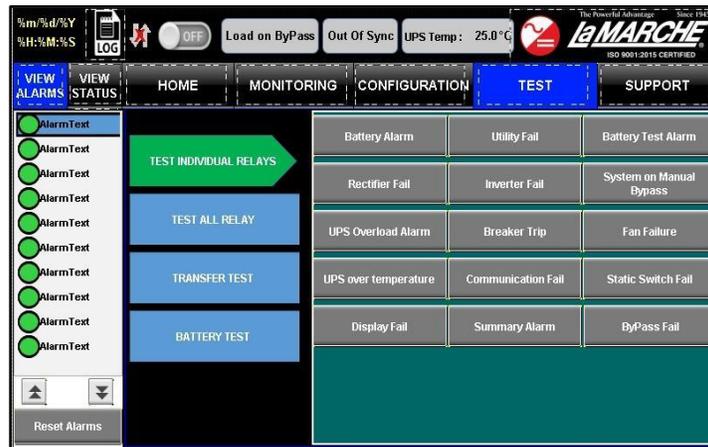
When interacting with the connected USB drive, one of the two following messages will appear:



The USB Error message will appear when there is an error with the USB drive (EX: Corrupted or faulty USB drive). The Data Saved/Loaded Successfully message will appear when the saving or loading process with the USB drive has been successful.

### 5.3.4 Test Tab

The Test Tab allows the user to perform test for the alarm relays, as well as a transfer test. The Test tab is further divided into 4 sections; Test Individual Relays, Test All Relays, Transfer Test, and Battery Test. Each section will be explained in further details below.



#### 5.3.4.1 Test Individual Relays

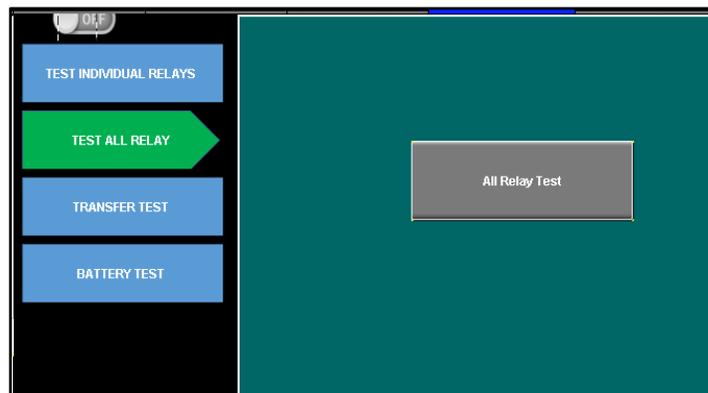
The Test Individual Relays section is made to let the user check the individual relay alarm connected to the IUPS. On each relay, an alarm is printed with a name according to related connection. The list of individual relays is:

- Battery Alarm
- UPS Overload Alarm
- UPS Over Temperature
- Utility Fail
- Rectifier Fail
- Inverter Fail
- Bypass Fail
- Breaker Trip
- Communication Fail
- HMI Display Fail
- Summary Alarm
- Battery Test Alarm
- Fan Failure
- System on Manual Bypass
- Static Switch Fail

The relay assignment and conditions to trigger are shown on Table 4 under Section 2.4.1 for reference. Pressing on one of the alarm icons will change the state of the selected relay, whether it will energize or de-energize, and the icon will become orange. To end the relay test, press on the orange alarm icon.

