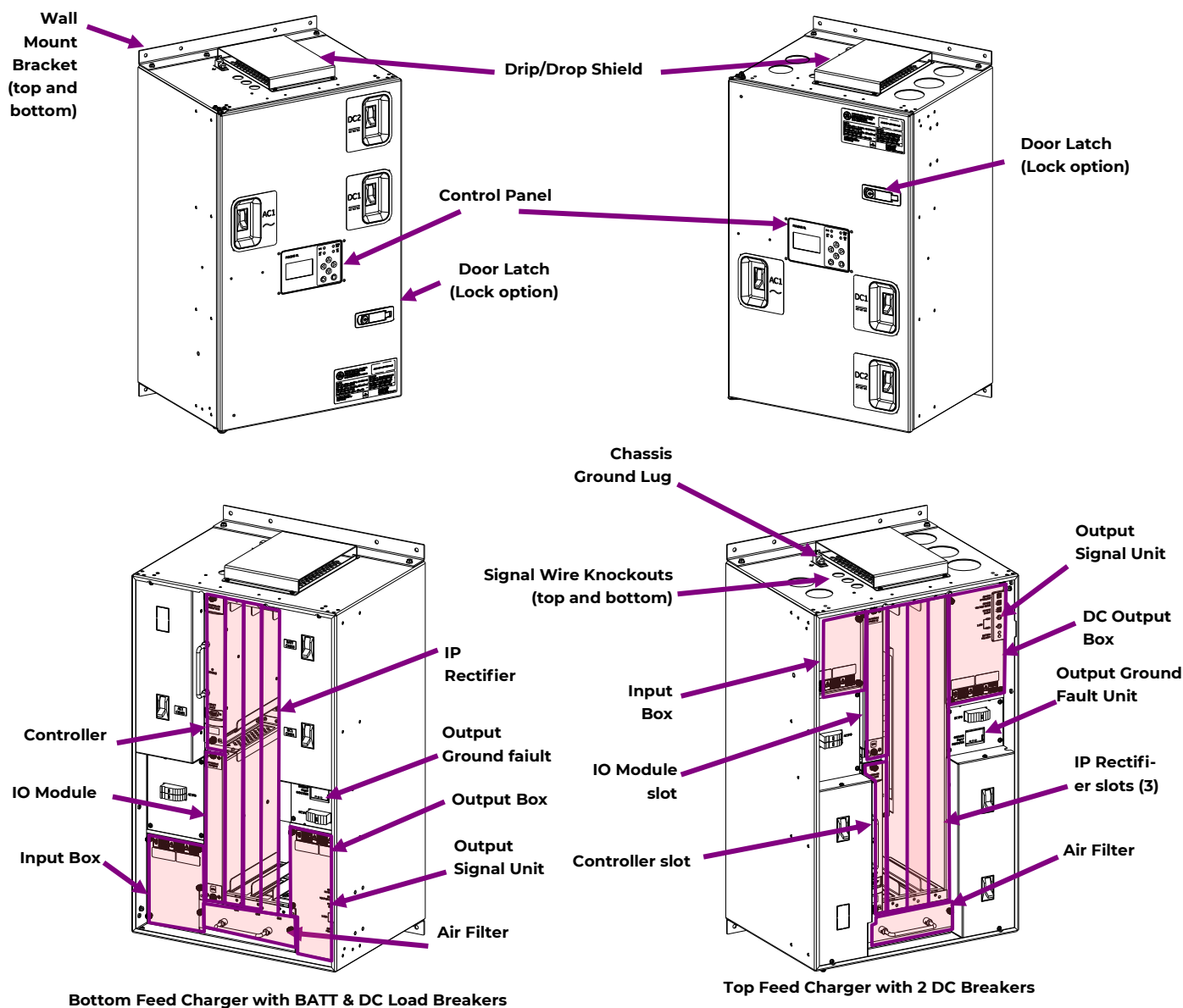


## QUICK START GUIDE

# Integritas™ Battery Charger

8600092587P



Read and follow all safety statements, warnings, and precautions in this guide.

### Basic Features:

All DC outputs are floating - not referenced to ground.

DC output Ground Fault Detection. Set at factory default adjustable at site, if necessary.

Monitored class II AC input surge device included in addition to surge capability of IP rectifier units.

Monitored Class III output surge device included.

Full-featured charger control unit.

# Contents

<b>Safety and Precautions.....</b>	<b>3</b>
<b>Installation .....</b>	<b>4</b>
1 Set External Shunt Jumper—Option.....	4
2 Mount the Charger .....	5
2 Wall.....	5
2 Rack.....	5
3 Ground the Chassis .....	6
4 Connect AC Input .....	6
4A Single Phase.....	7
4B Three (3) Phase 200/240V~ Three Phase .....	8
5 Connect Loads .....	9
6 Connect Batteries .....	10
7 Connect External Distribution (optional).....	11
8 Connect Controller Signals and Bias.....	11
8A Pulsar XL Controller .....	11
8B Nebula Controller .....	12
9 Connect Output Signals Unit Signals.....	13
10 Install Rectifiers .....	14
11 Initial Start Up.....	14
12 Configure Controller .....	14
13 Apply Power to Loads.....	15
<b>Information:</b>	
Controller - View and Change Parameters and Alarm Severity.....	15
Controller - Controller - LAN Port - Local / Network.....	16
Controller Alarm Relay Jumpers .....	16
IP843G Controller Basic Operation.....	16
IP943G Controller Basic Operation .....	18
Battery Monitoring Connections - for use with VRLA batteries only .....	19
Interlock Cable Recommendations .....	19
Signal Connections.....	19
Alarm Outputs .....	19
Alarm Inputs.....	20
System Communications Ports .....	20
Power Units.....	20
<b>Maintenance.....</b>	<b>21</b>
<b>Troubleshooting.....</b>	<b>21</b>
<b>Parts List .....</b>	<b>21</b>
<b>Specifications &amp; Application .....</b>	<b>22</b>
<b>Reference Documents .....</b>	<b>22</b>
<b>Notes.....</b>	<b>23</b>

## Important Safety Instructions

1. SAVE THESE INSTRUCTIONS – This document contains important safety and operating instructions for the Integritas battery charger.
2. Before using battery charger, read all instructions and cautionary markings on battery charger, battery, and all connected equipment.
3. Rules and Regulations - Follow all national and local rules and regulations when making field connections.
4. Field-wired Conductors - Follow all National Electric Code (NEC) and local rules and regulations.
  - a. Insulation rating: 90°C minimum; 105°C (minimum) if internal to enclosed equipment cabinets.
  - b. Size AC field-wired conductors with 75°C ampacity (NEC) equal to or greater than their panel board circuit breaker rating.
  - c. Size DC field-wired conductors with 90°C ampacity (NEC) equal to or greater than circuit breaker/fuse rating.
5. AC and DC input disconnect/protection - Provide accessible devices to remove input power in an emergency.
6. Compression Connectors
  - a. U. S. or Canada installations - use Listed/Certified compression connectors to terminate Listed/Certified field -wire conductors.
  - b. All installations - apply the appropriate connector to the correct size conductor as specified by the connector manufacturer, using only the connector manufacturer's recommended or approved tooling for that connector.
7. Electrical Connection Securing: Torque to the values specified on labels or in the product documentation.
8. Cable Dress - dress to avoid damage to the conductors and undue stress on the connectors.
9. Alarm Signals - Provide external current limiting protection. Rating—60V (125V for 125V charger), 0.5A unless otherwise noted.
10. Grounding - Connect the equipment chassis directly to ground.
11. WARNING: Equipment does not provide battery discharge control and protection. To be provided by external battery source.
12. WARNING: A battery can present a risk of electrical shock, burn from high short circuit current, fire or explosion

## Precautions

- Install, service, and operate equipment only by professional, skilled and qualified personnel who have the necessary knowledge and practical experience with electrical equipment and who understand the hazards that can arise when working on this type of equipment.
- Disconnect batteries from outputs and/or follow safety procedures while working on equipment. Batteries may be connected in parallel with the output of the rectifiers. Turning off the rectifiers will not necessarily remove power from the bus.
- Batteries may produce explosive gas. Do not create arcs, smoke, or use an open flame in the vicinity.
- Do not disconnect permanent bonding connections unless all power inputs are disconnected.
- Verify that equipment is properly safety earth grounded before connecting power. High leakage currents may be possible.
- Exercise care and follow all safety warnings and practices when servicing this equipment. Hazardous energy and voltages are present in the unit and on the interface cables and connectors that can shock or cause serious injury.
- Use safe lifting practices. The equipment is heavy. Lifting devices are recommended.
- Use the following precautions in addition to proper job training and safety procedures:
- Use only properly insulated tools.
- Remove all metallic objects (key chains, glasses, rings, watches, or other jewelry).
- Follow Lock Out Tag Out (LOTO) procedures: customer specified, site specific, or general as appropriate. Disconnect all power input before servicing the equipment. Check for multiple power inputs.
- Wear safety glasses.
- Follow Personal Protective Equipment requirements: customer specified, site specific, or general as appropriate.
- Test circuits before touching.
- Be aware of potential hazards before servicing equipment.
- Identify exposed hazardous electrical potentials on connectors, wiring, etc.
- Avoid contacting circuits when removing or replacing covers;.
- Use a personal ESD strap when accessing or removing electronic components.
- Follow all warning and precautionary battery instructions, including proper replacement and disposal procedures, to minimize risk of injury. External batteries, if applicable, are to be installed in accordance with all national and local rules and regulations, including CEC, part 1.
- Personnel with electronic medical devices need to be aware that proximity to DC power and distribution systems, including batteries and cables, typically found in telecommunications utility rooms, can affect medical electronic devices, such as pacemakers. Effects decrease with distance.

## Installation

Regulations, standards, site engineering instructions etc. take precedence over these general installation instructions.

