

Comba Battery Backup Unit

CPBBUV1-48055-UL

Quick Installation Guide

Version: 1.1.2

**THIS INSTALLATION GUIDE IS FOR FIRMWARE VERSION V8B01 ONLY.
FOR ALL OTHER FIRMWARE VERSIONS, PLEASE CONTACT
COMBA TECHNICAL SUPPORT FOR UPGRADE INSTRUCTIONS.**

IMPORTANT! READ BELOW

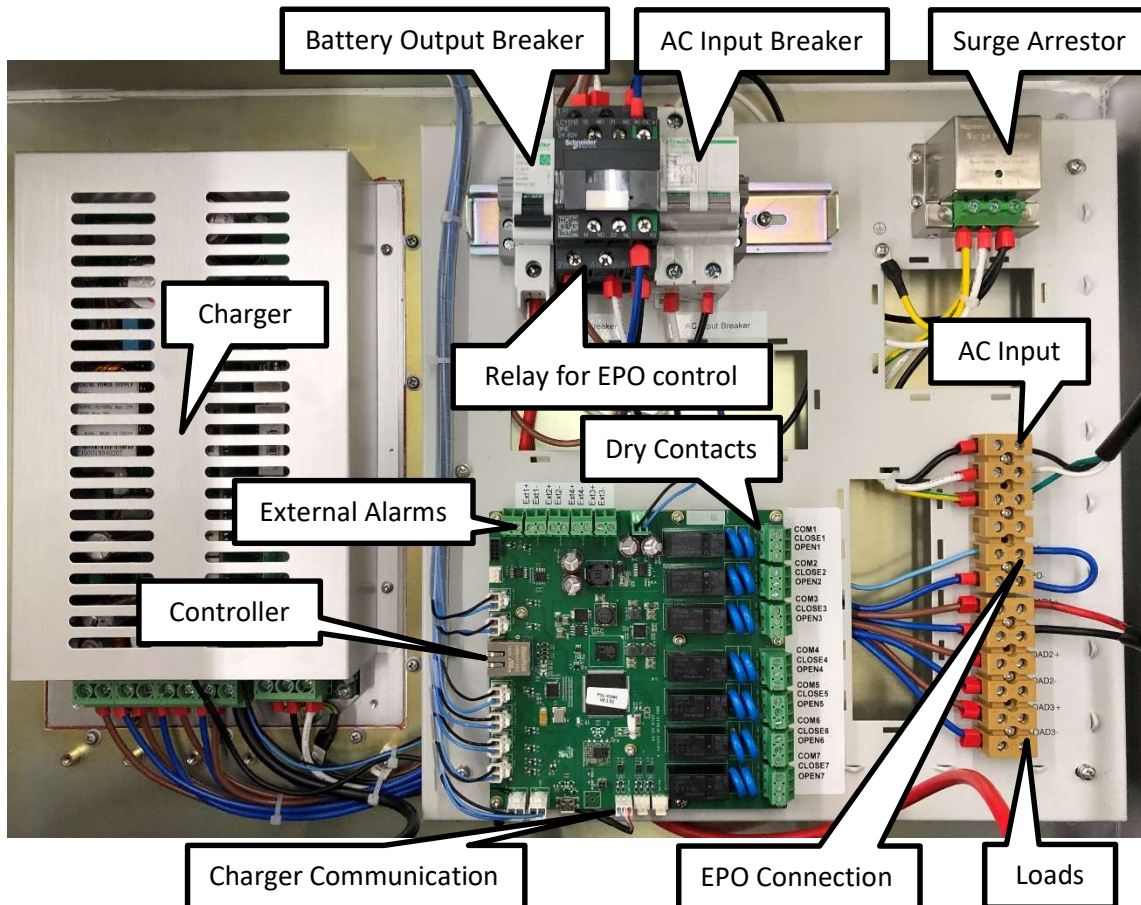
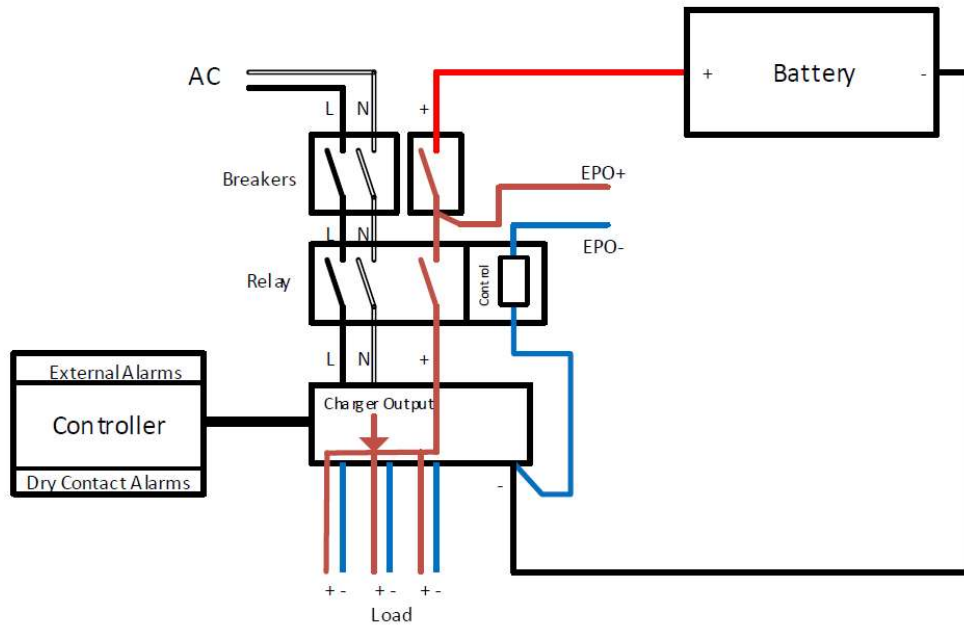
**UPON SYSTEM INSTALL, IF BATTERY STATUS ON WEBOMT SOFTWARE SHOWS “CUT OFF”
CHECK THE BATTERY VOLTAGE. IF ALL BATTERIES MEASURE OVER 12.5 VOLTS, RESET CUT OFF
STATUS IN MANAGEMENT TAB OF WEBOMT. IF BATTERIES MEASURE LESS THAN 12.5V, CONTACT
COMBA TECHNICAL SUPPORT FOR HELP.**

COMBA TECHNICAL SUPPORT: (408) 649-2627 ext 4

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System Diagram:



Battery Backup Shipping Contents:

The BBU is shipped with the following. Please check accessories to ensure all are included:

1. BBU Chassis
2. (4) 55AH Batteries
3. (3) Battery Jumper Cables
4. (8) Sets of screws/washers for 4 batteries
5. (8) Battery Terminal Caps
6. (4) Liquid Tight Connectors

Note: For Comba Annunciator, See Annunciator Panel Manual.

