



# 9900 Series

## MMS Monitoring System

### User's Manual

U-ENM00038 Rev. 1

June 19, 2016

## **PREFACE**

The following Manual describes the operation, display information and functions of the Monitoring System for the Mitsubishi Electric three-phase, continuous duty, on-line solid-state Uninterruptible Power Supply Multi-Module System, hereafter referred to as the UPS MMS and MMS Monitoring System respectively.

Figures depicted in this manual may differ from the screen images on an installed CLC configuration due to differences in revision level, UPS module quantity, CLC customization and user configurable selections. Please consult the installation's shop drawing submittal for comparison.

**TABLE OF CONTENTS**

LIST OF TABLES .....	iii
LIST OF FIGURES .....	iv
HOW TO USE .....	vi
REVISIONS .....	vii
ACRONYMS .....	viii
WARNING.....	ix
1. BASIC FUNCTION .....	1
2. MMS MONITORING SYSTEM – SOFTWARE .....	2
2.1 SETUP SCREENS .....	3
2.1.1 DISPLAY DATA DETAILS .....	5
2.1.2 USER ORIENTATION DETAILS .....	5
2.2 ADMINISTRATIVE SETTINGS SCREEN .....	6
2.2.1 INITIALIZE CONFIGURATION WINDOW .....	6
2.2.2 CLC BREAKER CONFIGURATION WINDOW .....	7
2.2.3 EMAIL ENABLE .....	7
2.2.4 SCREEN PASSWORD ENTRY.....	8
2.2.5 SCREEN DETAILS .....	8
2.2.6 INITIALIZE CONFIGURATION WINDOW DETAILS.....	10
2.2.7 CLC CONFIGURATION WINDOW DETAILS .....	11
2.3 PASSWORD SETTINGS SCREEN .....	12
2.3.1 PASSWORD SETTING INPUT SCREEN FUNCTION TOUCH ICONS.....	12
2.4 ALARM OUTPUT / CONTACT SETTINGS SCREEN .....	13
2.4.2 DRY CONTACTS CONDITION TOUCH ICONS.....	13
2.4.1 SETTINGS SCREEN DETAILS.....	13
2.4.3 CONDITIONS SCREEN FUNTION TOUCH ICON .....	14
2.5 MAIN OVERVIEW SCREEN.....	15
2.5.1 DISPLAY DETAILS 1.....	16
2.5.2 DISPLAY DETAILS 2.....	17
2.6 UPS MODULE DATA SCREEN.....	18
2.6.2 USER ORIENTATION DETAILS .....	19
2.7 SYSTEM ALARM AND EVENT OVERVIEW DATA SCREEN.....	20
2.8 UPS MODULE ALARM AND EVENT DATA SCREEN .....	22
2.9 SYSTEM TREND DATA SCREEN .....	23
2.10 SYSTEM OPERATION [INVERTER↔BYPASS] TRANSFER WINDOW .....	24
2.10.1 CONDITIONS .....	26
2.10.2 SYSTEM INVERTER↔BYPASS OPERATION .....	27
3. MMS MONITORING SYSTEM – HARDWARE.....	28
3.1 DEVICE CONFIGURATION.....	29
3.2 GRAPHIC OPERATOR TERMINALS.....	30
3.3 AUXILIARY I/O MODBUS/TCP INTERFACE .....	31

4. FUTURE MITSUBISHI ELECTRIC MONITORING AND EVENT FUNCTIONALITY SOFTWARE.....	33
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APPENDICES

APPENDIX A DEFINITIONS

APPENDIX B MODBUS/TCP SLAVE REGISTERS

APPENDIX C PASSWORDS

APPENDIX D HMI SCREEN DISPLAY EXAMPLES

**LIST OF TABLES**

TABLE 1: DEFAULT SETTINGS FOR STANDARD UPS MMS MONITORING SYSTEM .....	31
TABLE 1B: AUXILIARY I/O REGISTER LIST - OUTPUTS .....	B2
TABLE 2B: AUXILIARY I/O REGISTER LIST - INPUTS .....	B3
TABLE 3B: CLC MIMIC REGISTER LIST .....	B4
TABLE 4B: CLC PARAMETER REGISTER LIST - 32 BIT .....	B5
TABLE 5B: CLC PARAMETER REGISTER LIST - 16 BIT .....	B6
TABLE 6B: UPS PARAMETER REGISTER LIST .....	B6
TABLE 7B: UPS MIMIC REGISTER LIST .....	B15

**LIST OF FIGURES**

FIGURE 1: HMI DISPLAY SCREEN TREE DIAGRAM .....	2
FIGURE 2: SETUP SCREEN 1 .....	4
FIGURE 3: ADMINISTRATIVE SETTINGS SCREEN .....	4
FIGURE 4: ADMINISTRATIVE SETTINGS SCREEN .....	4
FIGURE 5: SETUP SCREEN 1 .....	5
FIGURE 6: ADMINISTRATIVE SETTINGS SCREEN .....	6
FIGURE 7: INITIALIZE CONFIGURATION WINDOW .....	6
FIGURE 8: BREAKER CONFIGURATION WINDOW .....	7
FIGURE 9: EMAIL SETUP WINDOW .....	7
FIGURE 10: SELECT TRIGGER FOR EMAIL .....	7
FIGURE 11: ACCESSING ADMINISTRATIVE SCREEN .....	8
FIGURE 12: ADMINISTRATIVE SETTINGS SCREEN .....	9
FIGURE 13: INITIALIZE SETUP COMPLETE SCREEN .....	10
FIGURE 14: CLC BREAKER CONFIGURATION .....	11
FIGURE 15: PASSWORD SETTINGS SCREEN .....	12
FIGURE 16: OUTPUT CONTACT SETTINGS .....	14
FIGURE 17: OUTPUT CONTACT CONFIGURATION .....	14
FIGURE 18: MAIN OVERVIEW SCREEN .....	16
FIGURE 19: MAIN OVERVIEW SCREEN .....	17
FIGURE 20: MMS OPERATION INVERTER↔BYPASS WINDOW DISPLAY .....	17
FIGURE 21: UPS MODULE DATA SCREEN .....	18
FIGURE 22: INVERTER WINDOW DISPLAY .....	19
FIGURE 23: ANALOG METER DISPLAY .....	19
FIGURE 24: SYSTEM ALARM AND EVENT OVERVIEW SCREEN .....	20
FIGURE 25: UPS MODULE ALARM DATA SCREEN .....	22
FIGURE 26: SYSTEM TREND DATA SCREEN .....	23
FIGURE 27: SYSTEM OPERATION [INVERTER↔BYPASS] TRANSFER WINDOW .....	24
FIGURE 28: UPS MMS MAIN OVERVIEW SCREEN .....	25
FIGURE 29: TRANSFER OPERATION WINDOW .....	25
FIGURE 30: BYPASS↔INVERTER - TRANSFER ENABLE .....	26
FIGURE 31: PARALLELED BYPASS AND MAINTENANCE BYPASS - TRANSFER INHIBITED .....	26
FIGURE 32: BYPASS↔INVERTER - TRANSFER INHIBITED .....	26
FIGURE 33: BYPASS/INVERTER OPERATION WINDOW .....	27
FIGURE 34: UPS MMS MONITORING SYSTEM CONFIGURATION BLOCK DIAGRAM .....	29
FIGURE 35: 9900 SERIES UPS MODULE AGP-4200A HMI DIAGRAM .....	30
FIGURE 36: 9900 SERIES UPS MODULE AGP-4300L HMI .....	30
FIGURE 37: CLC PS-3711/PS4700ZA .....	30
FIGURE 38: OUTSIDE VIEW – AUXILIARY I/O MODBUS/TCP INTERFACE .....	31
FIGURE 39: CONNECTING POINTS, INPUT/OUTPUT .....	31
FIGURE 40: ETHERNET CONNECTING POINT .....	31
FIGURE 1D: UPS MMS INVERTER OPERATION - CAPACITY .....	D2
FIGURE 2D: UPS MMS AND LOAD ISOLATED - CAPACITY .....	D2

FIGURE 3D: UPS MMS BYPASS OPERATION - REDUNDANT .....	D3
FIGURE 4D: UPS MMS BATTERY OPERATION - REDUNDANT .....	D3
FIGURE 5D: UPS MMS INVERTER OPERATION OVERLOAD.....	D4
FIGURE 6D: UPS MMS SYSTEM MAINTENANCE BYPASS OPERATION .....	D4
FIGURE 7D: UPS MMS #1 INDIVIDUAL OPERATION.....	D5
FIGURE 8D: UPS MODULE #1 INVERTER OPERATION.....	D5
FIGURE 9D: SYSTEM ALARM AND EVENT DATA SCREEN – VARIOUS ALARMS.....	D6

## HOW TO USE

This manual is designed for ease of use, and for referencing information. Notes and pictures are used to create visuals on how to use the HMI screen.

For the creation of this manual multiple UPS MMS configuration has been illustrated to show different details on different example screens. Equivalent information is available for any permutation of UPS MMS configuration quantity. Actual screen display will be based on actual CLC configuration in accordance with the Setup Screen selections of UPS Quantity and System Configuration (2,3,4,5,6,7 or 8 UPS Modules: Capacity or Parallel redundant system, Breaker selections).

For this manual, the CLC HMI screen's operation has been simulated from the software package with actual CLC HMI and UPS Module screen data. For this reason some screen display data and measurements are not available and/or not displayed.



**REVISIONS**

This section is used to identify the originator and the specific changes made to a procedure as the result of a revision. Original procedures will be identified by the term 'ORIGINAL' in the Revision section of the footer and title page(s). Subsequent revisions will be identified by number. Recent revisions are highlighted.

Originator: M. Meinert  
Original Date: 6/19/16  
Revision Number: Original

REVISION	RELEASED	APPROVED BY	SIGNATURE	DESCRIPTION
ORIGINAL	6/19/16	M. Meinert		Original Release

**ACRONYMS**

- AC** - Alternating Current
- CB** - Circuit Breaker
- CF** - Compact Flash
- CLC** - Critical Load Cabinet
- CSV** - Comma-Separated Values
- DC** - Direct Current
- GUI** - Graphical User Interface
- HMI** - Human Machine Interface
- I/O** - Input/Output
- IP** - Internet Protocol
- KVA** – Kilovolt Amp
- LBT** - Load Bank Breaker
- MEPPI** - Mitsubishi Electric Power Products, Inc.
- MMS** - Multi Module System
- PLC** - Programmable Logic Controller
- SMB** - Maintenance Bypass Breaker
- SMTP** - Simple Mail Transfer Protocol
- TCP** - Transmission Control Protocol
- UPS** - Uninterruptable Power Supply
- USB** - Universal Serial Bus
- 52L** - Main output breaker of the UPS system
- 52L#** - Output breaker for specific unit

**WARNING****WARNING**

The UPS MMS Monitoring System described herein needs to be set up during UPS MMS installation and commissioning done by qualified and authorized Mitsubishi Electric Service personnel. UPS MMS Monitoring System software installation will be in accordance with the specific UPS MMS configuration.

Default UPS Module and Critical Load Cabinet. HMI's, target Names and IP Addresses shall be utilized in accordance with the standard Mitsubishi Electric system network configuration. Specific customer IP Address allocation can be configured in accordance with appropriate customer IT Department support and specification. Contact Mitsubishi Electric for guidance related to future UPS MMS configuration and network specification changes.

The operating procedure in this manual should be adhered to during configuration and operation of the UPS MMS Monitoring System. Please read this manual carefully and retain it for future reference.

Contact Mitsubishi Electric if further support and information is required.

## 1. BASIC FUNCTION

The MMS Monitoring System will monitor all UPS MMS components and display UPS MMS operational status and information on the HMI. The HMI will be a single user interface point allowing access for all UPS MMS Data. UPS MMS operation sequences shall also be possible from the Monitoring System HMI, and system summary alarm and user selectable system alarm contacts available. All information will be displayed and operator sequences initiated from the HMI. The CLC HMI will be IP interfaced to each UPS Module HMI via Modbus/TCP over Ethernet and will have access to all system UPS Module data via this network. Specific Target names and IP addresses will be allocated to each Monitoring System HMI for reference and identification. The CLC HMI will be Ethernet connected to the Monitoring System Auxiliary I/O Interface module communicating via Modbus/TCP. The Auxiliary I/O inputs will also accept the CLC circuit breaker status contacts for HMI display information. The Auxiliary I/O outputs shall be utilized for system summary alarm and user selectable system output contacts (selectable from the HMI). The CLC HMI software will create the Monitoring System user environment and operational architecture. UPS MMS configuration, UPS Module capacity and UPS quantity will be selectable for HMI display information.

Modbus/TCP: the Modbus protocol enables sharing, reading the variables of each HMI target machine through the TCP/IP network.

Additionally, the HMI UPS MMS Monitoring System shall serve as a Modbus Slave sharing the aggregate data parameters and MMS system information via Modbus/TCP to an IP connected Modbus Master

The following sections describe the Display Touch screens and Monitoring System functions that are available from the HMI.

## 2. MMS MONITORING SYSTEM – SOFTWARE

The MMS Monitoring System HMI will be a single user interface point allowing access for all UPS MMS Data and operation sequences. The following sub sections describe the Display Touch screens and Monitoring System functions that are available from the HMI. The subsequent sections then introduce the MMS Monitoring System Screen Display information and user orientation in detail, covering the HMI Display Screen Tree Diagram, seen in Figure 1, and each specific touch screen and user orientation.

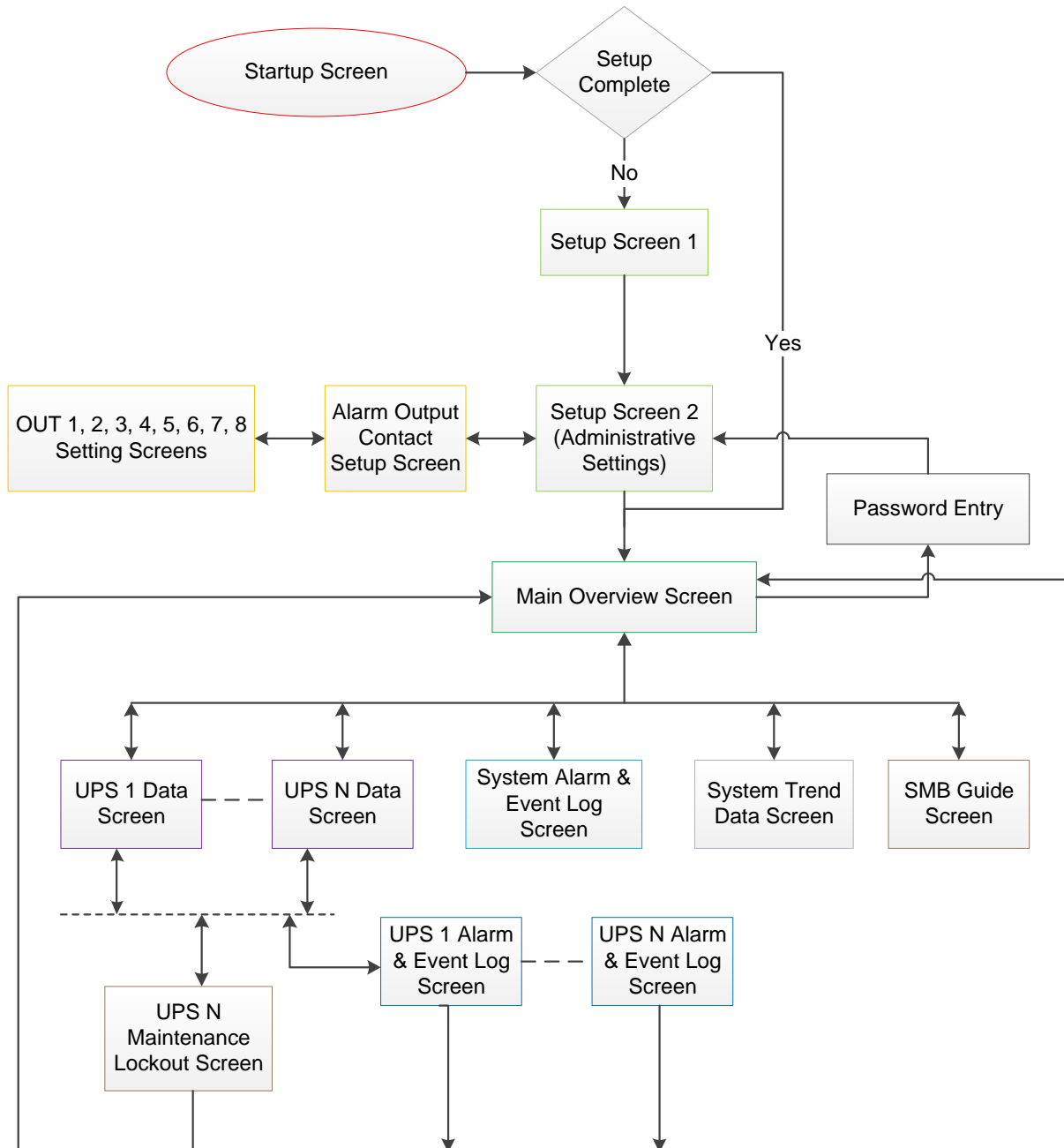


Figure1: HMI Display Screen Tree Diagram

## 2.1 SETUP SCREENS

There are Two (2) Setup Screens that will initialize and configure the MMS Monitoring System:

- **Setup Screen 1:** UPS Module Quantity Capacity setting, KVA confirmation, and Configuration setting (Parallel Redundant, Capacity) (See Figure 8).
- **Administrative Settings:** Password setting, CLC Breaker configuration, Email settings, and Output Contact configuration (See Figure 9)

On initial CLC HMI software install and power up, the initial HMI display will be Monitoring System Setup Screen. The administrator inputs the requested Module Quantity Capacity of the CLC, and Paralleled for Capacity or Redundancy per Setup Screen. This data will be stored in the non-volatile memory. Once the Setup Screen is completed, settings are saved and the Administrative Settings will be displayed. In order to access the Administrative Settings screen (Figure 3), the Administrator Password (Level 5) must be entered. Once on this page, any of the Administrative settings may be set before saving Administrative Settings. The Monitoring System HMI will automatically display the Main Overview Screen for the specific UPS MMS configuration required (Figure 4), and also set a Setup Complete Flag. In the event that the power supply to the Monitoring System (I/O module, etc.) is lost, on power restoration the HMI will confirm the Setup Complete Flag status and if set, start up with the Main Overview displayed (No need to set up MMS Monitoring System again as all data is stored and retrieved). In addition, if the administrator needs to change the UPS MMS Monitoring System Configuration (Future addition or reduction of UPS Modules to expand or reduce the MMS), the administrator can reset the Setup Complete Flag by initializing configuration in Administrative Settings. Setup Screens will again be displayed allowing the administrator to reconfigure the UPS MMS Monitoring System.

**\*Note:** The MMS Monitoring System should be set up during UPS MMS Installation and Commissioned by qualified/authorized Mitsubishi Electric personnel.