Tools required:

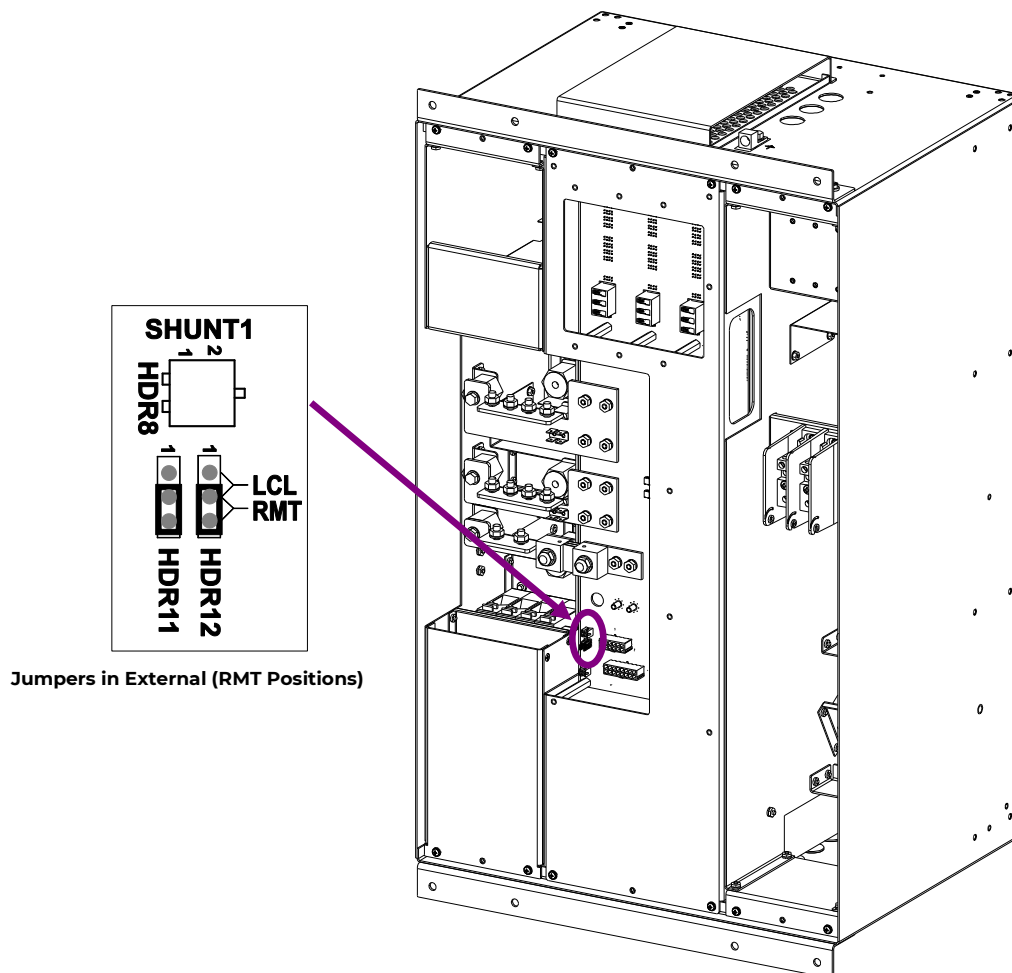
- Wire cutters and strippers
- Torque wrench - 0-65 in-lb (0-10 Nm)
- Screwdrivers - Philips and Flat
- Cable crimpers
- Sockets - 5/16", 7/16, etc.

### Step 1 - Set External Shunt Jumper - Option

The charger is factory configured for an internal shunt.

Set the Shunt Jumper to External if an external shunt is used.

1. Remove charger rear panel—6 screws: 3 each top and bottom.
2. Move both Shunt Jumpers HDR11 and HDR12 to RMT (External) position—pins 2-3.
3. Replace charger rear panel. Secure with 6 screws.



## Step 2 - Mount the Charger

The charger may be mounted on a wall or in a rack, in an area free of flammable/explosive materials.

Recommended clearance above and below the charger: 2 inches (5 cm). Recommended clearance in front of the charger: 36" (914 mm).

Hot air exits the top - do not locate temperature sensitive equipment above the charger.

**CAUTION:** Use safe lifting practices. The charger is heavy - up to 154 lb (70 kg). Lifting devices are recommended.

**Wall Mount** - follow **Step 2A Wall**.

**Rack Mount** - follow **Step 2B Rack**

### Step 2A Wall - Mount the Charger to a Wall

**CAUTION:** Use safe lifting practices. The charger is heavy. Lifting devices are recommended.  
The wall and fasteners must safely support 470 lb (3 times the charger weight).

Mount with (8) sets of mounting hardware rated for at least 60 lb. each.

1. Locate the appropriate place for the charger.
2. Secure the bottom wall mount bracket to the wall.
  - a. Remove the bottom wall mount bracket from the charger - 4 screws.
  - b. Drill (4) holes in the wall to mount the bottom bracket.  
Use the bottom bracket as a template.
  - c. Secure the bottom bracket to the wall with mounting hardware.
3. Prepare to secure the top wall mount bracket to the wall.
  - a. Place the charger against the wall, resting on the wall mounted bottom bracket.
  - b. Temporarily install one screw through the bottom bracket into the charger..
  - c. Mark (4) holes in the wall for top bracket mounting hardware.  
Use the top bracket as a template.
  - d. Remove the charger, first removing the screw installed in step b.
  - e. Drill (4) holes in the wall to mount the top bracket.
4. Secure the charger to the wall.
  - a. Place the charger against the wall, resting on the bottom secured bracket.
  - b. Secure the top bottom bracket to the wall with mounting hardware.
  - c. Secure the cabinet to the bottom bracket with the 4 screws removed in step a.

Go to Step 3

### Step 2B Rack - Mount the Charger to a Rack

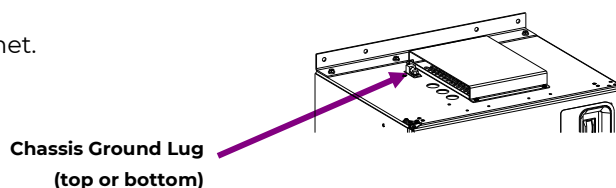
**CAUTION:** Use safe lifting practices. The charger is heavy. Lifting devices are recommended.

1. Attach Rack Mount Brackets positioned for flush mount or mid-mount.  
Secure mounting brackets - 8 screws each.  
Torque to 25 in-lb (2.8 Nm)
2. Attach the system to the frame using a minimum of twelve (six on each side) 12-24 screws (provided).  
Torque to 35 in-lb (4.0 Nm) using a 5/16" socket wrench.

### Step 3 - Ground the Chassis

Chassis ground lug - 1/4" on 5/8" centers (lug provided).  
Minimum 6 AWG recommended.

1. Connect ground wire to chassis on top or bottom of cabinet.  
1/4-20 screws (2) provided  
Torque to 65 in-lb (7.3 Nm) using a 7/16" socket wrench.

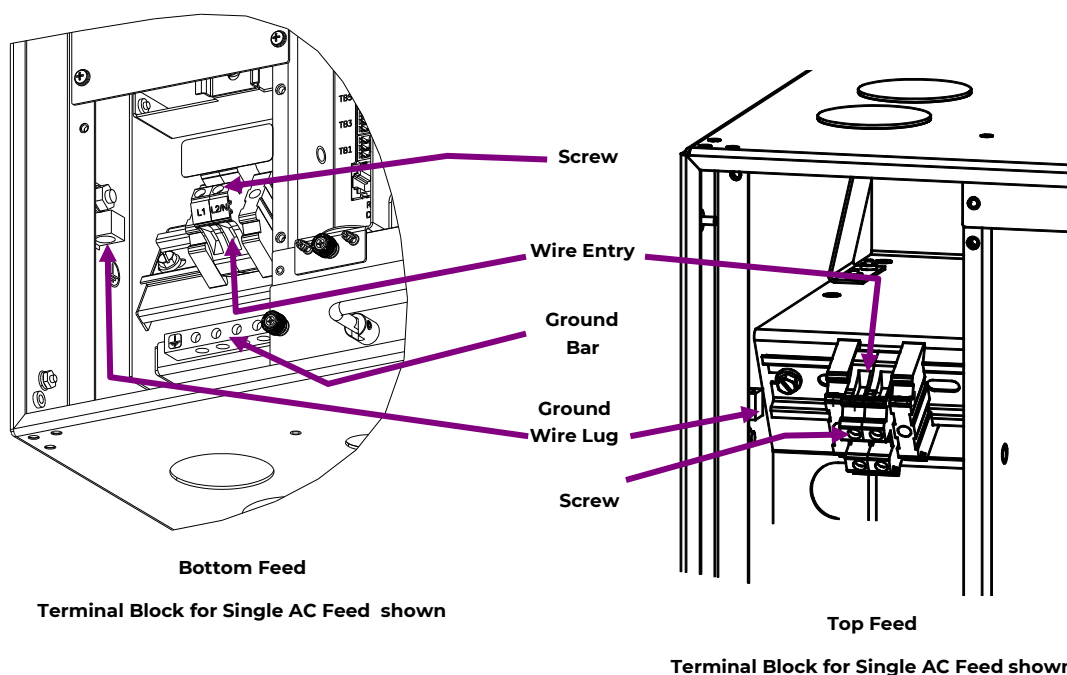


### Step 4 - Connect AC Input

AC Input box location: Bottom Feed - bottom left Top Feed - top left

AC knockouts: for 2" conduit.

**Danger:** **Shock Hazard** - Turn OFF and lock-out tag-out the AC source before making AC connections.  
When connecting to AC mains, follow all local and national wiring rules.



**Caution:** Ensure that wires do not come in contact with sharp or rough surfaces that may damage insulation and cause a short circuit.

1. Verify all AC breakers are off - Charger AC1 and external AC feed breaker.
2. Choose the next step to match AC input voltage marked on the charger ratings label.

AC Input per Charger Label	AC Input Option	Follow Step
120/240	AC	Step 4A Single Phase
200/240	AC	Step 4B Three Phase

## Step 4A Single Phase - Connect 120/240 Single Phase AC Input Section

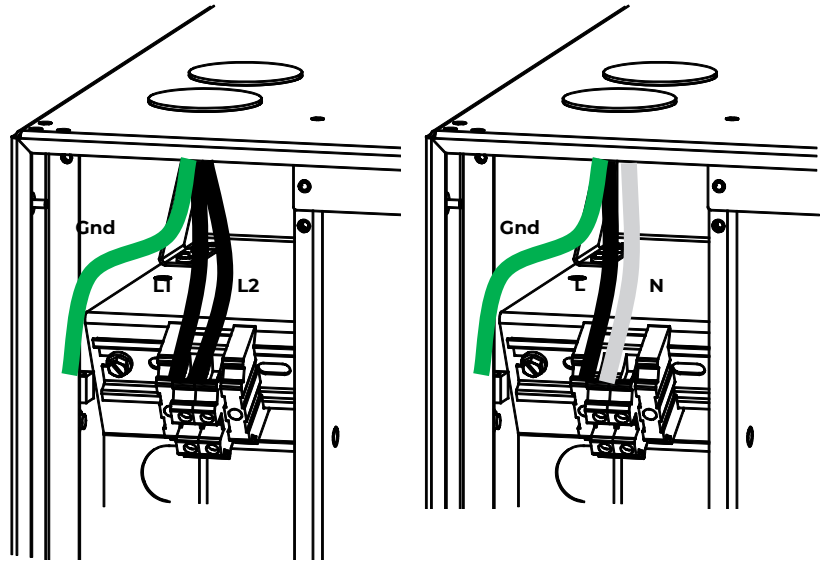
Sizing external protectors and wire for all rectifier positions (3 or 6) provides full power for all rectifier positions.