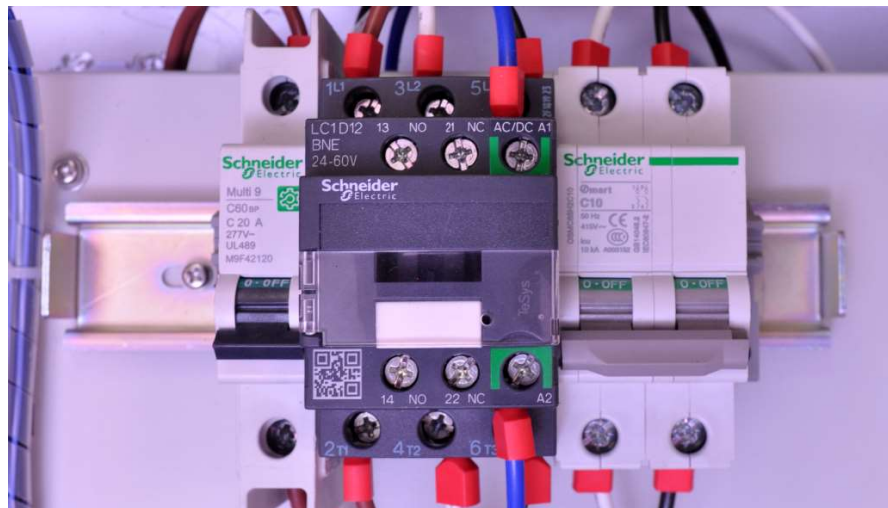
Before Starting

Before beginning installation, check the batteries and chassis for any shipping damage. If there are any signs of battery acid, cracked plastic around the batteries, or other deformities, contact Comba technical support for assistance. Note that the batteries may be shipped with an electrical grease on the battery terminals to prevent corrosion and oxidation.

Check the voltage of the batteries before installing. All batteries should be above 12.5V when installed. If the voltage of any battery is below 12.5V, contact Comba technical support for assistance.

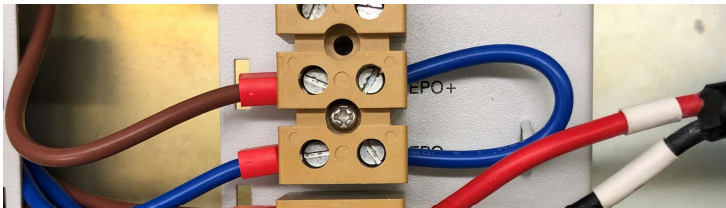
Cable Connection:

1. Turn off AC Input Breaker and Battery Output Breaker
 - AC Input Breaker disconnects the AC supply to the Charger
 - Battery Output Breaker disconnects the Battery from the Load/Charger



2. (Optional) Install EPO switch

- If you wish to install an EPO switch: Note that the EPO connections have a preinstalled wire that shorts the EPO+ and EPO-. Remove the preinstalled wire and connect the EPO switch; then turn the EPO switch to its “Closed” position (Normal Status) and continue to the next step
- DO NOT Set the EPO switch to “Open” (Cut Off Status)
- The EPO switch can be installed at a remote location; note that the voltage-drop caused by the wiring must be <14V
- The EPO function is triggered from a relay and this relay is energized by the battery or the charger; if the battery is over-discharged, then the EPO function may not work properly
- If you do not wish to use an EPO switch, then continue to the next step directly (do not remove the preinstalled shorting wire)



3. (Optional) Install Annunciator: See Annunciator BBU V(x) to Annunciator Panel Wiring Diagram.

4. Wire dry contact alarms and external alarms

Dry contact alarms default configurations:

- ALM 1: AC Fail
- ALM 2: Battery Low
- ALM 3: Charger Fail
- ALM 4: EXT ALM 1
- ALM 5: EXT ALM 2
- ALM 6: EXT ALM 3
- ALM 7: EXT ALM 4

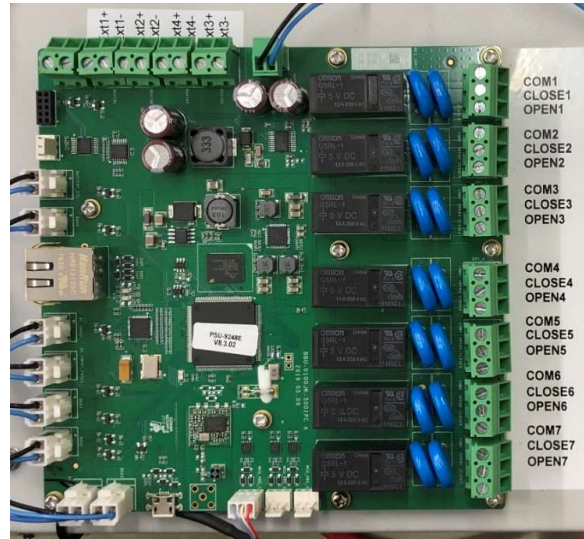
If you need to define different alarms, it can be done using the WEBOMT tool.

Note that the BBU dry contact alarms provide both Normally Open and Normally Closed configurations; refer to the picture below for wiring instructions

Alarms from external devices (BDA, AMS, etc.) can be tied into BBU EXT ALMs so they can be annunciated using the LEDs from the BBU front panel. In order to match the order of the BBU Annunciator LEDs:

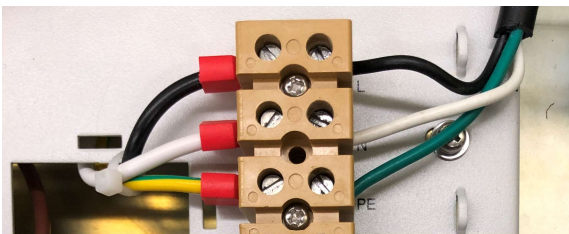
- EXT ALM 1 shall tie to Signal Booster Fail (from BDA)
- EXT ALM 2 shall tie to Antenna Malfunction (Normally from BDA)
- EXT ALM 3 shall tie to System Component Failure (Normally from BDA or AMS)
- EXT ALM 4 not defined

By default, the EXT ALMs work with Normally Open dry contact alarm wiring; the dry contact alarm type (Normally Open or Normally Closed) can be configured using the WEBOMT tool. The two wires from dry contact alarms can be tied to EXT ALMs positive and negative termination block – the polarity does not matter.



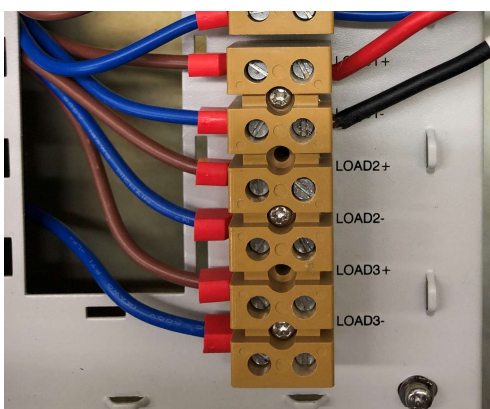
5. Install AC input wires

Primary Lead / Earthing Lead: min. 14 AWG (cable is not included)



6. Install wires for load

- BBU provides 3 sets of terminations for loads
- All 3 loads share the same power being supplied by the charger or batteries
- Note: All Comba BDAs, MUs, RUs, and other -48V products come with a power cable.



7. Install batteries, battery jumpers and connector caps

The batteries need to be installed in the straight up position as indicated in the picture (so that when the BBU is mounted to the wall, the battery posts are on top/pointed towards the ceiling).

- Partially pull out the batteries to connect all the positive terminals first, then push the batteries back in and connect the negative terminals.
- For safety, after installing the batteries always connect the black negative wire as the last step; for battery removal, always disconnect the black negative wire as the first step.

NOTE: If provided with the unit, discard the battery support bar that was originally included in the unit – it is no longer required to be installed.