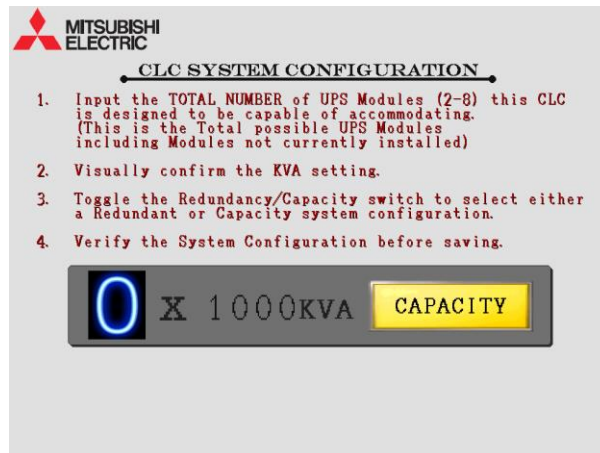


Figure 2: Setup Screen 1

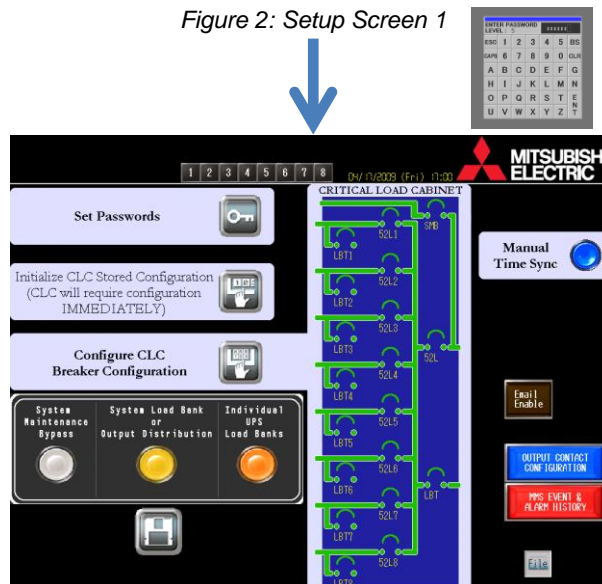


Figure 3: Administrative Settings Screen

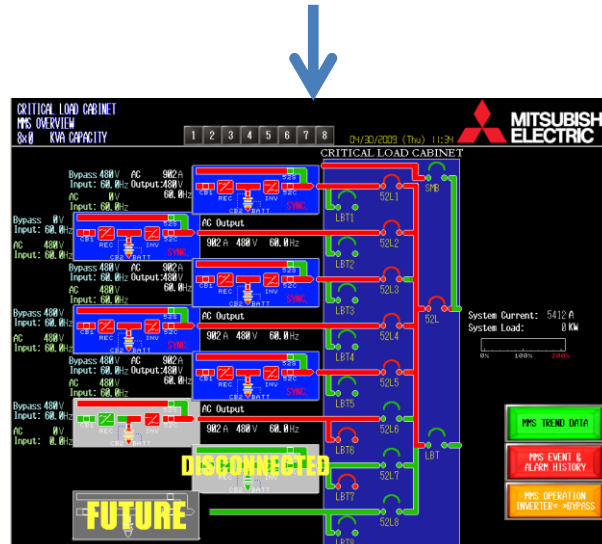


Figure 4: Main Overview Screen

### 2.1.1 DISPLAY DATA DETAILS

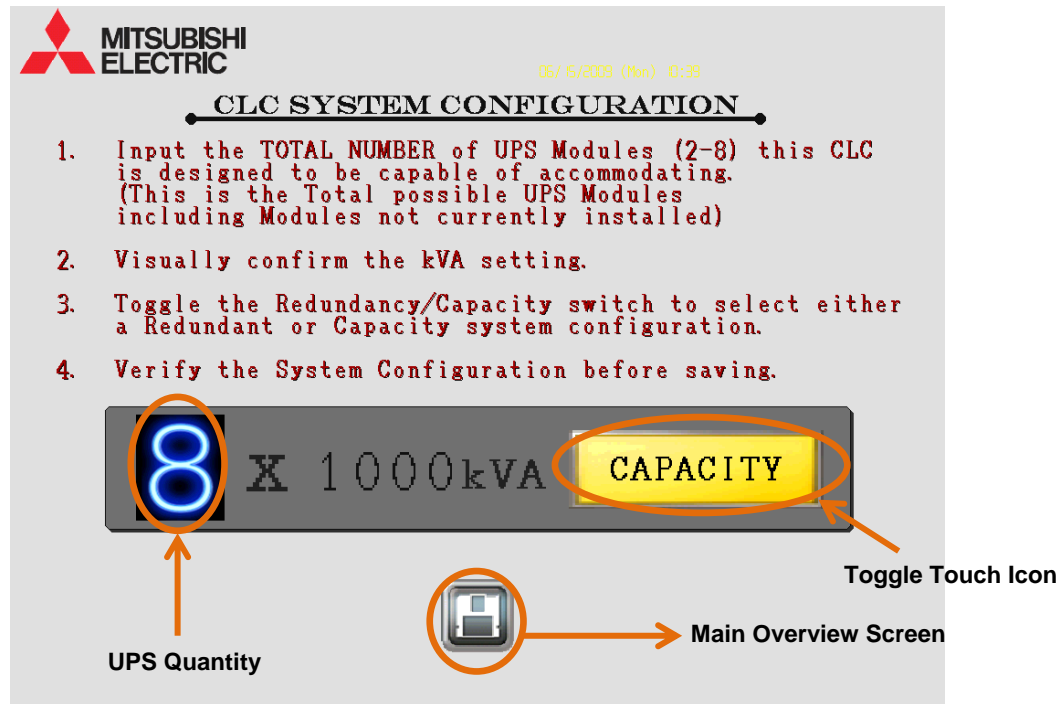


Figure 5: Setup Screen 1

**\*Note:** See Appendix A for definitions of touch icons.

**\*Note:** Default configuration of Redundant/Capacity is Redundant (N+1).

### 2.1.2 USER ORIENTATION DETAILS

On initialization of the HMI software and power up or following power up with the Setup Complete Flag reset to zero, the initial HMI display after the Startup Screen will be Monitoring System Setup Screen 1 (Figure 5). The user inputs the requested UPS module quantity and configuration data and follows the confirmation instructions per Setup Screen 1 (this data when saved is stored in the CF card non-volatile memory). Administrative settings must be confirmed immediately after saving the Setup Screen 1 settings. The Security Login screen will prompt for an Administrator Password, required before proceeding with setup. If an Administrator Password is not entered and Setup Screen 2 is not entered the Monitoring System HMI will automatically display the Main Overview Screen for the specific UPS MMS configuration required, and also set a Setup Complete Flag in the CF card. The administrative settings may be set after this point by accessing the Administrative Settings Touch Icon. Setup Screen 1: User selects System UPS Quantity, and confirms the acquired UPS KVA Capacity.



## 2.2 ADMINISTRATIVE SETTINGS SCREEN

The Administrative Settings Screen, seen in Figure 6, provides options to initialize and configure the UPS MMS Monitoring System. It has several window displays that pertain to specific configuration option. The screen also serves as the gateway to access other advanced settings such as password setting and output contact configuration.

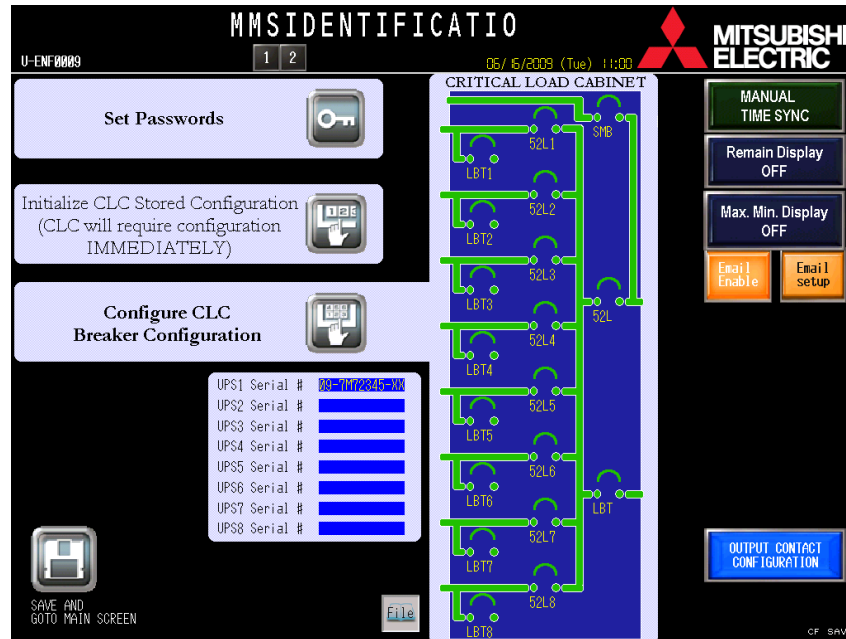


Figure 6: Administrative Settings Screen

### 2.2.1 INITIALIZE CONFIGURATION WINDOW

The Initialize Configuration Window, seen in Figure 7, displays the option to reset all configuration settings to default.



Figure 7: Initialize Configuration Window

**\*Note:** This does not affect the stored password settings.

### 2.2.2 CLC BREAKER CONFIGURATION WINDOW

The CLC Breaker Configuration Window, seen in Figure 8, provides options for adding/removing Critical Load Cabinet breaker displays from the Main Overview Screen mimic display. CLC Breaker labels can be modified from within the administrative settings, and will be saved, as long as they are displayed.

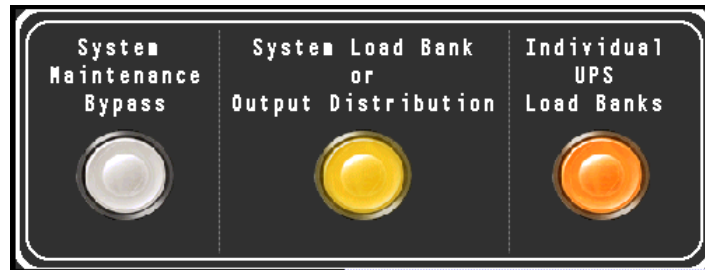


Figure 8: Breaker Configuration Window

### 2.2.3 EMAIL ENABLE

The Email Enable / Setup Window, seen in Figure 9 & 10, allows for SMTP configuration setting as well as test email initiation.

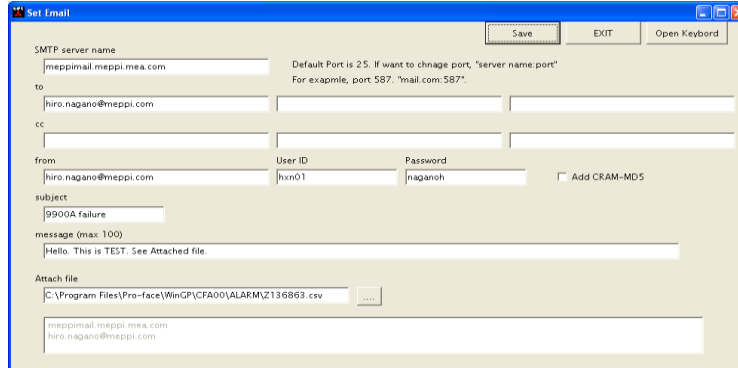


Figure 9: Email Setup Window



Figure 10: Select Trigger

### 2.2.4 SCREEN PASSWORD ENTRY

Access to the System Configuration Screen is password protected to stop unauthorized processes, seen in Figure 11. A Password Pop up window will request the user to input a six character Administrative Password to gain authorized access to the System Configuration Screen.

**Keypad Touch Icons:** Input Security Level 5 password and press enter to access Administrative Settings Screen

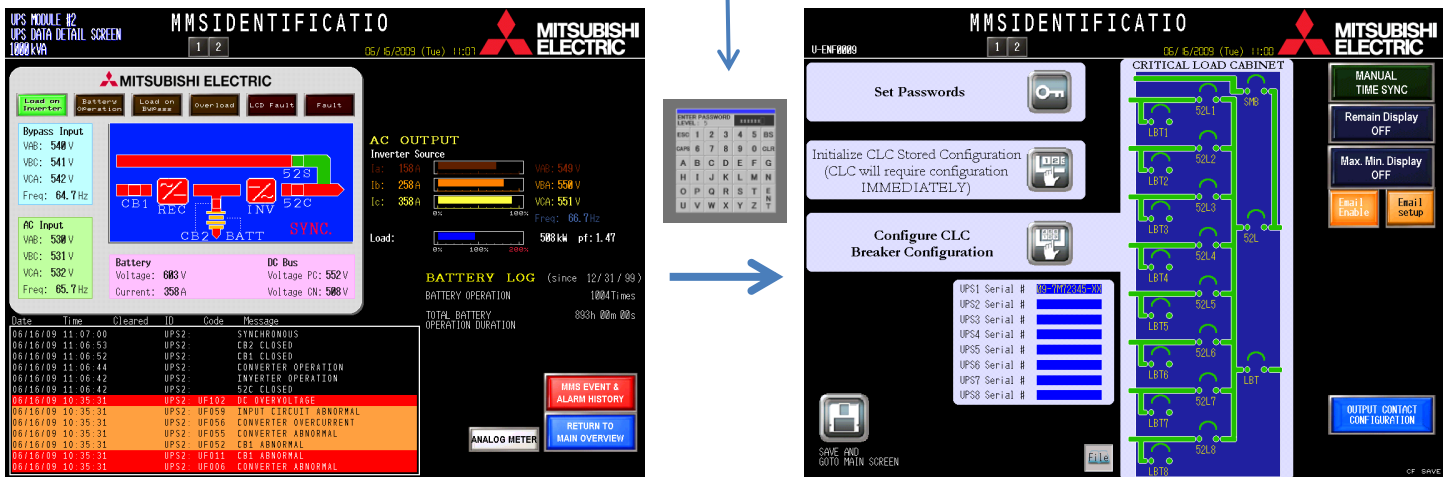
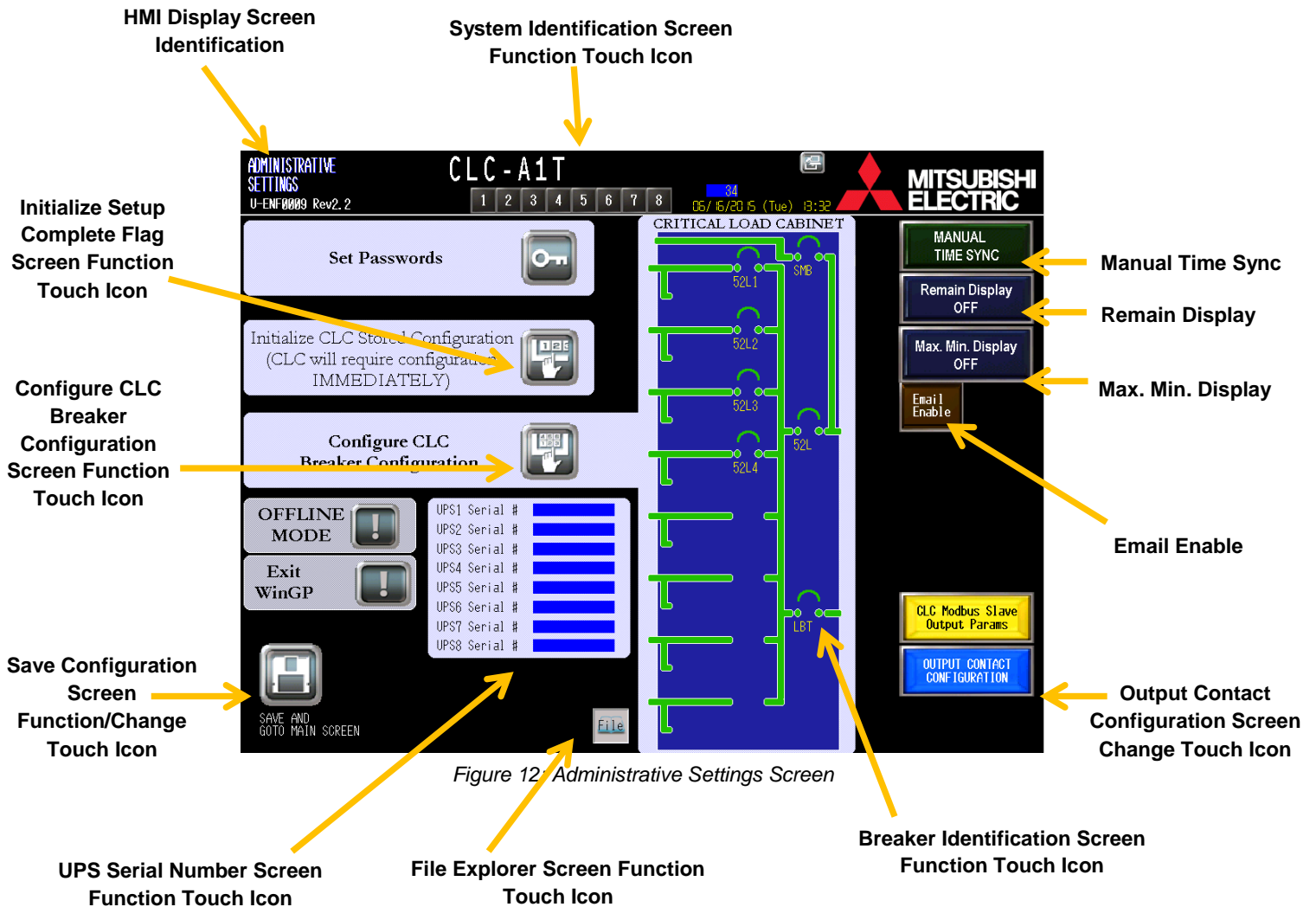


Figure 11: Accessing Administration Screen

### 2.2.5 SCREEN DETAILS

From the Administrative Settings Screen, seen in Figure 12, the user can reconfigure the CLC HMI and Monitoring System or reinitialize the MMS Monitor configuration setup. When initial UPS MMS Monitor System Setup is complete, a Setup Complete Flag is set and saved to the CF card. In the event that available power is lost, on power restoration, the HMI will confirm the Setup Complete Flag status and if set start up with the Main Overview displayed (MMS Monitoring System setup will not be necessary again as all data is stored and obtained from the CF card). In addition if the user needs to change the UPS MMS Monitoring System Configuration (Future addition or reduction of UPS Modules to expand or reduce the UPS MMS), the user can reset the Setup Complete Flag at the Administrative Settings Screen and the Setup Screens will immediately be displayed allowing the user to reconfigure the UPS MMS Monitoring System.



**\*Note:** See Appendix A for definitions of touch icons.

## 2.2.6 INITIALIZE CONFIGURATION WINDOW DETAILS

From the Administrative Settings Screen the user can reconfigure the CLC HMI or reinitialize the MMS Monitor configuration setup. When the initial MMS Monitor System Setup is complete, a Setup Complete Flag is set and saved to the CF card. In the event that available power is lost, on power restoration, the HMI will start-up with the Main Overview displayed. In addition, if the user needs to change the MMS Monitoring System Configuration, the user can reset the Setup Complete Flag at the Administrative Settings Screen and the Setup Screens will immediately be displayed allowing the user to reconfigure the MMS Monitoring System, through the window pictured in Figure 13.



Figure 13: Initialize Setup Complete Screen

**\*Note:** Pressing the Initialize CLC Stored Configuration icon will reset the monitor setup complete flag and return display to Setup Screen 1 (Figure 2).

## 2.2.7 CLC CONFIGURATION WINDOW DETAILS

From the Administrative Settings Screen the user can reconfigure the CLC diagram displayed on the Main Overview Screen. Each breaker label can be pressed to edit the label displayed. The Configure CLC Breaker Configuration Window Screen allows the optional breakers to be enabled/disabled to match the installation configuration. Both breaker labels and breaker configuration for the Main Overview CLC display are saved to the CF Card when the **Save and Goto Main Screen Touch Icon** is pressed, outlined in Figure 14.

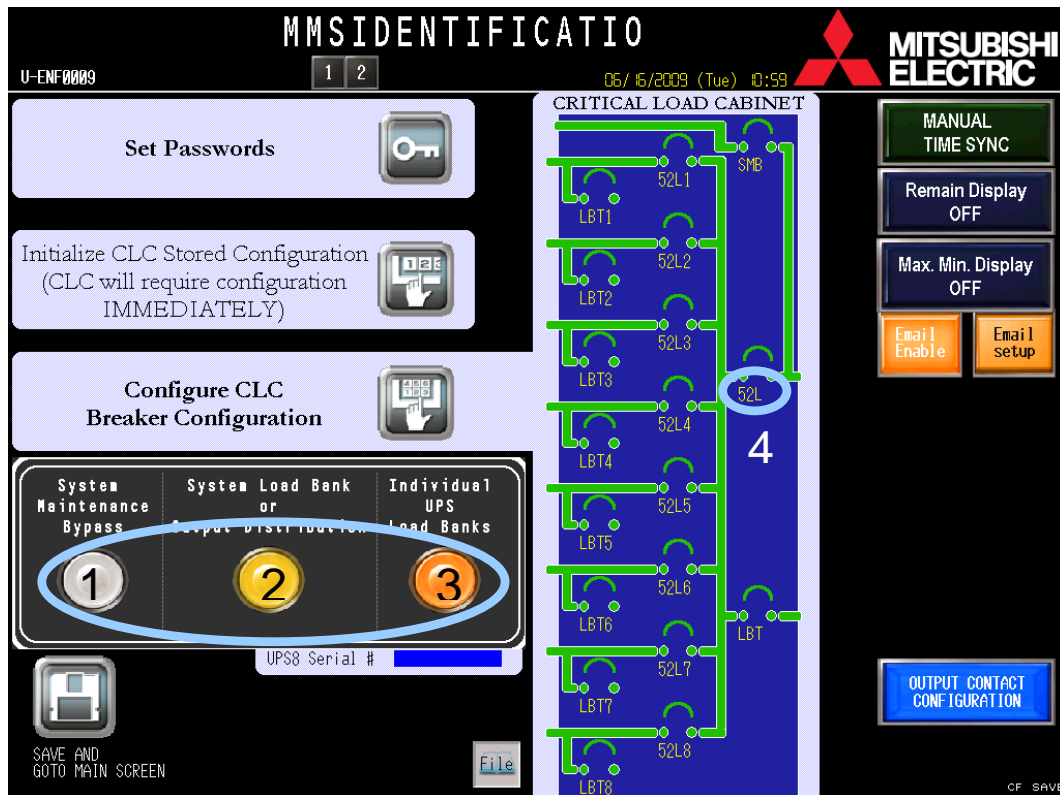


Figure 14: CLC Breaker Configuration

- 1. System Maintenance Bypass:** Activates the display of the SMB breaker and System Bypass path.
- 2. System Load Bank of Output Distribution:** Activates the display of the LBT breaker and System Load Bank Breaker Path.
- 3. Individual UPS Load Banks:** Activates the display of the LBTx breakers in parallel with the output isolation breakers, 52L(x).
- 4. Breaker Identification Screen Function Touch Icon:** Pressing any of the data display icons will display the text entry keypad to label the CLC breakers (5 character maximum).