Recommended External Protection and Minimum Wire Size - 6 AWG max.					
19" 3 rectifier configuration		120V~ Phase to Neutral (1200W per rectifier		240V~ Phase to Neutral (2725W per rectifier max)	
		Single-Phase Rectifiers			
Rectifier Positions Powered	Maximum Rectifiers per Feed	External Feed Protector	Minimum Wire	External Feed Protector	Minimum Wire
1	1	20A	14AWG	20A	14AWG
2	2	40A	8AWG	40A	8AWG
3	3	60A	6AWG	60A	6AWG

Recommended External Protection and Minimum Wire Size - 6 AWG max.					
23" 6 rectifier configuration		120V~ Phase to Neutral (1200W per rectifier max)		240V~ Phase to Neutral (2725W per rectifier max)	
		Single-Phase Rectifiers			
Rectifier Positions Powered	Maximum Rectifiers per Feed	External Feed Protector	Minimum Wire	External Feed Protector	Minimum Wire
1	1	20A	14AWG	20A	14AWG
2	2	40A	8AWG	40A	8AWG
3	3	60A	6AWG	60A	6AWG
4	4	80A	4AWG	80A	4AWG
5	5	100A	2AWG	100A	2AWG
6	6	120A	1AWG	120A	1AWG

## Step 4A Single Phase - Connect 120/240 Single Phase AC Input Section (Continued)

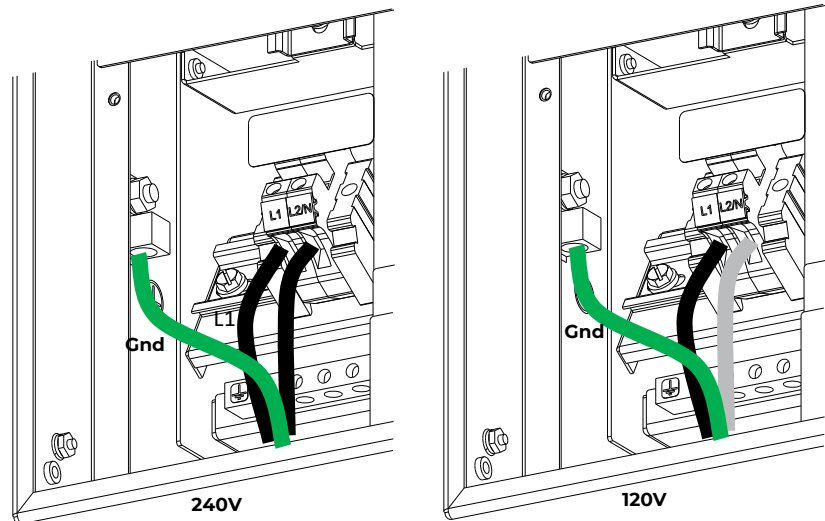
1. Verify the charger AC breaker (AC1) is OFF.
2. Verify AC voltage matches AC Input per charger label with a meter.
3. Bring AC wires into the AC Input Box in conduit through one of the 2" knockouts
4. Connect Ground wire (green /green-yellow) to lug.
  - a. Strip 1/2" (13mm)
  - b. Insert into ground lug.
  - c. Tighten lug screw securely.
  - d. Pull wire to verify.
5. Connect each AC wire to the terminal block in the AC Input Box.



AC terminal connections are labeled at each position - Gnd, L, N, L1, and L2.

- a. Strip 1/4" (10mm).
- b. Insert into terminal block.
- c. Torque screw to 13 in-lb (1.5 Nm).
- d. Pull wire to verify.

Go to Step 5





## Step 4B Three (3) Phase, 3W+PE - Connect 380-480V & 240V 3-Phase AC Input Section

Recommended External Protection and Minimum Wire Size - 6 AWG max.			
19" 3 rectifier configuration		380-480V~ Phase to Phase (2725W per rectifier max)	
		Three (3) Phase Rectifiers	
Rectifier Positions Powered	Maximum Rectifiers per Feed	External Feed Protector	Minimum Wire
1	1	15A	14AWG
2	2	30A	10AWG
3	3	40A	8AWG

Recommended External Protection and Minimum Wire Size - 6 AWG max.			
23" 6 rectifier configuration		380-480V~ Phase to Phase (2725W per rectifier max)	
		Three (3) Phase Rectifiers	
Rectifier Positions Powered	Maximum Rectifiers per Feed	External Feed Protector	Minimum Wire
1	1	15A	14AWG
2	2	30A	10AWG
3	3	40A	8AWG
4	4	50A	6AWG
5	5	60A	6AWG
6	6	70A	4AWG

Recommended External Protection and Minimum Wire Size - 6 AWG max.			
19" 3 rectifier configuration		240V~ Phase to Phase	
		Three-Phase Rectifiers	
Rectifier Positions Powered	Maximum Rectifiers per Feed	External Feed Protector	Minimum Wire
1	1	20A	14AWG
2	2	40A	8AWG
3	3	60A	6AWG

## Step 4B Three (3) Phase, 3W+PE - Connect 380-480V & 240V 3-Phase AC Input Section (Continued)

Recommended External Protection and Minimum Wire Size - 6 AWG max.			
23" 6 rectifier configuration		240V~ Phase to Phase (2725W per rectifier max)	
		Three-Phase Rectifiers	
Rectifier Positions Powered	Maximum Rectifiers per Feed	External Feed Protector	Minimum Wire
1	1	20A	14AWG
2	2	40A	8AWG
3	3	60A	6AWG
4	4	80A	4AWG
5	5	100A	2AWG
6	6	120A	1AWG

Sizing external protectors and wire for all rectifier positions (3 or 6) provides full power for all rectifier positions.

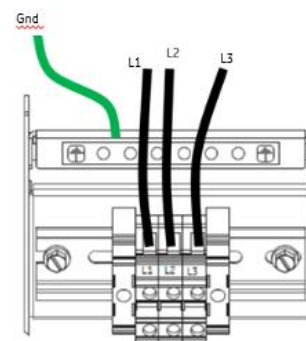
1. Verify the charger AC breaker (AC1) is OFF.
2. Verify AC voltage matches AC Input per Charger Label with a meter.
3. Bring AC wires into the AC Input Box in conduit through one of the 2" knockouts
4. Connect Ground wire (green /green-yellow) to lug.
  5. Strip 1/2" (13mm)
  6. Insert into ground lug.
  7. Tighten lug screw securely.
  8. Pull wire to verify.

5. Connect each AC wire to the terminal block in the AC Input Box. AC terminal connections are labeled at each position - Gnd, L, N, L1, and L2.

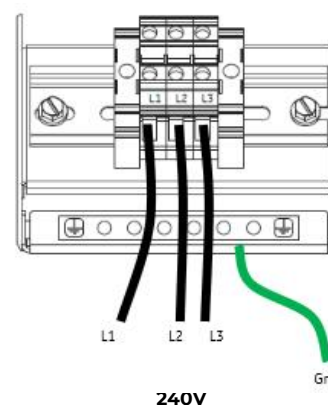
- a. Strip 1/4" (10mm).
- b. Insert into terminal block.
- c. Torque screw to 13 in-lb (1.5 Nm).
- d. Pull wire to verify.

Go to Step 5

Top Feed



Bottom Feed



240V

## Step 4C Three (3) Phase, 3W+N+PE - Connect 277V 3-Phase AC Input Section

Recommended External Protection and Minimum Wire Size - 6 AWG max.			
19" 3 rectifier configuration		277V~ Phase to Neutral (2725W per rectifier max)	
		Three-Phase Rectifiers	
Rectifier Positions Powered	Maximum Rectifiers per Feed	External Feed Protector	Minimum Wire
1	1	20A	14AWG
2	2	40A	8AWG
3	3	60A	6AWG

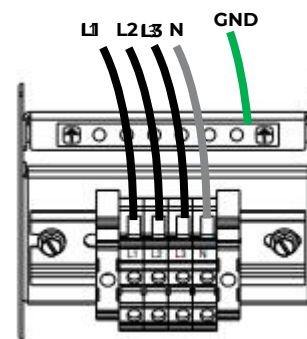
Recommended External Protection and Minimum Wire Size - 6 AWG max.			
23" 6 rectifier configuration		277V~ Phase to Neutral (2725W per rectifier max)	
		Three-Phase Rectifiers	
Rectifier Positions Powered	Maximum Rectifiers per Feed	External Feed Protector	Minimum Wire
1	1	20A	14AWG
2	2	40A	8AWG
3	3	60A	6AWG
4	4	80A	4AWG
5	5	100A	2AWG
6	6	120A	1AWG

Sizing external protectors and wire for all rectifier positions (3 or 6) provides full power for all rectifier positions.

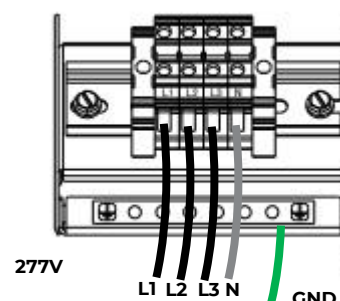
1. Verify the charger AC breaker (AC1) is OFF.
2. Verify AC voltage matches AC Input per Charger Label with a meter.
3. Bring AC wires into the AC Input Box in conduit through one of the 2" knockouts
4. Connect Ground wire (green /green-yellow) to lug.
  5. Strip 1/2" (13mm)
  6. Insert into ground lug.
  7. Tighten lug screw securely.
  8. Pull wire to verify.
5. Connect each AC wire to the terminal block in the AC Input Box. AC terminal connections are labeled at each position - Gnd, L, N, L1, and L2.
  - a. Strip 1/4" (10mm).
  - b. Insert into terminal block.
  - c. Torque screw to 13 in-lb (1.5 Nm).
  - d. Pull wire to verify.