8. Switch on both breakers; the BBU will boot up in 2-3 minutes and start working

Software Instructions:

The BBU should now be running; it will be configured to the default settings. To change the settings, or review product identification information, you can log into the unit using the optional WEB interface (WEBOMT). After logging in, the WEBOMT will provide the following information and options to you:

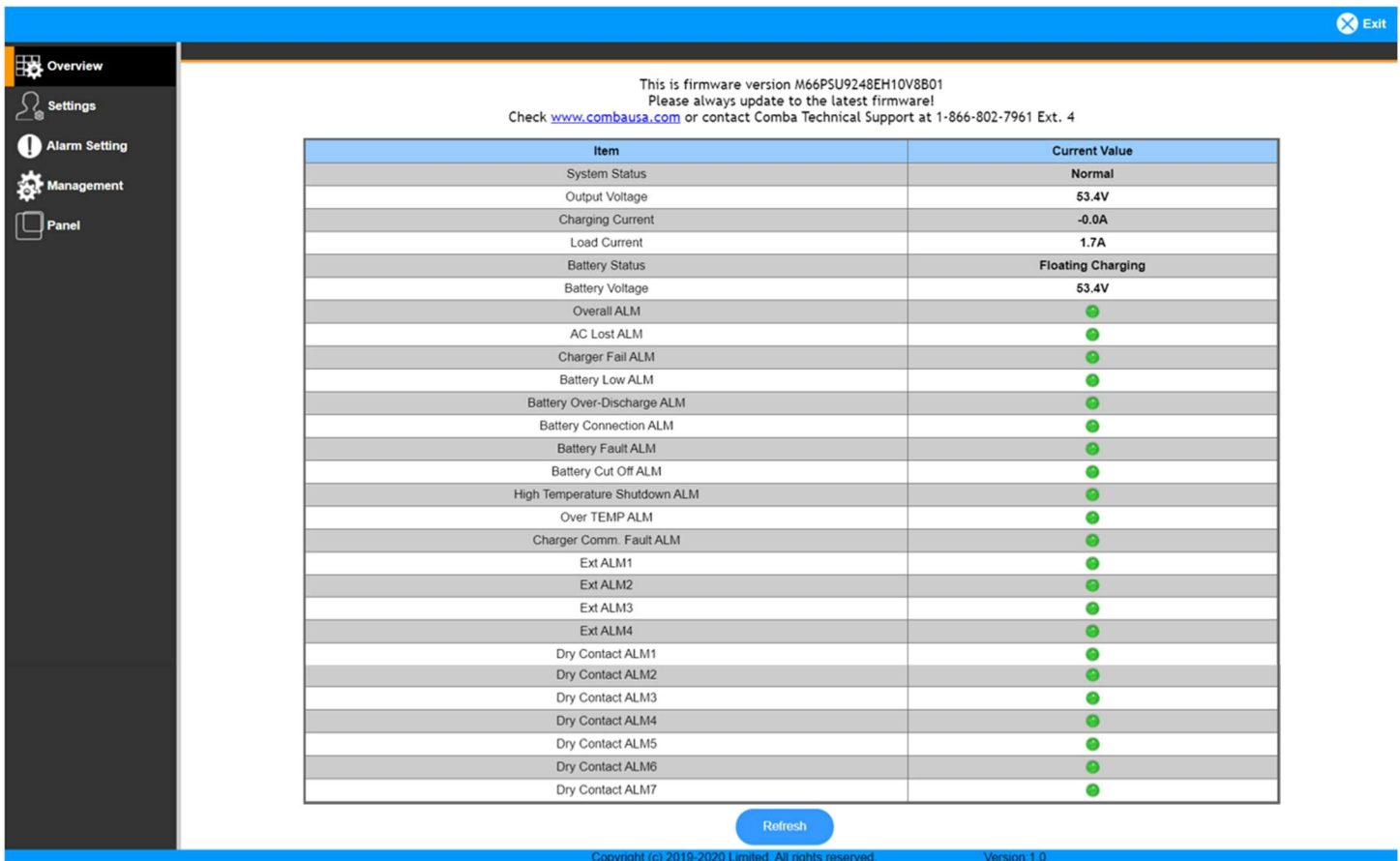
- **Unit information: Serial Number, Firmware versions and upgrade etc.**
- **Unit status: alarms, charging status, temperature etc.**
- **Customize alarming**

WEBOMT Login:

- Change IP address manually to 192.168.8.xxx/255.255.255.0 (DO NOT use 192.168.8.101)
Or wait for the IP address to be automatically assigned by the BBU
- Use 192.168.8.101 in the browser to login
(Comba recommends using Chrome in Incognito Mode, or Firefox in private mode)

WEBOMT interface:

Overview:

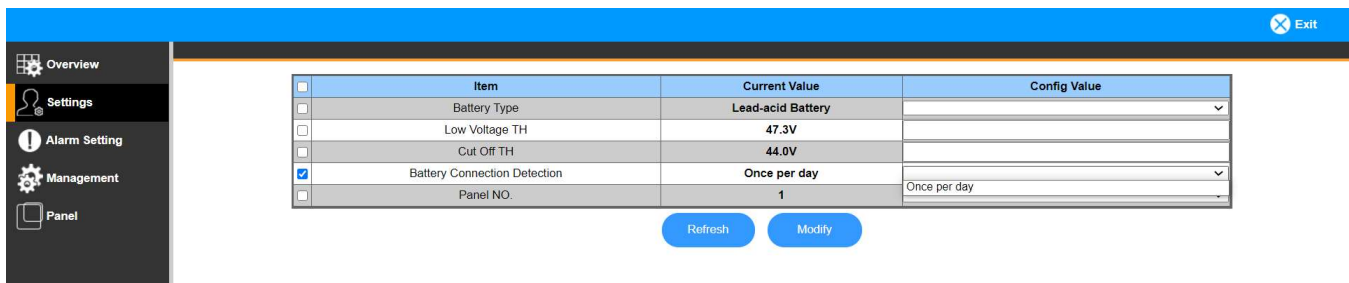


Item	Current Value
System Status	Normal
Output Voltage	53.4V
Charging Current	-0.0A
Load Current	1.7A
Battery Status	Floating Charging
Battery Voltage	53.4V
Overall ALM	●
AC Lost ALM	●
Charger Fail ALM	●
Battery Low ALM	●
Battery Over-Discharge ALM	●
Battery Connection ALM	●
Battery Fault ALM	●
Battery Cut Off ALM	●
High Temperature Shutdown ALM	●
Over TEMP ALM	●
Charger Comm. Fault ALM	●
Ext ALM1	●
Ext ALM2	●
Ext ALM3	●
Ext ALM4	●
Dry Contact ALM1	●
Dry Contact ALM2	●
Dry Contact ALM3	●
Dry Contact ALM4	●
Dry Contact ALM5	●
Dry Contact ALM6	●
Dry Contact ALM7	●

- **System Status:**
 - Normal: the charger is operating normally
 - Fault: the charger is not operating normally
 - In this state, the batteries may not be charging or the charger may not be providing a consistent DC voltage to the load.
 - Cut Off: the batteries are cut off from the charger
 - In this state, the load does not have backup from the batteries.
- **Output Voltage:**
 - The voltage that the BBU provides to the loads
- **Charging Current:**
 - The current draw while the BBU is charging the batteries
- **Battery Status:**
 - Cycle charging: BBU is using high current while charging the battery
Refer to Setting page: <Cycle Charge Voltage>
 - Float charging: BBU is using low current to periodically charge the battery
Refer to Setting page: <Float Charge Voltage>
 - Discharging: NO AC supply; all loads are running on batteries

- Cut off: Either (1) battery voltage is lower than the Cut Off Threshold so they have been cut off from the system to ensure they can still be recharged, or (2) batteries have not properly charged, leading to the BBU to cut them off to ensure no battery or system damage occurs. The unit might ship with the batteries in cut off status due to no batteries connected during factory firmware flash.
 - Refer to Setting page: <Cut Off TH>
- No battery: Battery is not connected
- **Battery Voltage:**
 - The voltage of the batteries
- **Alarm Status:**
 - Refer to Appendix - Alarm section

Settings:



Item	Current Value	Config Value
Battery Type	Lead-acid Battery	
Low Voltage TH	47.3V	
Cut Off TH	44.0V	
Battery Connection Detection	Once per day	Once per day
Panel NO.	1	

Refresh Modify

NOTE: After setting up a new unit or upgrading the firmware, always verify that all the parameters in this page are set to default values; always contact Comba technical support PRIOR to changing any of the parameters

- **Low Voltage TH: default = 47.3V**
 - Define the minimum percentage the battery capacity (e.g. 30%), and the <Battery Low> alarm will be triggered when the remaining battery capacity reaches 30%
- **Cut Off TH: default = 44V**
 - Battery supply to the loads will be cut off if the battery voltage is lower than the desired threshold; the charger will try to charge the batteries when AC is restored, but it is not guaranteed that the batteries can be charged if the batteries are over-discharged to the point of being damaged.
- **Over Temperature TH: default = 50degC**
 - Over temperature alarm threshold
- **Battery Connection Detection:** The system will check once during each 24-hour period to verify that all batteries are connected.
- **Panel NO:** See Annunciator Panel Manual.