## 2.3 PASSWORD SETTINGS SCREEN

The Password Settings Screen, seen in Figure 15, allows for customized OPERATOR and ADMINISTRATOR passwords for both Security Level 3 and Security Level 5, respectively. The passwords are input by pressing corresponding blue Password Setting Input Screen Function Touch Icon. The password can then be entered and once entered will be reflected in the corresponding Currently Configured Passwords Data Display. Changes must be saved in order for the previous password to be overwritten on the CF Card. If canceled, configured passwords will not be erased from the CF Card. Lost or forgotten passwords can be reset back to factory defaults by Mitsubishi Electric Service (please consult the service contact information on the labels of Mitsubishi Electric equipment).

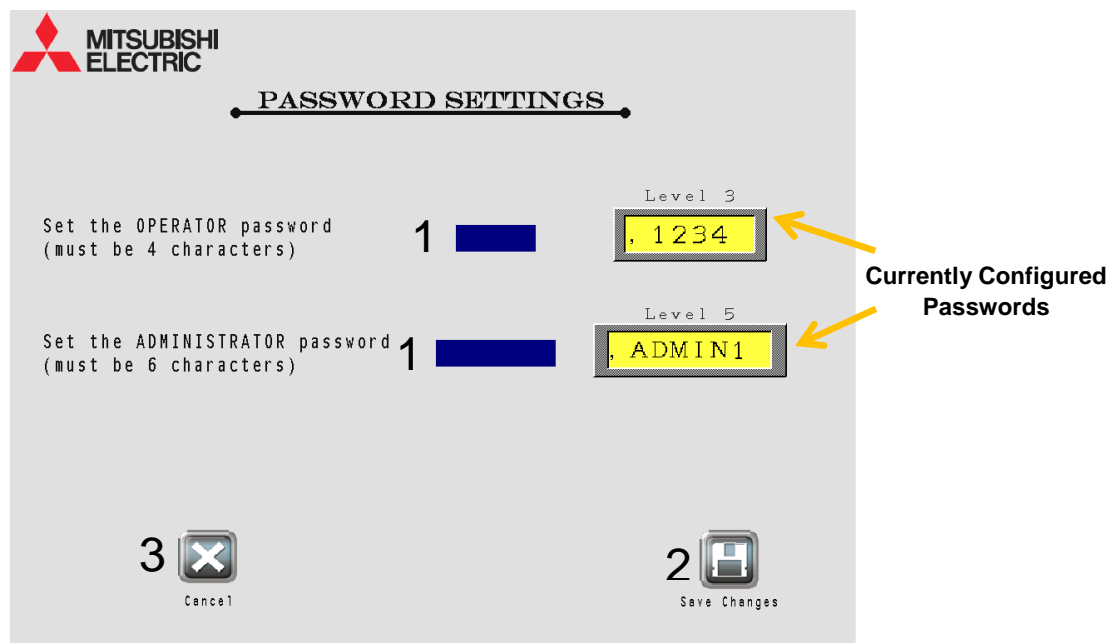


Figure 15: Password Settings Screen

- Entry of OPERATOR password (Security Level 3)
- Entry of ADMINISTRATIVE password (Security Level 5)
- Screen Function Touch Icons:
  1. Password entry fields
  2. Set Password button
  3. Cancel

### 2.3.1 PASSWORD SETTING INPUT SCREEN FUNCTION TOUCH ICONS

Pressing a Password Setting Input touch icon will display the input keyboard to change the desired password. The password is reflected in the Currently Configured Passwords data display and confirmed when the Save Changes Screen Change Icon is pressed.

## 2.4 ALARM OUTPUT / CONTACT SETTINGS SCREEN

MMS Monitoring System auxiliary I/O interface outputs are utilized for system dry contacts offering UPS MMS status and alarm notification. 8 user selectable outputs (Q0 through Q7) are available, being configured from the Alarm Output Contact Setting and Configuration Screens, as seen in Figures 16 & 17.

### 2.4.2 DRY CONTACTS CONDITION TOUCH ICONS

Out 1,2,3,4,5,6 contacts can be configured so that they are closed (output energized) when the following conditions are satisfied, [seen in Figure 17](#):

#### System Conditions

- UPS MMS Inverter Operation
- UPS MMS Bypass Operation
- UPS MMS Overload
- UPS MMS Isolated
- System Maintenance Bypass Operation
- UPS MMS Sync to Bypass
- UPS MMS Alarm

#### UPS Module Conditions (For each UPS MMS UPS Module)

- UPS # Inverter Operation
- UPS # Bypass Operation
- UPS # Battery Operation
- UPS # Output Available
- UPS # Transfer Enable
- UPS # Inverter Sync
- UPS # Bypass Source available
- UPS # Battery Low Voltage
- UPS # Major Fault
- UPS # Overload

#### CLC Circuit Breaker Status

- 52L, 52L1,2,3,4,5,6,7,8, SMB CB

#### Miscellaneous

- System Maintenance Bypass Voltage Source Available
- No selection

### 2.4.1 SETTINGS SCREEN DETAILS

Pressing the Dry Contact Status Lamp icon (Q0,1,2,3,4,5,6,7) , seen in Figure 16, will display the Output Contacts Configuration Screen, seen in Figure 17 for the **(Q0,1,2,3,4,5,6, or 7)** specific Auxiliary I/O Output Contact. Pressing a Contact Selection Trigger Condition screen function touch icons will set the output contact condition variable. This Condition variable number will be stored in the CF card non-volatile memory.

Auxiliary I/O Outputs are utilized for system dry contacts offering UPS MMS status and alarm notification. As well as used in the Modbus register list.



### 2.4.3 CONDITIONS SCREEN FUNTION TOUCH ICON

Pressing a Contact Selection Trigger Condition Screen Function Touch Icon will set the output contact condition variable. The variable number will be stored in the CF card non-volatile memory. The selected condition will be briefly displayed in red before returning to the Output Contacts Settings Screen.

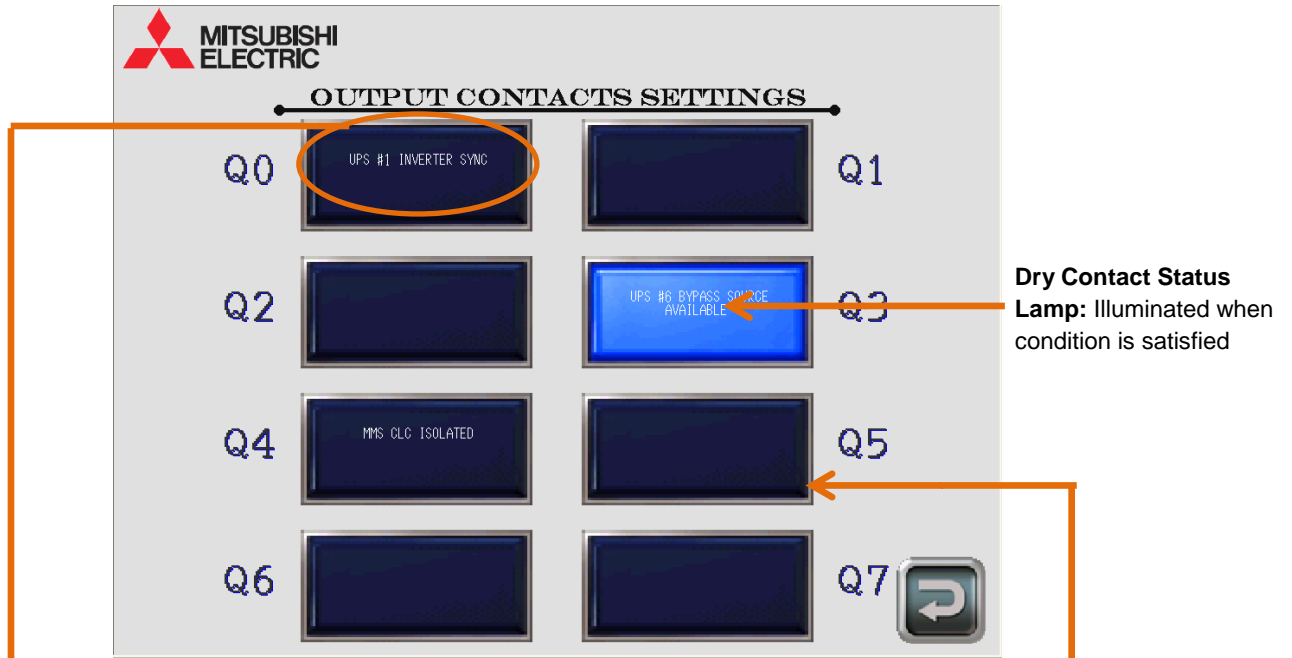


Figure 16: Output Contact Settings

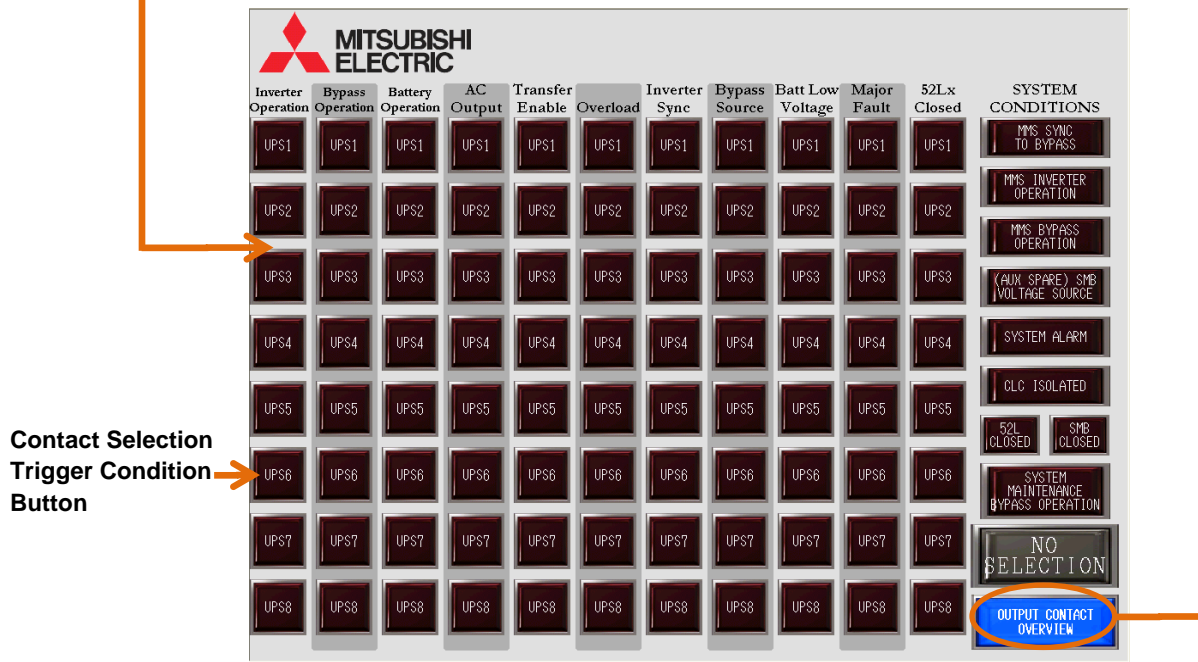


Figure 17: Output Contact Configuration

## 2.5 MAIN OVERVIEW SCREEN

The Main Overview Screen not only shows a complete Mimic diagram of the UPS's, but gives the user instant information and status of the complete MMS, and also offers orientation to other MMS Monitoring System Display Screens and functions. Features and functions of the Main Overview Screen are, as seen in Figure 18, 19 & 20:

- MMS Configuration Information
- Total MMS Mimic Display and Power Flow
- UPS Module component and CLC CB color status indication
- UPS Module and CLC Isolation Display
- Battery Discharge Data Window Display
- System Input and Output Measurement Data
- System Operation Status
  - UPS Module Alarm Indication
  - UPS Module Bypass Abnormal Alarm Indication (Including SYNC Alarm)
- UPS Maintenance Lockout Indication
- Date/Time Display
- Screen Selection Touch Icons
  - UPS Module Data Screen
  - System Alarm & Event Overview Data Screen
  - System Operation [Inverter↔Bypass] Transfer Window System Trend Data Screen
  - Administrative Settings Screen
  - Analog meter window Display Switch

2.5.1 DISPLAY DETAILS 1

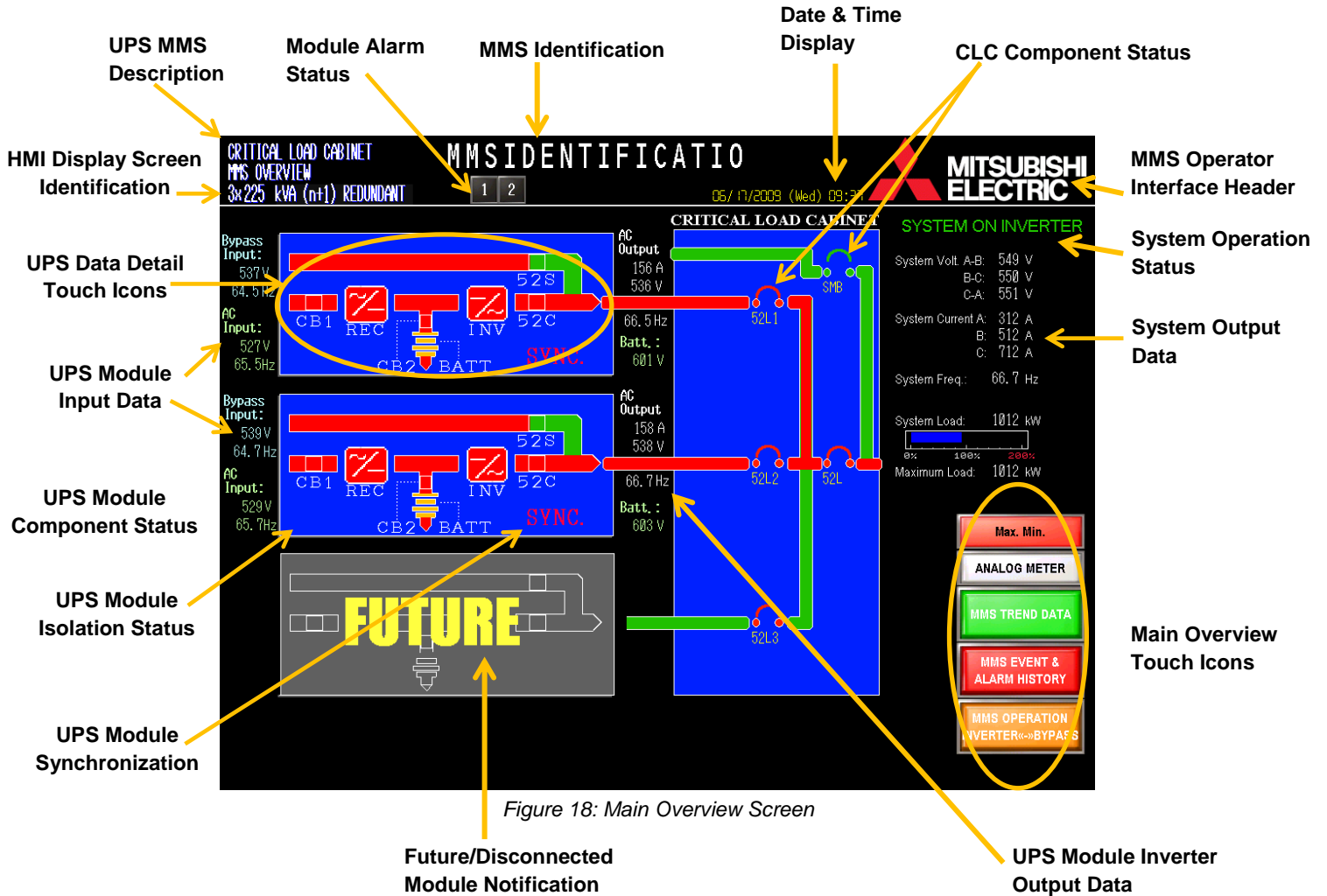


Figure 18: Main Overview Screen

\*Note: See Appendix A for explanation of touch icons.

2.5.2 DISPLAY DETAILS 2

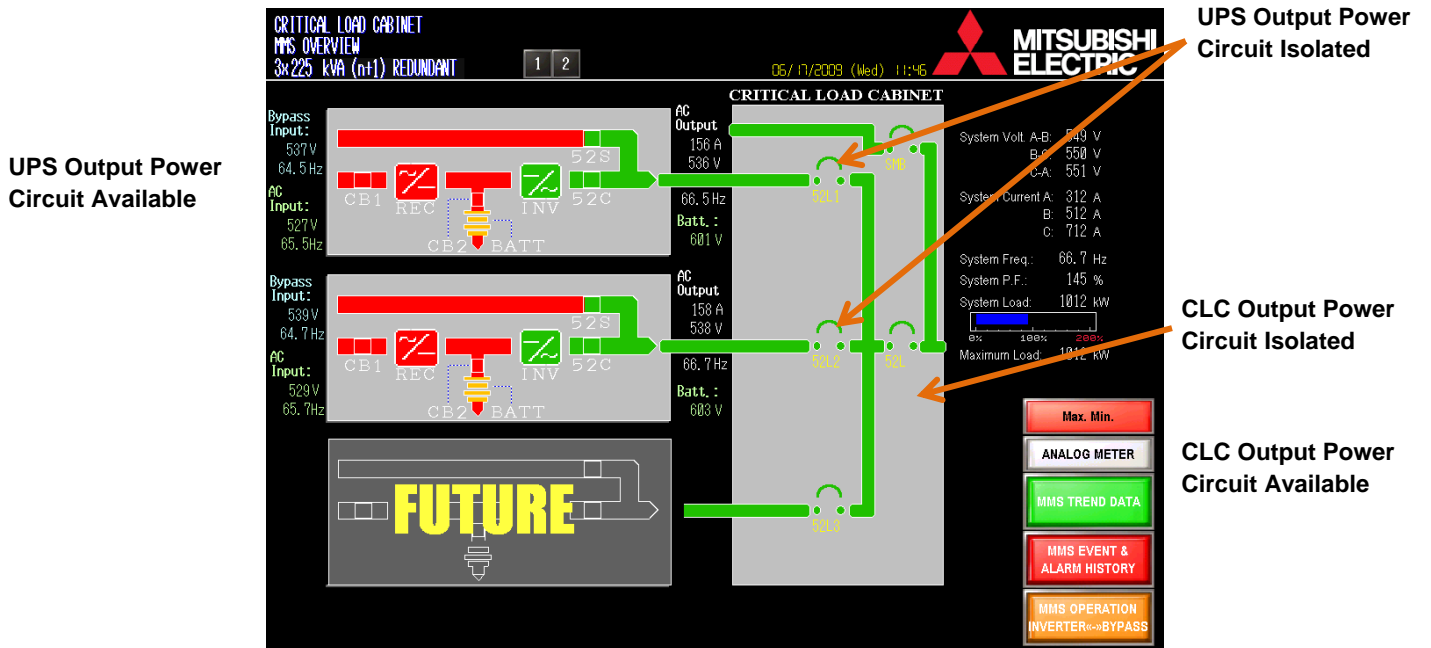


Figure 19: Main Overview Screen

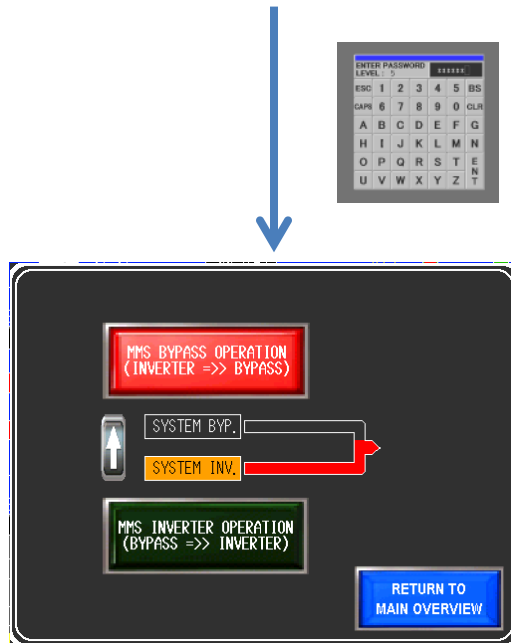


Figure 20: MMS Operation Inverter $\leftrightarrow$ Bypass Window Display

\*Note: See Appendix A for explanation of touch icons.