Go to Step 5

Top Feed



Bottom Feed



## Step 5 - Connect Loads (equipment to be powered)

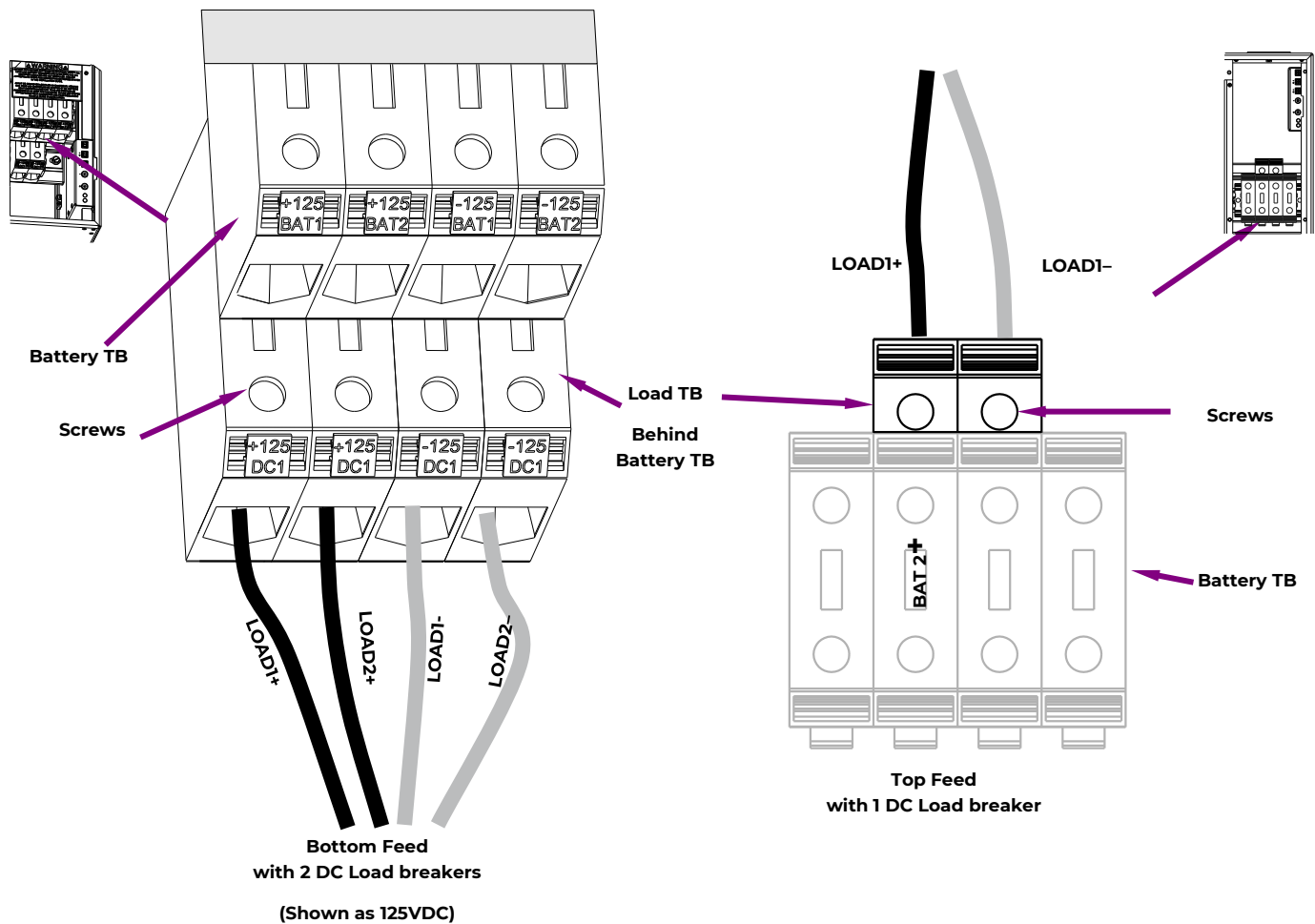
Load voltage is marked on the charger ratings label.

Load connections are to the terminal blocks in the DC Output Box.

Load terminal block (TB) is behind the Battery terminal block.

Each TB position is marked with its connection: BAT1+, BAT1-, BAT2+, BAT2-, 125V DC+, 125V DC-, 24VDC+, 24VDC-, 48VDC+, 48VDC-.

1. Verify that equipment being powered accepts the charger output voltage.
2. Verify all DC breakers (DC1, DC2) are OFF.
3. Remove the DC Output Box cover - 4 thumbscrews.
4. Connect Load 1 Positive cable to the Positive terminal block position marked Load 1.
5. Connect Load 1 Negative cable to the Negative terminal block position behind the positive position marked Load 1.
6. If DC2 Breaker is labeled "Load", Repeat from 4. for Load 2.
7. Replace the DC Output Box cover - 4 thumbscrews.



## Step 6 - Connect Batteries

**Danger:** **Energy Hazard** - avoid shorting battery wires to ground or to each other.

**Caution:** Ensure that wires do not come in contact with sharp or rough surfaces that may damage insulation and cause a short circuit.

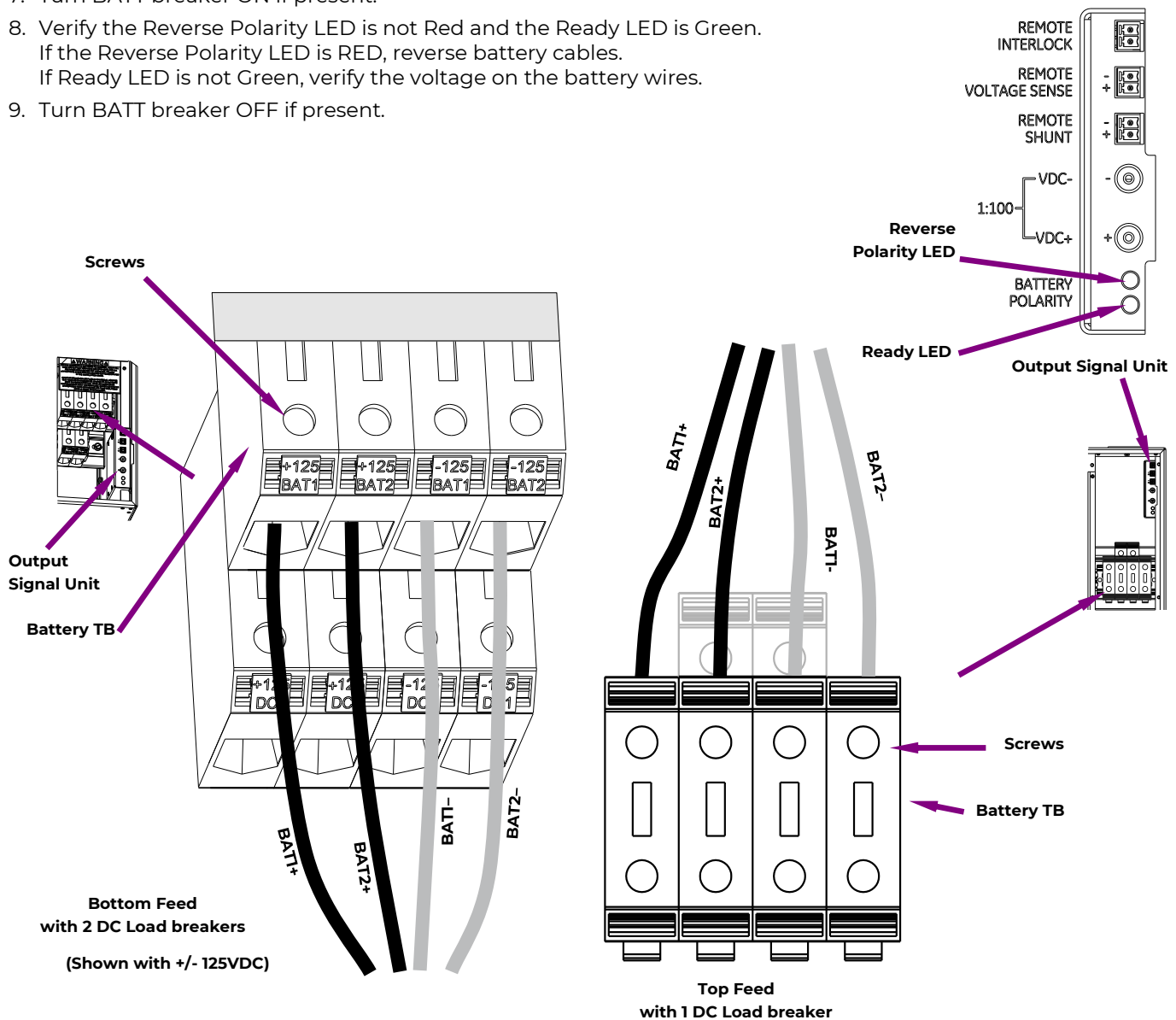
Battery voltage is marked on the charger ratings label.

DC Output Box location: Bottom Feed - bottom right Top Feed - top right

DC knockouts: for 2" conduit.

Wire Gauge: 6AWG to 1/0 Strip Length: 1" (24 mm) Torque Screw to 70 in-lb (8 Nm)

1. Measure battery voltage and polarity with a meter.
2. Verify all DC breakers (DC1 and DC2 / BATT if present) are OFF.
3. Remove the DC Output Box cover - 4 thumbscrews.
4. Connect Battery Positive cable to the terminal block position marked **BAT1+** (**BAT2+** for second battery).
5. Connect Battery Negative cable to the terminal block position marked **BAT1-** (**BAT2-** for second battery).
6. Repeat from 1 for second battery if present.
7. Turn BATT breaker ON if present.
8. Verify the Reverse Polarity LED is not Red and the Ready LED is Green.  
If the Reverse Polarity LED is RED, reverse battery cables.  
If Ready LED is not Green, verify the voltage on the battery wires.
9. Turn BATT breaker OFF if present.



## Step 7 - Connect External Distribution - future option

## Step 8 - Connect IO Module Signals and Bias

### 8A - Pulsar XL controller

Connect per site engineering instructions.

Connections are on the front of the IO Module connections unit.

Route wires through routing bend tab and tie wires to wire tie points and wire as desired.

TB1 - TB21 detachable block - Strip - 0.35" (9 mm) Torque - 2 in-lb (0.25 Nm)

#### Alarm Outputs and Inputs

TB1 - TB10 Alarms Outputs - Wire to office alarms. See Information: Signal Connections.

TB11 - TB20 Inputs - Wire to signal sources. See Information: Signal Connections.