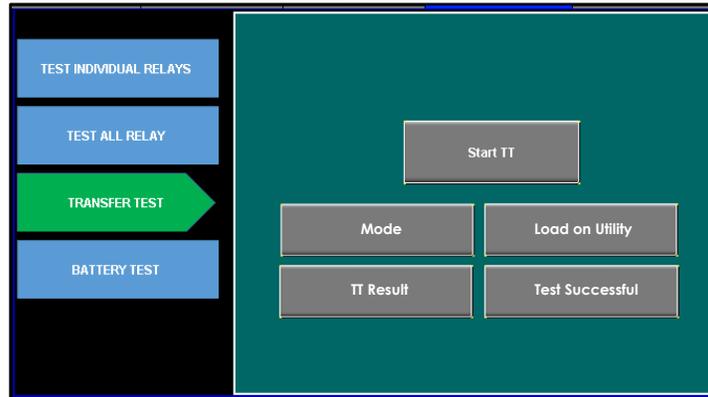
#### 5.3.4.2 Test All Relays

The Test All Relays section allows the user to test all the alarm relays included in the IUPS. To test all relays, Press the All Relay Test icon. The state of all alarm relays will change, whether it will energize or de-energize, and the All Relay Test icon will become orange. To end the relay test, press on the All Relay Test icon once again.



### 5.3.4.3 Transfer Test

The Transfer Test section allows the user to transfer the load from inverter to Bypass or vice versa. It has 2 buttons.



The Mode field will display a message whether the load is on utility or bypass. The TT Result field will display the previous Transfer Test's result. On pressing Start TT, the transfer of source for the connected load will start. The load will be transferred from its current source to the other source, if available. The TT Result field will display one of the 3 following messages:

- **Test Successful:** Transfer test was successful.
- **Bypass Source Fail:** Transfer test has failed due to bypass source issue or absent bypass source.
- **Inverter Fail:** Transfer test has failed due to inverter source issue or absent inverter source.

If the transfer test is initiated without inverter source, the If the present load source is an inverter, then the system will transfer the connected load to Bypass and vice versa in other cases.

### 5.3.4.4 Battery Test

The Battery Test section is not applicable to the IUPS system.

### 5.3.5 Support Tab

The Support tab gives information about La Marche Mfg Company and IUPS. The tab has only 2 sections: About Company & Contacts and User Manual. The sections will go into further detail below.



### 5.3.5.1 About Company and Contacts

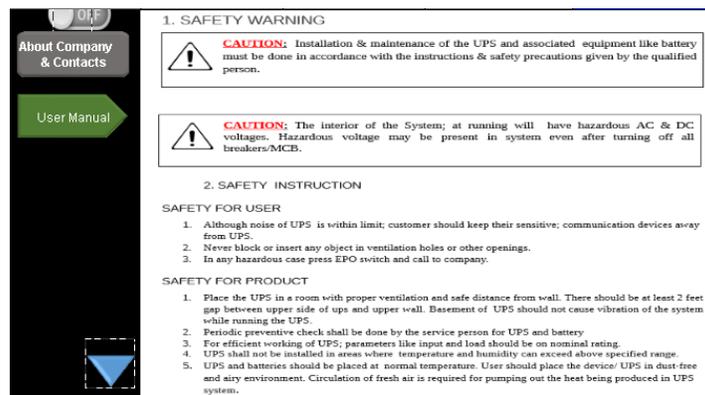
The About Company and Contacts section provides a summary about the company La Marche, as well as contact information.



The screenshot shows a navigation menu on the left with 'About Company & Contacts' selected. The main content area displays the La Marche logo, the tagline 'The Powerful Advantage Since 1945', and the text: 'Since 1945, La Marche has been providing reliable power conversion products. La Marche products include industrial battery chargers, rectifiers, power supplies, inverters and many more. We have built our reputation by controlling all aspects of the development process including design, in-house manufacturing and testing. La Marche is an ISO 9001:2015-certified manufacturer which includes 100% functional testing for every La Marche product. The Company is headquartered in Des Plaines, IL. Contact: service@lamarchemfg.com Phone: 847-298-1188 Fax: 847-298-3061 Emergency Contact: Phone: 847-298-8939'.

### 5.3.5.2 User Manual

The User Manual section to view general information regarding the system.



