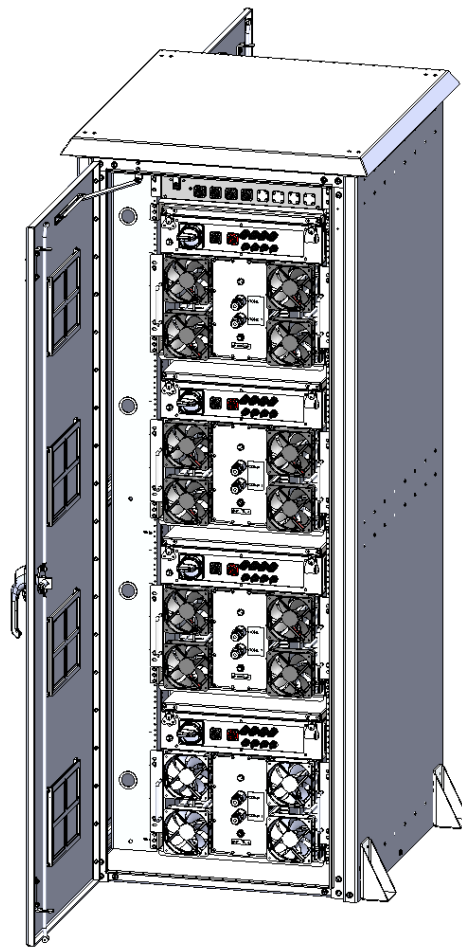




# SPOT & BOSS BOX + JBOX: Installation Manual

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Alencon Systems Integrated Form Factor for Paralleling Multiple SPOT or BOSS units in an outdoor rated container.



Alencon Systems – Passionate About Power

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## Contents

Disclaimer.....	1
Table of Figures .....	4
Installation Criteria .....	5
Deliverables .....	6
Installation Procedure.....	7
1. Unpacking and Mounting SPOT/BOSS-BOX.....	7
2. Conduit Cable Entry.....	9
3. Mounting Podd Wired Comms Box .....	11
4. Install Shelves into Enclosure.....	13
5. Unpacking SPOT/BOSS with FEED Units and Attaching Rack-mounting Brackets .....	16
6. Mounting SPOT/BOSS Units into Enclosure with Shelves.....	17
7. Mounting Junction Box into SPOT/BOSS-BOX Enclosure .....	18
8. Cabinet Wiring Modalities .....	18
8.a. Combined Primary (Input) and Distributed Secondary (Output) .....	19
8.b. Combined Primary (Input) and Combined Secondary (Output).....	25
9. Wiring Communication Cables to Podd .....	34
Grounding.....	36
Podd Grounding .....	36
Cabinet and Rack Grounding.....	36
SPOT/BOSS Grounding .....	36
Optional: BOX Door Modification .....	37
Purpose.....	37
Modification Criteria .....	38
Deliverables – Bill of Materials .....	38
Modification Procedure: .....	40
1. Removing Internal Filter Plates .....	40
2. Measure Cut-outs .....	40
3. Cut-out Door Louvers .....	42
4. Install Filter Plates and Hoods (Rear Door).....	42
5. Install Fans and Hoods (Front Door).....	43
6. Install Power Supply .....	45
7. Connect Wire Harness for Fans .....	46
Maintenance.....	47



Additional Maintenance:.....	47
Appendix A - Safety Precautions.....	48
A.1 Degree of Danger Symbols .....	48
A.2 Electrical hazards.....	48
A.2.1 Electric shock from live voltage .....	48
A.2.2 Danger due to Battery Voltage .....	49
A.2.3 Electric shock caused by ground fault.....	49
A.2.4 Electric shock due to damaged equipment.....	49
A.3 Environmental hazards .....	49
A.3.1 Danger to life due to blocked escape routes .....	49
A.3.2 Damage to the equipment caused by dust or moisture penetration .....	49
A.3.3 Danger to life due to electric shock when the equipment is unlocked .....	50
Appendix B – Glossary .....	50
Appendix C – Technical Support and Assistance .....	51



## Table of Figures

FIGURE 1: SPOT/BOSS-BOX ENCLOSURE, 42U, 19"-OD-78DDC [P-006645] .....	7
FIGURE 2: EXTERIOR PAD MOUNTING FEET FOR ENCLOSURE .....	7
FIGURE 3: ANCHOR BOLTS (1 SIDE SHOWN) .....	8
FIGURE 4: CONDUIT ACCESS ON SIDES (VIEW FROM INSIDE CABINET) .....	9
FIGURE 5: CONDUIT ACCESS (AND CLEARANCE) ON BOTTOM (VIEW FROM INSIDE CABINET) .....	10
FIGURE 6: PDD UNIT (3 VIEWS) .....	11
FIGURE 7: PDD MOUNTED ON UNISTRUT .....	11
FIGURE 8: ENCLOSURE RACK SUPPORT MOUNTING BOLTS .....	13
FIGURE 9: 19 INCH RACK POSITIONS INSIDE SPOT/BOSS-BOX ENCLOSURE .....	14
FIGURE 10: SPOT/BOSS-BOX ENCLOSURE WITH SHELVES AND JBOX MOUNTED .....	15
FIGURE 11: TYPICAL SHELF MOUNTING WITH HARDWARE .....	15
FIGURE 12: SPOT/BOSS WITH FEED AND MOUNTING BRACKETS .....	16
FIGURE 13: SPOT/BOSS RACK MOUNTING BRACKETS .....	16
FIGURE 14: SPOT PLACEMENT MAP .....	17
FIGURE 15: JUNCTION BOX LOCATION WITH MOUNTING HARDWARE .....	18
FIGURE 16: SURLOK CABLING ROUTED TO PRIMARY (INPUT) ON FEED #1 .....	19
FIGURE 17: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #2 .....	20
FIGURE 18: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #3 .....	21
FIGURE 19: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #4 .....	22
FIGURE 20: PV CABLE ROUTING TO SECONDARY (OUTPUT) AMPHENOL'S ON FEED #1 .....	23
FIGURE 21: REAR VIEW OF CUSTOMER CONNECTIONS TO PRIMARY (INPUT) ON JUNCTION BOX .....	24
FIGURE 22: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #1 .....	25
FIGURE 23: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #2 .....	26
FIGURE 24: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #3 .....	27
FIGURE 25: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #4 .....	28
FIGURE 26: SURLOK CABLING ROUTED TO SECONDARY (OUTPUT) FEED #1 .....	29
FIGURE 27: SURLOK CABLING ROUTED TO SECONDARY (OUTPUT) FEED #2 .....	30
FIGURE 28: SURLOK CABLING ROUTED TO SECONDARY (OUTPUT) FEED #3 .....	31
FIGURE 29: SURLOK CABLING ROUTED TO SECONDARY (OUTPUT) FEED #4 .....	32
FIGURE 30: REAR VIEW OF CUSTOMER CONNECTIONS TO JUNCTION BOX .....	33
FIGURE 31: RJ-45 DAISY CHAIN .....	34
FIGURE 32: PDD WIRING .....	35
FIGURE 33: PDD DEVICE GROUNDING .....	36
FIGURE 34: SPOT UNIT GROUNDING .....	36
FIGURE 35: BOX CABINET WITH DOOR HOOD MODIFICATION .....	37
FIGURE 36: DOOR HOODS .....	39
FIGURE 37: FAN PLATES .....	39
FIGURE 38: BOX CABINET WITH EXTERNAL LOUVER PANELS AND INTERNAL FILTER PLATES .....	40
FIGURE 39: FILTER PLATE BACKWARDS FOR STENCIL .....	41
FIGURE 40: BOX CABINET INTERNAL FILTER PLATES AND CUT-OUTS .....	41
FIGURE 41: FILTER PLATE .....	42
FIGURE 42: SILICONE CAULK SEAL ON DOOR HOODS .....	43
FIGURE 43: FAN PLATE .....	44
FIGURE 44: MODIFIED BOX CABINET .....	44
FIGURE 45: MORN SUN – CABINET MOUNTED .....	45
FIGURE 46: MORN SUN – DIMENSIONS .....	45
FIGURE 47: MORN SUN POWER SUPPLY MOUNTING HARDWARE .....	46
FIGURE 48: WIRE HARNESS FOR FANS .....	46



## Installation Criteria

Only skilled professionals with experience installing rack-mounted electrical systems should perform installation of the SPOT/BOSS-BOX. Persons installing the SPOT/BOSS-BOX should be able to lift 50 lbs. without assistance. At least 2 people are required to install the SPOT/BOSS-BOX, 3 are recommended.

Installation instructions should be followed exactly; improper installation of the SPOT/BOSS-BOX could void the warranty of the SPOT/BOSS-BOX and any or all its component parts.

If any instructions are unclear, or any additional information is required during the process, please contact Alencon Systems LLC for assistance, see Appendix C.

### Required Tool List:

- Hammer Drill
- Masonry Drill Bit (Appropriate size for customer supplied anchors)
- Adjustable wrench
- Power Driver with Socket Drive Adapter
- Ratchet and Extensions
- 3/8" Socket
- 9/16" Socket
- 13mm Socket
- #2 Phillips Screwdriver
- 3/16" Flathead Screwdriver

### Customer Supplied Hardware:

- Enclosure anchoring hardware (assumed concrete anchors listed below)
  - (4) 1/2" concrete anchor bolts with nuts and washers
- Unistrut and Hardware to Mount PODD Enclosure
  - (2) 1-5/8" Unistrut Channels
  - (2) 5/16" x 3/4" L Bolts (or M8)
  - (2) 5/16" flat washers (or M8)
  - (2) 5/16" Unistrut nuts (or M8)
- (1) Waterproof grommet or bulkhead for CAT5 cable with RJ-45 connectors
- Zip-ties or Velcro tape for cable management



## Deliverables

In most cases, to minimize carbon impact of shipping as well as cost, the BOX enclosure ships direct from the cabinet manufacturer to the customer's designated site. The SPOT or BOSS units, Junction Box, and cables ship from Alencon to the customer site.

