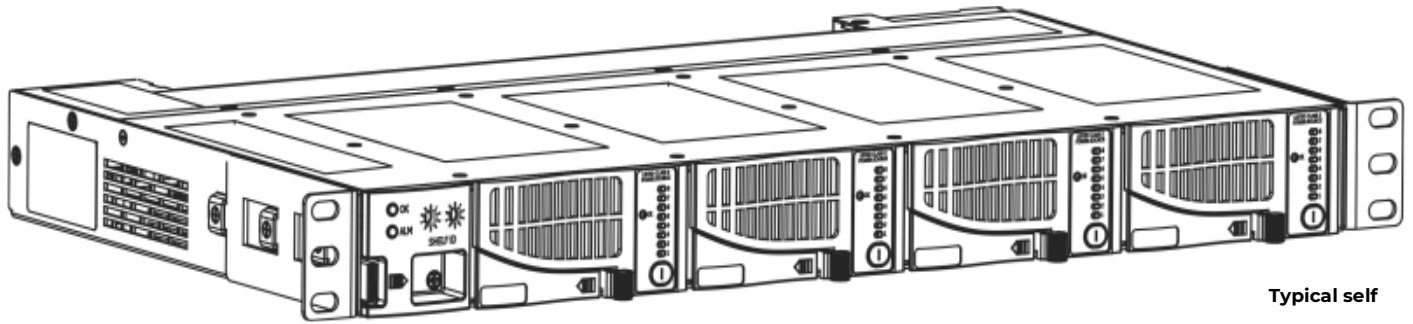


Power Express

NEC Class 2 Shelf

150028529 Shelf -48V input and output (unregulated)

150036912 Shelf -48V input, -57V output (regulated)



Typical self

Read and follow all safety statements, warnings, and precautions in this guide. This shelf must be installed in a housing that prevents access to its top and sides and that provides unrestricted front to rear

Tools required:

- Torque wrench (0-240 in-lb / 28 Nm)
- Cable crimpers
- Screw Drivers - Flat & 2 Phillips
- Sockets - 5/16", 7/16" and 1/2"
- Wire cutters and strippers

Step 1 - Mount the Shelf

1. Remove non-conductive coating from the surface of frame/rack and apply antioxidant. Chassis is grounded by mounting system to frame/rack. Ensure the frame/rack is properly bounded.
2. Attach the system to the frame/rack using a minimum of 12 (six on each side) 12-24 screws (provided). Torque to 35 in-lb - 5/16" socket.

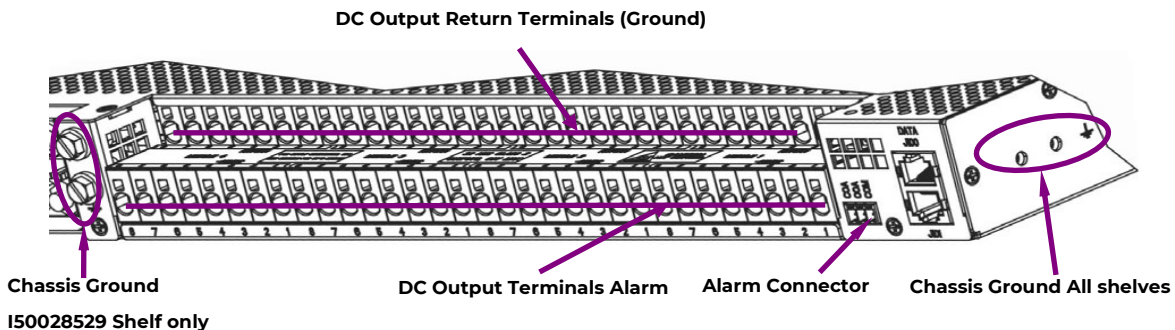
Step 2 - Connect Chassis Ground

- Wire - 6AWG minimum
- Lug - double-hole 1/4" on 5/8" centers (not provided).
- Secure lug with screws - 10-32 (provided)

Torque to 10-32 screws to 30 in-lb (3.4Nm) - 5/16" socket.