#### Alt Bias

TB21 Alternative 24V external Bias supply

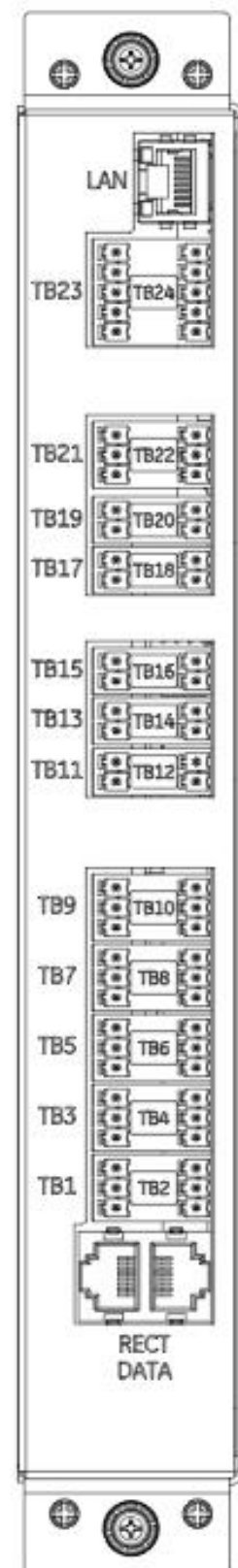
#### LAN

LAN Ethernet LAN or local PC connection

#### 1-Wire Battery Temp and Voltage Monitor - Optional

1-WIRE DATA See Information: Battery Monitoring Connections.

ALARM OUTPUTS RATED 125VDC @ 0.5A	
REF	FACTORY DEFAULT ASSIGNMENT (SIGNAL – PIN#1; COMMON – PIN2)
TB1	CRITICAL ALARM
TB2	MAJOR ALARM (CHARGER SUMMARY)
TB3	MINOR ALARM
TB4	R1 (RECTIFIER FAIL – RFA/MRFA)
TB5	R2 (AC FAIL – ACF/MACF)
TB6	R3 (LOW VOLTAGE – BD/VLV)
TB7	R4 (GROUND FAULT – GFI)
TB8	R5 (SURGE PROTECTOR – SPD)
TB9	R6 (HIGH VOLTAGE – HVSD/HV)
TB10	R7 (CHECK BATTERY)
ALARM INPUTS ("DRY", NO VOLTAGE, BINARY CONTACT MONITORS)	
TB11	AUX1 (AIR CONDITIONER FAIL)
TB12	AUX2 (DOOR OPEN)
TB13	AUX3 (HIGH EXTERNAL AMBIENT)
TB14	AUX4 (LOW EXTERNAL AMBIENT)
TB15	CHARGER/PLANT BATTERY TEST (PBT)
TB16	REMOTE RECTIFIER STANDBY (GSTBY)
TB17	AUX9 (AUXILIARY 9)
TB18	AUX8 (AUXILIARY 8)
TB19	OSA1 – (OPENSRING)
TB20	AUX6 (HYDROGEN PRESENT)
DIGITAL PORTS	
TB21	RESERVED FOR FUTURE USE
TB22	1-WIRE TEMP PROBES; 1-WIRE SIGNAL ON PIN1; RETURN ON PIN2
TB24	OPTIONAL #24VDC CONTROLLER BACK-BIAS INPUT ALT-BIAS 24VDC-IN PIN 4; ALT-BIAS 24VDC-IN RTN PIN 5
RECT DATA	RS485 / GALAXY PROTOCOL RECTIFIER SERIAL BUS
LAN	10/100 BASE-T ETHERNET



IP843G IO Module

## 8B - Nebula controller

Connect per site engineering instructions.

Connections are on the front of the IO Module connections unit.

Route wires through routing bend tab and tie wires to wire tie points and wire as desired.

TB1 - TB21 detachable block - Strip - 0.35" (9 mm) Torque - 2 in-lb (0.25 Nm)

### Alarm Outputs and Inputs

TB1 - TB10 Alarms Outputs - Wire to office alarms. See Information: Signal Connections.

TB11 - TB20 Inputs - Wire to signal sources. See Information: Signal Connections.

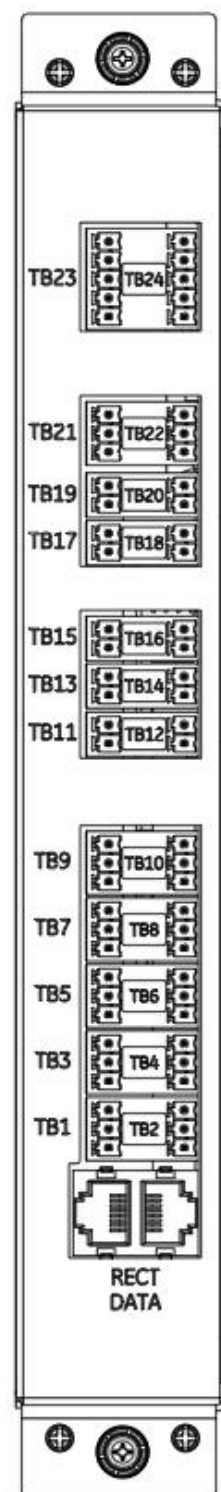
### Alt Bias

TB21 Alternative 24V external Bias supply

### 1-Wire Battery Temp and Voltage Monitor - Optional

1-WIRE DATA See Information: Battery Monitoring Connections.

ALARM OUTPUTS RATED 125VDC @ 0.5A	
REF	FACTORY DEFAULT ASSIGNMENT (SIGNAL – PIN#1; COMMON – PIN#2)
TB1	Power Critical Alarm severity indicator
TB2	Power Major Alarm severity indicator
TB3	Power Minor Alarm severity indicator
TB4	R1 Rectifier Fail (RFA/MRFA)
TB5	R2 AC Fail alarm (ACF/MACF)
TB6	R3 Low Voltage (BD/, VLV)
TB7	R4 Ground Fault (GFI)
TB8	R5 High Voltage (HVSD/HV)
TB9	R6 Multiple Rectifier Fail (MRFA/MFA)
TB10	R7 Check Battery
ALARM INPUTS ("DRY", NO VOLTAGE, BINARY CONTACT MONITORS)	
TB11	AUX1 (AIR CONDITIONER FAIL)
TB12	AUX2 (DOOR OPEN)
TB13	AUX3 (HIGH EXTERNAL AMBIENT)
TB14	AUX4 (LOW EXTERNAL AMBIENT)
TB15	CHARGER/PLANT BATTERY TEST (PBT)
TB16	REMOTE RECTIFIER STANDBY (GSTBY)
TB17	AUX9 (AUXILIARY 9)
TB18	AUX8 (AUXILIARY 8)
TB19	OSAI – (OPEN STRING)
TB20	AUX6 (HYDROGEN PRESENT)
DIGITAL PORTS	
TB21	RESERVED FOR FUTURE USE
TB22	1-WIRE TEMP PROBES; 1-WIRE SIGNAL ON PIN1; RETURN ON PIN2
TB23/24	OPTIONAL #24VDC CONTROLLER BACK-BIAS INPUT ALT-BIAS 24VDC-IN PIN 4; ALT-BIAS 24VDC-IN RTN PIN 5
RECT DATA	RS485 / GALAXY PROTOCOL RECTIFIER SERIAL BUS



IP943G IO Module

## Step 9 - Connect Output Signals Unit Signals

Connect per site engineering instructions.

Connections are on the front of the Output Signals Unit. In the DC Output Box

Detachable blocks - 16 AWG max Strip - 0.35" (9 mm) Torque - 2 in-lb (0.25 Nm)

Route wires through routing bend tab and tie wires to wire tie points and wire as desired.

### External Shunt - optional

Jumper on rear of charger must have been moved in Step 1.

Connect with polarity as marked.

### Remote Voltage Sense - optional

1. Install current limiting module at the battery.

Battery	Module
125V	847540424
24/48V	848738278

- a. Extend wires with butt splices (not provided).
- b. Connect to battery + and - posts (terminals not provided).  
Stack up: Battery Post, Power terminal, Remote Voltage Sense terminal.
- c. Torque per battery specification.

2. Connect current limiting module to the signal unit Remote Voltage Sense detachable block with polarity as marked.

Extend wires with butt splices (not provided).

### Remote Interlock - optional

A factory installed jumper enables the rectifiers without an external signal.

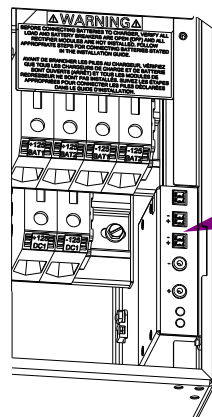
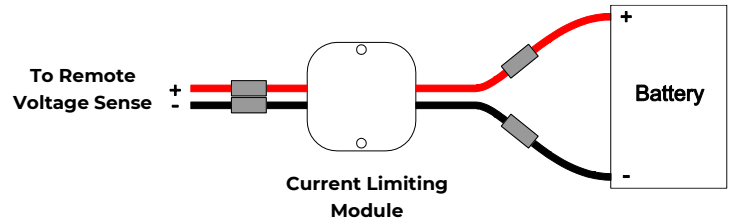
Interlock enables rectifier output.

Enable rectifier output with between pins of Remote Interlock connector.

Open Circuit voltage - 7Vdc. Short circuit current - 1mA per shelf. Max enable voltage - 0.7Vdc.

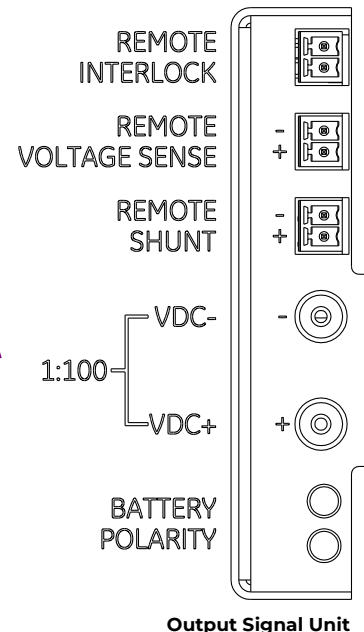
Cables not provided - see Information Interlock Cable Recommendations.

1. Remove factory installed jumper from Remote Interlock connector.
2. Insert interlock signal cable into Remote Interlock connector.



DC Output Box

Bottom Feed shown



Output Signal Unit

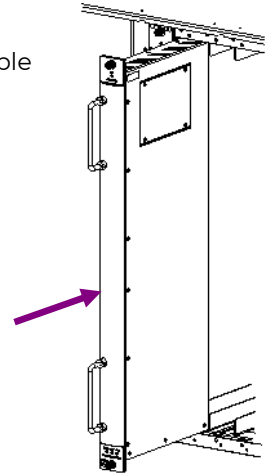


## Step 10 - Install Rectifiers

Rectifiers are keyed for input and output voltage, allowing only their installation into compatible chargers.