## 2.6 UPS MODULE DATA SCREEN

Individual UPS Module Data Screens desired (seen in Figure 21) can be accessed from the Main Overview Screen by touching the required UPS Module. More detailed information specific to each UPS Module is available on these screens. Features and functions of the UPS Module Data Screens are:

- UPS Module Characteristics and Information
- UPS Module Mimic Display and Power Flow
- UPS Module Component Color Status Indication
- UPS Module Input and Output Measurement Data
- UPS Module Indication
- UPS Module Battery Information and Log
- UPS Module Alarm Status
- UPS Module Bypass Abnormal Alarm Indication (Including SYNC Alarm) (*future*)
- UPS Module CLC Circuit Breaker Status
- UPS Maintenance Lockout Indication (*future*)
- Date/Time Display

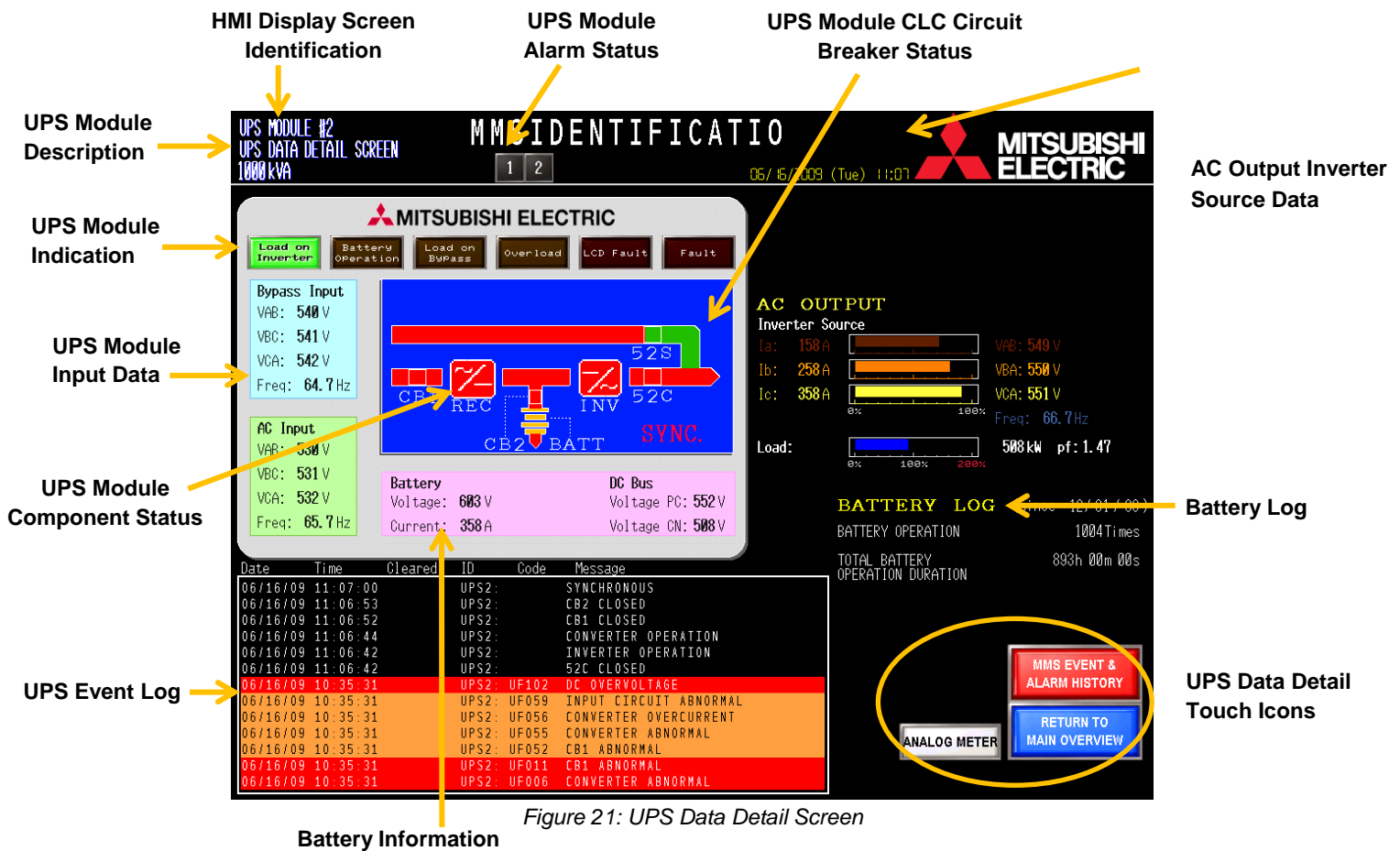


Figure 21: UPS Data Detail Screen

\*Note: See Appendix A for explanation of touch icons.

## 2.6.2 USER ORIENTATION DETAILS

Pressing the HMI Screen Function Touch Icons will initiate the specific screen function action:

### SMS Operation Bypass → Inverter Window Display

Pressing the SMS Inverter Operation Touch Icon starts the UPS inverter and closes the SMS Operation Bypass → Inverter Window Display.

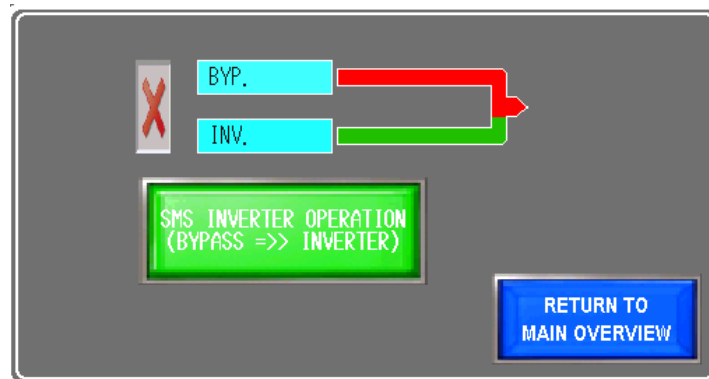


Figure 22: Inverter Window Display

### SMS Analog Meter Window Display

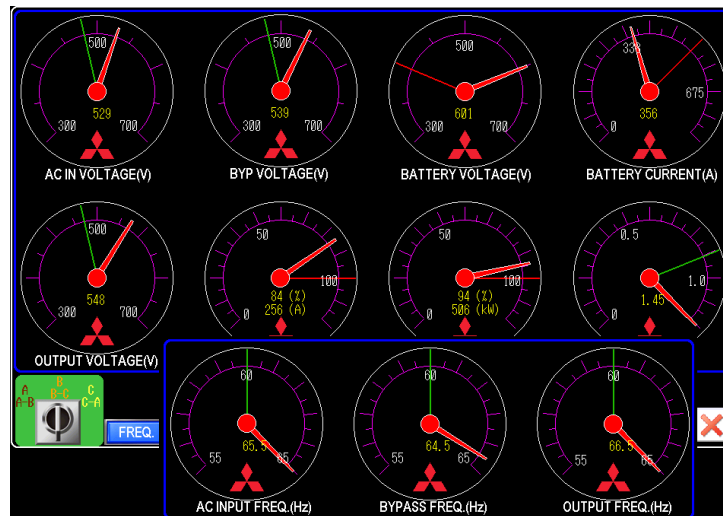


Figure 23: Analog Meter Display

Touch Icons (Figure 23):

- Phase Selector: Changes the meters' displayed phase.
- Frequency Window Display: Toggles the Frequency Meter Window Display.

## 2.7 SYSTEM ALARM AND EVENT OVERVIEW DATA SCREEN

The System Alarm and Event Overview Data Screen display a history log of all active and restored UPS MMS Alarms and Events. Features and functions are:

- All UPS Module Alarm Groups
- Chronological recording and reverse chronological display of both Active and Restored Alarms
- UPS Module Alarm Fault Code and Message Display upon fault selection
- Date/Time Display
- Screen Function Touch Icons:
  - Show Cursor, Hide Cursor
  - Alarm Scrolling (Up, Down, Page Up, Page Down)
  - Export log to USB drive
- Screen Selection Touch Icons
  - UPS Module Alarm and Event Data Screens
  - Return To Main Overview Screen
  - System Trend Data Screen
  - Administrative Settings Screen (Security Level 5 required)

**Header Messages: Date, Time, ID, Code, Message, and Cleared** (appear in header at the time of an alarm)

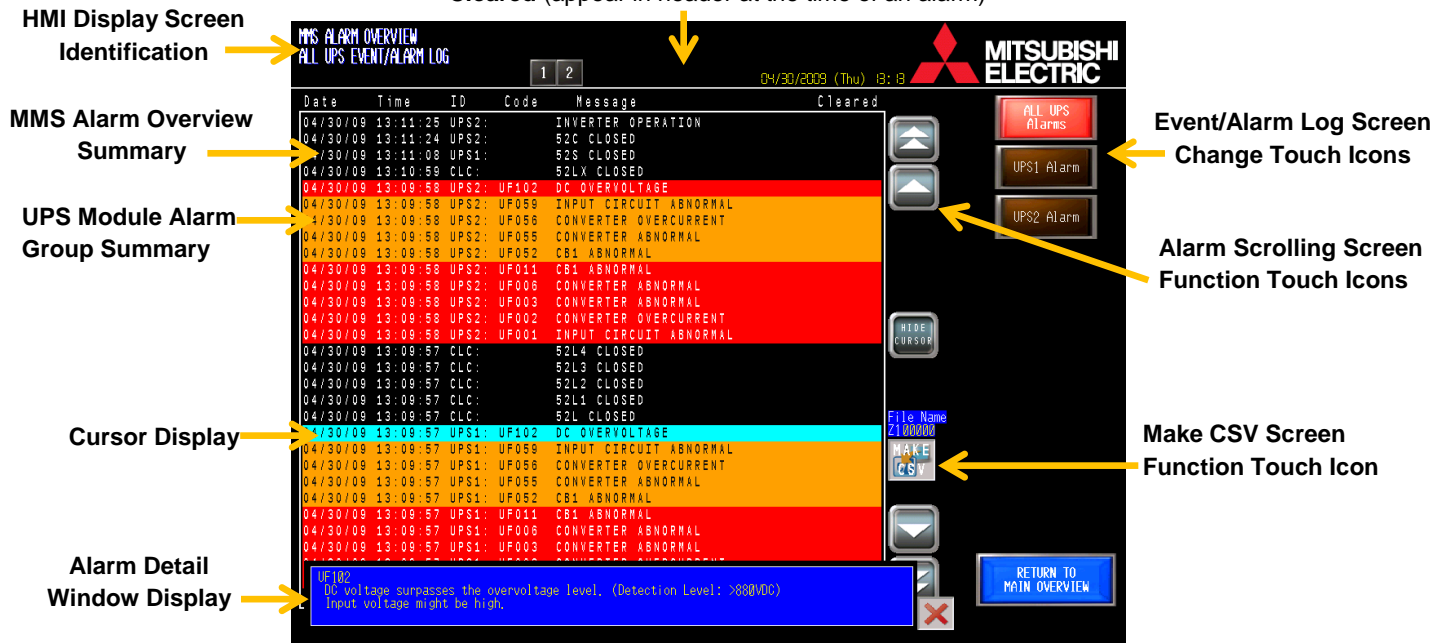


Figure 24: System Alarm and Event Overview Screen

\*Note: See Appendix A for explanation of touch icons.

**Total Number of log items that can be stored/displayed: 1000** (seen in Figure 24)

If total number of stored alarms exceeds 1000, the oldest stored log item will automatically be cleared (first in-first out queue).

**Available Alarms:**

- All UPS MMS UPS Module Alarms and associated Fault Codes.
- UPS MMS SYNC Alarm (UPS MMS Inverter Operation with Abnormal Bypass Source - Inverter Output not synchronized to bypass source)
- All UPS Module Battery Low Voltage Alarms

**Event/Alarm Log Screen Change Touch Icons**

The Event/Alarm Log of the current screen will be highlighted and pressing any of the available listed Event/Alarm Log Screen Change Touch Icon will display that particular log screen.

**UPS Module Alarm Group Summary****Reverse Chronological UPS Module Alarm and Event Log**

Only Alarm Group associated with specific UPS Module is Displayed (UPS Module 1,2,3,4,5,6,7 or 8)

**Available Events (subject to change):**

- CLC Circuit Breaker Status (CB Closed active event, Open restored event)
- System Maintenance Bypass Voltage Available (Voltage active event)
- UPS MMS System Operation Status (Operation active event) [UPS MMS Inverter, Bypass, and SMB Operations, System Isolated, System Shutdown]
- All UPS Module Maintenance Lockout Status (Lockout condition active event)
- All UPS Module Component Status (On/energized active event)



## 2.8 UPS MODULE ALARM AND EVENT DATA SCREEN

The UPS Module Alarm and Event Data Screen, seen in Figure 25, display a history log of all active or restored UPS Module Alarms and Events. Features and functions are:

- Individual UPS Module Alarm Group
- Chronological recording and reverse chronological display of both Active and Restored Alarms
- Date/Time Display
- Screen Function Touch Icons:
  - Cursor Display
  - Alarm Scrolling (Up, Down, Page Up, Page Down, Top Alarm, Bottom Alarm)
  - Acknowledge All Visible/Cursor Selected Active Alarms
  - Clear All Cursor Selected Restored Alarm
  - Clear All Visible Restored Alarms
- Screen Selection Touch Icons
  - Main Overview Screen (Return to)
  - System Alarm and Event Data Screen
  - Other UPS Module Alarm Data Screens
  - System and UPS Status Event Data Screen
  - Administrative Settings Screen (Security Level 5 required)

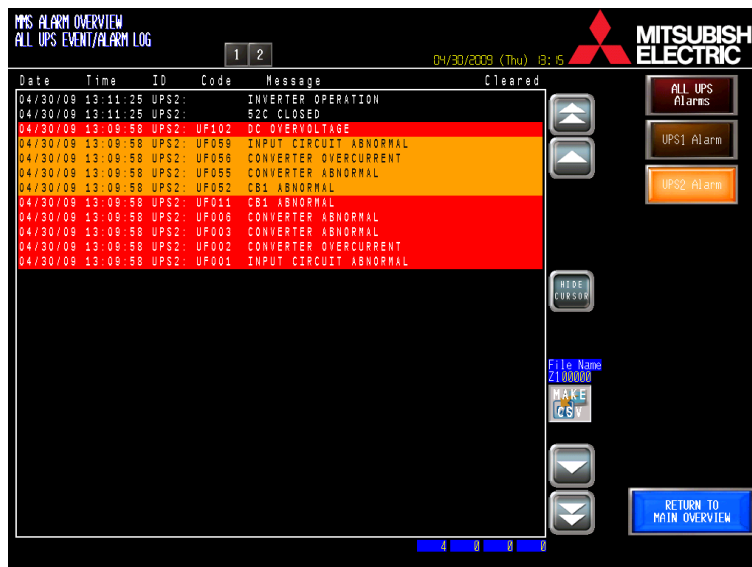


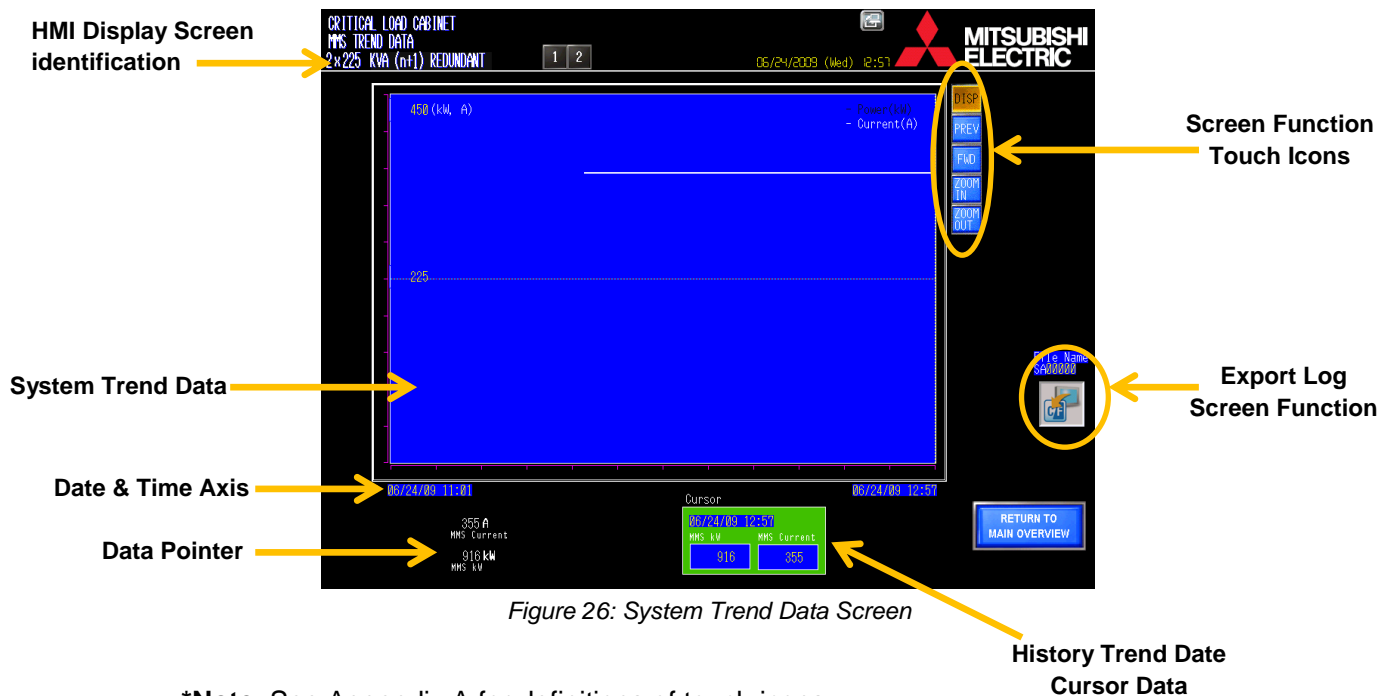
Figure 25: UPS Module Alarm Data Screen

**\*Note:** Total Number of Alarms that can be stored/displayed: 1000

## 2.9 SYSTEM TREND DATA SCREEN

The System Trend Data Screen, seen in Figure 26, displays the System Output Power and Current Trends. Features and functions are:

- System Output Current Trend Data Display
- System Output Power Trend Data Display
- 1 min Sample Rate
- 12 hr. Visible Samples
- History Trend Data Display
- Date/Time Display
- Screen Function Touch Icons:
  - Forward/Back/Display Control Icons
  - Visible Scale Input
  - History Trend Date Selection
- Screen Selection Touch Icons
  - Main Overview Screen (Return to)



**\*Note:** See Appendix A for definitions of touch icons.

**\*Note:** Total number of samples that can be stored/displayed: 44200 (30 days)

## 2.10 SYSTEM OPERATION [INVERTER↔BYPASS] TRANSFER WINDOW

UPS MMS operation sequences are possible from the MMS Monitoring System HMI. System Bypass or Inverter Operation can be initiated from the System Operation [Inverter↔Bypass] Transfer Window, seen in Figure 27. System Operation Transfer sequences incorporates:

- Transfer from Normal UPS MMS Inverter Operation to UPS MMS Bypass Operation
- Retransfer from UPS MMS Bypass Operation to UPS MMS Inverter Operation

Access to the Bypass Operation Screens is Operator Password (Security Level 3) protected to stop unauthorized operation transfer of UPS MMS. System Operation [Inverter↔Bypass] Transfer Window has the following features and functions:

- Window Access OPERATOR Password Protected (Security Level 3)
- Single Initiation point for Operation Transfer Sequences
- Operation Transfer Sequences (Transfer Inverter↔Bypass, Bypass↔Inverter)
- Inverter Inhibit display
- Synchronization display prior to transfer operation (*future*)
- Individual UPS Module start up on Retransfer (Startup procedure displayed)
- UPS MMS Operation Status Display
- Screen Function Touch Icons:
  - Transfer Operations Initiation
- Screen Selection Touch Icons
- Return To Main Overview Screen

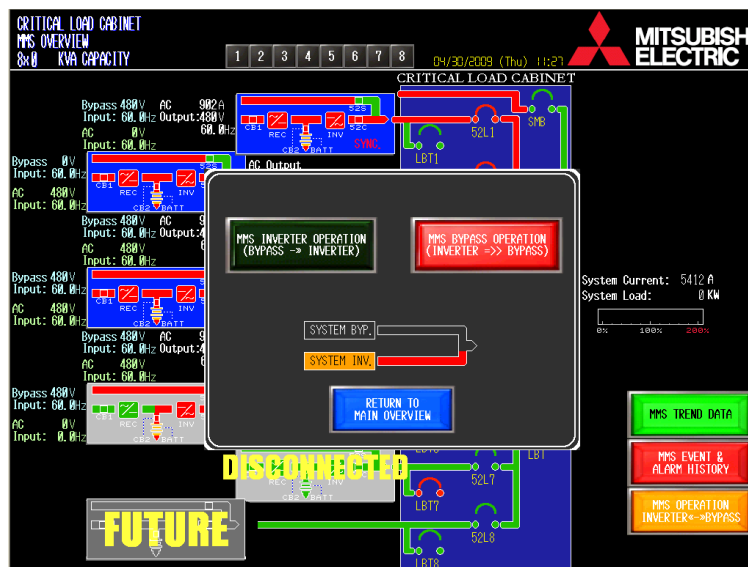


Figure 27: System Operation [Inverter↔Bypass] Transfer Window

Pressing the HMI MMS Operation Inverter ↔ Bypass Window Display Touch Icon on the UPS MMS Main Overview Screen will initiate access to the Transfer Operation Window. Access to the Transfer Operation Window requires the Operator Password [Security Level 3]

in order to prevent unauthorized operation of the UPS MMS, seen in Figure 28 & 29. Security Level 3 is required as a minimum (ADMINISTRATOR Password [Security Level 5] may also be used). When the window is closed the Security Level is immediately logged off (cleared).