Chassis Ground locations: Side location - all shelves; Rear location - 150028529 only.

Some applications may rely on frame mounting screws for shelf ground omitting the chassis ground cable.



Typical Shelf

Step 3 - Connect DC Input Cables

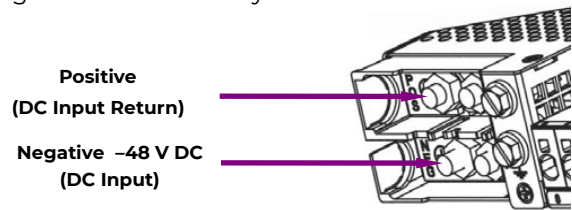
- Wire - 1AWG minimum
- Lugs 1/4" on 5/8" centers (not provided)

External Feed Protector - Recommended		
Vin	Vin min.	Protector
-48V	-42V	100A
-57V	-57V	70A

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

150028529 Shelf

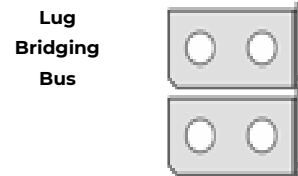
- A1. Verify battery cable voltage and polarity.
- A2. Connect to POS and NEG lug landings.
- A3. Torque all lug nuts to 65 in-lb (7.3Nm) - 7/16" socket.



150036912 Shelf

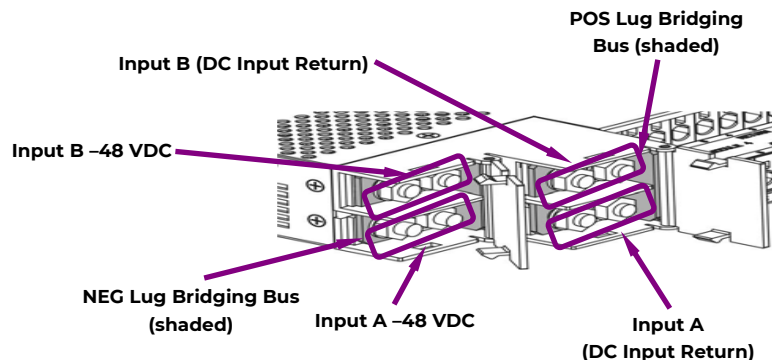
Lug Bridging Buses are under lug nuts.

- B1. Verify battery cable voltage and polarity.
- Connect Negative feed cables With Redundant Feed option - see note below.
- B2. Remove NEG Lug Bridging Bus.
- B3. Connect to NEGA and NEGB lug landings (2 cables)
- Without Redundant Feed option
- B4. Connect to NEGA or NEGB lug landing (1 cable).
- Connect Positive feed cables With Remote Output Reference option - see note below.
- B5. Remove POS Lug Bridging Bus.
- B6. Connect DC Input feed return to POSA lug landing.
- B7. Connect Output Reference ground to POSB lug landing.
- Without Remote Output Reference option
- B8. Connect to NEGA or NEGB lug landing (1 cable).
- Torque All Lug Nuts
- B9. Torque all lug nuts to 65 in-lb (7.3Nm) - 7/16" socket.



Notes: Apply these options only when directed by the site engineering instructions. Redundant Feed requires that each feed be capable of powering the entire shelf when the other feed is unpowered. Both feeds must be protected as recommended in Step 5.

Remote Output Reference references the converter outputs to a point other than POSA (DC Input Return) When used, the reference is usually connected to a ground point near the powered equipment.