**Warning:** Equipment Damage - Do not Install rectifiers if the Reverse Polarity LED is Red.

1. Verify the Reverse Polarity LED is not Red and the Ready LED is Green.  
If the Reverse Polarity LED is RED, reverse battery cables.  
If Ready LED is not Green, verify the voltage on the battery wires
2. Slide Rectifier firmly into a Rectifier position - oriented as shown.
3. Secure Rectifier - thumb screws - top and bottom.
4. Repeat for remaining Rectifiers.
5. Secure empty slot fillers in each vacant Rectifier position - thumb screws top and bottom.



## Step 11 - Initial Start-up

Rectifiers are keyed allowing only their installation into chargers of the same voltage.

1. Verify that AC and DC connections are complete and secure.
2. Turn on AC input breakers.
  - a. External feed breaker(s)
  - b. Charger AC breaker(s) (AC1 and AC2 if present)

Rectifiers will start-up. Then the Controller will start-up.

3. Verify
4. All rectifiers should be indicating green AC and DC LEDs with no red LEDs.  
The Controller should be indicating no alarms - display background should be green and no red LEDs.  
If alarms are present, see **Troubleshooting** section.  
If there are no alarms, make required adjustments to the default settings on the controller for this installation.

## Step 12 - Configure Controller

Verify and edit controller basic configuration parameters per site engineering instructions.

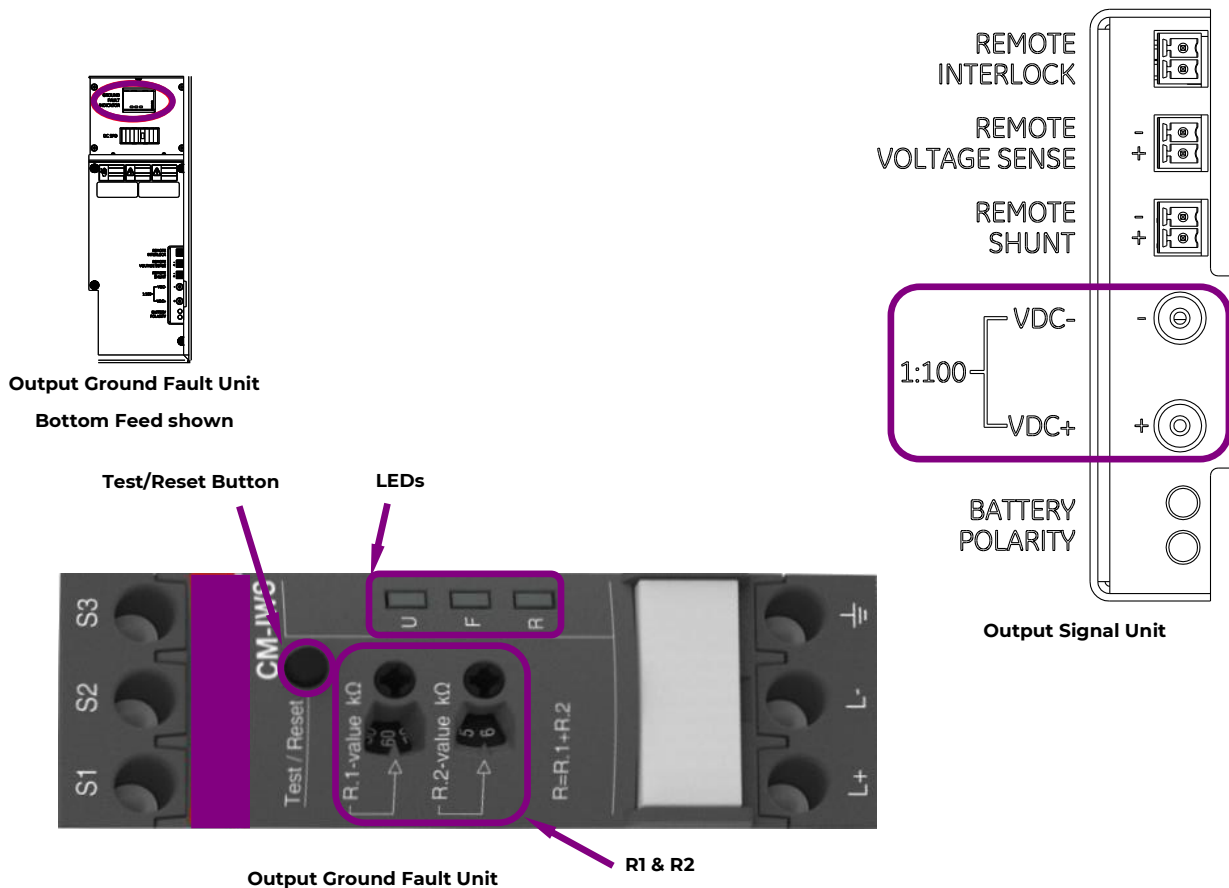
See Information: IP843G Controller Basic Operation.

IP843G Product Manual provides additional detail.

## Step 13 - Apply Power to Loads and Batteries Connected through Breakers

Rectifiers are keyed allowing only their installation into chargers of the same voltage.

1. Turn on BATT breaker if present
2. Verify DC output voltage with a meter on VDC+ and VDC- jacks on the Output Signal Unit.  
Terminals voltage is output voltage  $\pm 100$ .
3. Turn on load breaker(s) DC1 (and DC2 if present)
4. Verify No Ground Fault alarm - Ground Fault Unit U LED is Green and F LED NOT Red.  
If F LED is Red, adjust values of resistance threshold down ( $R1 + R2$ ).  
Operate Test/Reset button after each adjustment.  
If alarm continues, trouble shoot load and battery wiring accordingly.



## Information: Controller - View and Change Parameters and Alarm Severity

View and change system parameters and alarm severity from the factory defaults via:

- A. Front Display
- B. LAN port in Local mode via a laptop (web pages)
- C. LAN port in Network mode (web pages)
- D. Craft Port via laptop and EasyView2 software or HyperTerminal.

Easy View2 (GUI) software can be downloaded from <https://omnionpower.com>

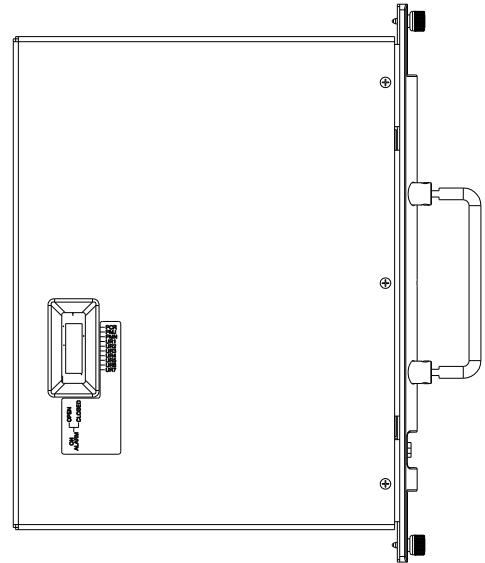
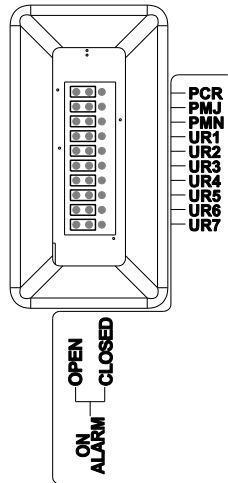
See Pulsar Plus G3 Controller Product Manual for details.

## Information: Pulsar XL Controller Alarm Relay Jumpers

Jumpers are located on the side top of the controller.

Alarm Relay Jumper Factory Defaults are Open On Alarm.

1. Remove Controller - 2 thumb screws.
2. Position jumpers per site engineering instructions
3. Replace controller - secure with 2 thumb screws.



## Information: Pulsar XL Controller - LAN Port - Local / Network

The LAN port is be configured as Local or Network - controller display menu path Configuration > Communication Ports > Network Settings > DHCP > mode CLIENT or SERVER

**Local** (Server): LAN connects to a laptop.  
Local (Server) is a temporary setting. When configuration is complete, return LAN port to Network (Client) mode.

**Network** (Client): LAN connects to a network. (Default).

**CAUTION:** Do not connect LAN port to a network when configured as Local.

See Pulsar Plus G3 Controller Product Manual for details.



## Information: Pulsars XL (IP843G) Controller Basic Operation

View and change system parameters from the factory defaults via

- A. Controller Display
- B. Craft Port on front of controller using a laptop with EasyView2 software or HyperTerminal.  
EasyView2 (GUI) software can be downloaded from <https://omnionpower.com>
- C. J5 LAN port web pages using a laptop with browser. LAN port Server mode is for local laptop connection. Set the LAN port to Server: With the controller set to Server enter the default IP address 192.168.2.1 (default) in the web browser address field.

**Warning:** Do not connect J5 LAN port to a network when set to Server. Set the controller to Client or Static before connecting to the network. Static is the factory default setting and the typical setting for most networks.

**Controller Alarm Status:** The display changes colors; Green = Normal, Amber = Minor Alarm, Red = Critical/Major Alarm

**Some alarms may occur during initial installation;** example: thermal probe fail or Major/Minor communication fail .

Clear these alarms: Via Controller Display: follow the menu path; Menu > Control/Operation > Clear Events or Uninstall Equipment.