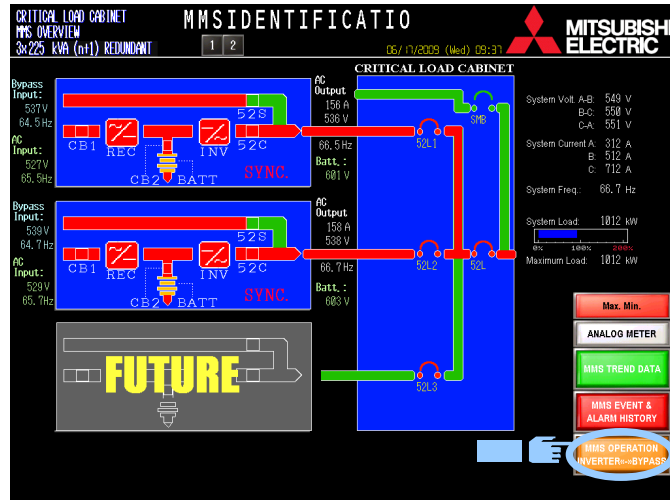


Figure 28: UPS MMS Main Overview Screen

**Keypad Touch Icons**

Input Security Level 3 password and press enter to access the Transfer Operation Window.

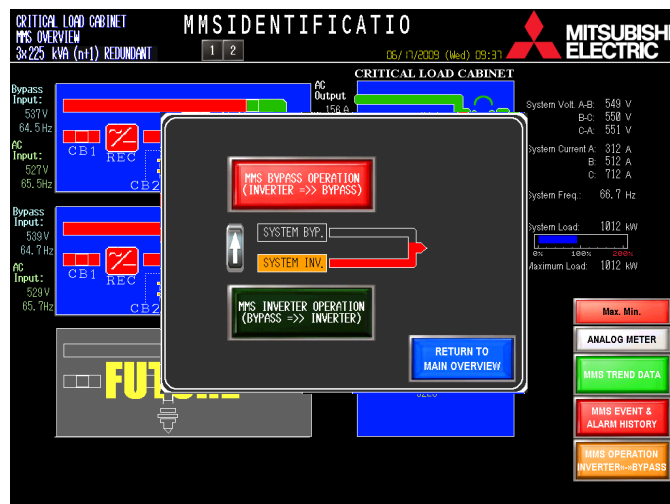
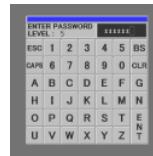


Figure 29: Transfer Operation Window

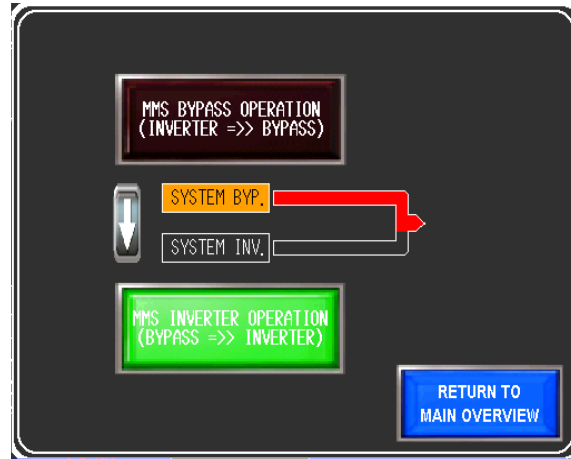
**2.10.1 CONDITIONS**


Figure 30: Bypass → Inverter (Transfer Enabled)

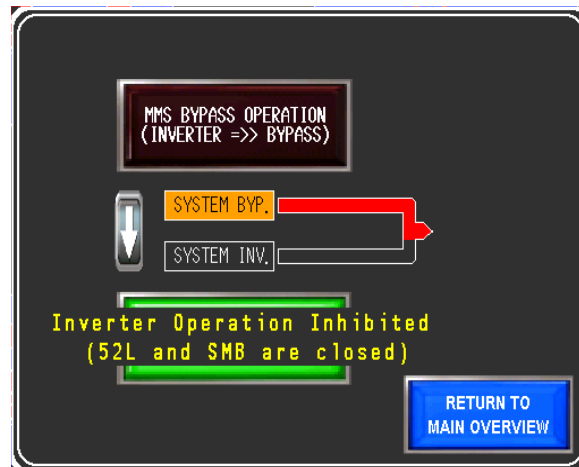


Figure 31: Paralleled Bypass & Maintenance Bypass (Transfer Inhibited)

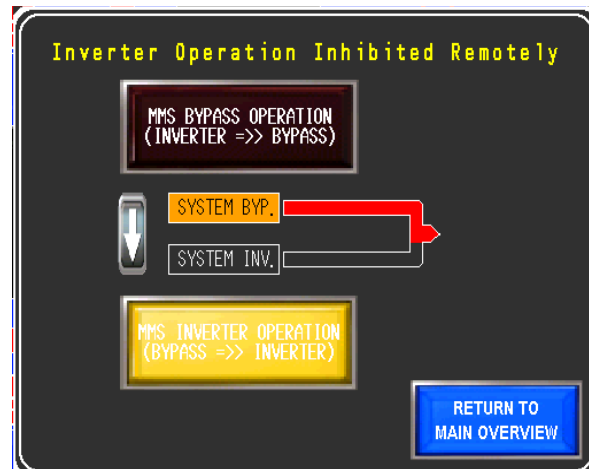


Figure 32: Bypass → Inverter (Transfer Inhibited)

### 2.10.2 SYSTEM INVERTER↔BYPASS OPERATION

The UPS MMS Transfer Operation Window allows transfer sequences dependent upon the current operation condition of the MMS. Inverter→Bypass transfers (Bypass Operation) is enabled when the MMS Bypass Operation Touch Icon is illuminated RED, seen in Figure 33. Bypass→Inverter transfers (Inverter Operation) is enabled when the MMS Inverter Operation Touch Icon is illuminated green. When the MMS Inverter Operation Touch Icon is illuminated yellow, transfer operation are inhibited from the HMI.

The mimic display in the center of the Transfer Operation Window illustrates in which operation condition the MMS is currently. The mimic display illuminates both the name and the power path of the current operation condition. Additionally the arrow guides the operator to which transfer operation may be enabled.

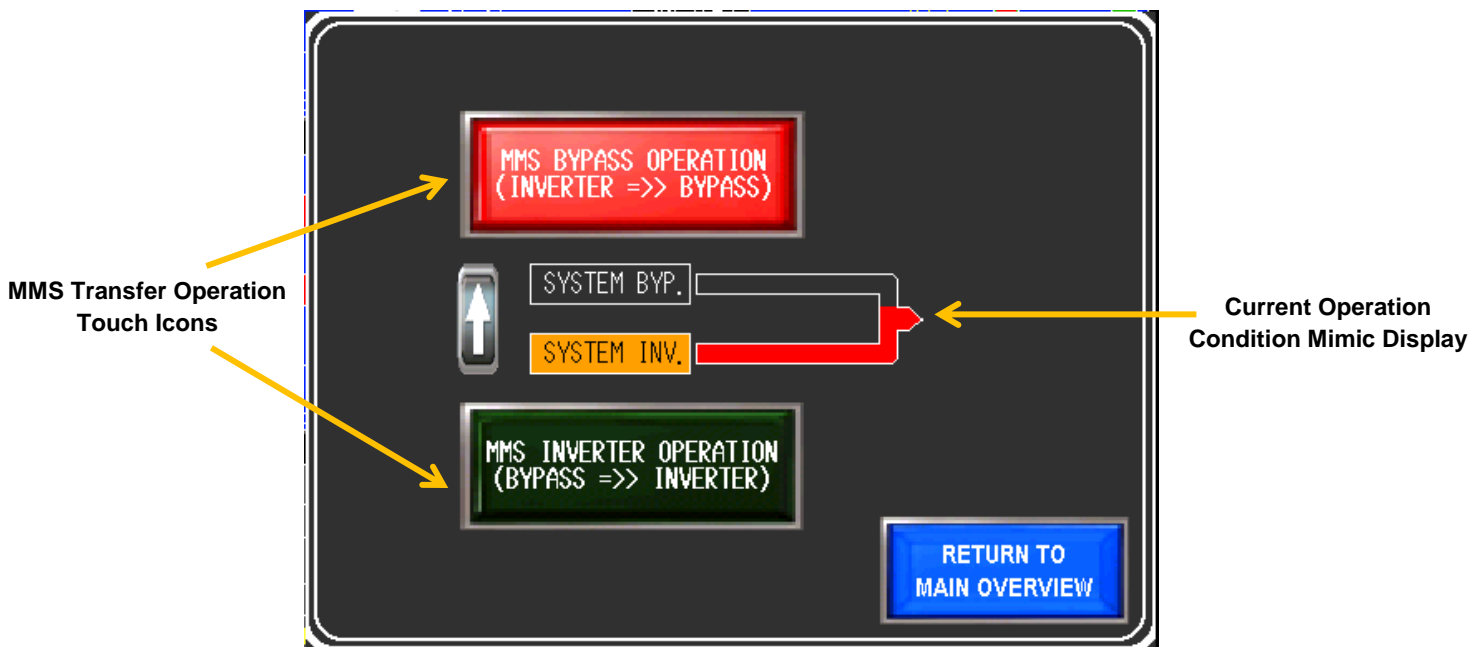


Figure 33: Bypass / Inverter Operation Window

**UPS MMS Inverter to Bypass Operation Screen Function Touch Icon:** Pressing either of the **UPS MMS Operation Screen Function Touch Icon** initiates the appropriate transfer operation sequence (if enabled), closes the Transfer Operation Window, and logs off (security level cleared).

**\*Note:** UPS MMS Inverter Output must be synchronized to the Bypass Source to allow transfer operation.

**\*Note:** See Appendix A for definitions of Touch Icons.

### 3. MMS MONITORING SYSTEM – HARDWARE

MMS shall consist of a PLC that parallel connects individual UPS module power circuits to offer system capacity or redundancy to support the critical load. The PLC consists of two sections, the power section and the monitoring section. The Monitoring Section shall be located in a separate enclosure to the Power Section and incorporate a monitoring system. The monitoring system consists of the following hardware and software:

- a.) PS-3711/PS4700ZA IP/AT Series Solid-state PC: 65,536 Colors, 15 inch touch screen with high communication capability – Gigabit Ethernet (1000 Base-TX) Ethernet (100 Base-TX).
  - [Model: Pro-face PS3711A-T42-24V-1G-XPC08-WG or PS4700Z]
  - The PS3711A IP/AT PC shall be the Monitoring System Human Machine Interface (HMI) and shall be located on the PLC door exterior.
- b.) Auxiliary I/O Modbus/TCP Interface – Telemecanique/Schneider-Electric Ethernet Distributed I/O Module.
  - [Model: Telemecanique/Schneider-Electric OTB 1E0DM9LP]
- c.) Ethernet Hub and cables (N Port depending on system UPS Module quantity).
  - Ethernet interface between PS-3711/PS4700ZA, Auxiliary I/O Modbus/TCP interface, and system UPS Module Graphic Operator Terminals (AGP-4200A/AGP-4300L GOTs)
  - [Model: Standard 10/100 Base-T(X) Ethernet Hub and cables (Phoenix unmanaged network switch 10/100 mbps hub or similar specification)]
- d.) PS-3711/PS4700ZA Runtime Software (WinGP) and Compact Flash Card (S/W Install, PS-3711/PS4700ZA Back Up Memory)
- e.) Associated power supplies

**\*Note:**

- 1.) UPS Module AGP-4200A/AGP-4300L GOT Software will be provided for each stand-alone UPS Module. Each UPS Module AGP-4200A/AGP-4300L GOT S/W will be specified a Target Name (UPS1, UPS2, UPSN etc.)
- 2.) IP Address allocation for each UPS MMS Monitoring System GOT device (PLC PS-3711/PS4700ZA and each UPS Module AGP-4200A/AGP-4300L GOT) will be default for Mitsubishi Electric standard system network configuration. For specific Customer IT department system configuration and interface, contact Mitsubishi Electric for details.
- 3.) Equivalent substitutes may replace above devices.

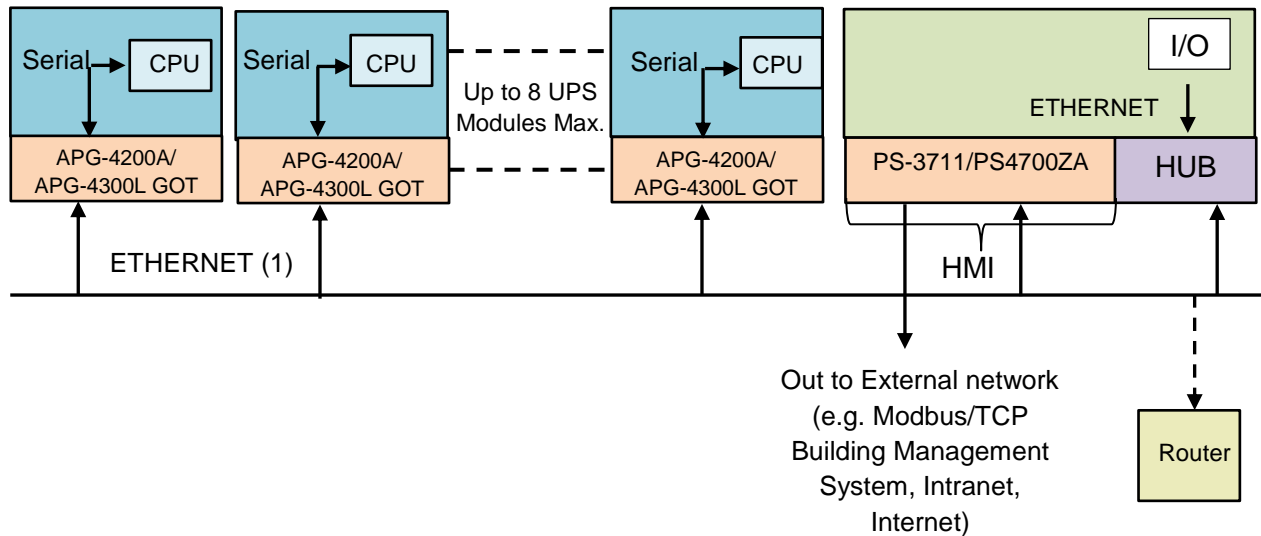
**3.1 DEVICE CONFIGURATION**


Figure 34: UPS MMS Monitoring System Configuration Block Diagram

**\*Note:** 1) Target name and IP Address allocation for each MMS Monitoring System GOT device (CLC PS3711A and each UPS Module AGP-4200A/AGP-4300L GOT) will be default for Mitsubishi Electric standard system Ethernet (1) network configuration. Ethernet (2) network configuration is configurable (e.g. DHCP). For specific Customer IT department system configuration and interface, contact Mitsubishi Electric for details. Refer to the following. UPS MMS Monitoring System Graphic Operator Terminals for Mitsubishi Electric Default Target Names and IP Address allocation.

2) Router and associated set-up and security are Customer Scope of work. Refer to Web Monitoring Function. See Figure 34.



**3.2 GRAPHIC OPERATOR TERMINALS**

Communication:  
Memory:  
Display:  
  
Color:

Fast Ethernet 100 Base-TX  
Application: 6MB Flash EPROM  
3.8 in | 5.7 in 320 x 240  
Monochrome LCD  
65,356 Colors (Figures 35 & 36)



*Figure 35: 9900 Series UPS Module  
AGP-4200A GOT*



*Figure 36: 9900 Series UPS Module  
AGP-4300L GOT*

Communication:  
  
Memory:  
Display:  
  
Color:

Fast Ethernet 100 Base-TX,  
Gigabit Ethernet 1000 Base-TX  
Application: 4MB Compact Flash  
15 inch 1024 x 768 TFT Color  
LCD  
65,356 3 Speed Blink (Figure 37)



*Figure 37: CLC PS-3711/PS4700ZA*

Network Device (TCP/IP)	Target Name	IP Address
CLC PS-3711/PS4700ZA	CLC	192.168.001.105
UPS Module #1 GP-4300	UPS1	192.168.001.111
UPS Module #2 GP-4300	UPS2	192.168.001.121
UPS Module #3 GP-4300	UPS3	192.168.001.131
UPS Module #4 GP-4300	UPS4	192.168.001.141
UPS Module #5 GP-4300	UPS5	192.168.001.151
UPS Module #6 GP-4300	UPS6	192.168.001.161
UPS Module #7 GP-4300	UPS7	192.168.001.171
UPS Module #8 GP-4300	UPS8	192.168.001.181
Auxiliary Contact I/O Interface	AuxcontactIO	192.168.001.101

Table 1: Default Settings for Standard UPS MMS Monitor System Network Configuration

**\*Note:** Target Name and IP Address designated in CLC GP-Pro EX.

### 3.3 AUXILIARY I/O MODBUS/TCP INTERFACE

#### Telemechanique Distributed I/O System for Network (OTB 1E0DM9LP)

##### High Speed Operation

Transfer Rate: 10/100 MB/s

Dual Twisted Pair or ConneXium medium

##### Reliable Connectivity

256 Maximum devices per segment, unlimited with switch

500 m (1640 ft.) Maximum network length; 1 km (3281) with ConneXium

##### Module Expandability

12 discrete inputs, 6 relay outputs, and 2 discrete outputs

Included 16 input discrete I/O expansion module (TM2 DDI 16DT)



Figure 38: Outside View - Auxiliary I/O Modbus/TCP Interface

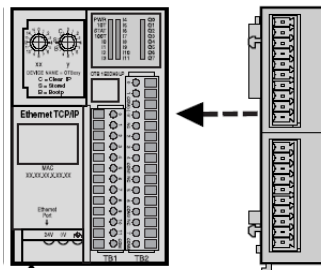


Figure 39: Connecting Points Input/Output

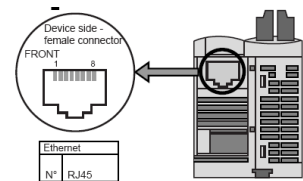


Figure 40: Ethernet Connecting Point

The following lists indicate the allocation for Auxiliary I/O Modbus/TCP Interface contacts within the UPS MMS Monitoring System.

### Input/Output Specification

Total I/O: 36

Inputs: 28

Outputs: 8

UPS MMS Monitoring System I/O Configuration:

#### Input:

I0	CLC VMB (Spare)	2	CLC 52L7 CB
I1	CLC SMB CB	3	CLC 52L8 CB
I2	CLC 52L CB	4	CLC LBT5 CB
I3	CLC LBT (52LB) CB	5	CLC LBT6 CB
I4	CLC 52L1 CB	6	CLC LBT7 CB
I5	CLC 52L2 CB	7	CLC LBT8 CB
I6	CLC 52L3 CB	8	INV INHIBIT
I7	CLC 52L4 CB	9	
I8	CLC LBT1 CB	10	<i>Auxiliary I/O module expansion contacts</i>
I9	CLC LBT2 CB	11	<i>#9-15 are unallocated. Items connected to</i>
I10	CLC LBT3 CB	12	<i>these contacts will have no effect or</i>
I11	CLC LBT4 CB	13	<i>display on MMS Monitoring System.</i>
0	CLC 52L5 CB	14	
1	CLC 52L6 CB	15	

#### Output:

Q0	OUT 1	<b>Q0</b> and <b>Q1</b> are discrete contacts
Q1	OUT 2	
Q2	OUT 3	<b>Q2-Q7</b> are relay contacts
Q3	OUT 4	
Q4	OUT 5	
Q5	OUT 6	
Q6	OUT 7	
Q7	OUT 8	

#### **4. FUTURE MITSUBISHI ELECTRIC MONITORING AND EVENT FUNCTIONALITY SOFTWARE**

Future software revision will allow event functionality for notification of UPS MMS Alarms and Events.

Custom Software is available for customer specific displays, controlling and metering projects.



# **APPENDIX A**

## Definitions

U-ENM00038-A Rev. 1

June 19, 2016

**REVISIONS**

This section is used to identify the originator and the specific changes made to a procedure as the result of a revision. Original procedures will be identified by the term 'ORIGINAL' in the Revision section of the footer and title page(s). Subsequent revisions will be identified by number. Recent revisions are highlighted.

Originator: M. Meinert  
Original Date: 6/19/16  
Revision Number: Original

REVISION	RELEASED	APPROVED BY	SIGNATURE	DESCRIPTION
ORIGINAL	6/19/16	M. Meinert		Original Release

**AC Output Bypass Source Data:**

- Bypass Input Voltage - VAB (V)
- Bypass Input Frequency (Hz)

**AC Output Inverter Source Data:**

- Inverter Output Current (Numerical and Bar Graph form)
- Ia, Ib, Ic (A)
- Inverter Output Line Voltage
- VAB, VBC, VCA (V)
- Inverter Output Frequency (Hz)
- Inverter Load (kW) (Numerical and Bar Graph form)
- Inverter Output Power Factor

**Battery Information:**

- Battery Voltage (V)
  - Battery Current (A)
- Battery Status**
- Charging
  - Discharging  
(REMAINING Battery Capacity % Displayed during Discharge Operation)

**Battery Log:**

- Battery Log Commencement Date
- Battery Operation Counter
- Total Battery Operation Duration
- Discharge Current Average

**Breaker Identification Screen Function Touch Icon:** Pressing any of the data display icons will display the text entry keypad to label the CLC breakers (5 character maximum).