NOTE 1: IF THE BBU DOES NOT SEE A LOAD (i.e., the BDA or fiber DAS devices is powered down, or has been removed for some reason), the Battery Connection Detection alarm may trigger. To prevent this, we recommend disabling the Battery Connection Detection alarm until the BDA or fiber DAS device has been powered up or has been re-installed.

Alarm Setting:

Overview
Settings
Alarm Setting
Management
Panel

Item	Status	Name	
Dry Contact ALM1	●	AC Fail	⚙️ Modify
Dry Contact ALM2	●	Battery Low	⚙️ Modify
Dry Contact ALM3	●	Charger Fail	⚙️ Modify
Dry Contact ALM4	●	Signal Booster Fail	⚙️ Modify
Dry Contact ALM5	●	Antenna Malfunction	⚙️ Modify
Dry Contact ALM6	●	SystemComponent Fail	⚙️ Modify
Dry Contact ALM7	●	Not Configured	⚙️ Modify

Ext Alarm	Status	Name	Alarm Type	
Ext ALM1	●	Signal Booster BDA F	Normally Open	⚙️ Modify
Ext ALM2	●	Donor Antenna	Normally Open	⚙️ Modify
Ext ALM3	●	Ext Alm3	Normally Open	⚙️ Modify
Ext ALM4	●	Ext Alm4	Normally Open	⚙️ Modify

Item	Current Value	Config Value
<input type="checkbox"/> AC Lost ALM	●	▼
<input type="checkbox"/> Charger Fail ALM	●	▼
<input type="checkbox"/> Battery Low ALM	●	▼
<input type="checkbox"/> Battery Fault ALM	●	▼
<input type="checkbox"/> Battery Cut Off ALM	●	▼
<input type="checkbox"/> Over TEMP ALM	●	▼
<input type="checkbox"/> High Temperature Shutdown ALM	●	▼
<input type="checkbox"/> Battery Over-Discharge ALM	●	▼
<input type="checkbox"/> Charger Comm. Fault ALM	●	▼
<input type="checkbox"/> Battery Comm. Fault ALM	●	▼
<input type="checkbox"/> Battery Connection ALM	●	▼

Item	Current Value	
Alarm Detect Duration(10s)	1	⚙️ Modify

Refresh
Modify

- **Dry Contact Alarm setting page**

- Users can define an alarm or a set of alarms (to trigger a single alarm when any one of the alarms in the “set” triggers) to trigger dry contact alarms through 1-7
- Modifying the Dry Contact Alarms will result in a pop-up menu to enable which alarms trigger the dry contact and the ability to rename the alarm. See image below.

Dry Contact ALM1

<input type="checkbox"/>	Alarms	<input type="checkbox"/>	Alarms	<input type="checkbox"/>	Alarms
<input checked="" type="checkbox"/>	AC Lost ALM	<input type="checkbox"/>	Charger Fail ALM	<input type="checkbox"/>	Battery Low ALM
<input type="checkbox"/>	Over TEMP ALM	<input type="checkbox"/>	Battery Over-Discharge ALM	<input type="checkbox"/>	Charger Comm. Fault ALM
<input type="checkbox"/>	Battery Connection ALM	<input type="checkbox"/>	Ext ALM1	<input type="checkbox"/>	Ext ALM2
<input type="checkbox"/>	Ext ALM3	<input type="checkbox"/>	Ext ALM4		

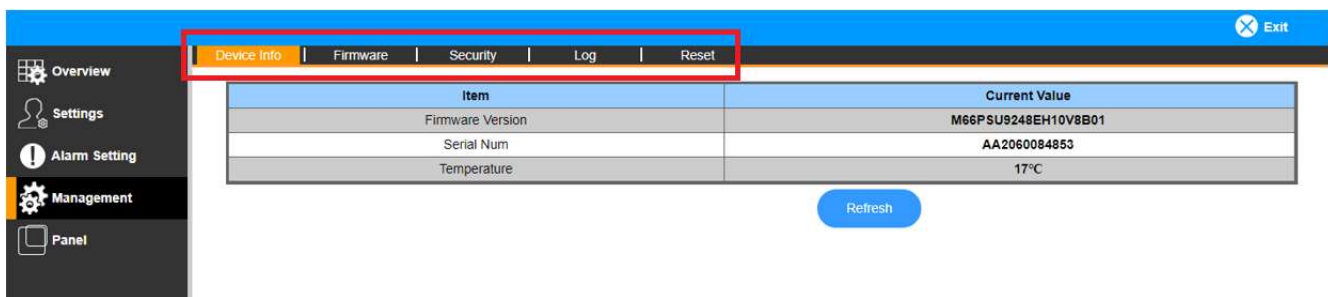
Alarm name/remark

<input type="checkbox"/>	Item	Current Value	Config Value
<input type="checkbox"/>	Dry Contact Remark1	AC Fail	

Ok
Cancel

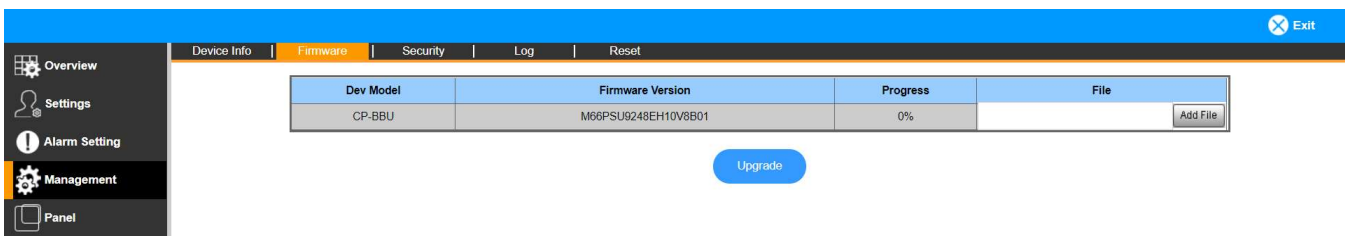
- **External Alarm setting page**
 - o Users can define whether the external alarm is a Normally Open or Normally Closed alarm from an external device (such as the dry contact alarms from BDA), so the external alarms will be triggered accordingly
- **Alarm Enable/Disable page**
 - o Users can enable or disable the listed alarms
- **Alarm Detect Duration**
 - o Users can define a time interval to specify the amount of delay before an alarm is triggered; each number set here indicates 10 seconds (e.g. 5 = 50s, 10 = 100s, etc.) – the system will monitor the alarm status during this duration and then will trigger the alarm after the specified delay time.