### SPOT/BOSS-BOX Components:

- (1) SPOT/BOSS-BOX cabinet
  - Single Bay Outdoor Enclosure, 42U, 19" - OD-78DDC [P-006645]
- (1) Exterior Pad Mounting Feet, 1/2" Anchor Clearance, for DDB Enclosures, Gray, kit includes (4) feet w/ hardware [P-007009]
- (5) Fixed Shelf, 2U 19" Rack, 22.5" Deep, Black Powder Coated 12 GA CRS [A-001023]
- (42) #10-32 x 1/2" SEMS Screw / Internal Tooth Washer / Phillips / Pan Head / Steel / Black Oxide [P-006998]
- Cabinet Grounding Lugs (upon request)
- (4) SPOT/BOSS with FEED units (Configured for customer application)—each unit numbered and marked on the box
- (1) Rack Mounted Junction Box (Configured for customer application)
- SPOT/BOSS mounting brackets
  - (4) Left Bracket [A-000734]
  - (4) Right Bracket [A-000735]
- (16) Bracket Mounting Screws:
  - 1/4"-20 x 3/4 Hex Washer Head w/ Slot, Type F SZP [P-005533]
- SPOT/BOSS-BOX Installation Manual

### Cabling:

- (2 or 4) 1.5-foot SurLok Cables for SPOT #1
- (2 or 4) 5-foot SurLok Cables for SPOT #2
- (2 or 4) 6.5-foot SurLok Cables for SPOT #3
- (2 or 4) 8-foot SurLok Cables for SPOT #4
- (3) 2-foot CAT5 Communication Cables with RJ-45 Connectors (from SPOT/BOSS to SPOT/BOSS)
- (1) 6-foot CAT5 Communication Cable with RJ-45 Connectors (to PODD connection)
- (1) RJ-45 Termination dongle (used to terminate last SPOT connection)
- (1) ACE-PODD unit package with accessories:



## Installation Procedure

### 1. Unpacking and Mounting SPOT/BOSS-BOX

- The SPOT/BOSS-BOX cabinet [P-006645] will arrive on a pallet ( Figure 1)
  - Manufacturer's Specification Sheet and Owner's Manual should be used as installation reference:
    - <https://www.ddbunlimited.com/outdoor-enclosures/od-series/od-78ddc/>
- Remove packaging and unbolt the enclosure from the pallet



FIGURE 1: SPOT/BOSS-BOX ENCLOSURE, 42U, 19"-OD-78DDC [P-006645]

- (Optional) Install Exterior Pad Mounting Feet [P-007009] onto enclosure using included hardware in kit and manufacturer's instructions (Figure 2).

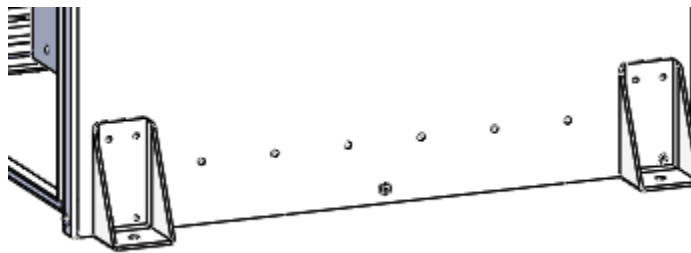


FIGURE 2: EXTERIOR PAD MOUNTING FEET FOR ENCLOSURE





Position cabinet on concrete pad

- Use (4) ½" diameter concrete anchor bolts to mount the SPOT/BOSS-BOX enclosure (and Figure 3)

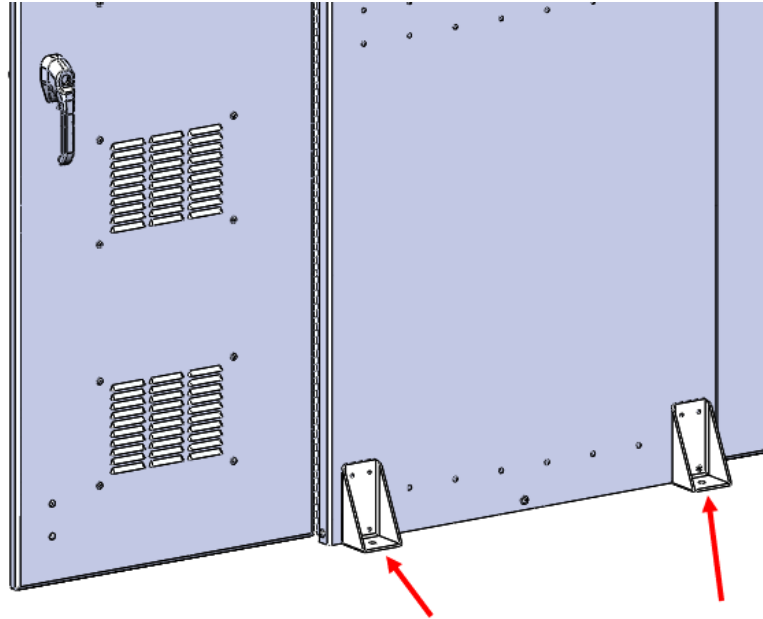


FIGURE 3: ANCHOR BOLTS (1 SIDE SHOWN)



## 2. Conduit Cable Entry



### Drawing A-001051: Assembly, BOSS Box Enclosure with Shelves and Hardware

- Conduit accessibility is available on the sides and bottom of the enclosure
- Areas depicted in red boxes in Figure 4 and Figure 5 are available for cable ingress into cabinet
- Visual Inspection of enclosure hardware clearance is mandatory to avoid interference along edges and corners of detailed space
- Entry through vertical sides is limited in depth as detailed in bottom view
- Locating Entry on Sides to avoid installed shelves is recommended but not detailed.

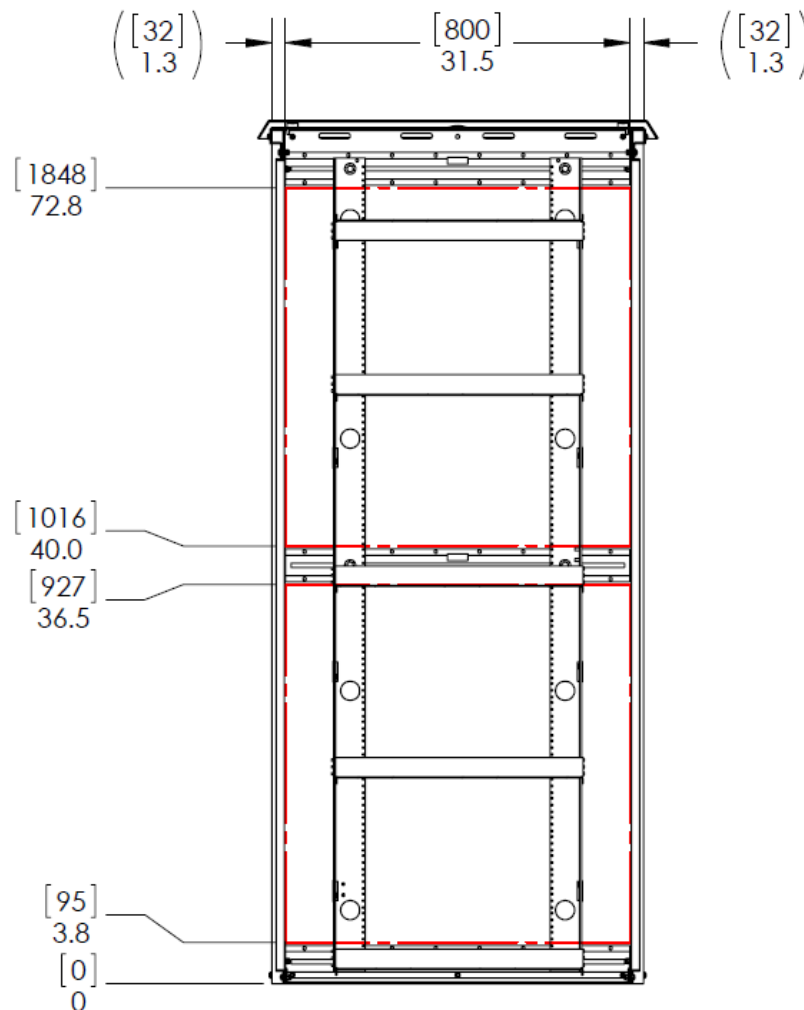


FIGURE 4: CONDUIT ACCESS ON SIDES (VIEW FROM INSIDE CABINET)

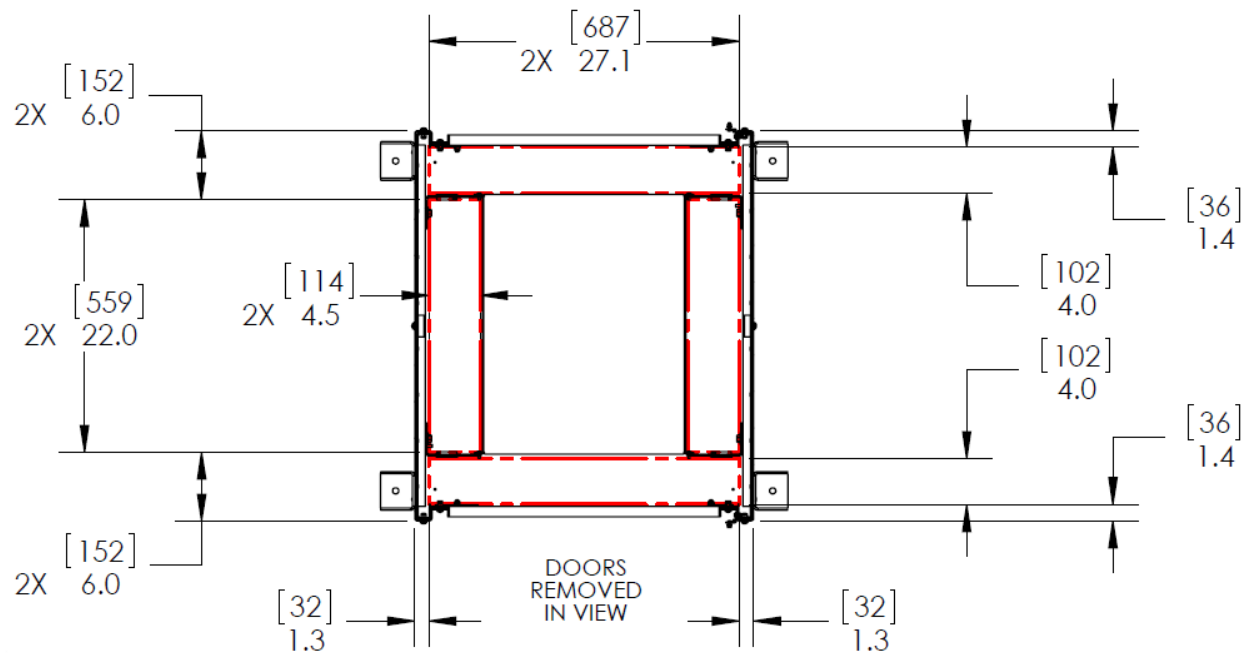


FIGURE 5: CONDUIT ACCESS (AND CLEARANCE) ON BOTTOM (VIEW FROM INSIDE CABINET)



### 3. Mounting PODD Wired Comms Box

The PODD (Figure 6) will need to be mounted outside of the SPOT Box cabinet. The PODD mounting plate is designed to be mounted on standard 1-5/8" channel Unistrut (Figure 7). If mounting Unistrut on the BOX enclosure, locate the PODD enclosure in an area defined in Section 2 to avoid interferences.