**CLC Circuit Breaker Status and UPS MMS Isolation:** The Open/Close Status of the CLC circuit breakers depicts if UPS MMS power circuits are available or isolated. Color representation of each system UPS and the CLC is accordance with text displays indicate UPS MMS power circuit availability and isolation with respect to the critical load.  
Default Settings:

- Blue: Power Circuit Available
- Grey: Power Circuit Isolated

**CLC Component Status:** Inputs/Outputs Circuit Breakers

- Red: On
- Green: Off (default settings)

**CLC Output Power Circuit Available:** The CLC output power circuit will be available if 52L and any one or more of the UPS Module output power circuit breakers (52L1, 52L2 and 52L3) are closed and powered - Red.

Or

CLC SMB circuit breaker is closed and powered - Red, supplying the critical load supplied from the System Maintenance Bypass source, that is UPS MMS SMB Operation.

The CLC output power circuit will be available and the CLC represented in blue.

**CLC Output Power Circuit Isolated:** CLC 52L and CLC SMB circuit breaker open - Green; or CLC 52L circuit breaker is closed - Red, but all UPS Module output power circuit breakers (52L1, 52L2 and 52L3 in this example) are open - Green: UPS MMS CLC output power circuit isolated. CLC Color represented in grey.

**Configure CLC Breaker Configuration Screen Function Touch Icon:** Pressing the **Configure CLC Breaker Configuration** window display icon will display the setup window to configure the breakers shown on Main Overview CLC diagram.

**Current Operation Condition Mimic Display:** Reflects the current operation condition (System Bypass Operation or System Inverter) of the MMS. The arrow indicates which Transfer Operation Touch Icon may be enabled.

**Data Pointer:** System Output Current Trend.

**Date & Time Axis:** Month/Day/Year Date Display  
24 Hr., Min., Sec. Time Display scale the graph x-axis.

**Date & Time Display:** Month/Date/Year (Day) | 24 hr. Min., Time Display.

**Email Enable:** When enabled, email notification will occur and Email Setup is selectable.

**Email Setup:** Pressing the **Email Setup** icon will launch the Email settings external application.

**Email Trigger Selection Touch Icons:** Pressing any of the Email Trigger Touch icons will utilize that condition to initiate emails.

**Export Log Screen Function:** Pressing the Export Log Screen Function Touch Icon will generate a comma separated values text document of the entire trend log with the file name shown above. This log is stored on the CF card can be transferred to the USB media via file explorer.

**File Explorer Screen Function Touch Icon:** Pressing the **FILE** icon will display the file explorer for CF Card and USB file access.

**Future/Disconnected Module Notification:** Future UPS Module / Disconnected module Notification can be toggled by Mitsubishi Service.

**History Trend Date Cursor Data:** Touching the Trend data **Display** Touch Icon then touching the graph will place the cursor at that point on the graph. This will display the coordinate and trend parameters at the coordinate in the green cursor data display.

**HMI Display Screen Identification:** Administrative Settings Screen/Software Version/ UPS Module Data Screen/ MMS Trend Data Screen.

**Initialize Setup Complete Flag Screen Function Touch Icon:** Pressing the **Initialize CLC Stored Configuration** window icon will display the initialize configuration button.

**Main Overview Screen:** Return to Main Overview Touch Icon closes the Transfer Operation Window.

**Main Overview Touch Icons**

- Maximum/Minimum Reference Parameters Window Display



- Analog Meters Window Display
- MMS Trend Data Screen Change
- MMS Event & Alarm Log Screen Change
- MMS Operation Inverter ↔ Bypass Window Display

**Manual Time Sync:** When pressed will manual synchronize UPS modules to MMS Monitor Time (weekly auto-sync is uninterrupted).

**Max. Min. Display:** When enabled, maximum and minimum reference parameter are selectable from Main Overview Screen.

**MMS Identification:** Editable label for monitor.

**MMS Operator Interface Header:** Header repeated on every operator screen contains the Administrative Settings Touch Icon (Mitsubishi Logo) and other information repeated over Header.

**MMS Transfer Operation Touch Icons:**

- MMS Bypass Operation (Inverter→Bypass)
- MMS Bypass Operation (Bypass→Inverter)

**Module Alarm Status**

- No Active Alarms
- UPS Module Active Alarm

**Output Contact Configuration Screen Change Touch Icon:** Pressing the **Output Contact Configuration** icon will change the screen to the Output Contacts Settings Screen.

**Remain Display:** When enabled, Battery remaining calculations will be displayed on the Main Overview Screen during discharge operation.

**Save Configuration Screen Function/Change Touch Icon:** Pressing the **Save and go to Main Screen** icon will save Administrative Setting and change screen to the Main Overview Screen.

**Screen Function Touch Icons:** Pressing **Display** presents the current log data in graphical form on the graph, along with the ability to place the cursor by touch. Pressing the **Forward/Previous/Pause Control Screen Function Touch Icons** allows the user to scroll trend data.

**System Identification Screen Function Touch Icon:** Pressing this data display will display the text entry keypad to label the MMS Monitor.

**System Output Data**

- System Voltage (V)
- System Current (A)
- System Frequency (Hz)
- System Load (kW)
- Power Bar Graphical Representation
- System Load Capacity (kW)

**System Trend Data:** The System Trend Data Screen displays the System Output Trend Graph.

- System Output Current
- System Output Power
- 1 Min Sample Rate
- 12 Hr. Visible Samples
- Sample Rate Display
- History Trend Data

**UPS Data Detail Touch Icons:**

- SMS Operation Bypass → Inverter Window Display
- MMS Event & Alarm Log Screen Change
- Main Overview Screen Change
- Analog Meters Window Display
- UPS Module Data Detail Display Screen Change Icons

**UPS Event Log:** Event and Alarm Log.

**UPS MMS Description**

- UPS Module Quantity: 2,3,4,5,6,7,8
- UPS Module Capacity: kVA Rating
- UPS MMS Configuration: Parallel Redundant (N+1 etc.) or Capacity

**UPS Module Alarm Status:**

- Active Alarms (Refer to Alarm Data Screens) (Blinks when active)
- No Active Alarms

**UPS Module CLC Circuit Breaker Status:**

UPS Module CLC Circuit Breaker and power circuit status:

- UPS Module #1,2,3,4,5,6,7 or 8 Output Power Circuit Isolated. UPS Module Isolation color represented in Grey.

**UPS Module Component Status:**

- AC Input: Inverter
- CB1: 52C Output
- Rectifier: 52S Bypass
- CB2: Bypass Input
- DC Input: UPS Module Output
- Default Settings: Red (On), Green (Off)

**UPS Module Description:**

- UPS Module Target Name: 1,2,3,4,5,6,7,8
- UPS Module Capacity: kVA Rating

**UPS Module Indication:** Corresponds to 9900 UPS Module Operator Terminal LED Indication Lamps. Lamps illuminates when signal is on:

- Load on Inverter (Green Lamp)
- Battery Operation (Yellow Lamp)
- Load on Bypass (Orange Lamp)
- Overload (Red Lamp)
- LCD Fault (Red Lamp)
- UPS Major Fault (Red Lamp)

**UPS Module Input Data:**

- Bypass Input Voltage – VAB (V)
- Bypass Input Frequency (Hz)
- AC Input Voltage – VAB (V)
- AC Input Frequency (Hz)
- Battery Voltage (V)

**UPS Module Inverter Output Data:** UPS Module Inverter Output Data is only displayed when UPS is on inverter (In Bypass Condition or UPS module shutdown no information is displayed):

- Inverter Output Voltage – VAB (V)
- Inverter Output Frequency (Hz)
- Inverter Output Current – Ia (A)

**UPS Module Isolation Status:** UPS Module Isolation Status Frame (Changes color to illustrate UPS isolation)

Settings:

- Blue: Active
- Grey: Isolated

**UPS Module Synchronization:** UPS Module Inverter Output Synchronization to Bypass Display (Only Displayed when in SYNC condition).

**\*Note:** Refer to UPS MMS Synchronization control description for details.

**UPS Output Power Circuit Isolated:** CLC 52L1/52L2 circuit breakers open - Green  
UPS Modules #1 & #2 output power circuits isolated. UPS Isolation Color represented in grey.

**UPS Output Power Circuit Available:** CLC 52L1 circuit breaker closed - Red  
UPS Module #1 output power circuit available. UPS Module Color represented in blue.

**UPS Serial Number Screen Function Touch:** Pressing any of the data display icons will display the text entry keypad to store module serial numbers for quick reference



# **APPENDIX B**

## **Modbus/TCP Slave Registers**

U-ENM00038-B Rev. 1

June 19, 2016

**REVISIONS**

This section is used to identify the originator and the specific changes made to a procedure as the result of a revision. Original procedures will be identified by the term 'ORIGINAL' in the Revision section of the footer and title page(s). Subsequent revisions will be identified by number. Recent revisions are highlighted.

Originator: M. Meinert  
Original Date: 6/19/16  
Revision Number: Original

REVISION	RELEASED	APPROVED BY	SIGNATURE	DESCRIPTION
ORIGINAL	6/19/16	M. Meinert		Original Release

**CLCII MONITOR SYSTEM MODBUS TCP REGISTER LIST**

The data from the CLCII MMS Monitor System is presented as IEC61131 0-based holding registers (%MW). Several data parameters contain an implied decimal place for greater precision. For example, register 00078 indicates the bypass frequency of the bypass line and must be multiplied by 0.1 (a value of 599 indicates a frequency of 59.9Hz). These details are documented in the notes.

**AUXILIARY I/O REGISTER LIST - OUTPUTS**

Register	Bit	Description
%MW00005	:X08	[Q0] Discrete Output 1
	:X09	[Q1] Discrete Output 2
	:X10	[Q2] Relay Output 3
	:X11	[Q3] Relay Output 4
	:X12	[Q4] Relay Output 5
	:X13	[Q5] Relay Output 6
	:X14	[Q6] Relay Output 7
	:X15	[Q7] Relay Output 8

*Table 1B: Auxiliary I/O Register List*

**AUXILIARY I/O REGISTER LIST - INPUTS**

Register	Bit	Description
%MW00006	:X00	[10] SMB Input Power (VMB)
	:X01	[11] SMB Closed
	:X02	[12] 52L Closed
	:X03	[13] LBT Closed
	:X04	[14] 52L1 Closed
	:X05	[15] 52L2 Closed
	:X06	[16] 52L3 Closed
	:X07	[17] 52L4 Closed
	:X08	[18] LBT1 Closed
	:X09	[19] LBT2 Closed
	:X10	[110] LBT3 Closed
	:X11	[111] LBT4 Closed
	:X12	[0] 52L5 Closed
	:X13	[1] 52L6 Closed
	:X14	[2] 52L7 Closed
%MW00007	:X00	[4] LBT5 Closed
	:X01	[5] LBT6 Closed
	:X02	[6] LBT7 Closed
	:X03	[7] LBT8 Closed
	:X04	[8] Inverter Inhibit
	:X05	[9]
	:X06	[10]
	:X07	[11]
	:X08	[12]
	:X09	[13]
	:X10	[14]
	:X11	[15]

*Table 2B: Auxiliary I/O Register List*

**CLC MIMIC REGISTER LIST**

Register	Bit	Description
<b>%MW00000</b>	:X00	CLC AC power from UPS1
	:X01	CLC AC power from UPS2
	:X02	CLC AC power from UPS3
	:X03	CLC AC power from UPS4
	:X04	CLC AC power from UPS5
	:X05	CLC AC power from UPS6
	:X06	CLC AC power from UPS7
	:X07	CLC AC power from UPS8
<b>%MW00001</b>	:X00	System Alarm

*Table 3B: CLC Mimic Register List*



**CLC PARAMETER REGISTER LIST - 32 BIT**

Register	Measurement	Notes
%MW00010	System KW Percentage	x0.1%
%MW00012	System KW	KW
%MW00014	System AC Current	A
%MW00016	Output Current UPS1	x0.1A
%MW00018	Output Current UPS2	x0.1A
%MW00020	Output Current UPS3	x0.1A
%MW00022	Output Current UPS4	x0.1A
%MW00024	Output Current UPS5	x0.1A
%MW00026	Output Current UPS6	x0.1A
%MW00028	Output Current UPS7	x0.1A
%MW00030	Output Current UPS8	x0.1A
%MW00032	Output KW UPS1	x0.1 KW
%MW00034	Output KW UPS2	x0.1 KW
%MW00036	Output KW UPS3	x0.1 KW
%MW00038	Output KW UPS4	x0.1 KW
%MW00040	Output KW UPS5	x0.1 KW
%MW00042	Output KW UPS6	x0.1 KW
%MW00044	Output KW UPS7	x0.1 KW
%MW00046	Output KW UPS8	x0.1 KW
%MW00048	Output KW Percentage UPS1	x0.1%
%MW00050	Output KW Percentage UPS2	x0.1%
%MW00052	Output KW Percentage UPS3	x0.1%
%MW00054	Output KW Percentage UPS4	x0.1%
%MW00056	Output KW Percentage UPS5	x0.1%
%MW00058	Output KW Percentage UPS6	x0.1%
%MW00060	Output KW Percentage UPS7	x0.1%
%MW00062	Output KW Percentage UPS8	x0.1%

*Table 4B: CLC Parameter Register List*

**CLC PARAMETER REGISTER LIST - 16 BIT**

Register	Measurement	Notes
%MW00008	CLC UPS Module Capacity	2,3,4,5,6,7, or 8
%MW00009	Modules' Individual UPS KVA	KVA
%MW00422	CLC ID Label	(128bit) 8x16bit
%MW00423	CLC ID Label	
%MW00424	CLC ID Label	
%MW00425	CLC ID Label	
%MW00426	CLC ID Label	
%MW00427	CLC ID Label	
%MW00428	CLC ID Label	
%MW00429	CLC ID Label	

*Table 5B: CLC Parameter Register List*
**UPS PARAMETER REGISTER LIST**

Register	Measurement	Notes
%MW00078	UPS1 Bypass Frequency	x0.1Hz
%MW00079	UPS1 Bypass Voltage	x0.1V
%MW00080	UPS1 Bypass Voltage AB	x0.1V
%MW00081	UPS1 Bypass Voltage BC	x0.1V
%MW00082	UPS1 Bypass Voltage CA	x0.1V
%MW00083	UPS1 Input Frequency	x0.1Hz
%MW00084	UPS1 Input Voltage	x0.1V
%MW00085	UPS1 Input Voltage AB	x0.1V
%MW00086	UPS1 Input Voltage BC	x0.1V
%MW00087	UPS1 Input Voltage CA	x0.1V
%MW00088		
%MW00089	UPS1 Output Voltage AB	x0.1V
%MW00090	UPS1 Output Voltage BC	x0.1V
%MW00091	UPS1 Output Voltage CA	x0.1V
%MW00092	UPS1 DC Voltage PC	x0.1V
%MW00093	UPS1 DC Voltage CN	x0.1V
%MW00094		
%MW00095	UPS1 Output Frequency	x0.1Hz

*Table 6B: UPS Parameter Register List*

%MW00096	UPS1 Output Voltage	x0.1 KW
%MW00097	UPS1 Power Factor	x0.01
%MW00098	UPS1 Output Current A	x0.1A
%MW00099	UPS1 Output Current B	x0.1A
%MW00100	UPS1 Output Current C	x0.1A
%MW00101		
%MW00102	UPS1 Output Current Percentage A	x0.1%
%MW00103	UPS1 Output Current Percentage B	x0.1%
%MW00104	UPS1 Output Current Percentage C	x0.1%
%MW00105		
%MW00106	UPS1 Output KW	x0.1 KW
%MW00107	UPS1 Output Power Percentage	x0.1%
%MW00108	UPS1 DC capacitor voltage	x0.1V
%MW00109	UPS1 Battery Voltage	x0.1V
%MW00110	UPS1 Battery Current	x0.1A
%MW00111	UPS1 Battery Remain Percentage	x0.1%
%MW00112	UPS1 Battery Runtime min	Minutes
%MW00113		
%MW00114	UPS1 Battery Discharge s	Seconds
%MW00115	UPS1 Battery Discharge min	Minutes
%MW00116	UPS1 Battery Discharge hr.	Hours
%MW00117	UPS1 Current Fault Count	
%MW00118	UPS1 KVA Rating	KVA
%MW00119	UPS1 Voltage In	x0.1V
%MW00120	UPS1 Voltage Out	x0.1V
%MW00121	UPS2 Bypass Frequency	x0.1Hz
%MW00122	UPS2 Bypass Voltage	x0.1V
%MW00123	UPS2 Bypass Voltage AB	x0.1V
%MW00124	UPS2 Bypass Voltage BC	x0.1V
%MW00125	UPS2 Bypass Voltage CA	x0.1V
%MW00126	UPS2 Input Frequency	x0.1Hz
%MW00127	UPS2 Input Voltage	x0.1V
%MW00128	UPS2 Input Voltage AB	x0.1V
%MW00129	UPS2 Input Voltage BC	x0.1V
%MW00130	UPS2 Input Voltage CA	x0.1V
%MW00131		
%MW00132	UPS2 Output Voltage AB	x0.1V
%MW00133	UPS2 Output Voltage BC	x0.1V
%MW00134	UPS2 Output Voltage CA	x0.1V
%MW00135	UPS2 DC Voltage PC	x0.1V

Table 6B (Continued): UPS Parameter Register List

%MW00136	UPS2 DC Voltage CN	x0.1V
%MW00137		
%MW00138	UPS2 Output Frequency	x0.1Hz
%MW00139	UPS2 Output Voltage	x0.1 KW
%MW00140	UPS2 Power Factor	x0.01
%MW00141	UPS2 Output Current A	x0.1A
%MW00142	UPS2 Output Current B	x0.1A
%MW00143	UPS2 Output Current C	x0.1A
%MW00144		
%MW00145	UPS2 Output Current Percentage A	x0.1%
%MW00146	UPS2 Output Current Percentage B	x0.1%
%MW00147	UPS2 Output Current Percentage C	x0.1%
%MW00148		
%MW00149	UPS2 Output KW	x0.1 KW
%MW00150	UPS2 Output Power Percentage	x0.1%
%MW00151	UPS2 DC capacitor voltage	x0.1V
%MW00152	UPS2 Battery Voltage	x0.1V
%MW00153	UPS2 Battery Current	x0.1A
%MW00154	UPS2 Battery Remain Percentage	x0.1%
%MW00155	UPS2 Battery Runtime min	Minutes
%MW00156		
%MW00157	UPS2 Battery Discharge s.	Seconds
%MW00158	UPS2 Battery Discharge min.	Minutes
%MW00159	UPS2 Battery Discharge hr.	Hours
%MW00160	UPS2 Current Fault Count	
%MW00161	UPS2 KVA Rating	KVA
%MW00162	UPS2 Voltage In	x0.1V
%MW00163	UPS2 Voltage Out	x0.1V
%MW00164	UPS3 Bypass Frequency	x0.1Hz
%MW00165	UPS3 Bypass Voltage	x0.1V
%MW00166	UPS3 Bypass Voltage AB	x0.1V
%MW00167	UPS3 Bypass Voltage BC	x0.1V
%MW00168	UPS3 Bypass Voltage CA	x0.1V
%MW00169	UPS3 Input Frequency	x0.1Hz
%MW00170	UPS3 Input Voltage	x0.1V
%MW00171	UPS3 Input Voltage AB	x0.1V
%MW00172	UPS3 Input Voltage BC	x0.1V
%MW00173	UPS3 Input Voltage CA	x0.1V
%MW00174		
%MW00175	UPS3 Output Voltage AB	x0.1V

Table 6B (Continued): UPS Parameter Register List

%MW00176	UPS3 Output Voltage BC	x0.1V
%MW00177	UPS3 Output Voltage CA	x0.1V
%MW00178	UPS3 DC Voltage PC	x0.1V
%MW00179	UPS3 DC Voltage CN	x0.1V
%MW00180		
%MW00181	UPS3 Output Frequency	x0.1Hz
%MW00182	UPS3 Output Voltage	x0.1 KW
%MW00183	UPS3 Power Factor	x0.01
%MW00184	UPS3 Output Current A	x0.1A
%MW00185	UPS3 Output Current B	x0.1A
%MW00186	UPS3 Output Current C	x0.1A
%MW00187		
%MW00188	UPS3 Output Current Percentage A	x0.1%
%MW00189	UPS3 Output Current Percentage B	x0.1%
%MW00190	UPS3 Output Current Percentage C	x0.1%
%MW00191		
%MW00192	UPS3 Output KW	x0.1 KW
%MW00193	UPS3 Output Power Percentage	x0.1%
%MW00194	UPS3 DC capacitor voltage	x0.1V
%MW00195	UPS3 Battery Voltage	x0.1V
%MW00196	UPS3 Battery Current	x0.1A
%MW00197	UPS3 Battery Remain Percentage	x0.1%
%MW00198	UPS3 Battery Runtime min	Minutes
%MW00199		
%MW00200	UPS3 Battery Discharge s.	Seconds
%MW00201	UPS3 Battery Discharge min.	Minutes
%MW00202	UPS3 Battery Discharge hr.	Hours
%MW00203	UPS3 Current Fault Count	
%MW00204	UPS3 KVA Rating	KVA
%MW00205	UPS3 Voltage In	x0.1V
%MW00206	UPS3 Voltage Out	x0.1V
%MW00207	UPS4 Bypass Frequency	x0.1Hz
%MW00208	UPS4 Bypass Voltage	x0.1V
%MW00209	UPS4 Bypass Voltage AB	x0.1V
%MW00210	UPS4 Bypass Voltage BC	x0.1V
%MW00211	UPS4 Bypass Voltage CA	x0.1V
%MW00212	UPS4 Input Frequency	x0.1Hz
%MW00213	UPS4 Input Voltage	x0.1V
%MW00214	UPS4 Input Voltage AB	x0.1V
%MW00215	UPS4 Input Voltage BC	x0.1V