Management:

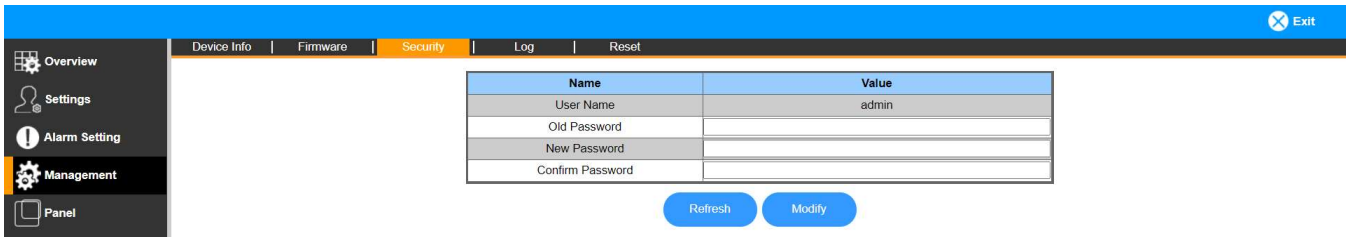


Users can obtain information and perform tasks:

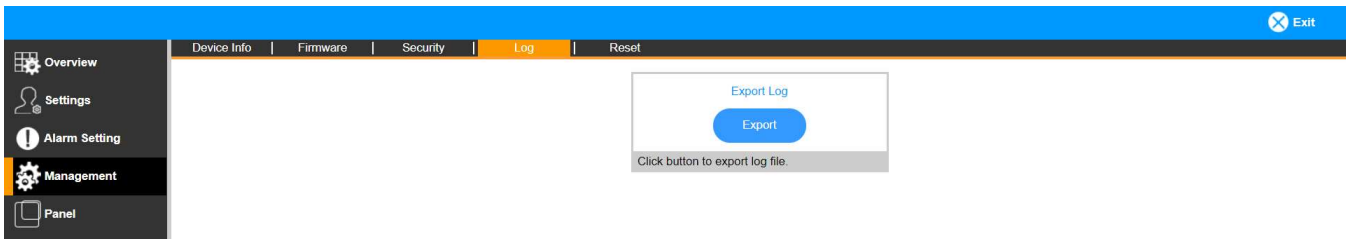
- Get device S/N, temperature, Firmware version
- Upgrade firmware
 - o After upgrading the firmware, the user must recheck all dry contact alarm settings to verify no changes to these have been made by the upgrade



- Change Login Password

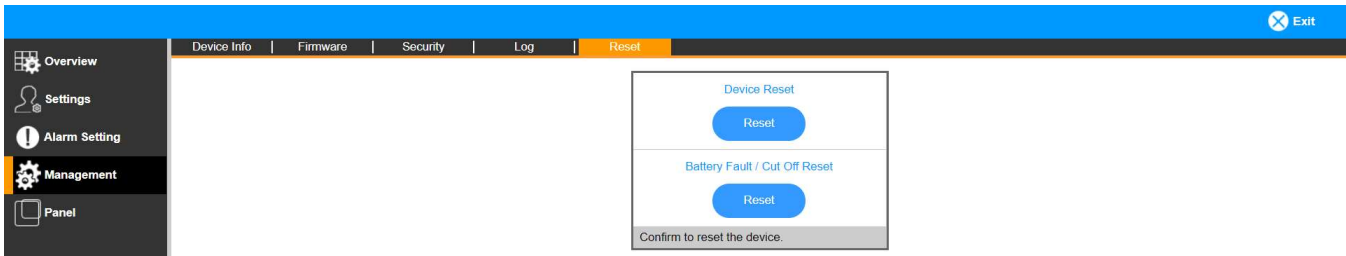


- Export alarms log



- Reset Controller and Reset the Cut Off Status

- On most installations, the cut off reset will need to be performed on system turn up.
- After initial installation, if batteries show cut off status, do not perform cut off reset without first checking battery health.



Panel:

- This BBU firmware version supports Comba's Annunciator Panel. Please see the Annunciator Panel Quick Install Guide for more information.

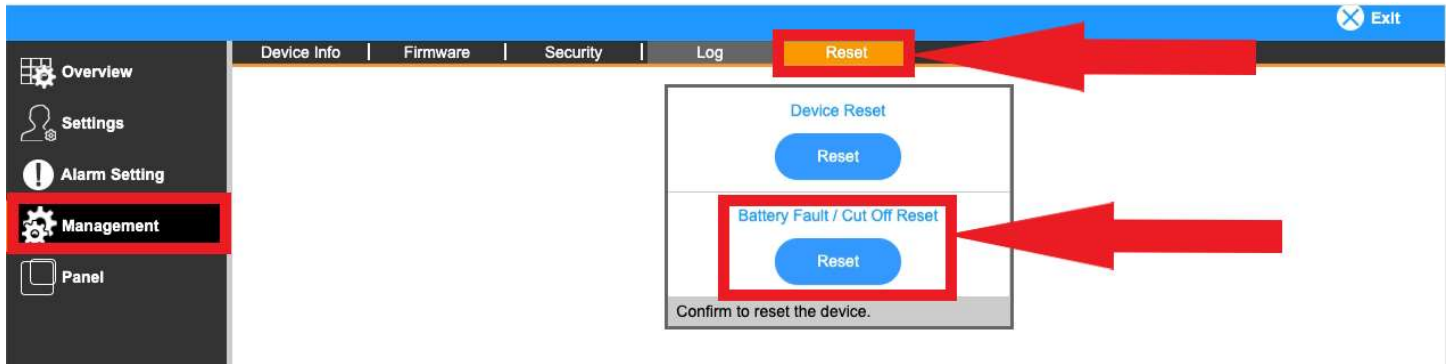


Firmware V8E01 Update:

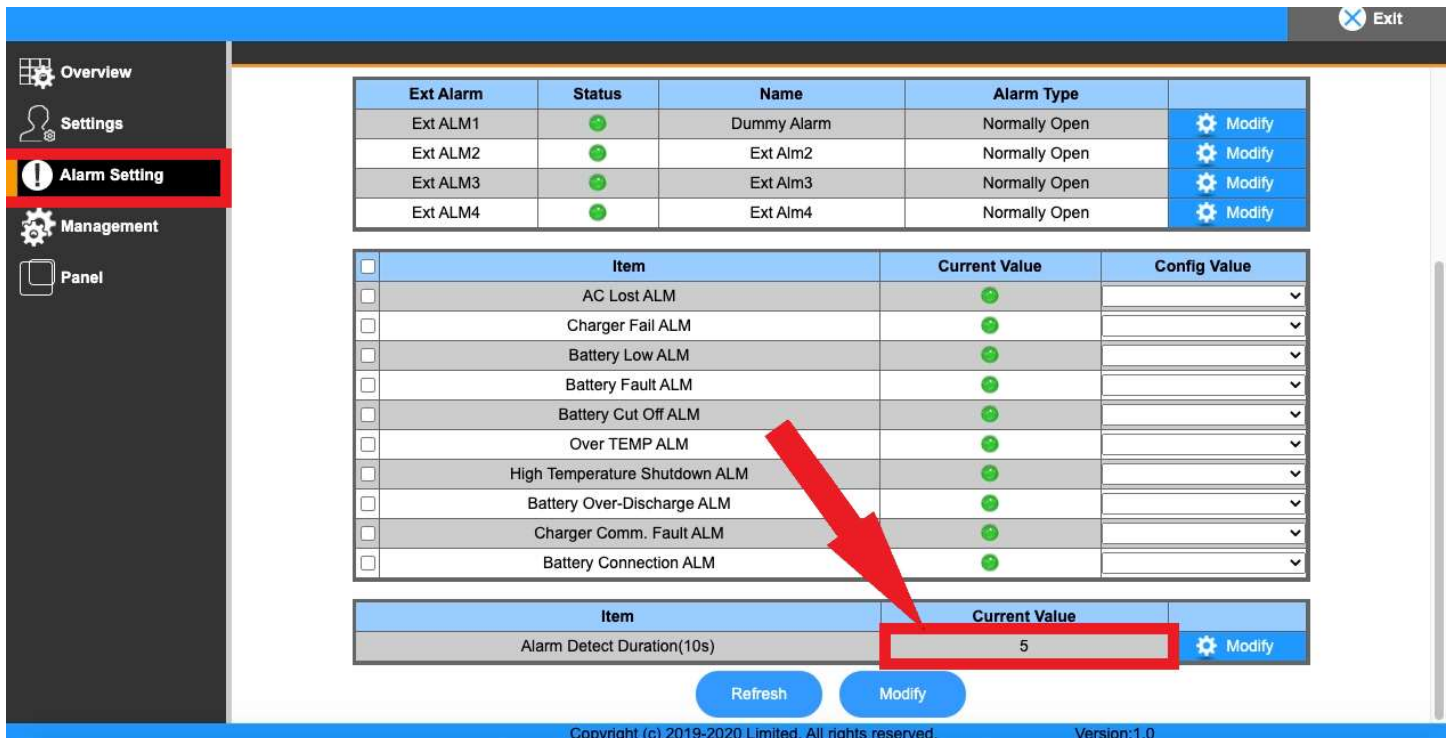
After firmware on the BBU is updated to V8E01m the following steps are needed to be performed to ensure the unit functions properly.