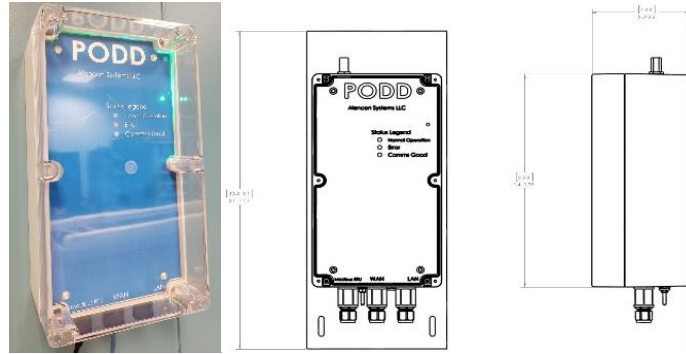


FIGURE 6: PODD UNIT (3 VIEWS)

- Customer supplied Unistrut must be mounted 20" apart on centerline ( Figure 7).
- Hang the PODD mounting plate to the top Unistrut and secure the bottom of the plate through the two slots with 5/16" (M8) hardware into the bottom Unistrut channel.

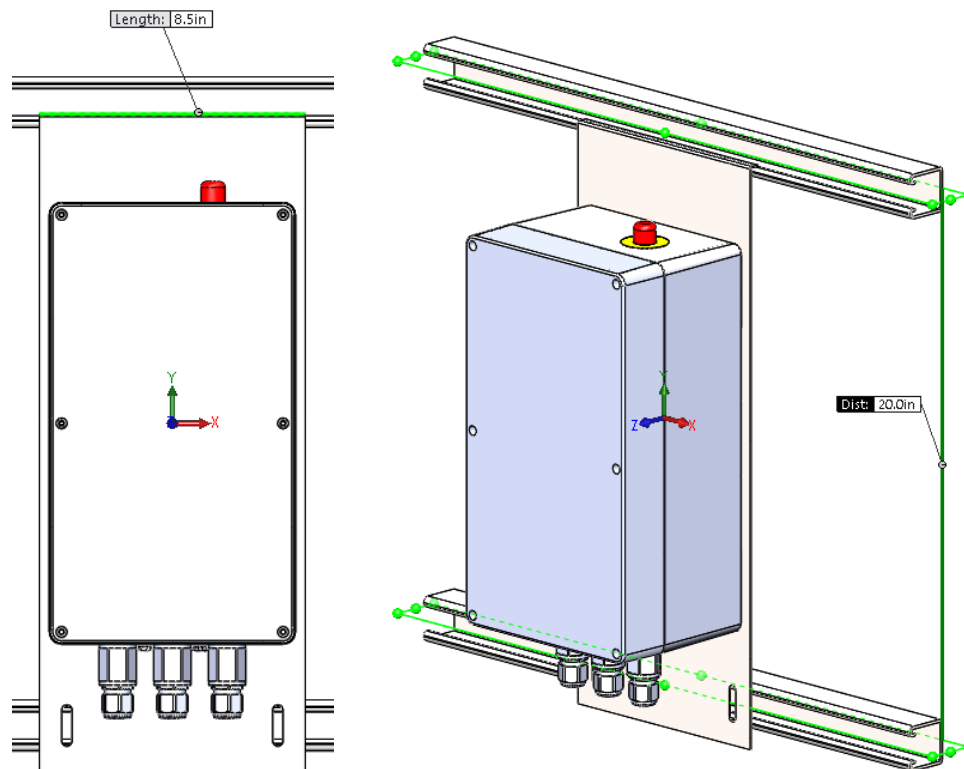


FIGURE 7: PODD MOUNTED ON UNISTRUT



A communication cable will be installed through the enclosure wall to connect the PODD to the SPOTs. A separate customer supplied connection will provide access to the customer designated network/SCADA system.

- Installation will require routing a CAT5 cable from inside the SPOT BOX to the PODD
- Drill hole to be used for routing CAT5 cable from inside cabinet
  - Cable grommet or RJ-45 bulkhead is customer supplied. Follow installation instructions as defined by device manufacturer.
- Install/route cable through BOX enclosure wall to connect to SPOTs at a later step



Access to this cable will be limited after installation of shelves and hardware



#### 4. Install Shelves into Enclosure

The SPOT/BOSS-BOX enclosure is shipped without shelves mounted on interior 19" Rack EIA frame



Drawing A-001051: Assembly, BOSS Box Enclosure with Shelves and Hardware

- Use a 9/16" socket to loosen enclosure rack supports (Figure 8) and position as shown in Figure 9.

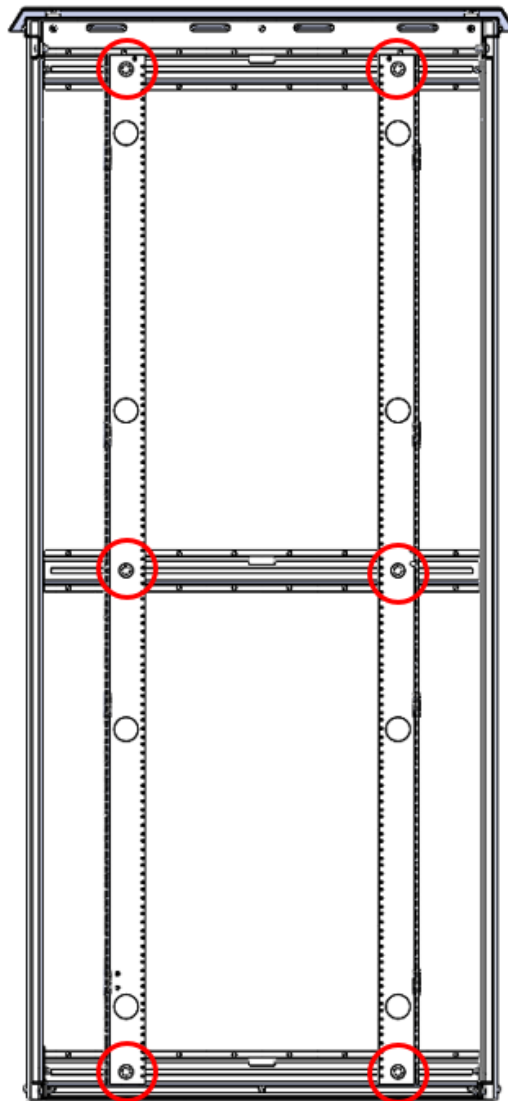


FIGURE 8: ENCLOSURE RACK SUPPORT MOUNTING BOLTS

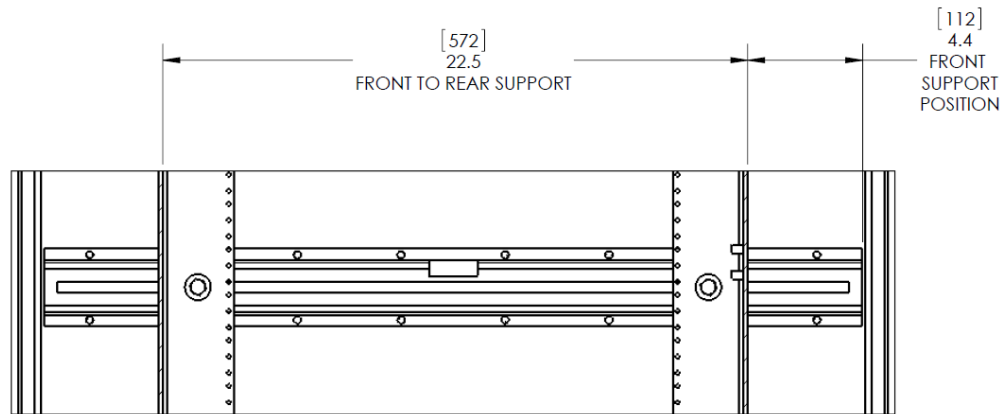


FIGURE 9: 19 INCH RACK POSITIONS INSIDE SPOT/BOSS-BOX ENCLOSURE

- Mount the shelves as depicted in Figure 10 and Table 1.
  - The EIA 19" rack rails are etched with RU numbers for simplified installation of equipment to a prescribed mounting location.
- Use (12) #10-32 x 1/2" Screws to mount each shelf (Figure 11).

SHELF LOCATION CHART	
<u>Shelf Orientation</u>	<u>Location (From Bottom)</u>
"U-Shape" Up	RU 34
"U-Shape" Up	RU 24
"U-Shape" Down	RU 20
"U-Shape" Up	RU 11
"U-Shape" Up	RU 01

Table 1: Shelf Location and Orientation



The shelf orientations are different between the Junction box and the SPOTs.