Step 4 - Verify DC Input Voltage and Polarity

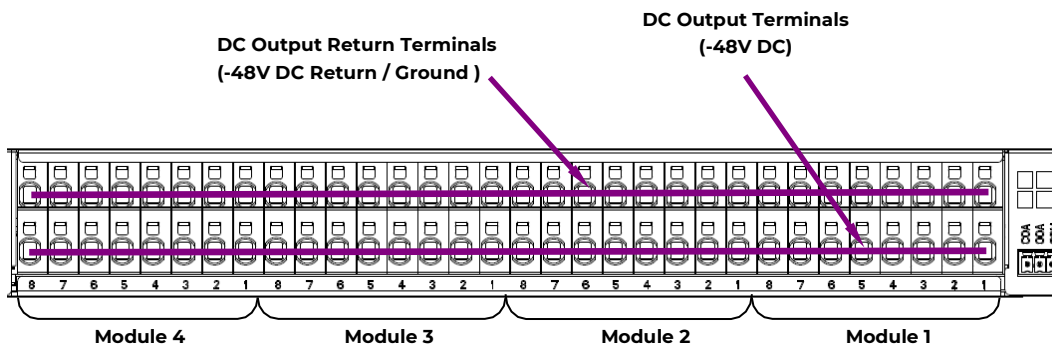
- Verify that the DC Input voltage is -48VDC and matches the marked polarity using a meter.

Note: Equipment will operate properly only with proper DC Input voltage and polarity.

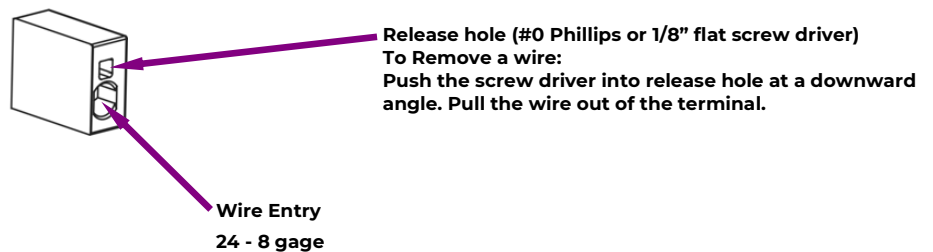


Step 5 - Connect DC Outputs

- Connect DC Output and DC Output Return wires for each output.
- 32 DC Outputs - 8 per Module.

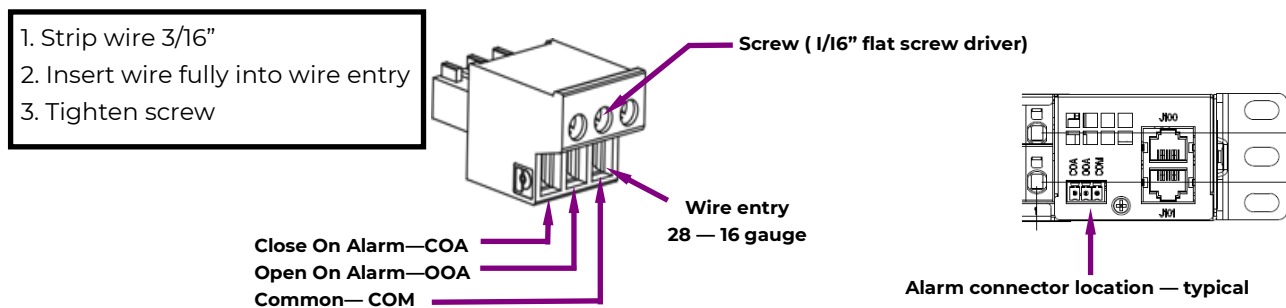


- Strip wire 1/2"
- Insert wire fully into wire entry
- Pull wire to verify insertion



Step 6 - Connect Alarm Cable

- Remove alarm connector from the chassis.
- Connect alarm cable.
- Insert alarm connector into the chassis.

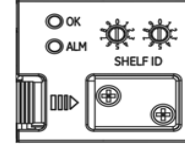


Warning: Shock Hazard and Equipment Damage - Equipment and subassembly ports:

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.

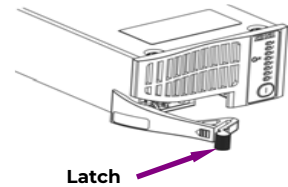
Step 7 - Verify Shelf ID Setting

- Set Shelf ID to 00 to operate without a system controller.
- Set Shelf ID to 01 through 98 are read by a controller if present.
- Set Shelf ID to 99 to perform Lamp Test.