The screenshot shows the 'User Manual' section with a navigation menu on the left. The main content area is titled '1. SAFETY WARNING' and contains two caution boxes. The first box states: 'CAUTION: Installation & maintenance of the UPS and associated equipment like battery must be done in accordance with the instructions & safety precautions given by the qualified person.' The second box states: 'CAUTION: The interior of the System, at running will have hazardous AC & DC voltages. Hazardous voltage may be present in system even after turning off all breakers/MCB.' Below this is '2. SAFETY INSTRUCTION' which is divided into 'SAFETY FOR USER' and 'SAFETY FOR PRODUCT'. The 'SAFETY FOR USER' section includes three points: 1. Although noise of UPS is within limit; customer should keep their sensitive; communication devices away from UPS. 2. Never block or insert any object in ventilation holes or other openings. 3. In any hazardous case press EPO switch and call to company. The 'SAFETY FOR PRODUCT' section includes five points: 1. Place the UPS in a room with proper ventilation and safe distance from wall. There should be at least 2 feet gap between upper side of ups and upper wall. Basement of UPS should not cause vibration of the system while running the UPS. 2. Periodic preventive check shall be done by the service person for UPS and battery. 3. For efficient working of UPS; parameters like input and load should be on nominal rating. 4. UPS shall not be installed in areas where temperature and humidity can exceed above specified range. 5. UPS and batteries should be placed at normal temperature. User should place the device/ UPS in dust-free and airy environment. Circulation of fresh air is required for pumping out the heat being produced in UPS system.

## 6 Service

All work inside the IUPS system should be performed by qualified personnel. La Marche is not responsible for any damages caused by an unqualified technician.



Before working inside the IUPS, ensure the MBS is set to bypass, all power is off at the main breaker panel and the battery has been removed from the IUPS's battery terminals, either by removing the battery cables or exercising the battery disconnect.

### 6.1 Performing Routine Maintenance

Although minimal maintenance is required with the IUPS, routine checks and adjustments are recommended to ensure optimum system performance.

#### Yearly

- Confirm air vents are open. Remove dust and debris from interior of unit.
- Verify all connections are tight.
- Perform a visual inspection on all internal components.
- Check front panel meters for accuracy and LED operation.
- Review data logging for any alarm occurrences within the past months.

#### 7th Year

- If the IUPS is consistently operated in higher temperature environments, all capacitors are recommended to be replaced.

#### 10th Year

- Check magnetics, components and wiring for signs of excessive heat.
- It is recommended to replace all capacitors if not done so at the 7-year interval.

## Appendix A: IUPS Specifications

<b>UPS INPUT</b>	<b>UPS kVA Rating</b>	(Up to 60) kVA
	<b>AC Input Voltage</b>	3 Phase: 380Vac, 400Vac, 415Vac & 480Vac 1 Phase: 120Vac, 208Vac, 220Vac, 230Vac & 240Vac
	<b>AC Input Range</b>	-12% / +10%
	<b>Input Frequency</b>	50Hz or 60Hz (+/-5%)
<b>UPS OUTPUT</b>	<b>AC Output Voltage</b>	1 Phase: 120Vac, 208Vac, 220Vac, 230Vac & 240Vac
	<b>Output voltage stability (0-100% load variation)</b>	Static Balanced Load +/-1% Static Unbalanced Load +/-2% Dynamic Load +/- 3%
	<b>Output Frequency</b>	60Hz +/-0.1% (50Hz Available)
	<b>Frequency Stability</b>	Free Running +/-0.1% Mains sync +/-3%
	<b>Total Harmonic Distortion</b>	With 100% linear load: <3% With 100% non-linear load: <7% (nonlinear load defined by IEC 62040)
	<b>Efficiency</b>	80-85%
	<b>Inverter Overload Capacity</b>	105% for 60 mins 125% for 10 mins 150% for 1 min >150% for 200mS
	<b>Load Power Factor</b>	0.8 lagging to 0.8 leading
	<b>Output Crest Factor Admissible</b>	3:1
<b>DC LINK</b>	<b>DC Voltage</b>	120Vdc   240Vdc   360Vdc
	<b>DC Voltage Range</b>	(110-145) Vdc   (220-264) Vdc   (330-440) Vdc
	<b>Inverter DC Input Voltage Range</b>	-20% / 18%
	<b>Rectifier Output Voltage Stability</b>	<1%
	<b>Rectifier Output Voltage Ripple</b>	<2%
	<b>Battery Charger Capacity</b>	10% of system capacity (higher capacity charger available on request)
<b>STATIC SWITCH</b>	<b>kVA Rating</b>	125% of system Rating
	<b>Transfer Time</b>	<1mS
	<b>Overload Capacity</b>	125% for Continuous 150% for 10 minutes 200% for 1 minute 1000% for 1 cycle
<b>MANUAL BYPASS</b>	<b>Switch Type</b>	Rotary Switch
	<b>Switching</b>	Make Before Break