**FIGURE 10: SPOT/BOSS-BOX ENCLOSURE WITH SHELVES AND JBOX MOUNTED**



**FIGURE 11: TYPICAL SHELF MOUNTING WITH HARDWARE**





## 5. Unpacking SPOT/BOSS with FEED Units and Attaching Rack-mounting Brackets

- SPOT/BOSS with FEED units (here-on called 'SPOT/BOSS' units) shown in Figure 12 can be unpackaged and lifted onto a table or work bench to attach mounting brackets (Figure 13)
- Using (4) of the provided  $\frac{1}{4}$ "-20 x  $\frac{3}{4}$  Self Tapping-Type F Screws [P-005533], securely attach the left and right mounting brackets to the SPOT unit's side, so that 'wings' are flush to the front face

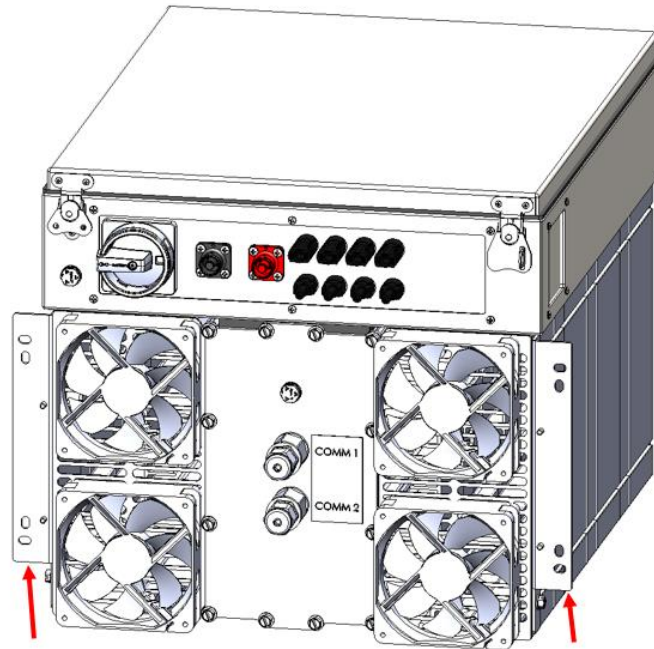


FIGURE 12: SPOT/BOSS WITH FEED AND MOUNTING BRACKETS

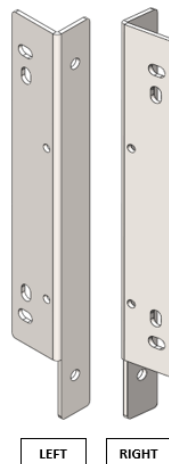


FIGURE 13: SPOT/BOSS RACK MOUNTING BRACKETS



## 6. Mounting SPOT/BOSS Units into Enclosure with Shelves

- SPOT/BOSS units can be lifted and placed one on each shelf in the SPOT/BOSS-BOX cabinet.
- SPOT/BOSS units have a designated place within the cabinet, denoted by a numbered label on the SPOT/BOSS front face which should be matched to the diagram in Figure 14
- Leave the top shelf of each rack unpopulated (Figure 14). This will be used for the Junction Box at a later step.
- Each SPOT/BOSS weighs upwards of 150lbs, to avoid injury or damage to the units, at least 2 able-bodied people should lift them into place, 3 people are recommended
- Use (4) #10-32 x 1/2" screws [P-006998] to secure each SPOT/BOSS unit to the rack through the mounting brackets.



FIGURE 14: SPOT PLACEMENT MAP



## 7. Mounting Junction Box into SPOT/BOSS-BOX Enclosure

- The Junction Box will be placed in the middle of the rack inside the enclosure, above SPOT/BOSS #3 shown in Figure 14.
- Carefully place the Junction Box on the shelf. The shelf is inverted, and there is a lip on the front that the Box must clear in order to set flat on the shelf.
- Use (6) #10-32 x 1/2" screws [P-006998] to secure each SPOT/BOSS unit to the rack through the mounting brackets (Figure 15).

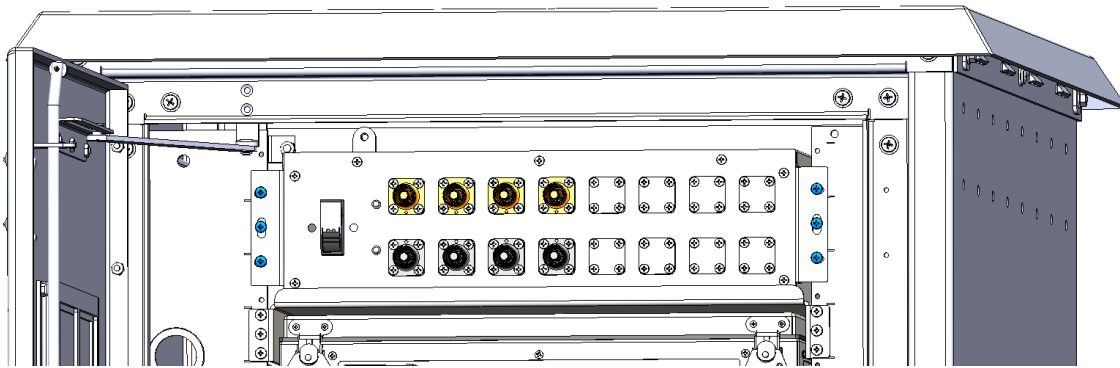


FIGURE 15: JUNCTION BOX LOCATION WITH MOUNTING HARDWARE

## 8. Cabinet Wiring Modalities

There are two different wiring configurations:

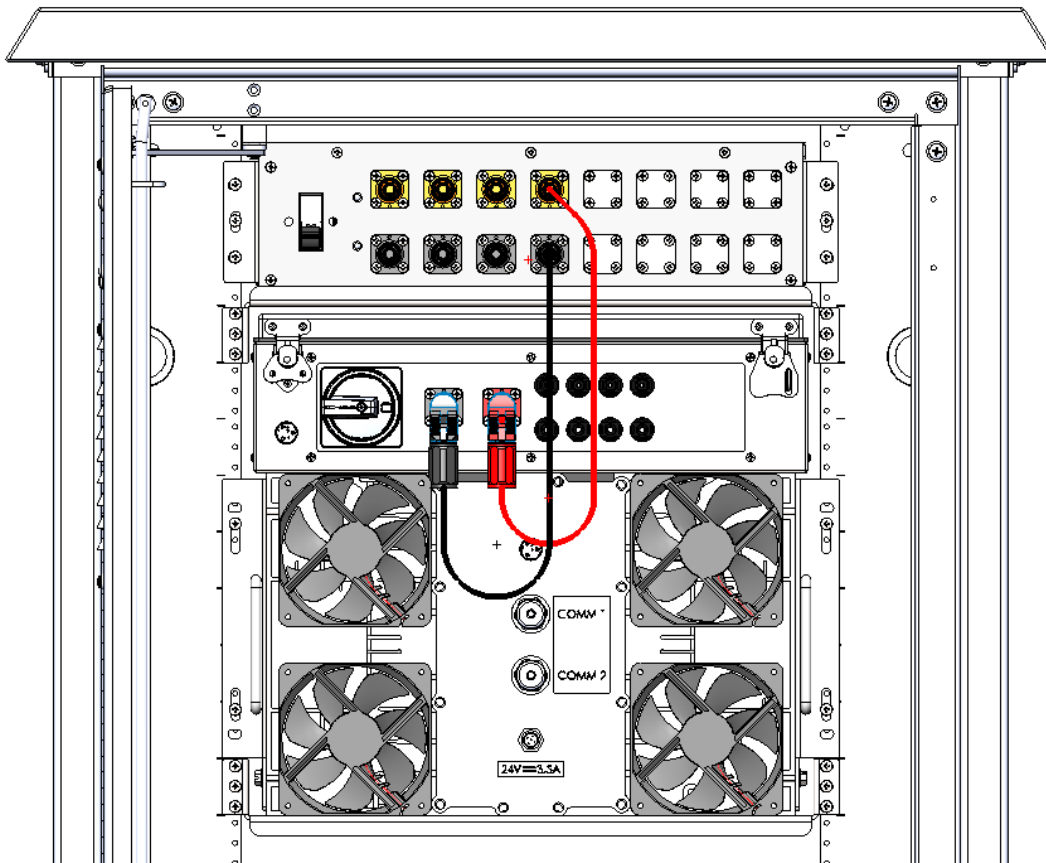
- 8.a. Combined Primary (Input) and Distributed Secondary (Output) Connect Surlok cables from Junction Box to Primary (Input) FEED Connections
- Connect Amphenol Cables from PV Strings to Secondary (Output) FEED Connections
- Connect Customer Primary (Input) and Ground Cables to Junction Box
- 8.b. Combined Primary (Input) and Combined Secondary (Output) Connect Surlok cables from Junction Box to Primary (Input) FEED Connections
- Connect Surlok cables from Junction Box to Secondary (Output) FEED Connections
- Connect Customer Primary (Input), Secondary (Output), and Ground Cables to Junction Box



## 8.a. Combined Primary (Input) and Distributed Secondary (Output)

### 8.a.i. Connect Surlok cables from Junction Box to Primary (Input) FEED Connections

- (8) SurLok cables are used to connect Primary (Input) connectors on each FEED unit to the junction box.
- Working from right to left on the junction box:
  - connect [black] ground on the junction box to [black] ground on the FEEDs' Primary (Input) connector
  - Connect [orange] positive on the junction box to [red] positive on the FEEDs' Primary (Input) connector
- Secure all cables appropriately to left side stanchion after installation.
- (2) 1.5-foot SurLok Cables for SPOT #1 shown in Figure 16.
  - Routed direct from junction box to FEED #1



**FIGURE 16: SURLOK CABLING ROUTED TO PRIMARY (INPUT) ON FEED #1**



- (2) 5-foot SurLok Cables for SPOT #2 shown in Figure 17.
  - Routed along left side stanchion