Step 8 - Install Modules

1. Verify Module Type - see Information: 8 port Module Compatibility
2. Open latch.
3. Insert module into Shelf.
4. Close latch.



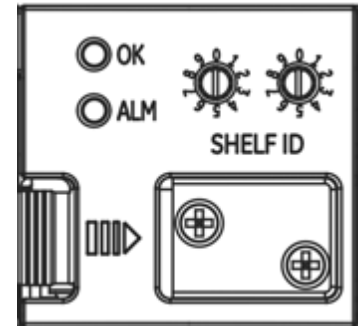
Step 9 - Initial Start Up

1. Verify that all connections are complete and secure.
2. Turn on the DC input breaker.

Modules automatically start up and scan outputs for loads. Circuits with loads are turned ON, circuits without loads are turned OFF.

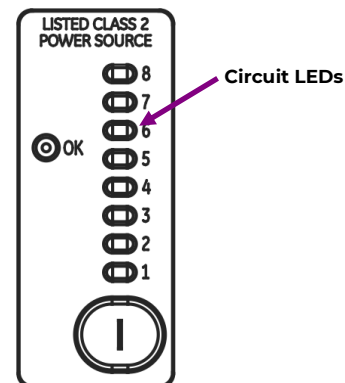
Information: LEDs and Alarm

Shelf LEDs and Alarm			
Condition	Shelf LED		Shelf Alarm
	OK	ALM	
Class 2 Circuit ON	G	OFF	-
Class 2 Circuit OFF	G	OFF	-
Class 2 Circuit Over Current/Shorted	OFF	Y	Alarm
Class 2 Circuit Fail (1 or more)	OFF	R	Alarm
Input Voltage Very Low	OFF	OFF	Alarm
Input Voltage Out of Range	OFF	Y BLINK	Alarm
Reversed Input Polarity	OFF	R BLINK Y BLINK	Alarm
Alarm Card Fail	OFF	R	Alarm
Internal Shelf Comm Fault3	OFF	G	Alarm
GP Comm Fault	OFF	R BLINK	Alarm



Alarm Card

Module LEDs			
Condition	Module OK LED		Module Circuit LEDs ²
	Priority ¹	LED	
Circuit - ON		G	G
Circuit - OFF		G	OFF
Circuit - ON - Over Current	3	Y	Y
Circuit - Fail	1	R	R
Comm Fault <-> Alarm Card	4	R BLINK	Per Circuit Condition
Module Fail	1	R	OFF
Input Voltage Out of Range	2	Y BLINK	OFF
Input Voltage Very Low or Reversed Polarity		OFF	OFF



Circuit LEDs

1. OK LED indicates the highest LED priority. Priority 1 is highest.
2. Each Circuit LED indicates the Condition of its Circuit, independently of the other Circuits.
3. Internal Shelf Comm Fault is the loss of communication between the alarm card and 1 or more modules.
Possible causes: module removal and module internal failure. Replace the module or removed and replaced the Alarm Card to clear the alarm.

Information: Circuit ON/OFF and Load Detection

Circuit ON: Output is powered unless over loaded (power exceeds 100VA). Overloads are retested every 4 sec.

Circuit OFF: Output is unpowered.

Circuit Load Detection: Circuits are scanned for loads upon module power up and upon manual scan.

Circuits with loads are turned ON, circuits without loads are turned OFF.

Circuit ON/OFF status is only set by scans and Manual Circuit ON/OFF actions. The last action determines the ON/OFF state of each circuit. The only automatic change in circuit ON/OFF status occurs upon module power up.

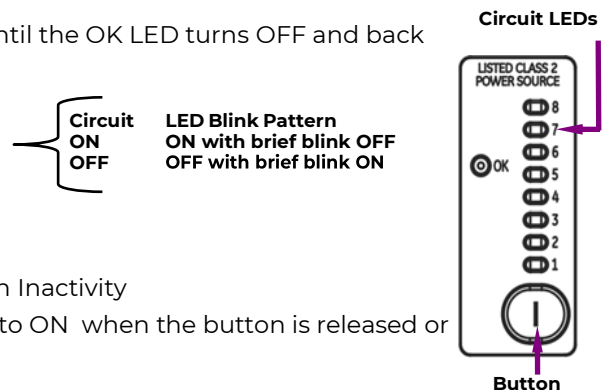
Information: Manual Module Operations

Manually Scan Circuit Loads: Press and release the Button - no interruption of power to ON circuits.