*Table 6B (Continued): UPS Parameter Register List*

%MW00216	UPS4 Input Voltage CA	x0.1V
%MW00217		
%MW00218	UPS4 Output Voltage AB	x0.1V
%MW00219	UPS4 Output Voltage BC	x0.1V
%MW00220	UPS4 Output Voltage CA	x0.1V
%MW00221	UPS4 DC Voltage PC	x0.1V
%MW00222	UPS4 DC Voltage CN	x0.1V
%MW00223		
%MW00224	UPS4 Output Frequency	x0.1Hz
%MW00225	UPS4 Output Voltage	x0.1 KW
%MW00226	UPS4 Power Factor	x0.01
%MW00227	UPS4 Output Current A	x0.1A
%MW00228	UPS4 Output Current B	x0.1A
%MW00229	UPS4 Output Current C	x0.1A
%MW00230		
%MW00231	UPS4 Output Current Percentage A	x0.1%
%MW00232	UPS4 Output Current Percentage B	x0.1%
%MW00233	UPS4 Output Current Percentage C	x0.1%
%MW00234		
%MW00235	UPS4 Output KW	x0.1 KW
%MW00236	UPS4 Output Power Percentage	x0.1%
%MW00237	UPS4 DC capacitor voltage	x0.1V
%MW00238	UPS4 Battery Voltage	x0.1V
%MW00239	UPS4 Battery Current	x0.1A
%MW00240	UPS4 Battery Remain Percentage	x0.1%
%MW00241	UPS4 Battery Runtime min	Minutes
%MW00242		
%MW00243	UPS4 Battery Discharge s.	Seconds
%MW00244	UPS4 Battery Discharge min.	Minutes
%MW00245	UPS4 Battery Discharge hr.	Hours
%MW00246	UPS4 Current Fault Count	
%MW00247	UPS4 KVA Rating	KVA
%MW00248	UPS4 Voltage In	x0.1V
%MW00249	UPS4 Voltage Out	x0.1V
%MW00250	UPS5 Bypass Frequency	x0.1Hz
%MW00251	UPS5 Bypass Voltage	x0.1V
%MW00252	UPS5 Bypass Voltage AB	x0.1V
%MW00253	UPS5 Bypass Voltage BC	x0.1V
%MW00254	UPS5 Bypass Voltage CA	x0.1V
%MW00255	UPS5 Input Frequency	x0.1Hz

Table 6B (Continued): UPS Parameter Register List

%MW00256	UPS5 Input Voltage	x0.1V
%MW00257	UPS5 Input Voltage AB	x0.1V
%MW00258	UPS5 Input Voltage BC	x0.1V
%MW00259	UPS5 Input Voltage CA	x0.1V
%MW00260		
%MW00261	UPS5 Output Voltage AB	x0.1V
%MW00262	UPS5 Output Voltage BC	x0.1V
%MW00263	UPS5 Output Voltage CA	x0.1V
%MW00264	UPS5 DC Voltage PC	x0.1V
%MW00265	UPS5 DC Voltage CN	x0.1V
%MW00266		
%MW00267	UPS5 Output Frequency	x0.1Hz
%MW00268	UPS5 Output Voltage	x0.1 KW
%MW00269	UPS5 Power Factor	x0.01
%MW00270	UPS5 Output Current A	x0.1A
%MW00271	UPS5 Output Current B	x0.1A
%MW00272	UPS5 Output Current C	x0.1A
%MW00273		
%MW00274	UPS5 Output Current Percentage A	x0.1%
%MW00275	UPS5 Output Current Percentage B	x0.1%
%MW00276	UPS5 Output Current Percentage C	x0.1%
%MW00277		
%MW00278	UPS5 Output KW	x0.1 KW
%MW00279	UPS5 Output Power Percentage	x0.1%
%MW00280	UPS5 DC capacitor voltage	x0.1V
%MW00281	UPS5 Battery Voltage	x0.1V
%MW00282	UPS5 Battery Current	x0.1A
%MW00283	UPS5 Battery Remain Percentage	x0.1%
%MW00284	UPS5 Battery Runtime min	Minutes
%MW00285		
%MW00286	UPS5 Battery Discharge s.	Seconds
%MW00287	UPS5 Battery Discharge min.	Minutes
%MW00288	UPS5 Battery Discharge hr.	Hours
%MW00289	UPS5 Current Fault Count	
%MW00290	UPS5 KVA Rating	KVA
%MW00291	UPS5 Voltage In	x0.1V
%MW00292	UPS5 Voltage Out	x0.1V
%MW00293	UPS6 Bypass Frequency	x0.1Hz
%MW00294	UPS6 Bypass Voltage	x0.1V
%MW00295	UPS6 Bypass Voltage AB	x0.1V

Table 6B (Continued): UPS Parameter Register List

%MW00296	UPS6 Bypass Voltage BC	x0.1V
%MW00297	UPS6 Bypass Voltage CA	x0.1V
%MW00298	UPS6 Input Frequency	x0.1Hz
%MW00299	UPS6 Input Voltage	x0.1V
%MW00300	UPS6 Input Voltage AB	x0.1V
%MW00301	UPS6 Input Voltage BC	x0.1V
%MW00302	UPS6 Input Voltage CA	x0.1V
%MW00303		
%MW00304	UPS6 Output Voltage AB	x0.1V
%MW00305	UPS6 Output Voltage BC	x0.1V
%MW00306	UPS6 Output Voltage CA	x0.1V
%MW00307	UPS6 DC Voltage PC	x0.1V
%MW00308	UPS6 DC Voltage CN	x0.1V
%MW00309		
%MW00310	UPS6 Output Frequency	x0.1Hz
%MW00311	UPS6 Output Voltage	x0.1 KW
%MW00312	UPS6 Power Factor	x0.01
%MW00313	UPS6 Output Current A	x0.1A
%MW00314	UPS6 Output Current B	x0.1A
%MW00315	UPS6 Output Current C	x0.1A
%MW00316		
%MW00317	UPS6 Output Current Percentage A	x0.1%
%MW00318	UPS6 Output Current Percentage B	x0.1%
%MW00319	UPS6 Output Current Percentage C	x0.1%
%MW00320		
%MW00321	UPS6 Output KW	x0.1 KW
%MW00322	UPS6 Output Power Percentage	x0.1%
%MW00323	UPS6 DC capacitor voltage	x0.1V
%MW00324	UPS6 Battery Voltage	x0.1V
%MW00325	UPS6 Battery Current	x0.1A
%MW00326	UPS6 Battery Remain Percentage	x0.1%
%MW00327	UPS6 Battery Runtime min	Minutes
%MW00328		
%MW00329	UPS6 Battery Discharge s.	Seconds
%MW00330	UPS6 Battery Discharge min.	Minutes
%MW00331	UPS6 Battery Discharge hr.	Hours
%MW00332	UPS6 Current Fault Count	
%MW00333	UPS6 KVA Rating	KVA
%MW00334	UPS6 Voltage In	x0.1V
%MW00335	UPS6 Voltage Out	x0.1V

Table 6B (Continued): UPS Parameter Register List



%MW00336	UPS7 Bypass Frequency	x0.1Hz
%MW00337	UPS7 Bypass Voltage	x0.1V
%MW00338	UPS7 Bypass Voltage AB	x0.1V
%MW00339	UPS7 Bypass Voltage BC	x0.1V
%MW00340	UPS7 Bypass Voltage CA	x0.1V
%MW00341	UPS7 Input Frequency	x0.1Hz
%MW00342	UPS7 Input Voltage	x0.1V
%MW00343	UPS7 Input Voltage AB	x0.1V
%MW00344	UPS7 Input Voltage BC	x0.1V
%MW00345	UPS7 Input Voltage CA	x0.1V
%MW00346		
%MW00347	UPS7 Output Voltage AB	x0.1V
%MW00348	UPS7 Output Voltage BC	x0.1V
%MW00349	UPS7 Output Voltage CA	x0.1V
%MW00350	UPS7 DC Voltage PC	x0.1V
%MW00351	UPS7 DC Voltage CN	x0.1V
%MW00352		
%MW00353	UPS7 Output Frequency	x0.1Hz
%MW00354	UPS7 Output Voltage	x0.1 KW
%MW00355	UPS7 Power Factor	x0.01
%MW00356	UPS7 Output Current A	x0.1A
%MW00357	UPS7 Output Current B	x0.1A
%MW00358	UPS7 Output Current C	x0.1A
%MW00359		
%MW00360	UPS7 Output Current Percentage A	x0.1%
%MW00361	UPS7 Output Current Percentage B	x0.1%
%MW00362	UPS7 Output Current Percentage C	x0.1%
%MW00363		
%MW00364	UPS7 Output KW	x0.1 KW
%MW00365	UPS7 Output Power Percentage	x0.1%
%MW00366	UPS7 DC capacitor voltage	x0.1V
%MW00367	UPS7 Battery Voltage	x0.1V
%MW00368	UPS7 Battery Current	x0.1A
%MW00369	UPS7 Battery Remain Percentage	x0.1%
%MW00370	UPS7 Battery Runtime min	Minutes
%MW00371		
%MW00372	UPS7 Battery Discharge s.	Seconds
%MW00373	UPS7 Battery Discharge min.	Minutes
%MW00374	UPS7 Battery Discharge hr.	Hours
%MW00375	UPS7 Current Fault Count	

Table 6B (Continued): UPS Parameter Register List

%MW00376	UPS7 KVA Rating	KVA
%MW00377	UPS7 Voltage In	x0.1V
%MW00378	UPS7 Voltage Out	x0.1V
%MW00379	UPS8 Bypass Frequency	x0.1Hz
%MW00380	UPS8 Bypass Voltage	x0.1V
%MW00381	UPS8 Bypass Voltage AB	x0.1V
%MW00382	UPS8 Bypass Voltage BC	x0.1V
%MW00383	UPS8 Bypass Voltage CA	x0.1V
%MW00384	UPS8 Input Frequency	x0.1Hz
%MW00385	UPS8 Input Voltage	x0.1V
%MW00386	UPS8 Input Voltage AB	x0.1V
%MW00387	UPS8 Input Voltage BC	x0.1V
%MW00388	UPS8 Input Voltage CA	x0.1V
%MW00389		
%MW00390	UPS8 Output Voltage AB	x0.1V
%MW00391	UPS8 Output Voltage BC	x0.1V
%MW00392	UPS8 Output Voltage CA	x0.1V
%MW00393	UPS8 DC Voltage PC	x0.1V
%MW00394	UPS8 DC Voltage CN	x0.1V
%MW00395		
%MW00396	UPS8 Output Frequency	x0.1Hz
%MW00397	UPS8 Output Voltage	x0.1 KW
%MW00398	UPS8 Power Factor	x0.01
%MW00399	UPS8 Output Current A	x0.1A
%MW00400	UPS8 Output Current B	x0.1A
%MW00401	UPS8 Output Current C	x0.1A
%MW00402		
%MW00403	UPS8 Output Current Percentage A	x0.1%
%MW00404	UPS8 Output Current Percentage B	x0.1%
%MW00405	UPS8 Output Current Percentage C	x0.1%
%MW00406		
%MW00407	UPS8 Output KW	x0.1 KW
%MW00408	UPS8 Output Power Percentage	x0.1%
%MW00409	UPS8 DC capacitor voltage	x0.1V
%MW00410	UPS8 Battery Voltage	x0.1V
%MW00411	UPS8 Battery Current	x0.1A
%MW00412	UPS8 Battery Remain Percentage	x0.1%
%MW00413	UPS8 Battery Runtime min	Minutes
%MW00414		
%MW00415	UPS8 Battery Discharge s.	Seconds

Table 6B (Continued): UPS Parameter Register List

%MW00416	UPS8 Battery Discharge min./	Minutes
%MW00417	UPS8 Battery Discharge hr.	Hours
%MW00418	UPS8 Current Fault Count	
%MW00419	UPS8 KVA Rating	KVA
%MW00420	UPS8 Voltage In	x0.1V
%MW00421	UPS8 Voltage Out	x0.1V

*Table 6B (Continued): UPS Parameter Register List*
**UPS REGISTER LIST - MIMIC DISPLAY**

Register	Bit	Description
%MW00070	0	UPS1 Modbus Communication Error
	1	UPS1 AC Input
	2	UPS1 CB1 Input Contactor
	3	UPS1 DC Bus
	4	UPS1 CB2 Battery Circuit Breaker
	5	UPS1 Inverter Operation
	6	UPS1 52C AC Output Contactor
	7	UPS1 Bypass Input
	8	UPS1 52S Bypass Output Contactor
	9	UPS1 AC Output
	10	UPS1 MultiModule System Synchronization
	11	
	12	
	13	UPS1 Rectifier Operation
	14	UPS1 Battery Discharging
15	UPS1 Fault	
%MW00071	0	UPS2 Modbus Communication Error
	1	UPS2 AC Input
	2	UPS2 CB1 Input Contactor
	3	UPS2 DC Bus

*Table 7B: UPS Register List*

	4	UPS2 CB2 Battery Circuit Breaker
	5	UPS2 Inverter Operation
	6	UPS2 52C AC Output Contactor
	7	UPS2 Bypass Input
	8	UPS2 52S Bypass Output Contactor
	9	UPS2 AC Output
	10	UPS2 MultiModule System Synchronization
	11	
	12	
	13	UPS2 Rectifier Operation
	14	UPS2 Battery Discharging
	15	UPS2 Fault
<b>%MW00072</b>	0	UPS3 Modbus Communication Error
	1	UPS3 AC Input
	2	UPS3 CB1 Input Contactor
	3	UPS3 DC Bus
	4	UPS3 CB2 Battery Circuit Breaker
	5	UPS3 Inverter Operation
	6	UPS3 52C AC Output Contactor
	7	UPS3 Bypass Input
	8	UPS3 52S Bypass Output Contactor
	9	UPS3 AC Output
	10	UPS3 MultiModule System Synchronization
	11	
	12	
	13	UPS3 Rectifier Operation
	14	UPS3 Battery Discharging
	15	UPS3 Fault
<b>%MW00073</b>	0	UPS4 Modbus Communication Error
	1	UPS4 AC Input

Table 7B (Continued): UPS Register List

	2	UPS4 CB1 Input Contactor
	3	UPS4 DC Bus
	4	UPS4 CB2 Battery Circuit Breaker
	5	UPS4 Inverter Operation
	6	UPS4 52C AC Output Contactor
	7	UPS4 Bypass Input
	8	UPS4 52S Bypass Output Contactor
	9	UPS4 AC Output
	10	UPS4 MultiModule System Synchronization
	11	
	12	
	13	UPS4 Rectifier Operation
	14	UPS4 Battery Discharging
	15	UPS4 Fault
<b>%MW00074</b>	0	UPS5 Modbus Communication Error
	1	UPS5 AC Input
	2	UPS5 CB1 Input Contactor
	3	UPS5 DC Bus
	4	UPS5 CB2 Battery Circuit Breaker
	5	UPS5 Inverter Operation
	6	UPS5 52C AC Output Contactor
	7	UPS5 Bypass Input
	8	UPS5 52S Bypass Output Contactor
	9	UPS5 AC Output
	10	UPS5 MultiModule System Synchronization
	11	
	12	
	13	UPS5 Rectifier Operation
	14	UPS5 Battery Discharging
	15	UPS5 Fault

*Table 7B (Continued): UPS Register List*

<b>%MW00075</b>	0	UPS6 Modbus Communication Error
	1	UPS6 AC Input
	2	UPS6 CB1 Input Contactor
	3	UPS6 DC Bus
	4	UPS6 CB2 Battery Circuit Breaker
	5	UPS6 Inverter Operation
	6	UPS6 52C AC Output Contactor
	7	UPS6 Bypass Input
	8	UPS6 52S Bypass Output Contactor
	9	UPS6 AC Output
	10	UPS6 MultiModule System Synchronization
	11	
	12	
	13	UPS6 Rectifier Operation
	14	UPS6 Battery Discharging
	15	UPS6 Fault
<b>%MW00076</b>	0	UPS7 Modbus Communication Error
	1	UPS7 AC Input
	2	UPS7 CB1 Input Contactor
	3	UPS7 DC Bus
	4	UPS7 CB2 Battery Circuit Breaker
	5	UPS7 Inverter Operation
	6	UPS7 52C AC Output Contactor
	7	UPS7 Bypass Input
	8	UPS7 52S Bypass Output Contactor
	9	UPS7 AC Output
	10	UPS7 MultiModule System Synchronization
	11	
	12	
	13	UPS7 Rectifier Operation

Table 7B (Continued): UPS Register List

	14	UPS7 Battery Discharging
	15	UPS7 Fault
<b>%MW00077</b>	0	UPS8 Modbus Communication Error
	1	UPS8 AC Input
	2	UPS8 CB1 Input Contactor
	3	UPS8 DC Bus
	4	UPS8 CB2 Battery Circuit Breaker
	5	UPS8 Inverter Operation
	6	UPS8 52C AC Output Contactor
	7	UPS8 Bypass Input
	8	UPS8 52S Bypass Output Contactor
	9	UPS8 AC Output
	10	UPS8 MultiModule System Synchronization
	11	
	12	
	13	UPS8 Rectifier Operation
	14	UPS8 Battery Discharging
	15	UPS8 Fault

Table 7B (Continued): UPS Register List



# APPENDIX C

## Passwords

U-ENM00038-C Rev. 1

June 19, 2016



**REVISIONS**

This section is used to identify the originator and the specific changes made to a procedure as the result of a revision. Original procedures will be identified by the term 'ORIGINAL' in the Revision section of the footer and title page(s). Subsequent revisions will be identified by number. Recent revisions are highlighted.

Originator: M. Meinert  
Original Date: 6/19/16  
Revision Number: Original

REVISION	RELEASED	APPROVED BY	SIGNATURE	DESCRIPTION
ORIGINAL	6/19/16	M. Meinert		Original Release

**Default Passwords**

By default all security logins utilize Upper Case (CAPITAL) letters. When the “CAPS” button is selected lower case letters will be input.

<u>CREDENTIAL TYPE</u>	<u>SECURITY LEVEL</u>	<u>DEFAULT PASSWORD</u>
Operator Password	3	1234
Administrator Password	5	ADMIN or ADMIN1



# **APPENDIX D**

## **HMI Screen Display Examples**

U-ENM00038-D Rev. 1

June 19, 2016

**REVISIONS**

This section is used to identify the originator and the specific changes made to a procedure as the result of a revision. Original procedures will be identified by the term 'ORIGINAL' in the Revision section of the footer and title page(s). Subsequent revisions will be identified by number. Recent revisions are highlighted.