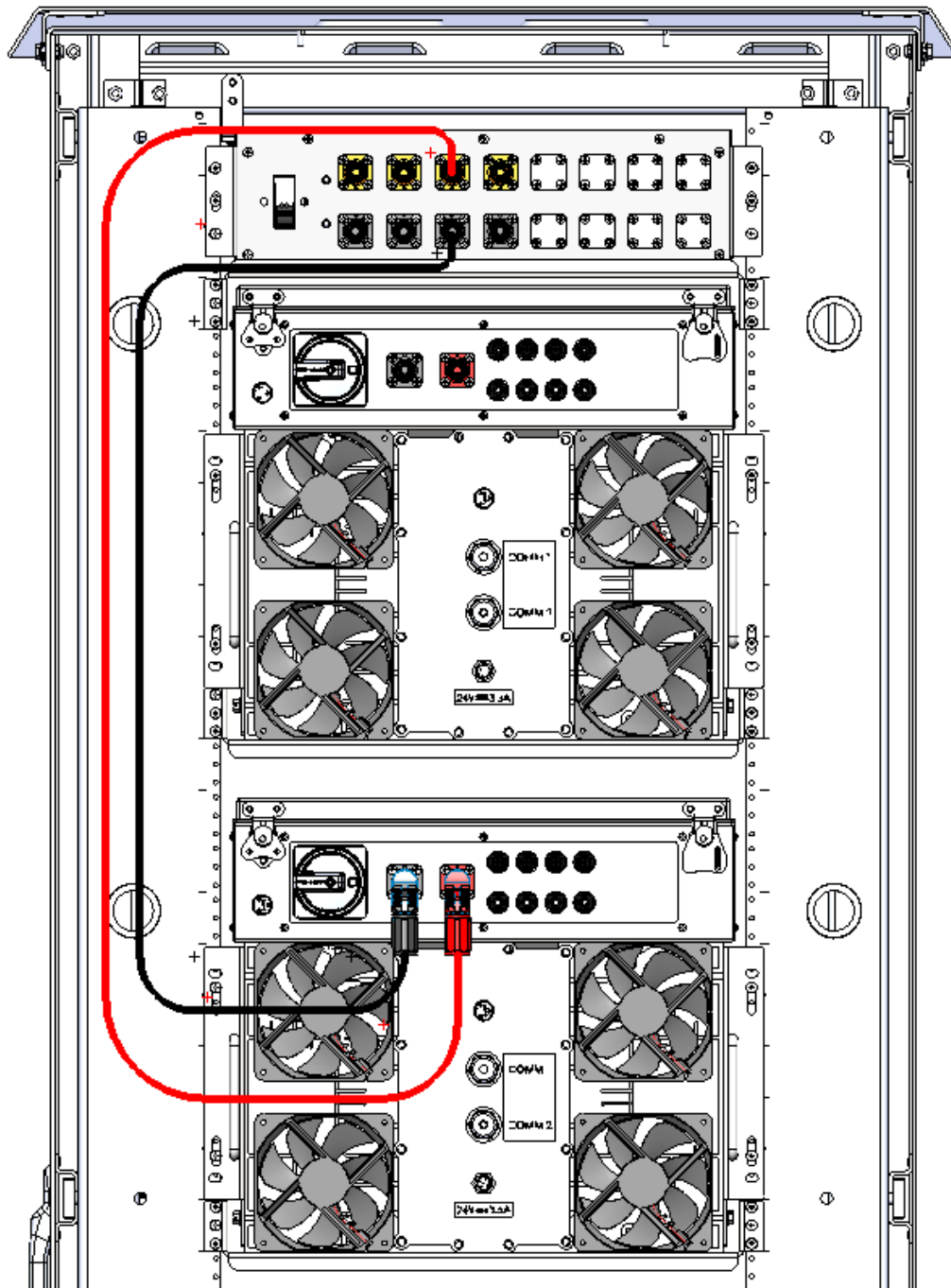


FIGURE 17: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #2



- (2) 6.5-foot SurLok Cables for SPOT #3 shown in Figure 18.
  - Routed along left side stanchion

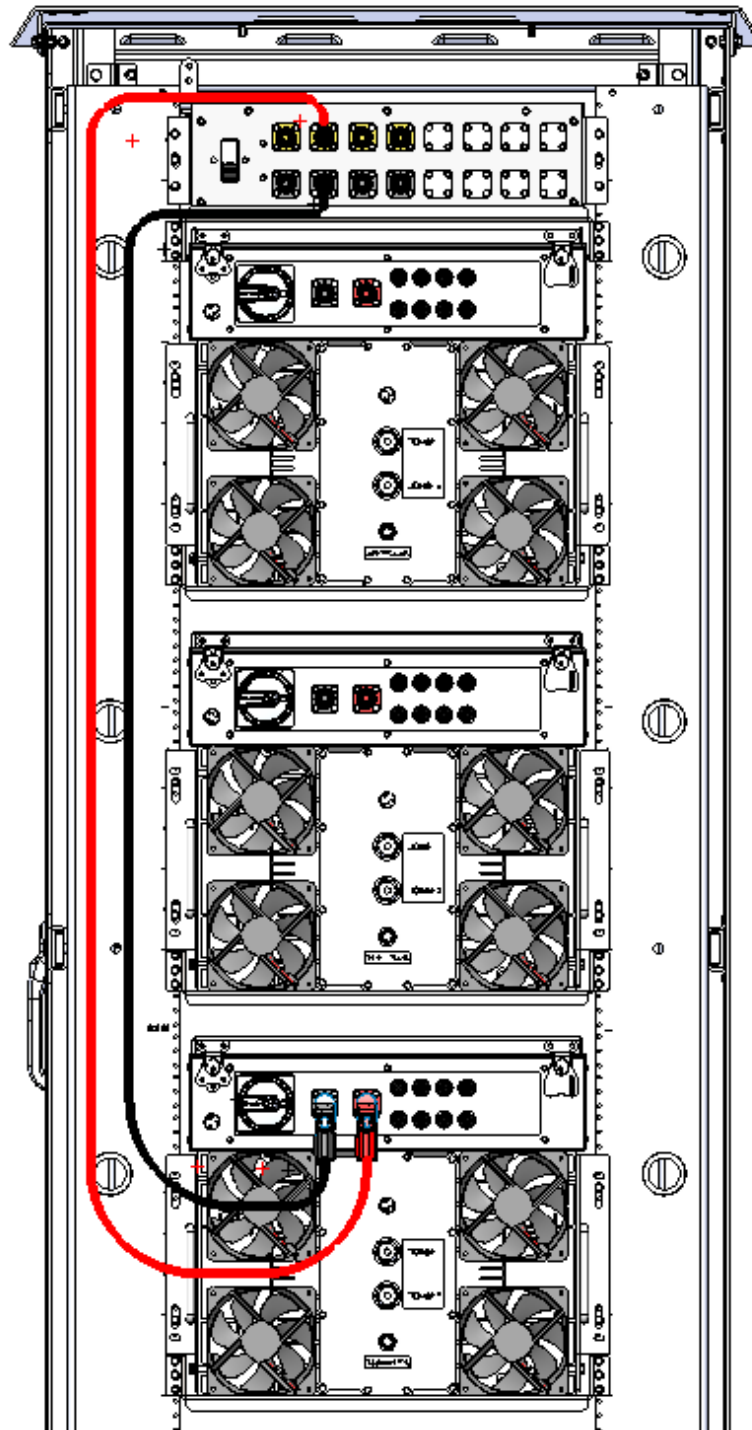


FIGURE 18: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #3



- (2) 8-foot SurLok Cables for SPOT #4 shown in Figure 19.
  - Routed along left side stanchion

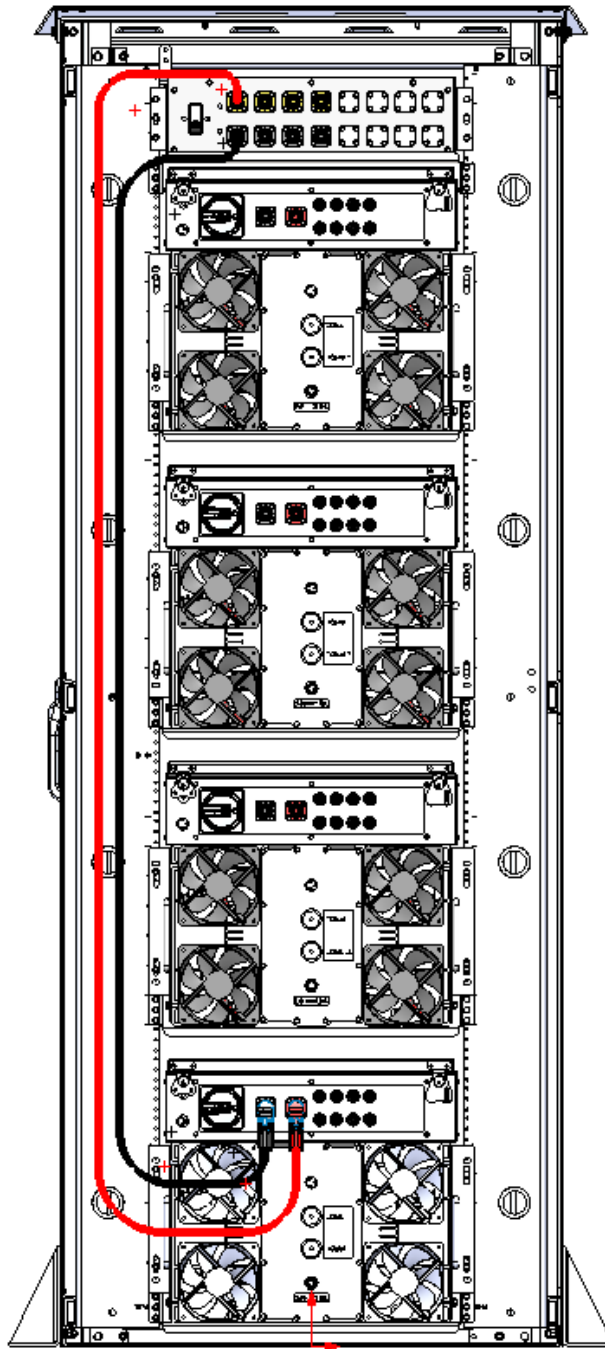


FIGURE 19: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #4



DO NOT zip-tie the cables too tightly or bend around sharp edges as it may cause breaks in the cable insulation, which could lead to leakage currents, arcing or ground-faults





8.a.ii. Connect Amphenol Cables from PV Strings to Secondary (Output) FEED Connections

- Cables that connect to SPOT PV connections will be routed from Customer facility
- Beginning with FEED #1, connect customer cabling to PV connectors
  - Route all PV wires along right-side rack stanchion as shown in Figure 20.
- Connect PV cables to FEED #2, FEED #3, and FEED #4
- Use zip-ties or Velcro tape to secure the cables to the right stanchion.