Manual Circuit ON/OFF:

1. Press and hold the Button to enter the manual mode hold until the OK LED turns OFF and back ON (2 seconds)
2. Tap the Button repeatedly until the desired Circuit LED blinks
3. Press and hold the Button to toggle the circuit ON/OFF hold until the OK LED turns OFF and back ON (2 seconds)
4. Repeat from step 2 to operate another circuit
5. Automatic operation is restored after a few seconds of Button Inactivity

The OK LED is turned OFF when the button is pressed. It returns to ON when the button is released or after the button is held for 2 seconds.



Information: Fault Detection

Circuit ON: Output is powered unless over loaded (power exceeds 100VA). Overloads are retested every 4 sec.

Circuit OFF: Output is unpowered.

Circuit Load Detection: Circuits are scanned for loads upon module power up and upon manual scan.

Circuits with loads are turned ON, circuits without loads are turned OFF.

Circuit ON/OFF status is only set by scans and Manual Circuit ON/OFF actions. The last action determines the ON/OFF state of each circuit. The only automatic change in circuit ON/OFF status occurs upon module power up.

Information: 8 port Module Compatibility

8 port Module Compatibility		
Shelf	Module	Output
150028529	150027362	-48V unregulated
150036912	150037261	-57V regulated

Specifications and Application

- Specifications and ordering information are in the Power Express Class 2 Distribution Brochure available at omnionpower.com
- External Surge Protective Device (SPD) is required on all AC inputs.
- 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 in Network Telecommunication Facilities, OSP, or where NEC applies.
- Battery return may be either Isolated DC return (DC-I) or Common DC return (DC-C).

Reference Documents

These documents are available at omnionpower.com

Document	Title
	Power Express Class 2 Distribution Brochure (aka Power Express Class 2 Distribution Ordering Guide)

Safety Statements

- Do not install this equipment over combustible surfaces.
- Rules and Regulations - Follow all national and local rules and regulations when making field connections.
- Compression Connectors
 - U. S. or Canada installations - use Listed/Certified compression connectors to terminate Listed/Certified field-wire conductors where required.
 - 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.
- Electrical Connection Securing: Torque to the values specified on labels or in the product documentation.
- Cable Dress - dress to avoid damage to the conductors and undue stress on the connectors.
- Fuses and Circuit Breakers - Size as required by the National Electric Code (NEC) and/or local codes.
 - Refer to the equipment ratings to assure current does not exceed:
 - Continuous Load (List 1) - 60% of protector rating
 - Maximum Load (List 2 - typically end of discharge) - 80% of protector rating.
- Field-wired Conductors - Follow all National Electric Code (NEC) and local rules and regulations .
 - Insulation rating: 90°C minimum; 105°C (minimum) if internal to enclosed equipment cabinets.
 - Size AC field-wired conductors with 75°C ampacity (NEC) equal to or greater than their panel board circuit breaker rating.
 - Size DC field-wired conductors with 90°C ampacity (NEC) equal to or greater than circuit breaker/fuse rating.
- AC and DC input disconnect/protection - Provide accessible devices to remove input power in an emergency.
- Alarm Signals - Provide external current limiting protection. Rating 60V, 0.5A unless otherwise noted.
- Grounding - Connect the equipment chassis directly to ground. In enclosed equipment cabinets connect to the cabinet ac service ground bus. In huts, vaults, and central offices connect to the system bonding network.
- Circuit Breakers and Fuses - Use only those specified in the equipment ordering guide.
- GMT Style Fuses - Use only fuses provided with safety caps.

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.
- 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 that can shock or cause serious injury. When equipped with ringer modules, hazardous voltages will be present on the ringer output connectors.
- 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.
- 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.

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