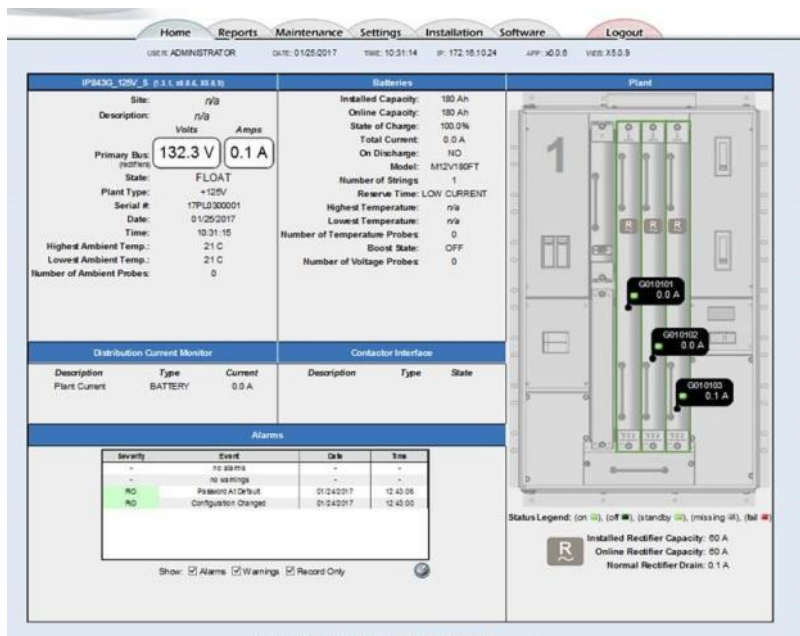
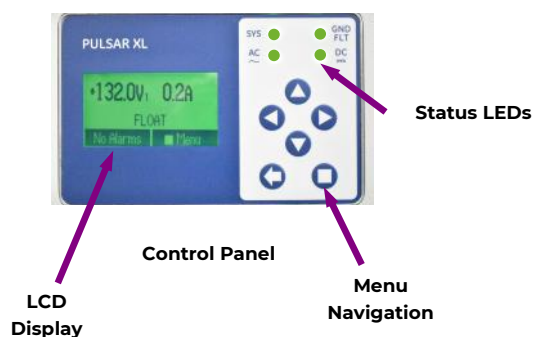
Via web pages or EasyView2; Select the Maintenance tab > clear latched events and clear missing devices.

**Verify Basic Installation Settings:** Date, Time, Battery Type, number of strings and float voltage

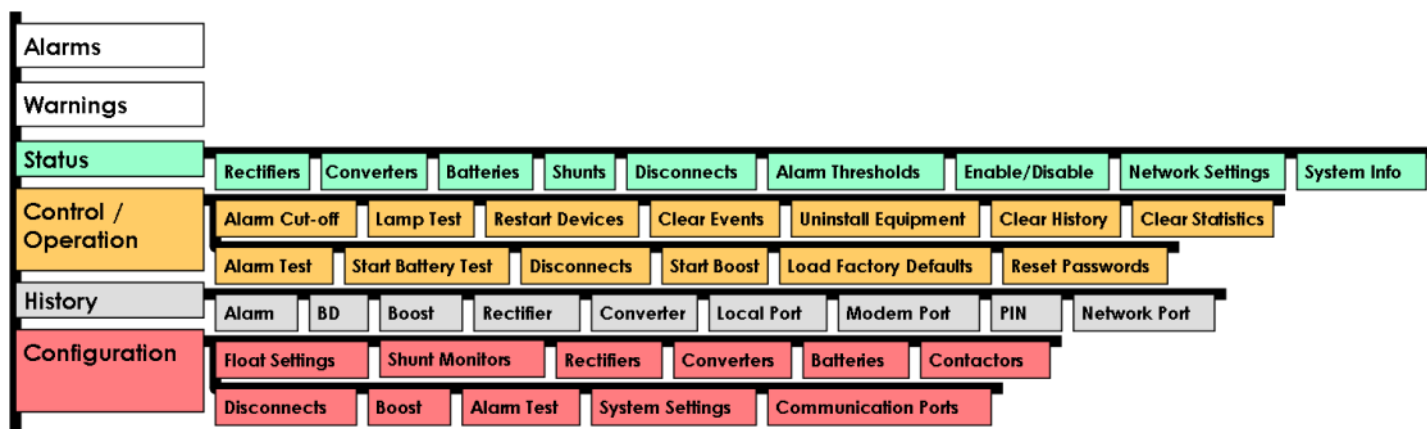
**Controller Display** - Menu > Configuration > System Settings and Menu > Configuration > Batteries.

**Web pages or EasyView2** - Installation Tab for Date, Time. Site ID and Site Description.

Settings Tab > Battery Management for Battery Type and number of battery strings installed.



Web Home Page



Front Display Menu Map

## Information: Nebula (IWC943) Controller Basic Operation

View and change system parameters from the factory defaults via

A. Controller Display

B. Craft Port on front of controller using a laptop. Connect using a standard web browser using IP address 192.168.1.1

**Controller Alarm Status:** The main home screen indicates the presence of any or No alarms being present.

**Some alarms may occur during initial installation;** example: thermal probe fail or Major/Minor communication fail .

Clear these alarms: Via Controller Display: follow the menu path; Menu > Maintenance> Clear latched events and clear missing devices.

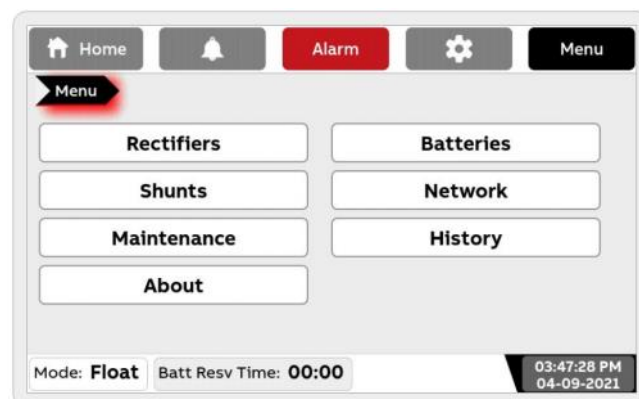
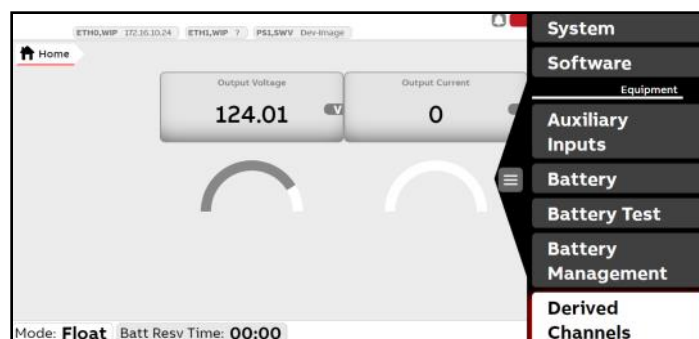
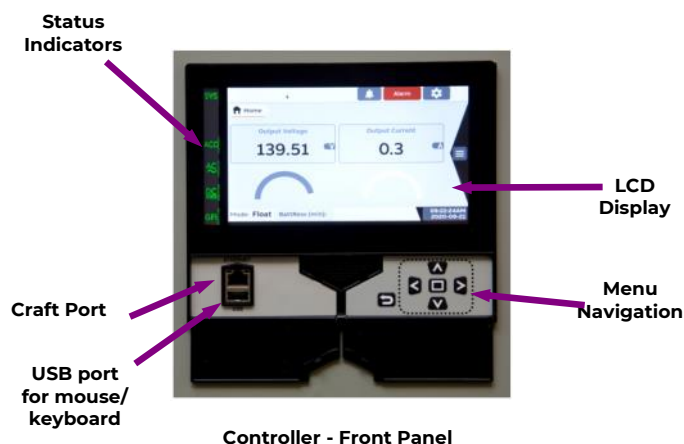
Via web pages or EasyView2; Select the Maintenance tab > clear latched events and clear missing devices.

**Verify Basic Installation Settings:** Date, Time, Battery Type, number of strings and float voltage

**Controller Display** - Menu > Batteries.

**Web pages or EasyView2** - Date and time on bottom right corner of the web page.

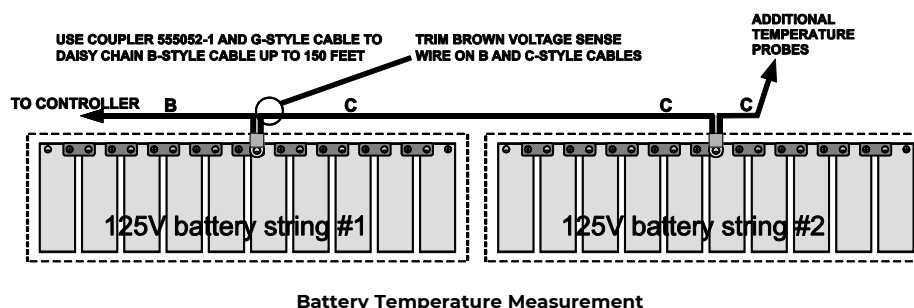
Settings Tab > Battery tab for Battery Type and number of battery strings installed.



## Information: Battery Monitoring Connections - for use with NiCd and Lead acid batteries (VRLA, Flooded)

Battery Monitoring is accomplished with a “Daisy Chained” series of probes. The Probes monitor battery temperature. Bolt the Probe under the “-” terminal connector hardware; NOT under the connecting lug.

Max per system: Probes - 16.



Ordering Codes	Descriptions
1600093513A	DTP873-Battery Thermal Probe
1600093512A	DTP873-Ambient Probe

## Information Interlock Cable Recommendations

- Wire - 20-24 AWG
- Mating Connector: Molex housing - 43025- 0200,
- Terminals - Molex 43030-0008 (15μ"gold plated)
- Hand Crimp Tool - Molex 0638190000
- Insertion Tool - Molex 0638120800
- Extraction Tool - Molex 0011030043

## Information: Signal Connections.

**Alarm Relays** Factory set to Open On Alarm. Rated 125V (60V for 24V and 48V chargers), 0.5A.

**“Dry” No Voltage Binary Inputs** Require a contact closure to Common (pin 2).

**“Dry” 24V Biased Binary inputs** Require a contact closure to 24V Source (pin 2).

Pulsar XL Alarm Outputs		
Connector	Description—Signal on Pin 1	Pin 2
TB1	Power Critical Alarm	Common
TB2	Power Major Alarm	Common
TB3	Power Minor Alarm	Common
TB4	Alarm R1 (default is RFA/MRFA)	Common
TB5	Alarm R2 (default is ACFMACF)	Common
TB6	Alarm R3 (default is BD/VLV)	Common
TB7	Alarm R4 (default is GFI)	Common
TB8	Alarm R5 (default is SPD, DC, and AC)	Common
TB9	Alarm R6 (default is BTA “Battery Test Active”)	Common
TB10	Alarm R7 (default is “Check Battery”)	Common