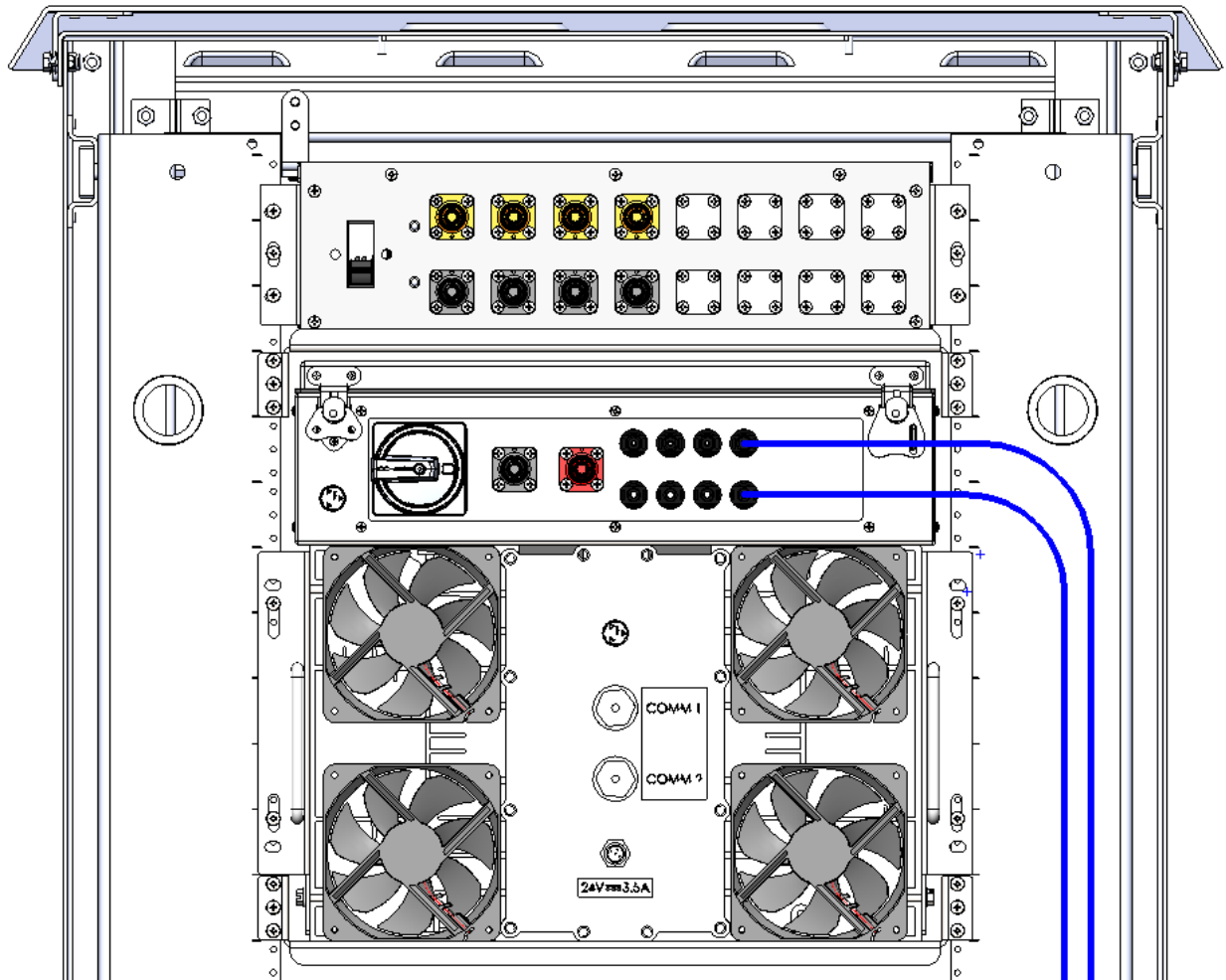


FIGURE 20: PV CABLE ROUTING TO SECONDARY (OUTPUT) AMPHENOL'S ON FEED #1



**DO NOT** zip-tie the cables too tightly or bend around sharp edges as it may cause breaks in the cable insulation, which could lead to leakage currents, arcing or ground-faults





8.a.iii. Connect Customer Primary (Input) and Ground Cables to Junction Box



Ensure all cables are disconnected from power before handling

- The Rebling terminals on the junction box require a cable lug with an M8 clearance ID
- Connect customer Primary (Input) cables and ground cables to Rebling connectors on rear of Junction Box shown in Figure 21.
  - The positive lead connects to 1 of the terminals on the top row (red line)
  - The negative lead connects to 1 of the terminals on the bottom row (black line)
  - The system ground connects to the terminal on the right side (green line)
- Tighten each Rebling terminal with a 13mm socket.
- Make sure each lug is secured and secure the cable appropriately as routed to conduit.

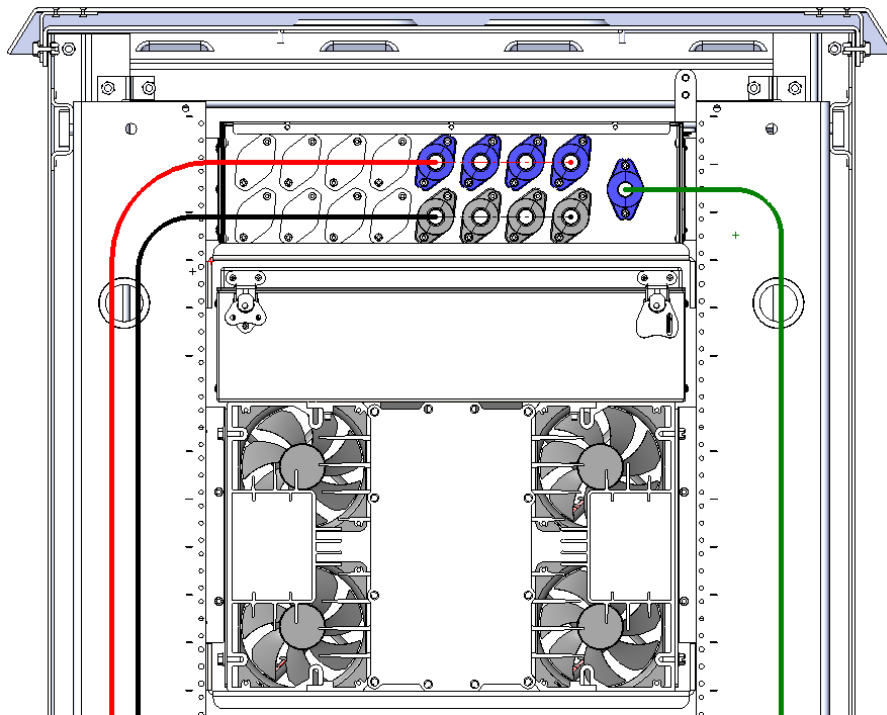


FIGURE 21: REAR VIEW OF CUSTOMER CONNECTIONS TO PRIMARY (INPUT) ON JUNCTION BOX



## 8.b. Combined Primary (Input) and Combined Secondary (Output)

### 8.b.i. Connect Surlok cables from Junction Box to Primary (Input) FEED Connections

- (8) SurLok cables are used to connect Primary (Input) connectors on each FEED unit to the junction box.
- Working from right to left on the junction box:
  - connect [black] ground on the junction box to [black] ground on the FEEDs' Primary (Input) connector
  - Connect [orange] positive on the junction box to [red] positive on the FEEDs' Primary (Input) connector
- Secure all cables appropriately to left side stanchion after installation.
- (2) 1.5-foot SurLok Cables for SPOT #1 shown in Figure 22.
  - Routed direct from junction box to FEED #1

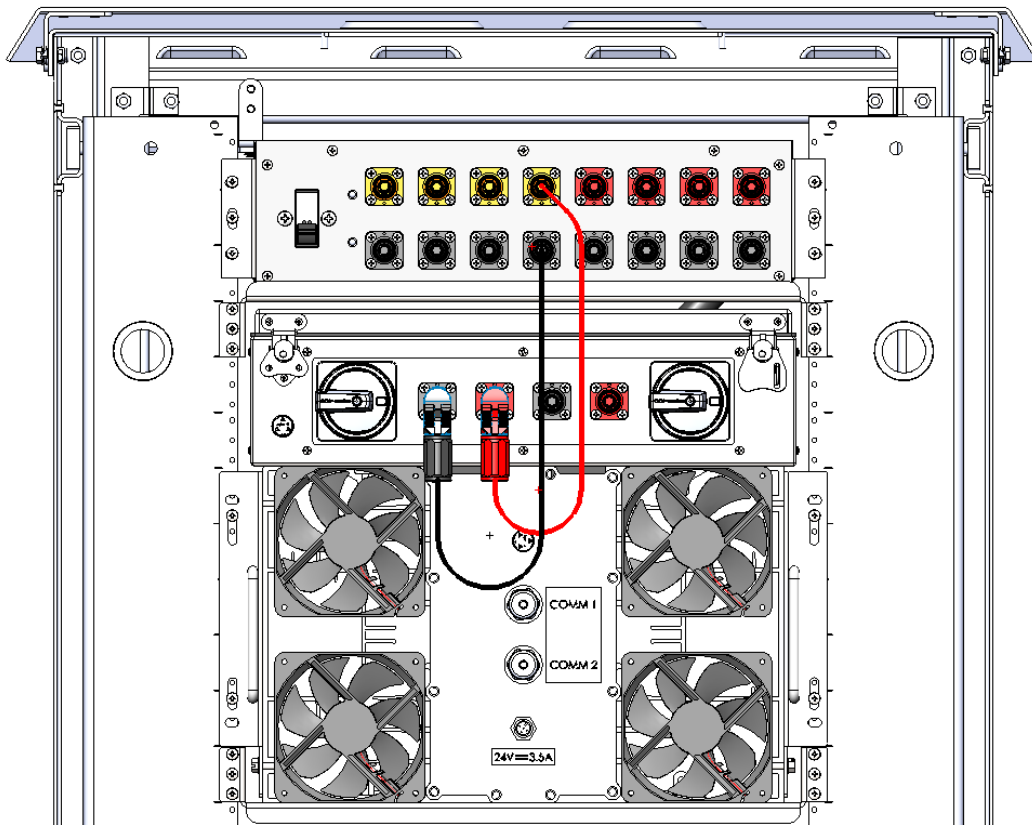


FIGURE 22: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #1



- (2) 5-foot SurLok Cables for SPOT #2 shown in Figure 23.
  - Routed along left side stanchion