After the BBU has restarted:

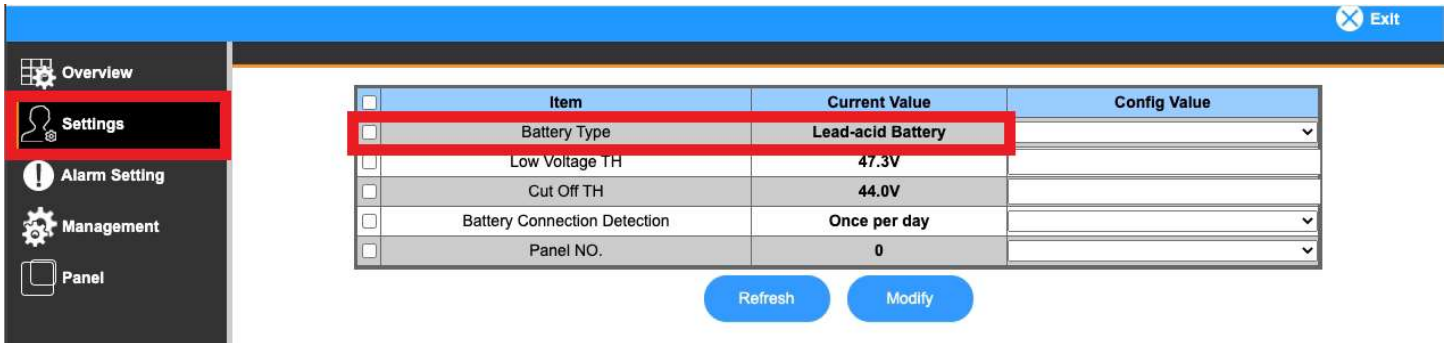
- Click [Management] -> {Reset} -> Battery Fault/ Cut off Reset



- Click [Alarm Settings] and adjust “Alarm Detection Duration” is 3 or greater. V8E01 firmware no longer supports shorter durations.



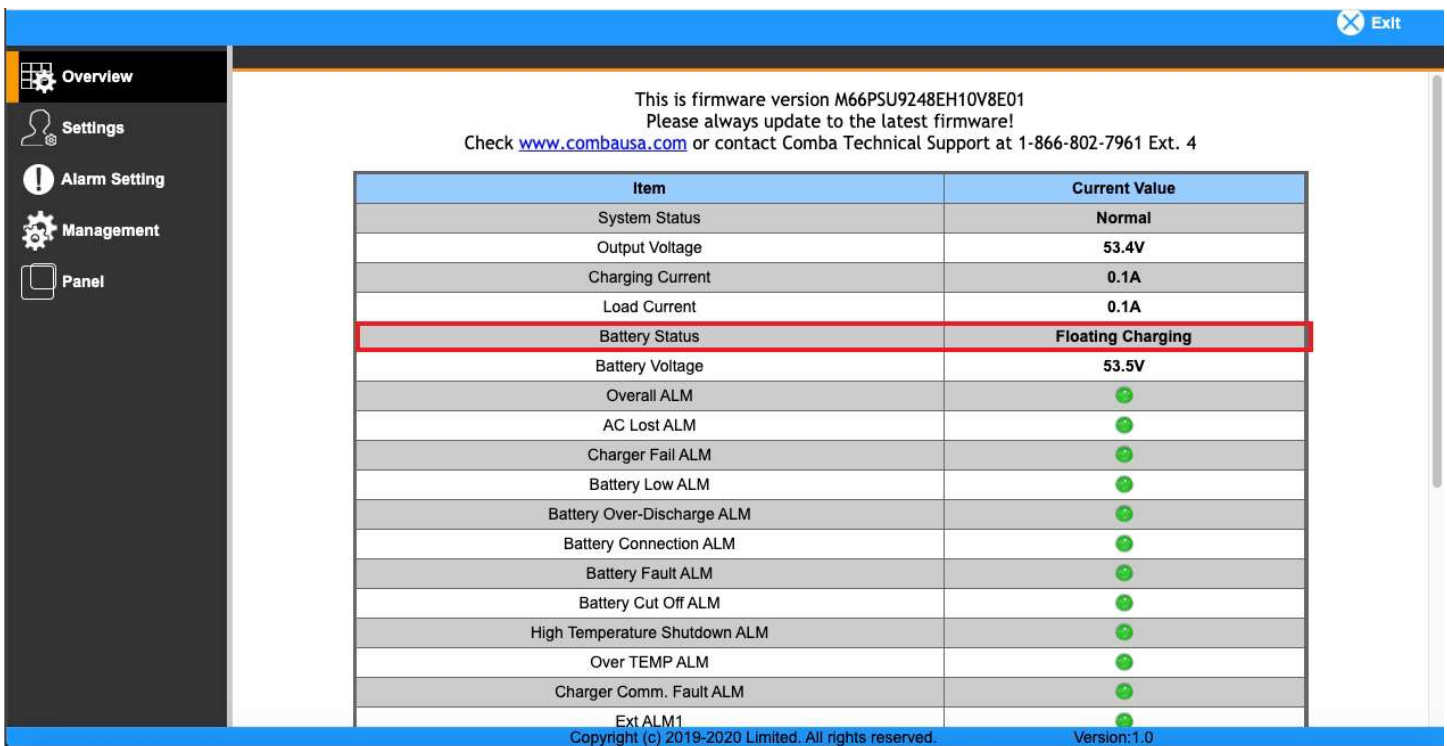
- Click [Settings] and ensure the correct battery type of “Lead-acid battery” is selected.



Item	Current Value	Config Value
Battery Type	Lead-acid Battery	
Low Voltage TH	47.3V	
Cut Off TH	44.0V	
Battery Connection Detection	Once per day	
Panel NO.	0	

Refresh Modify

- Click [Overview] and ensure no alarms are present and “Battery Status” is “Cycle” or “Float” Charging.
 - Power cycle BBU if alarms are present.