Originator: M. Meinert  
Original Date: 6/19/16  
Revision Number: Original

REVISION	RELEASED	APPROVED BY	SIGNATURE	DESCRIPTION
ORIGINAL	6/19/16	M. Meinert		Original Release

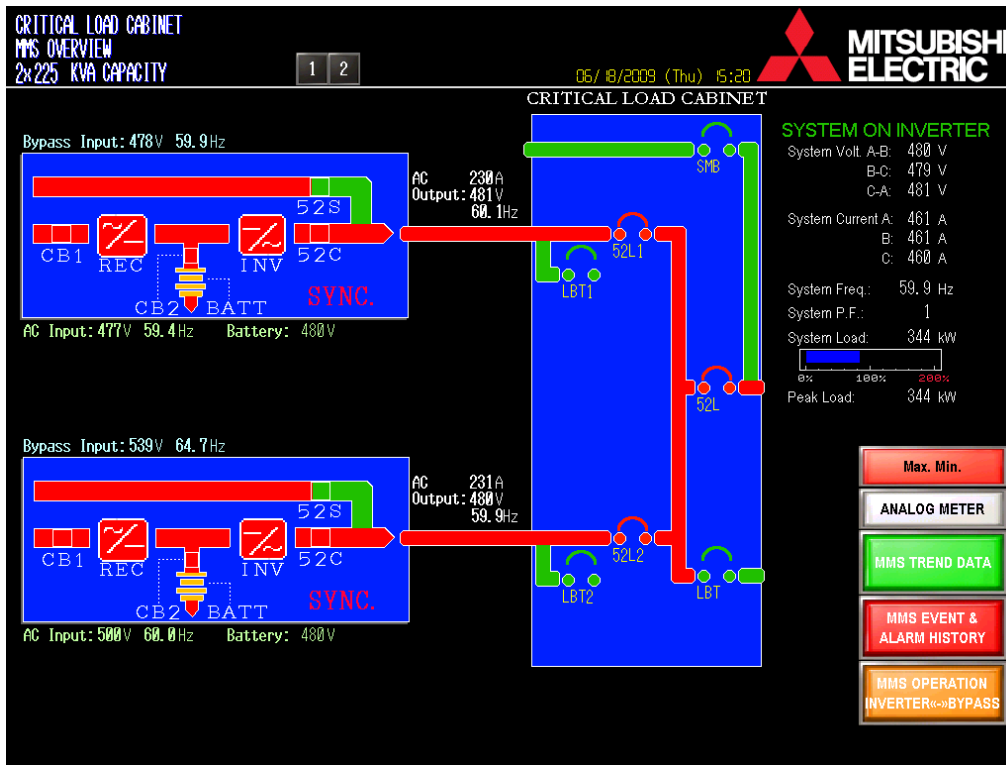


Figure 1D: UPS MMS Inverter Operation - Capacity

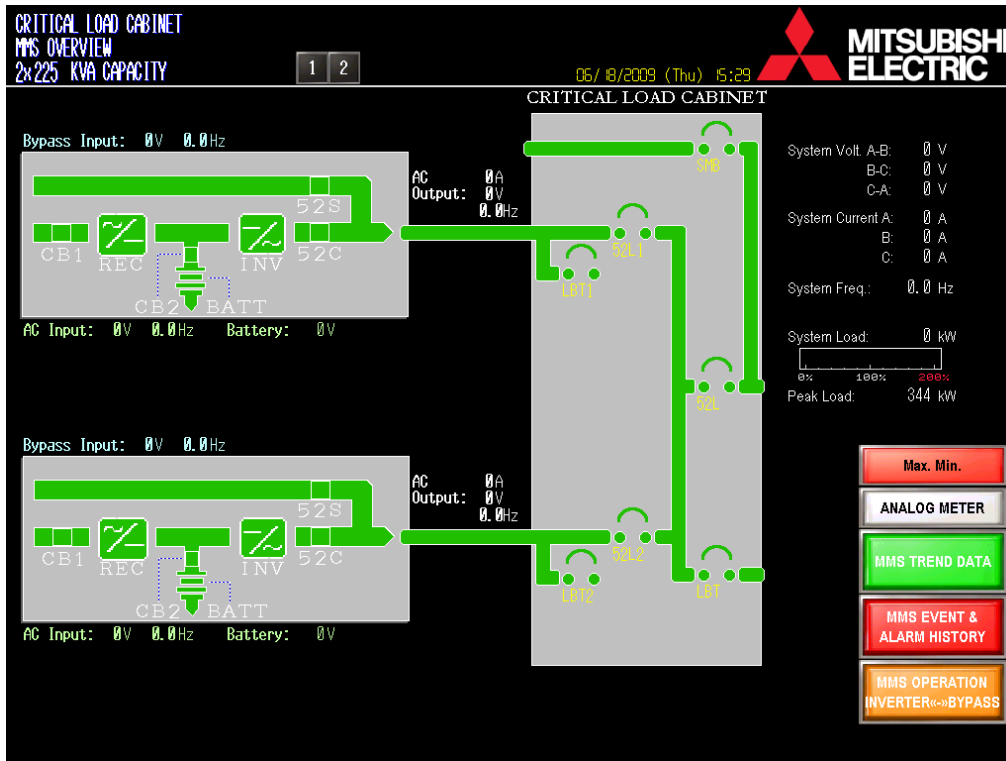


Figure 2D: UPS MMS and Load Isolated - Capacity

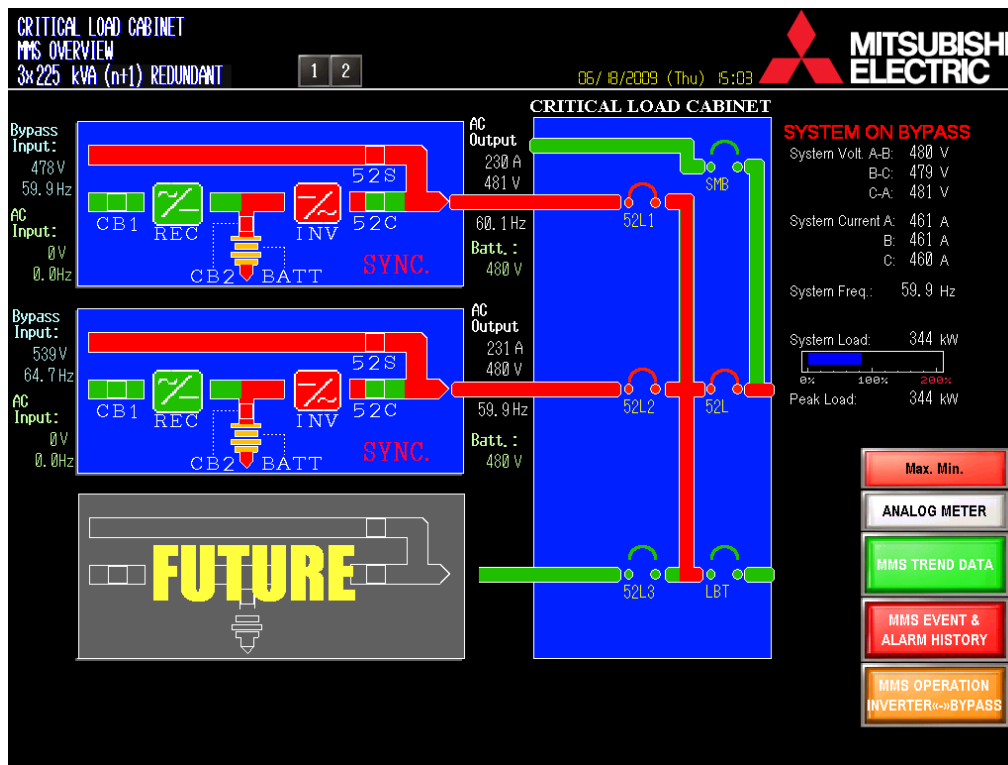


Figure 3D: UPS MMS Bypass Operation - Redundant

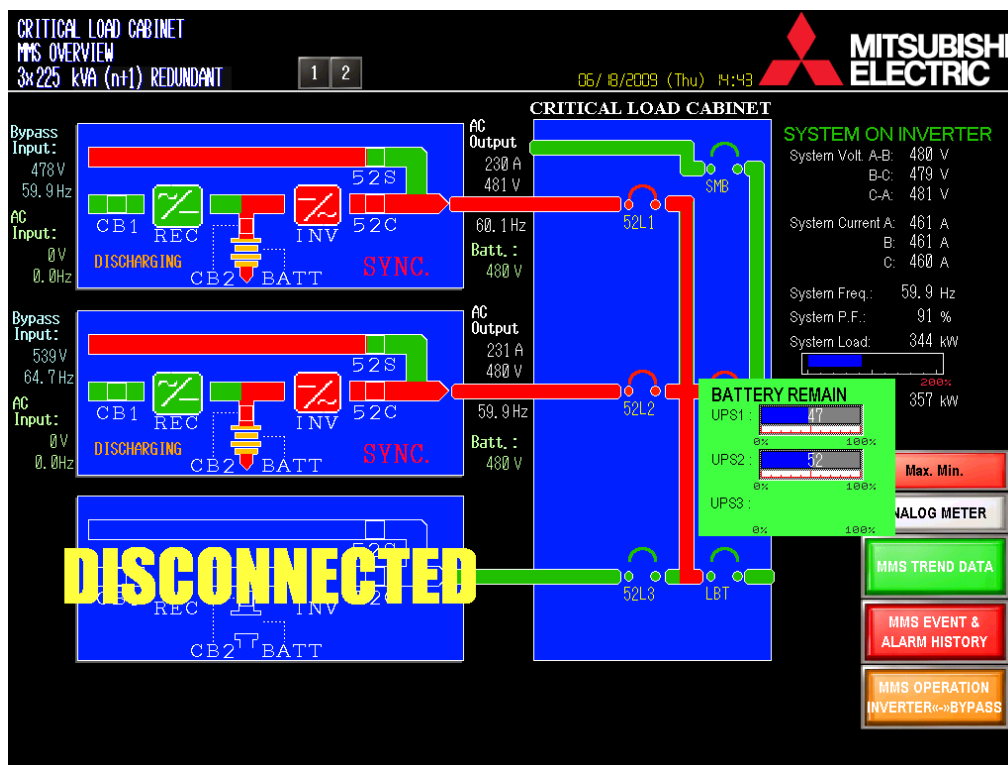


Figure 4D: UPS MMS Battery Operation - Redundant

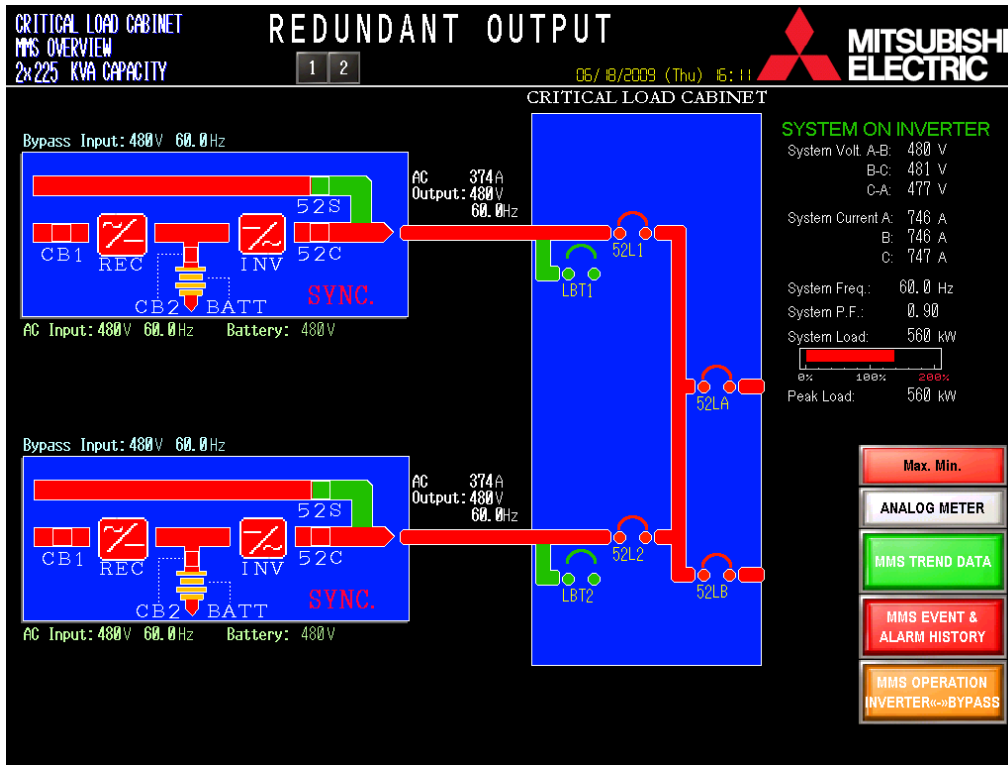


Figure 5D: UPS MMS Inverter Operation Overload

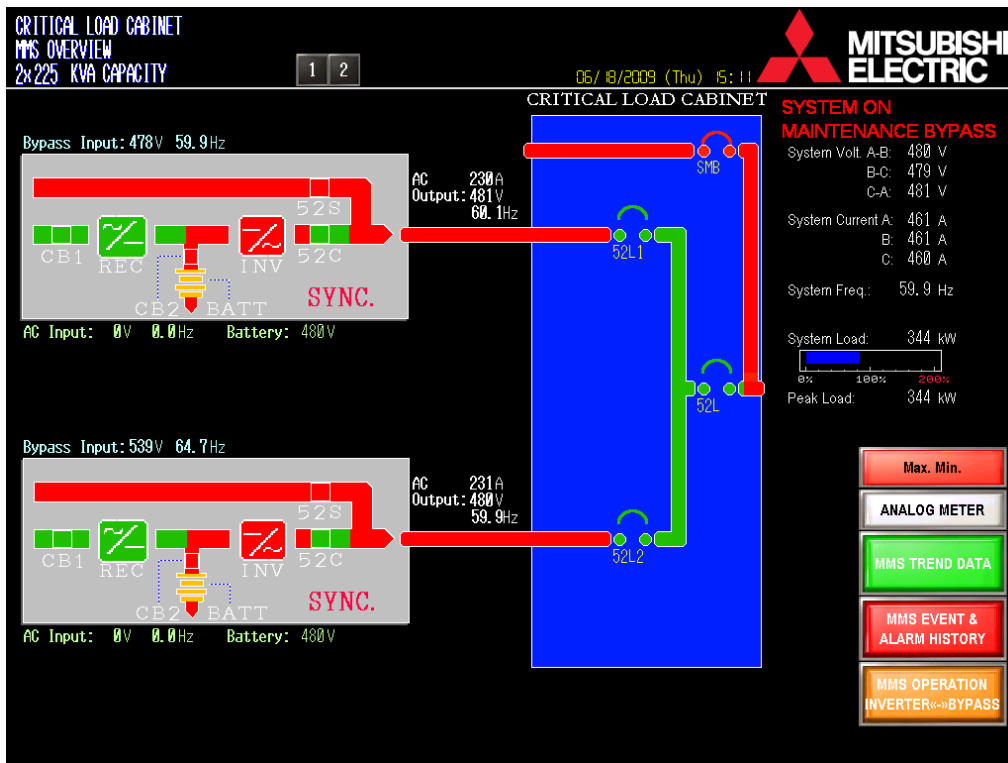


Figure 6D: UPS MMS System Maintenance Bypass Operation

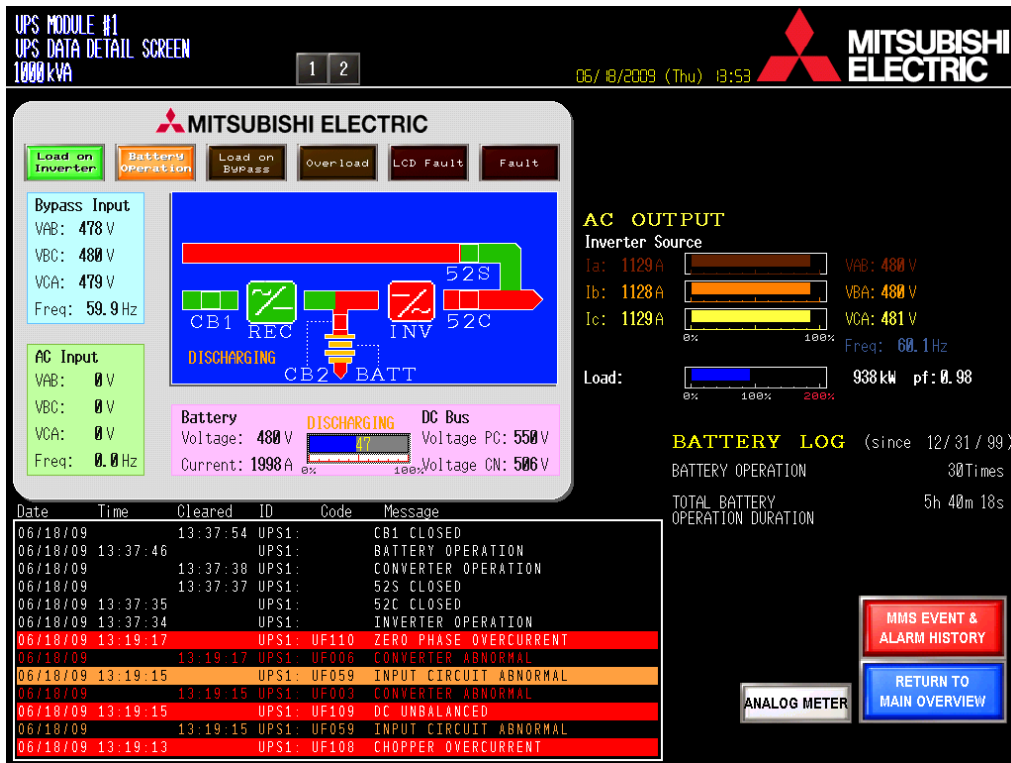


Figure 7D: UPS MMS #1 Individual Operation

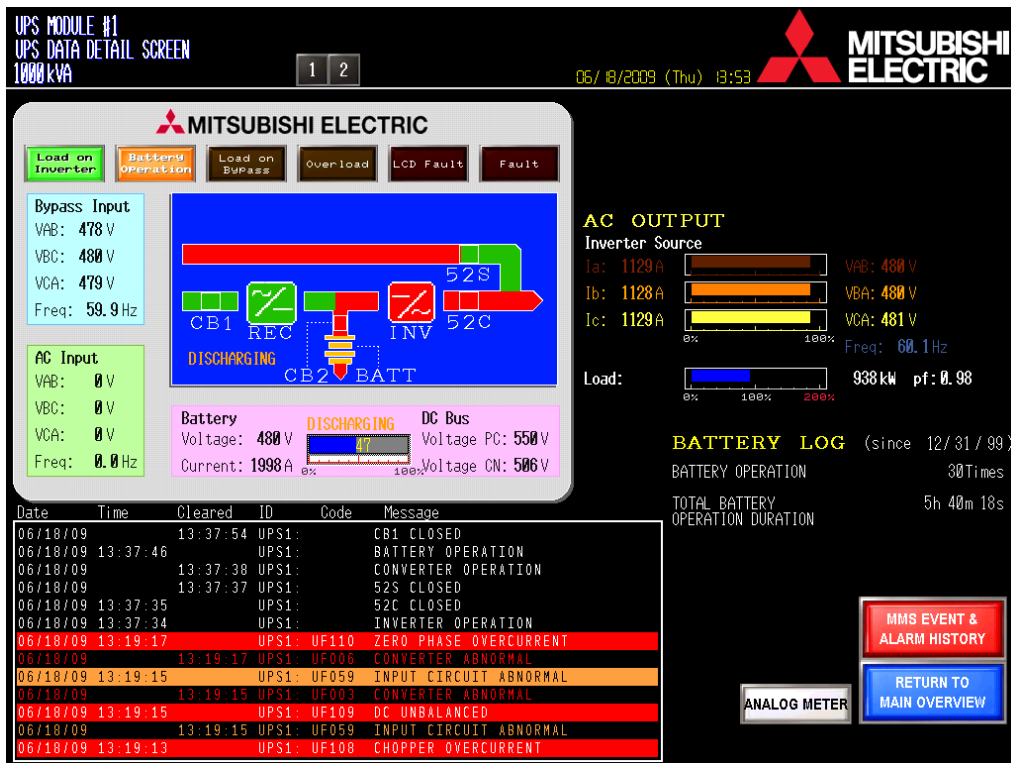


Figure 8D: UPS Module #1 Inverter Operation



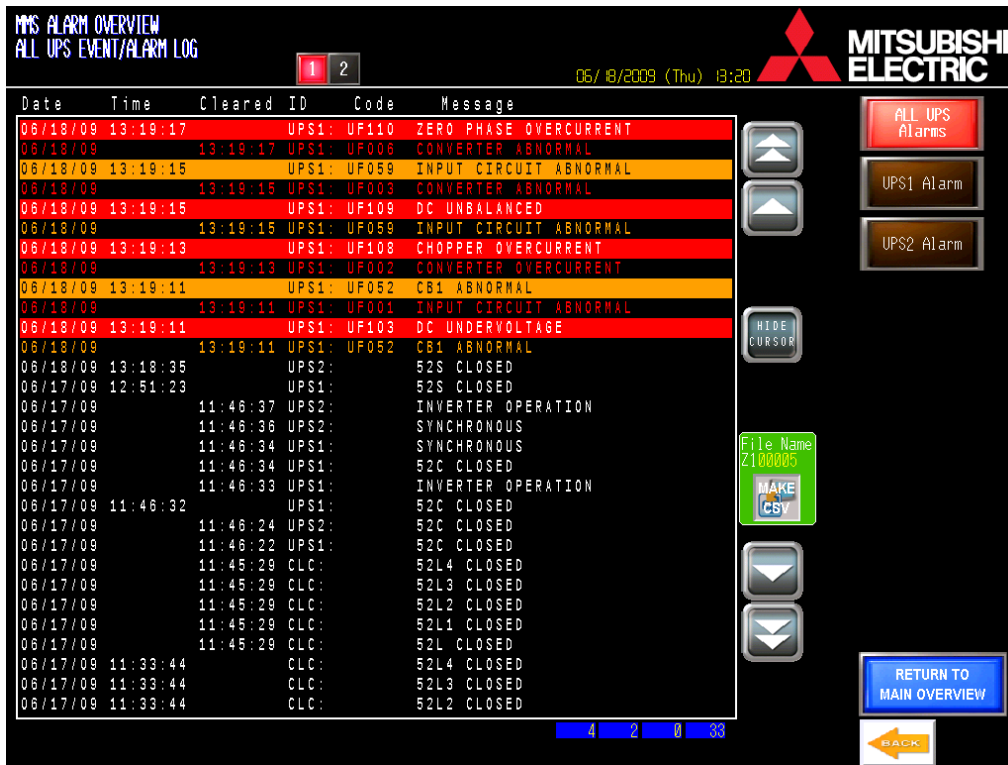


Figure 9D: System Alarm and Event Data Screen – Various Alarms