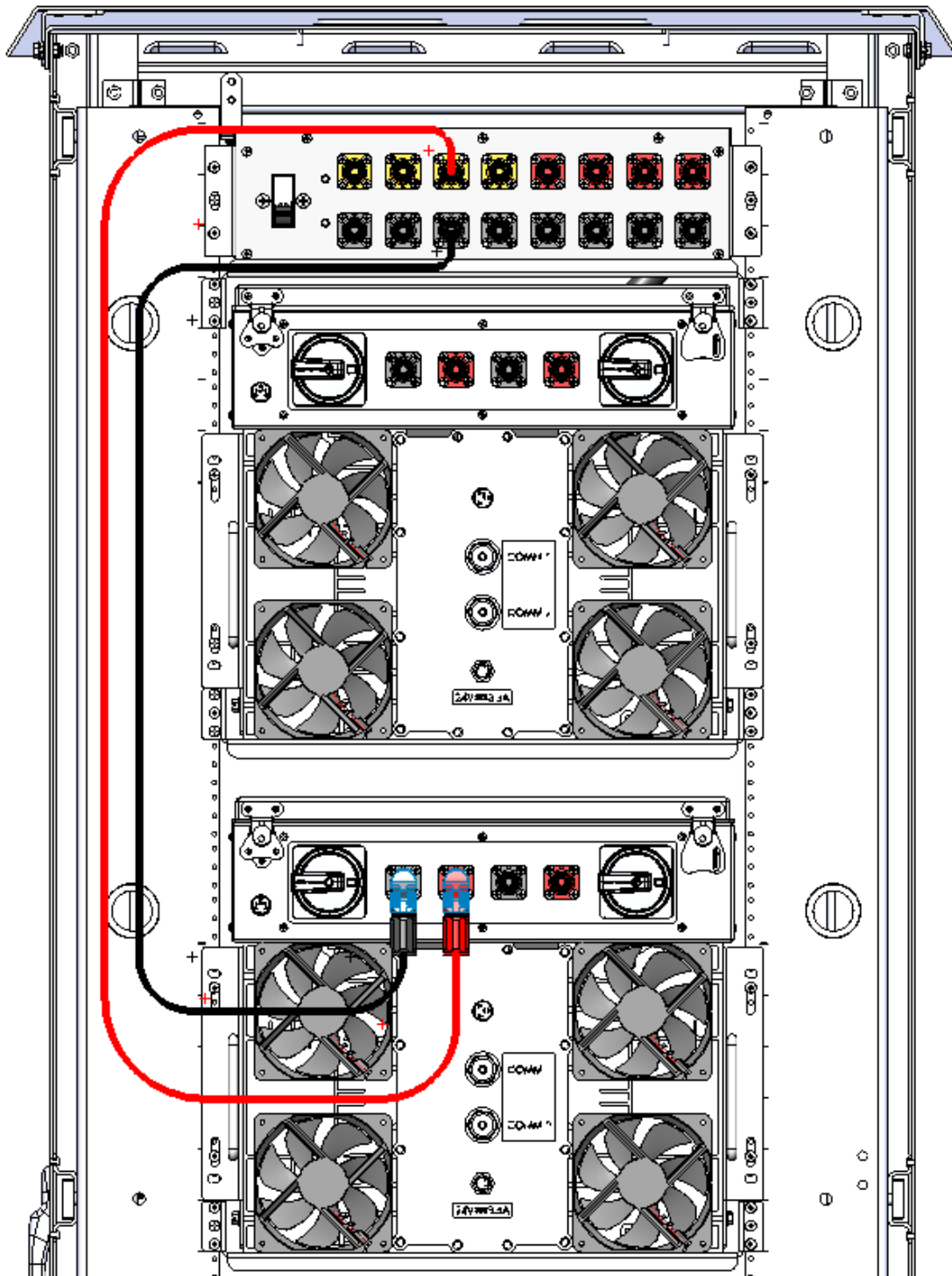


FIGURE 23: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #2



- (2) 6.5-foot SurLok Cables for SPOT #3 shown in Figure 24.
  - Routed along left side stanchion

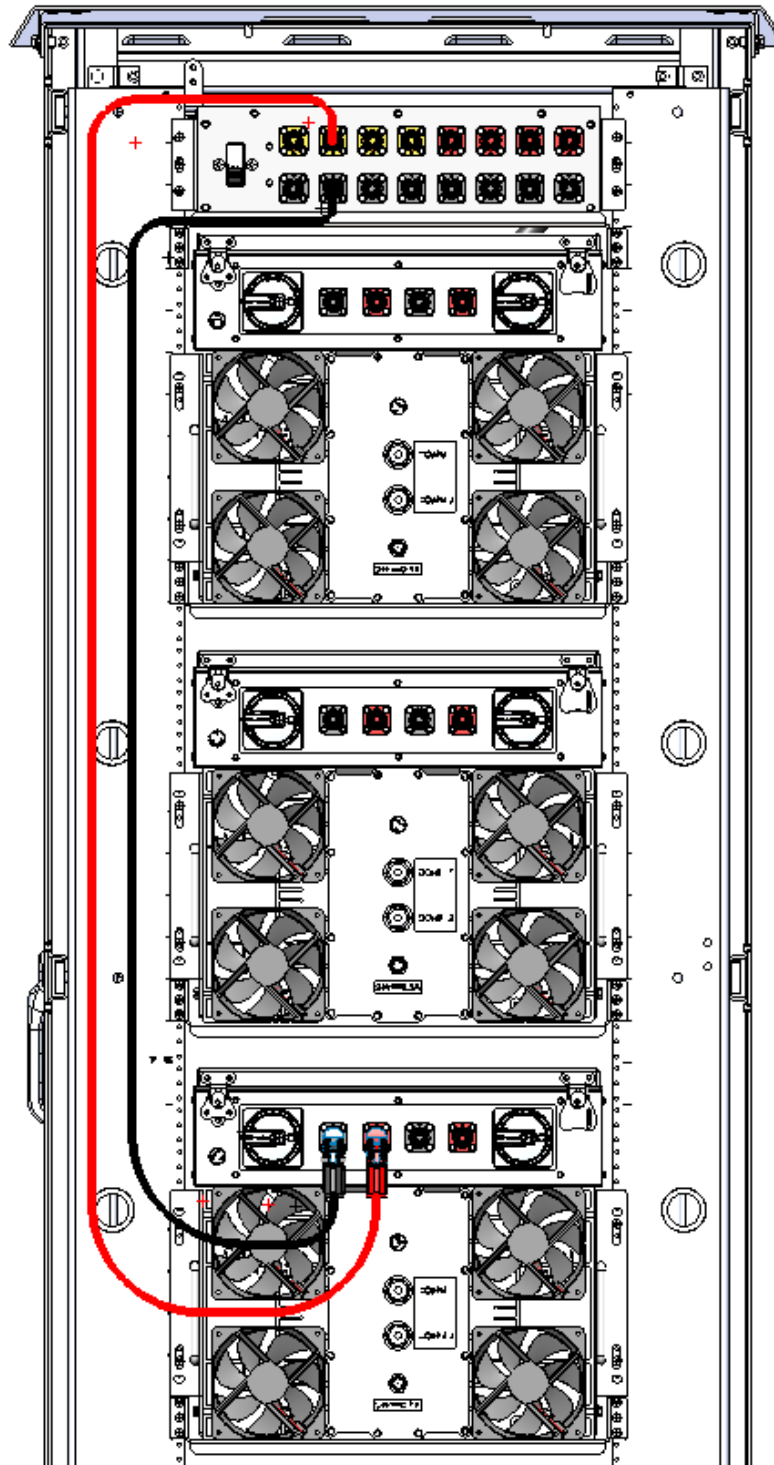


FIGURE 24: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #3



- (2) 8-foot SurLok Cables for SPOT #4 shown in Figure 25.
  - Routed along left side stanchion