This is firmware version M66PSU9248EH10V8E01
Please always update to the latest firmware!
Check www.combausa.com or contact Comba Technical Support at 1-866-802-7961 Ext. 4

Item	Current Value
System Status	Normal
Output Voltage	53.4V
Charging Current	0.1A
Load Current	0.1A
Battery Status	Floating Charging
Battery Voltage	53.5V
Overall ALM	●
AC Lost ALM	●
Charger Fail ALM	●
Battery Low ALM	●
Battery Over-Discharge ALM	●
Battery Connection ALM	●
Battery Fault ALM	●
Battery Cut Off ALM	●
High Temperature Shutdown ALM	●
Over TEMP ALM	●
Charger Comm. Fault ALM	●
Ext ALM1	●

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Appendix - Alarms:

The following table shows the alarms that may be present in the WEBOMT software and what triggers them. The alarm configuration for required alarms (and LED lights) is configurable to include any of the following:

Alarms	Causes
Overall	Any of alarms trigger
AC Lost	Triggers when AC is lost and on system shutdown
Charger Fail	Triggers when the charger module fails (Output Voltage High, Output Voltage Low, Current High, Temperature High, Circuit Short Protection Mode)
Battery Low	Triggers when battery voltage is lower than the Low Voltage TH threshold. May also trigger when batteries are in cut off status due to high temperature, bad batteries, or full depletion. To recover: Recharge batteries or contact Comba technical support for assistance if batteries are in cut off status.
Over TEMP	Triggers when the temperature of the BBU is higher than the threshold
Battery Over-Discharge	Triggers when the charger fails to charge the battery (Charger will still try to charge even when battery voltage is lower than 40V at first, but if it still fails after the attempts, system will stop trying to charge anymore and trigger the alarm)
Comm. Fault	Triggers when the charger communication cable (the white connector with red, white, and blue wires on the bottom of the Controller Module) is disconnected from the MCU
Battery Connection	Triggers when batteries are not connected to the BBU

Dry Contact Alarm setting and Alarm Simulation:

- **AC Lost: (trigger Dry Contact Alarm 1 by default)**

Confirm Dry Contact Alarm setting:

- WEBOMT – Alarm Setting Page – Dry Contact ALM1
- Check AC Lost ALM

Either way listed below will trigger the alarm:

- Unplug AC input
- Switch off AC Input Breaker

- **Battery Low: (trigger Dry Contact Alarm 2 by default)**

Confirm Dry Contact Alarm setting:

- In WEBOMT – Alarm Setting Page – Dry Contact ALM2
- Check Battery Low ALM
- Check Battery Connection ALM

Either of the 2 methods listed below will trigger the alarm:

- Wait for the battery to drain about 16 hours with a 100W load and alarm will be triggered
- Change the "Battery Low Alarm Threshold" in the setting page to be higher than current battery voltage to immediately trigger the alarm for testing purpose

- **Charger Fail: (trigger Dry Contact Alarm 3 by default)**

Confirm Dry Contact Alarm setting:

- In WEBOMT – Alarm Setting Page – Dry Contact ALM3
- Check Charger Fail ALM
- Check AC Lost ALM (optional, refer to your local AHJ's requirement)
- Check Comm. Fault ALM
- Check Over Temp ALM

Either way listed below will trigger the alarm:

- Unplug the charger communication cable on Controller Module (the white connector with red, white, and blue wires on the bottom of the Controller Module)
- Unplug AC input (optional, refer to your local AHJ's requirement)
- Switch off AC Input Breaker

Note: AC Lost ALM can be unchecked from Dry Contact ALM3 if it is requested by the AHJ, so losing AC will not trigger the Charger Fail Dry Contact Alarm. The simulation can only be done by unplugging the charger communication cable

- **If external alarms are used for BDA/AMS alarming (trigger Dry Contact Alarm 4-7 by default)**

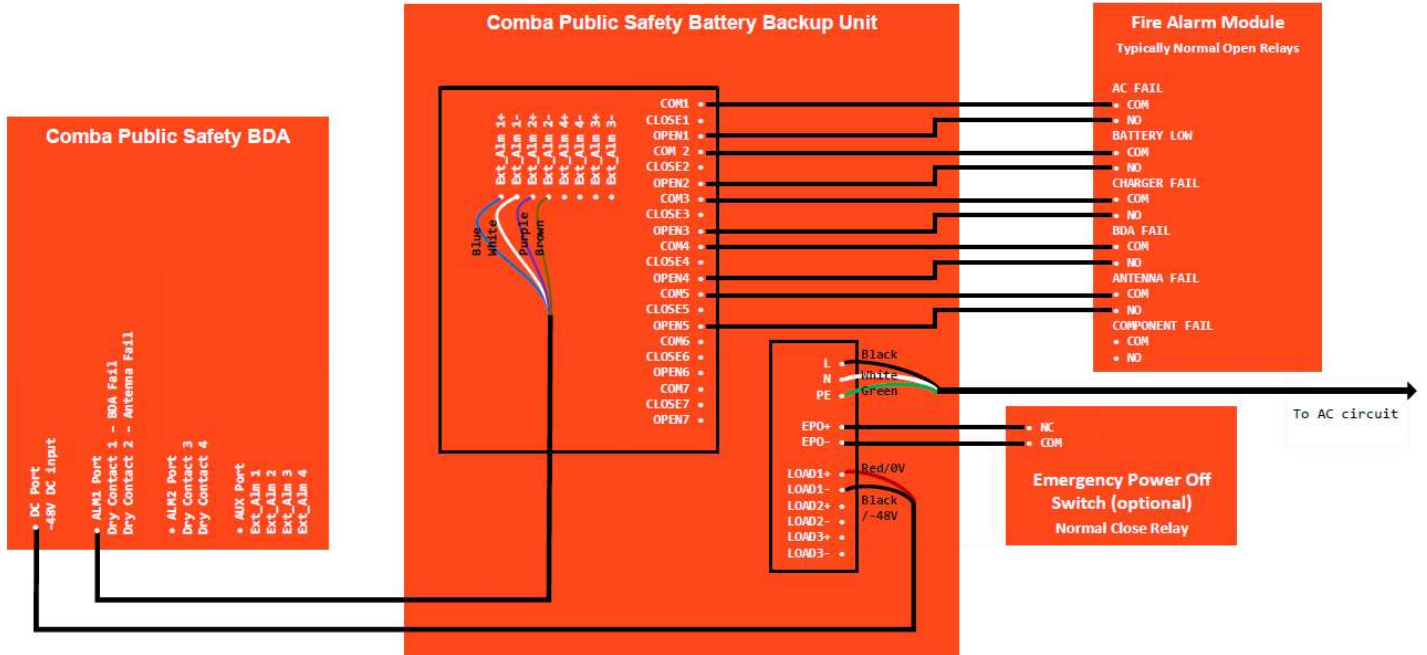
Refer to user manuals for BDA/AMS for alarm simulations

Appendix A – Firmware Version Control:

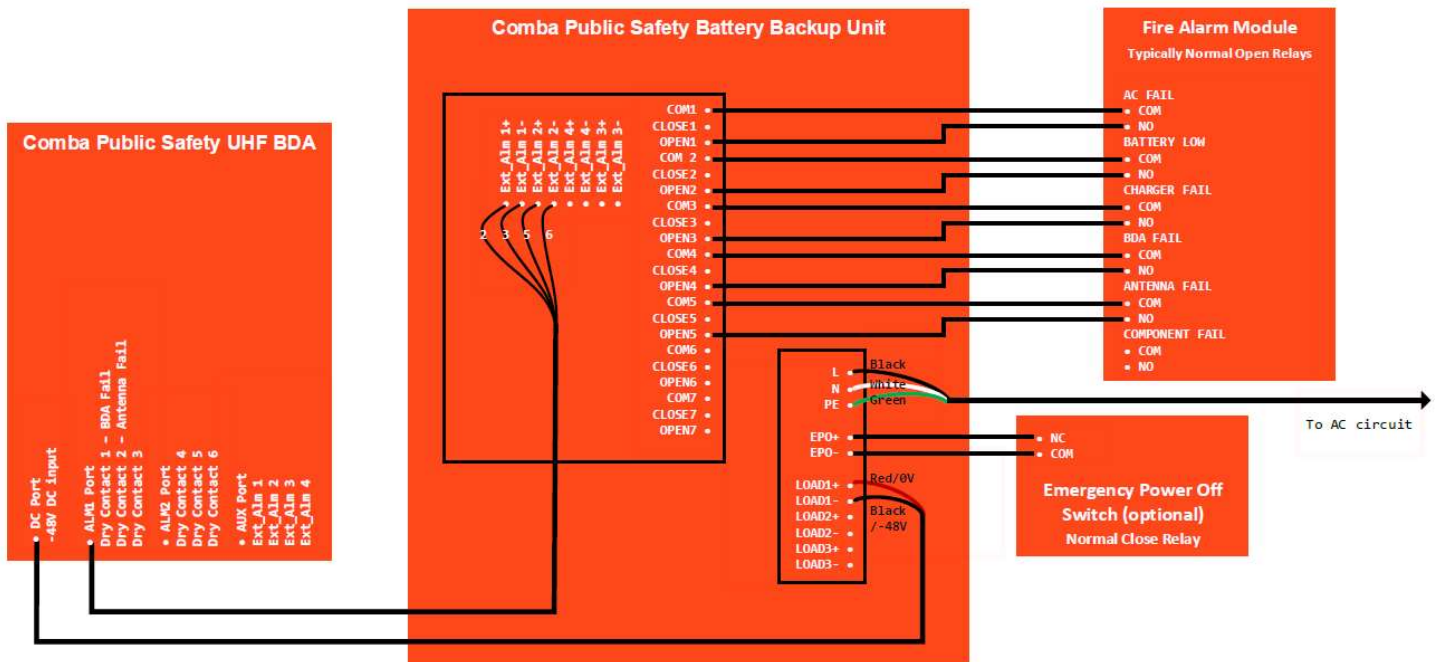
FW Version	Release Notes
M66PSU9248EH10V8E01 (Latest Version)	1. Fixed false alarms generated by internal cycle clock
M66PSU9248EH10V8B01	1. Fixed battery cut off settings – will give 48 hour notice before removing batteries from service 2. Added end-of-life method for batteries
M66PSU9248EH10V8901	1. Updated charging method 2. Added “Cut Off” battery status 3. Added reset methods in WEBOMT 4. Removed user control of voltage and max current
M66PSU9248EH10V8801	1. Bug Fix: Alarms from Slave Modules will be saved during power lost 2. Bug Fix: Alarms will be kept status during 24H reboot 3. Added 0x0A4A Load Detection Current Threshold 0x0A49 Battery Detection Delta Voltage 0x0A44 Battery Detection Current Threshold in WEB DEBUG Mode 4. Optimized Battery Detection, detects battery status with and without load 5. On system bootup, when Charging Status = No battery, will conclude "batteries not connected"
M66PSU9248EH10V8705	1: Removed all Battery Detection options except “Every 24 hours”
M66PSU9248EH10V8601	<u>Improvements</u> 1.Added ‘Communication Fault Alarm’ which monitors the communication link between the BBU controller and the Charger Module. 2.Separated Battery Detection Alarm from Battery Low Alarm, the Battery Detection Alarm can be individually triggered. <u>Bug Fixes</u> 1.Minor bugs fixed
M66PSU9248EH10V8404	<u>Improvements</u> 1. Added ‘Battery Connection Status’ Alarm <u>Bug Fixes</u> 1. Fixed daily alarm issue from 8302
M66PSU9248EH10V8302	Known bug: Each day, all 7 alarms on unit will “test” and be sent to FACP

Appendix B – Typical Wiring Diagrams:

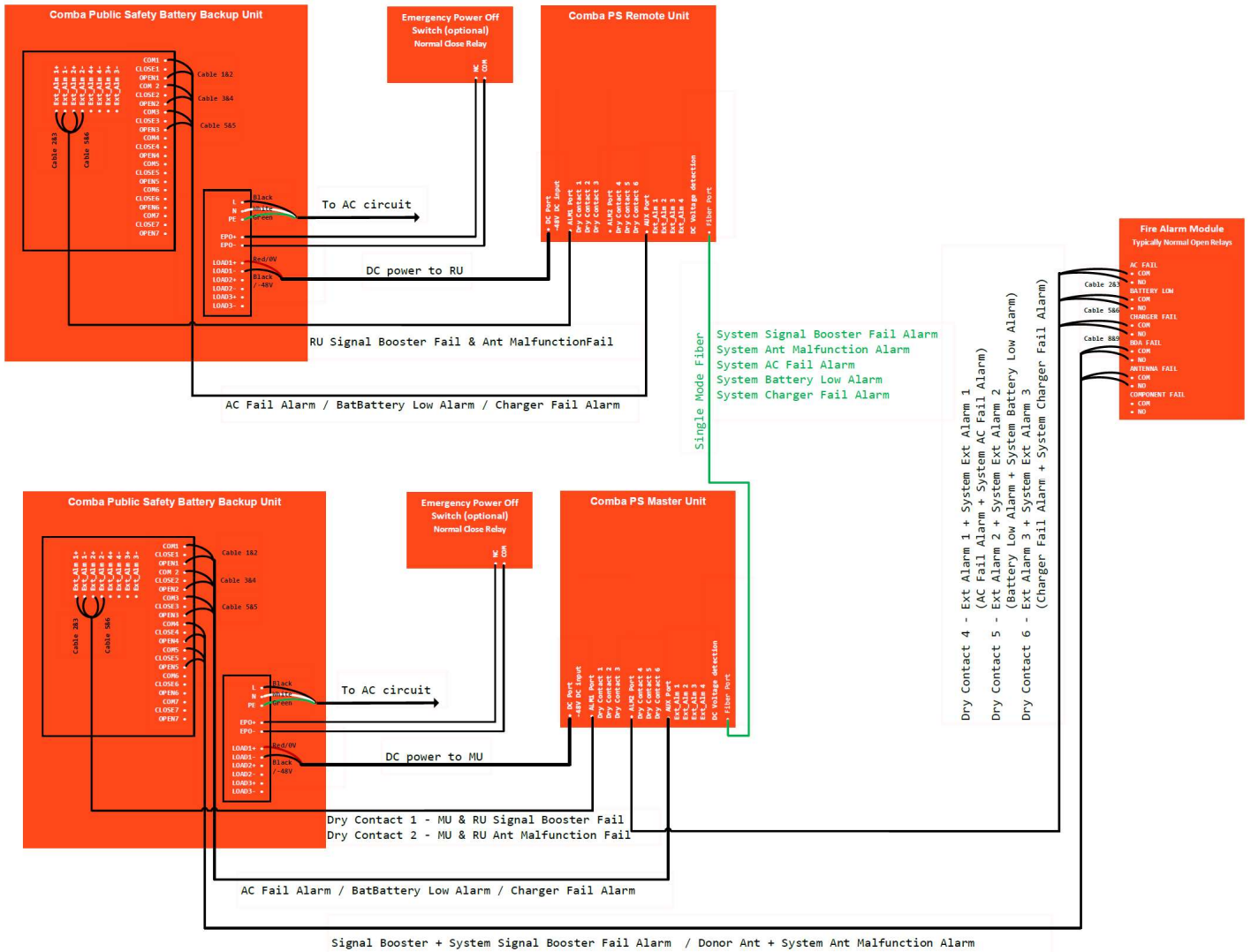
BBU to 700/800 MHz BDA (Typical Connections):



BBU to UHF BDA (Typical Connections):



BBU with 700/800 Fiber DAS (Typical Connections, MU alarming all remotes and BBUs):



Sample Installation:



Sample Installation:



Sample Installation (EPO Switch):



Sample Installation (BBU, BDA, and AMS):