<b>PROTECTION</b>	<b>Protection</b>	Input Under Voltage, Input Over Voltage, Output Under Voltage, Output Over-Voltage, Battery Over Charging, Input in Rush Current Protection by soft start as well as pre-charge circuit, Output Over Load, Battery Under Voltage, DC Over Voltage, Output Short Circuit
<b>ENVIRONMENTAL</b>	<b>Ambient Temperature</b>	0 <sup>0</sup> to 40 <sup>0</sup> C (32 <sup>0</sup> to 104 <sup>0</sup> F)
	<b>Relative Humidity</b>	0-95% non-condensing
	<b>Operating Altitude</b>	Up to 1000 meters without derating the output
	<b>Noise Level</b>	65-70 dBA @ 1 meter
<b>MECHANICAL</b>	<b>Enclosure Color</b>	ANSI Grey or as Requested
	<b>Cooling</b>	Fan assisted (kVA rating dependent)
	<b>External Protection</b>	IP20 as standard (others available upon request)
	<b>Dimensions</b>	According to ratings and options
	<b>Compliance (pending)</b>	UL 1778   NEMA PE1   IEC 62040-1/-2/-3   FCC Part 15 Class A

## Appendix B: Power Wiring Guide

Use the following formulas and table to determine proper wire size for minimal voltage drop. At distances exceeding 10 feet, the DC wire size should be chosen to keep the voltage difference between the IUPS's DC input terminals and the battery at less than 1/2 volt when the IUPS is fully loaded.

### Table of Conventions:

*CMA* = Cross section of wire in circular MIL area

*A* = Ultimate drain in amps

*LF* = Conductor loop feet

*MaxAmp* = Maximum allowable amps for given voltage drop

*AVD* = Allowable voltage drop

*K* = 11.1 for commercial (TW) copper wire

= 17.4 for aluminum

### Calculating Wire Size Requirements:

$$CMA = \frac{A \times LF \times K}{AVD}$$

Size (AWG)	Area CIR.MILS	Size (MCM)	Area CIR.MILS
18	1620	250	250000
16	2580	300	300000
14	4110	350	350000
12	6530	400	400000
10	10380	500	500000
8	16510	600	600000
6	26240	700	700000
4	41740	750	750000
3	52620	800	800000
2	66360	900	900000
1	83690	1000	1000000
0	105600	1250	1250000
00	133100	1500	1500000
000	167800	1750	1750000
0000	211600	2000	2000000

Table 5 – Wire Size/Area Table

### Calculating Current Carrying Capacity of Wire:

$$MaxAmp = \frac{CMA \times AVD}{LF \times K}$$

## Appendix C: Technical Specifications

Single Phase Input																	
	Model Number	KVA Rating	UPS Output / Bypass Input						AC Input						DC Bus		
			Phase	Output Current (A) @ Output Volts (V)				Freq. (Hz)	Phase	Input Current (A) @ Input Volts (V)				Freq. (Hz)	Voltage (Vdc)	Rectifier Capacity (A)	Inverter Input Current (A)
				120	208	220	240			120	208	220	240				
120 Vdc	IUPS-5K	5	1PH	41.7	24.1	22.8	20.9	60	1PH	116	67	63.3	58	60	120	60	56.1
	IUPS-10K	10	1PH	83.4	48.1	45.	41.7	60	1PH	---	133.9	126.6	116	60	120	120	112.1
	IUPS-15K	15	1PH	125	72.2	68.2	62.5	60	1PH	---	200.8	189.8	174	60	120	180	168.1
240 Vdc	IUPS-5K	5	1PH	41.7	24.1	22.8	20.9	60	1PH	116	67	63.3	58	60	240	30	28.1
	IUPS-10K	10	1PH	83.4	48.1	45.5	41.7	60	1PH	---	133.9	126.6	116	60	240	60	56.1
	IUPS-15K	15	1PH	125	72.2	68.2	62.5	60	1PH	---	200.8	189.8	174	60	240	90	84.1