Pulsar XL Alarm Inputs		
Connector	Description—Signal on Pin 1	Pin 2
TB11 (IN007)	“Dry” No Voltage Binary contact input (default is AUX1 “Air Conditioner Fail”)	No Voltage Return
TB12 (IN008)	“Dry” No Voltage Binary contact input (default is AUX2 “Door Open”)	No Voltage Return
TB13 (IN009)	“Dry” No Voltage Binary contact input (default AUX3 “High External Ambient”)	No Voltage Return
TB14 (IN010)	“Dry” No Voltage Binary contact input (default AUX4 “Low External Ambient”)	No Voltage Return
TB15 (IN006)	“Dry” No Voltage Binary contact input (default “Plant Battery Test (PBT)”)	No Voltage Return
TB16 (IN005)	“Dry” No Voltage Binary contact input (default “Remote Rectifier Standby/ Emergency Power Off”)	No Voltage Return
TB17 (IN001)	“Dry” 24V Biased Binary contact input 24V Source (default “AUX9 Auxiliary 9”)	24V Source
TB18 (IN002)	“Dry” 24V Biased Binary contact input (default AUX8, “Auxiliary 8”)	24V Source
TB19 (IN004)	“Dry” 24V Biased Binary contact input 24V Source (default OSA1, “Open String”)	24V Source
TB20 (IN003)	“Dry” 24V Biased Binary contact input (default AUX6, “Hydrogen Present”)	24V Source
TB21	+24V Alternative external 24VDC back bias input for controller.	+24V DC Return
Pulsar XL System Communications Ports		
Connector	Description—Signal on Pin 1	Pin 2
RECT DATA	Connection to isolated rectifier RS485 Galaxy protocol serial bus.	not applicable
1-WIRE DATA	Connection to 1-Wire temperature probes. 1-Wire signal on pin 1.	1-Wire Return

Nebula Alarm Outputs		
Connector	Description—Signal on Pin 1	Pin 2
TB1	Power Critical Alarm	Common
TB2	Power Major Alarm	Common
TB3	Power Minor Alarm	Common
TB4	Alarm R1 (default is RFA/MRFA)	Common
TB5	Alarm R2 (default is ACFMACF)	Common
TB6	Alarm R3 (default is BD/VLV)	Common
TB7	Alarm R4 (default is GFI)	Common
TB8	Alarm R5 (default is HVSD/HV)	Common
TB9	Alarm R6 (default is multiple rectifier fail MRFA/MFA)	Common
TB10	Alarm R7 (default is “Check Battery”)	Common

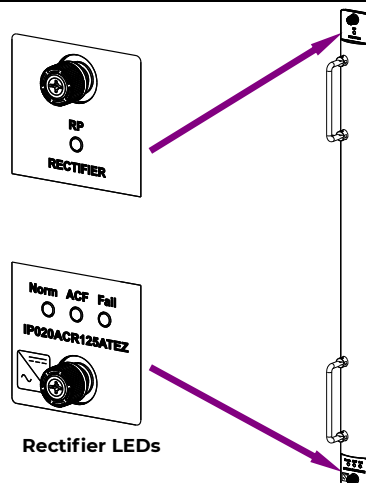
Nebula Alarm Inputs		
Connector	Description—Signal on Pin 1	Pin 2
TB11 (IN007)	“Dry” No Voltage Binary contact input (default is AUX1 “Air Conditioner Fail”)	No Voltage Return
TB12 (IN008)	“Dry” No Voltage Binary contact input (default is AUX2 “Door Open”)	No Voltage Return
TB13 (IN009)	“Dry” No Voltage Binary contact input (default AUX3 “High External Ambient”)	No Voltage Return
TB14 (IN010)	“Dry” No Voltage Binary contact input (default AUX4 “Low External Ambient”)	No Voltage Return
TB15 (IN006)	“Dry” No Voltage Binary contact input (default “Plant Battery Test (PBT)”)	No Voltage Return
TB16 (IN005)	“Dry” No Voltage Binary contact input (default “Remote Rectifier Standby/ Emergency Power Off”)	No Voltage Return
TB17 (IN001)	“Dry” 24V Biased Binary contact input 24V Source (default “AUX9 Auxiliary 9”)	24V Source
TB18 (IN002)	“Dry” 24V Biased Binary contact input (default AUX8, “Auxiliary 8”)	24V Source
TB19 (IN004)	“Dry” 24V Biased Binary contact input 24V Source (default OSA1, “Open String”)	24V Source
TB20 (IN003)	“Dry” 24V Biased Binary contact input (default AUX6, “Hydrogen Present”)	24V Source
TB21	+24V Alternative external 24VDC back bias input for controller.	+24V DC Return
Nebula System Communications Ports		
Connector	Description—Signal on Pin 1	Pin 2
RECT DATA	Connection to isolated rectifier RS485 Galaxy protocol serial bus.	not applicable
1-WIRE DATA	Connection to 1-Wire temperature probes. 1-Wire signal on pin 1.	1-Wire Return



## Information: Power Modules (Rectifiers)

Rectifiers					
Rectifier		Input V	AC Option	Output DC (nominal) Voltage	Power
 gray	IP020ACR125ATEZ 125Vdc	200-277 Vac	AC, L3, HW	125Vdc	2500W
		100-120 Vac	AC	125Vdc	1280W
 blue	IP050ACR048ATEZ 48Vdc	200-277 Vac	AC, L3, HW	48Vdc	2725W
		100-120 Vac	AC	48Vdc	1200W
 orange	IP100ACR024ATEZ 24Vdc	200-277 Vac	AC, L3, HW	24Vdc	2725W
		100-120 Vac	AC	24Vdc	1200W
 gray	IP040H3R125ATEZ 125Vdc	320-530 Vac	H3	125Vdc	6000W

Power Unit LEDs (see Troubleshooting for details)	
LED	Description
Norm	Normal—Green
ACF	AC Input Failure—Red
Fail	Failure—Red
RP	Reverse Polarity Failure—Red

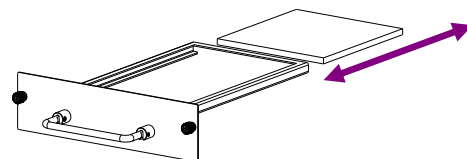


## Maintenance - Air Filters

Air Filters should be washed or replaced at intervals determined by the installation environment—dusty environments require more frequent service.

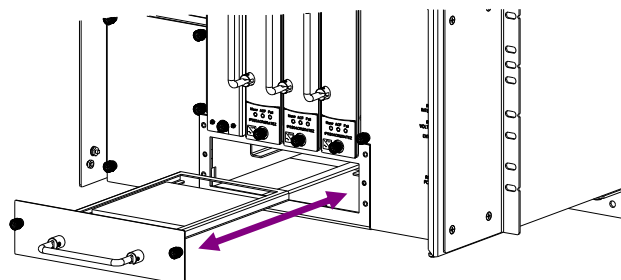
Air filters may be washed and reused.

1. Remove air filter carrier—2 thumb screws.
2. Remove and replace air filter.  
Air filter slides out to the rear of the air filter carrier.
3. Replace air filter carrier with filter—secure with 2 thumb screws.



### Filter Washing

1. Wash filter in soap water.
2. Gently wring out by hand.
3. Air dry for at least 24 hours before installing into filter carrier.





## Troubleshooting

Troubleshooting tables are in the Pulsar Plus Controller Family Troubleshooting Table document.

## Parts List

Power Modules		
Comcode	Description	Application
150050531	IP020ACR125ATEZ	125VDC Hot-Swappable Integritas Charger Module, Single Phase 120 - 277AC Input, 20A Output
150050530	IP050ACR048ATEZ	48VDC Hot-Swappable Integritas Charger Module, Single Phase 120 - 277AC Input, 50A Output
150052733	IP100ACR024ATEZ	24VDC Hot-Swappable Integritas Charger Module, Single Phase 120 - 277AC Input, 100A Output
8600092348P	Blank IP Charger Module Faceplate	Blank filler for empty charger slots

Controller Modules		
Comcode	Description	Application
1600093508A	IP843G_24V_S CONTROLLER MODULE	Integritas Wall Charger, Hot- Swappable 24VDC Controller Module with secure protocols
1600093510A	IP843G_48V_S CONTROLLER MODULE	Integritas Wall Charger, Hot- Swappable 48VDC Controller Module with secure protocols
1600093509A	IP843G_125V_S CONTROLLER MODULE	Integritas Wall Charger, Hot- Swappable 125VDC Controller Module with secure protocols
1600093511A	IP843G_IO MODULE	Integritas Wall Charger, Input / Output Module (Compatible with all charger voltages)

Thermal Probes		
Comcode	Description	Application
1600093512A	DTP873_AMBIENT	Ambient Thermal Probe Kit
1600093513A	DTP873_BATTERY	Battery Terminal Thermal Probe Kit

Additional Accessories (Mounting Hardware, Filters, etc.)		
Comcode	Description	Application
1600097831A	19IN IWC 19IN FRAME MOUNT KIT	Mounting hardware to attach 19" Battery Charger to 19" Frame
1600097832A	19IN IWC 23IN FRAME MOUNT KIT	Mounting hardware to attach 19" Battery Charger to 23" Frame
850052732	FILTER, WALL BOX, 19"	Air Filter for 19" Battery Charger cabinet
850053032	FILTER, WALL BOX, 23"	Air Filter for 23" Battery Charger cabinet
4600097827P	VAL-CP-350-ST 2859602	AC Line Surge Arrestor Replacement Module
4600097268P	VAL-CP-N/PE-350-ST 2859699	AC N-PE Surge Arrestor Replacement Module
4600097830P	PST-SEC-T3-24P 2905232	24V DC Surge Arrestor Replacement Module
4600219078P	VAL-US-600D/30/P- 2910341	Type 2 600 V AC Plug For 3-phase DELTA Surge Protection Device
4600097829P	PST-SEC-T3-60P 2905233	48V DC Surge Arrestor Replacement Module
4600097828P	PST-SEC-T3-230P 2905235	125V DC Surge Arrestor Replacement Module

## Specifications and Application

- External Surge Protective Device (SPD) is required on all AC inputs.
- Equipment Safety is Approved in UL1449/IEC 60664-1 Installation Category II environments for ambient temperature up to 50°C.  
Models using IP020ACR125ATEZ rectifiers: For input voltages above 266V, the maximum output current and power are de-rated by 2.8% per °C for operating ambient above 40°C.
- Equipment and subassembly ports:
  1. are suitable for connection to intra-building or unexposed wiring or cabling;
  2. can be connected to shielded intra-building cabling grounded at both ends.
- Grounding / Bonding Network – Connect to an Isolated Ground Plane (Isolated Bonding Network) or an Integrated Ground Plane (Mesh-Bonding Network or Common Bonding Network).
- Installation Environment - Install where NEC applies.

## Reference Documents

These documents are available at <https://omnionpower.com>

Document Title

8600092588P Pulsar XL Product Manual

850049786 Pulsar Plus Controller Family Troubleshooting

0001258890 Integritas Industrial Battery Chargers Ordering Guide

## Notes

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