Three Phase Input																	
	Model Number	KVA Rating	UPS Output / Bypass Input						AC Input						DC Bus		
			Phase	Output Current (A) @ Output Volts (V)				Freq. (Hz)	Phase	Input Current (A) @ Input Volts (V)				Freq. (Hz)	Voltage (Vdc)	Rectifier Capacity (A)	Inverter Input Current (A)
				120	208	220	240			208	380	415	480				
120 Vdc	IUPS-5K	5	1PH	41.7	24.1	22.8	20.9	60	3PH	33.8	18.6	17	14.7	60	120	60	56.1
	IUPS-10K	10	1PH	83.4	48.1	45.5	41.7	60	3PH	67.6	37.1	33.9	29.3	60	120	120	112.1
	IUPS-15K	15	1PH	125	72.2	68.2	62.5	60	3PH	101.4	55.6	50.9	44	60	120	180	168.1
	IUPS-20K	20	1PH	166.7	96.2	91	83.4	60	3PH	140.9	77.1	70.6	61.1	60	120	250	224.1
	IUPS-30K	30	1PH	250	144.3	136.4	125	60	3PH	211.3	115.7	105.9	91.6	60	120	375	336.2
	IUPS-40K	40	1PH	333.4	192.4	181.9	166.7	60	3PH	281.7	154.2	141.2	122.1	60	120	500	448.2
240 Vdc	IUPS-5K	5	1PH	41.7	24.1	22.8	20.9	60	3PH	33.8	18.6	17	14.7	60	240	30	28.1
	IUPS-10K	10	1PH	83.4	48.1	45.5	41.7	60	3PH	67.6	37.1	33.9	29.3	60	240	60	56.1
	IUPS-15K	15	1PH	125	72.2	68.2	62.5	60	3PH	101.4	55.6	50.9	44	60	240	90	84.1
	IUPS-20K	20	1PH	166.7	96.2	91	83.4	60	3PH	140.9	77.1	70.6	61.1	60	240	125	112.1
	IUPS-30K	30	1PH	250	144.3	136.4	125	60	3PH	211.3	115.7	105.9	91.6	60	240	185	168.1
	IUPS-40K	40	1PH	333.4	192.4	181.9	166.7	60	3PH	281.7	154.2	141.2	122.1	60	240	250	224.1
	IUPS-50K	50	1PH	416.7	240.4	227.3	208.4	60	3PH	338	185.1	169.5	146.5	60	240	300	280.2
	IUPS-60K	60	1PH	500	288.5	272.8	250	60	3PH	422.5	231.3	211.8	183.1	60	240	375	336.2

## **Appendix D: Manufacturer's Warranty**

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory and is warranted to be free from any defect in workmanship and material that may develop within one year from date of purchase. In addition to the standard one (1) year warranty, La Marche warrants its magnetics and power diodes on a parts replacement basis only for four (4) more years under normal use.

Any part or parts of the equipment (except fuses, DC connectors and other wear-related items) that prove defective within a one (1) year period shall be replaced without charge providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. Magnetics and power diodes are warranted for five (5) years after date of purchase. During the last four (4) years of this five (5) year warranty period, the warranty covers parts replacement only and no labor or other services are provided by La Marche, nor is La Marche obligated to reimburse the owner or any other person for work performed.

Should a piece of equipment require major component replacement or repair during the first year of the warranty period, these can be handled in one of two ways:

1. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer during the first year. Transportation charges or duties shall be borne by purchaser.
2. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard LaMarche units will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

The above warranty is exclusive, supersedes and is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer, nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an official of the manufacturer.

## Appendix E: Document Control and Revision History

Part Number: 145047  
Instruction Number: P25-LIUPS-1  
Issue ECN: 23468

<b>23468 – 10/23</b>	22908- 05/21		