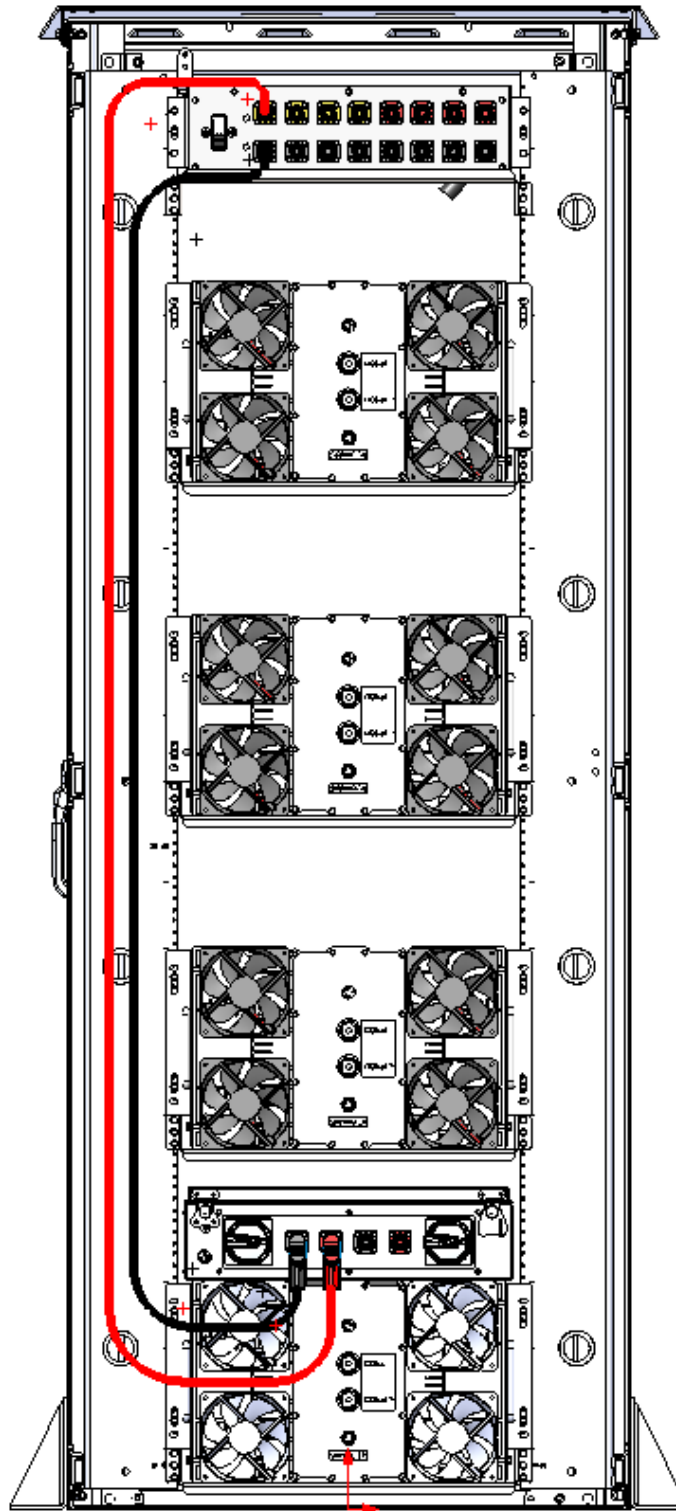


FIGURE 25: SURLOK CABLING ROUTED TO PRIMARY (INPUT) FEED #4



8.b.ii. Connect Surlok cables from Junction Box to Secondary (Output) FEED Connections

- (8) SurLok cables are used to connect Secondary (Output) connectors on each FEED unit to the junction box.
- Working from left to right on the junction box:
  - Connect [black] ground on the junction box to [black] ground on the FEEDs' Secondary (Output) connector
  - Connect [red] positive on the junction box to [red] positive on the FEEDs' Secondary (Output) connector
- Secure all cables appropriately to left side stanchion after installation.
- (2) 1.5-foot SurLok Cables for SPOT #1 shown in Figure 26.
  - Routed direct from junction box to FEED #1

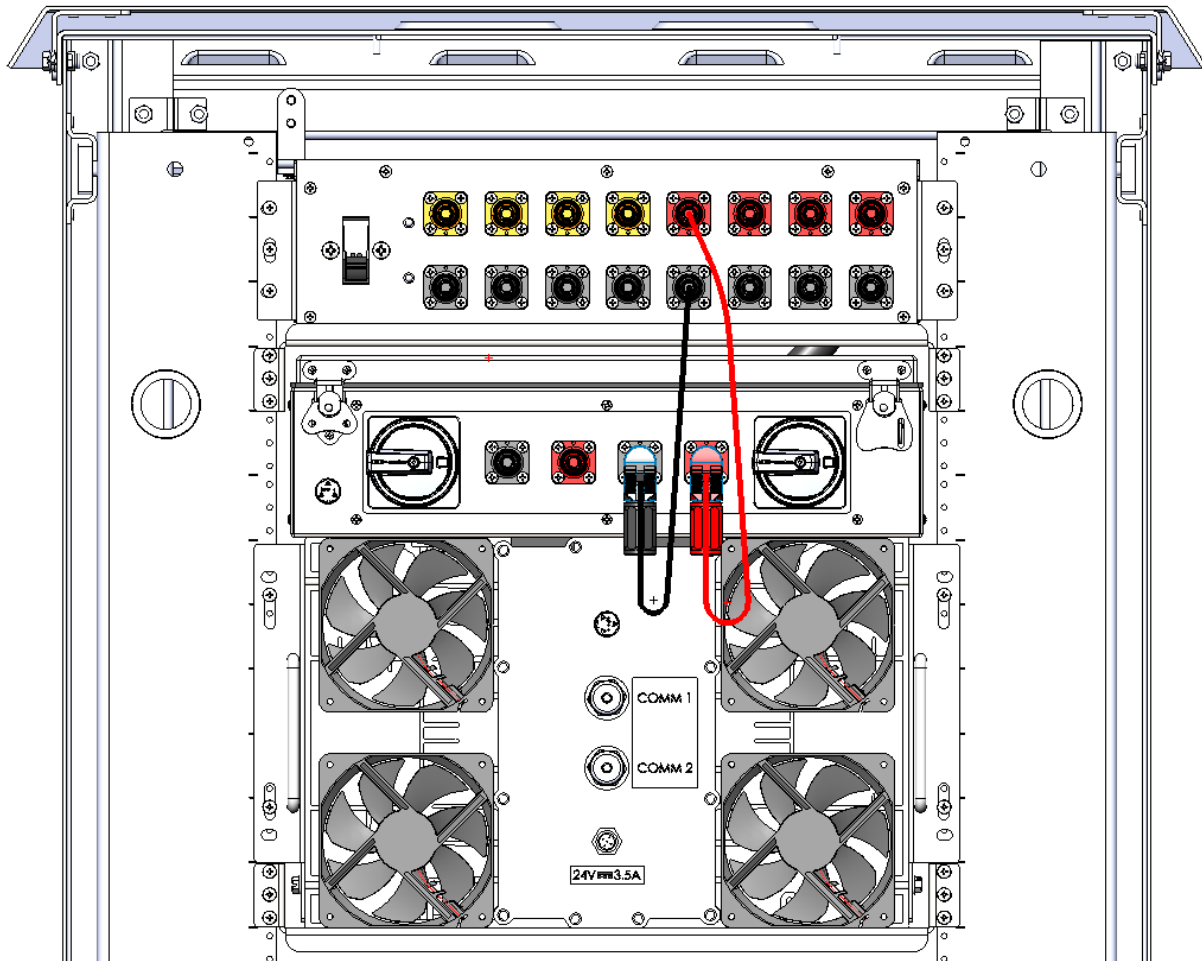


FIGURE 26: SURLOK CABLING ROUTED TO SECONDARY (OUTPUT) FEED #1



- (2) 5-foot SurLok Cables for SPOT #2 shown in Figure 27.
  - Routed along right-side stanchion

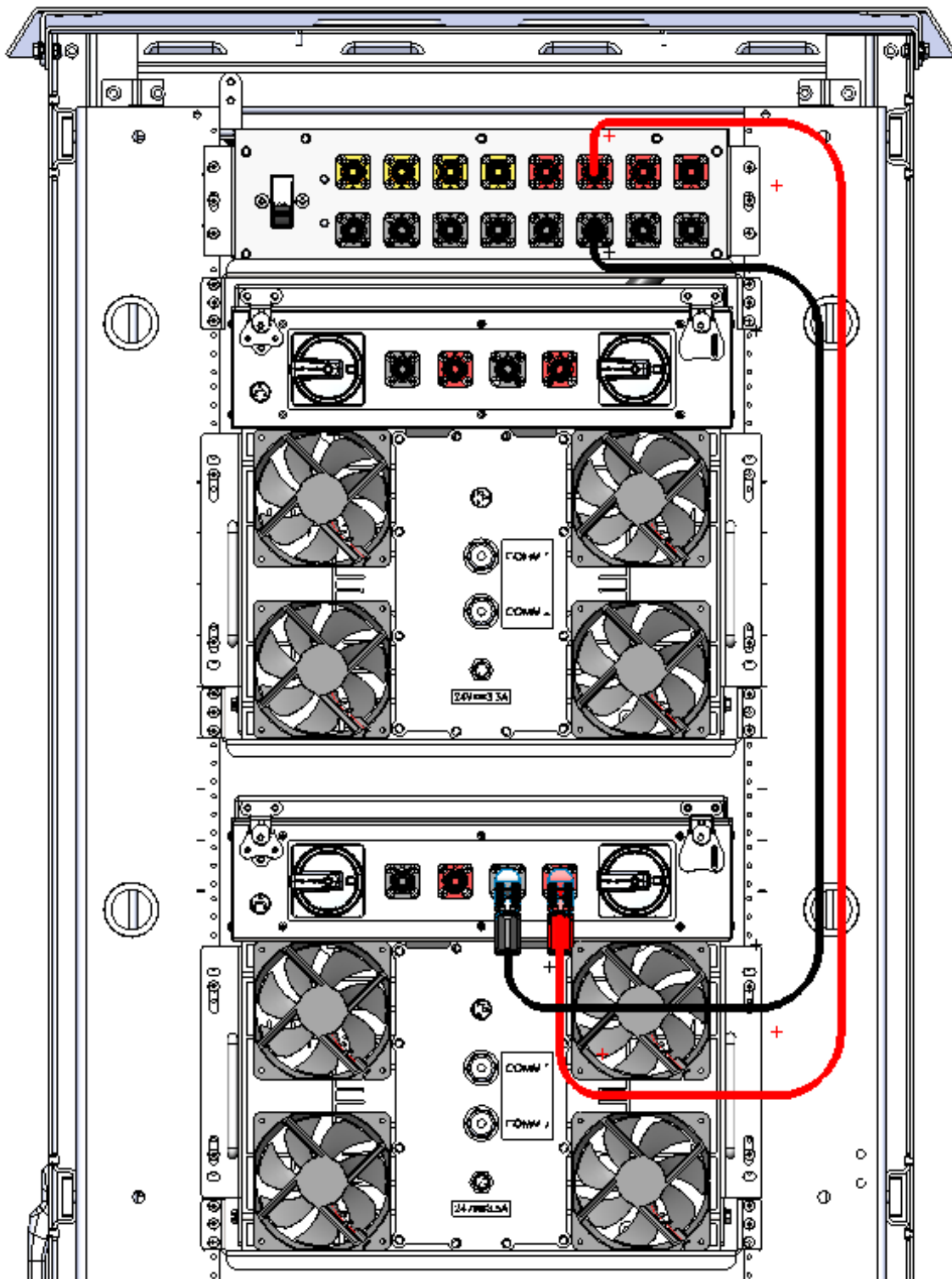


FIGURE 27: SURLOK CABLING ROUTED TO SECONDARY (OUTPUT) FEED #2





- (2) 6.5-foot SurLok Cables for SPOT #3 shown in Figure 28.
  - Routed along right-side stanchion

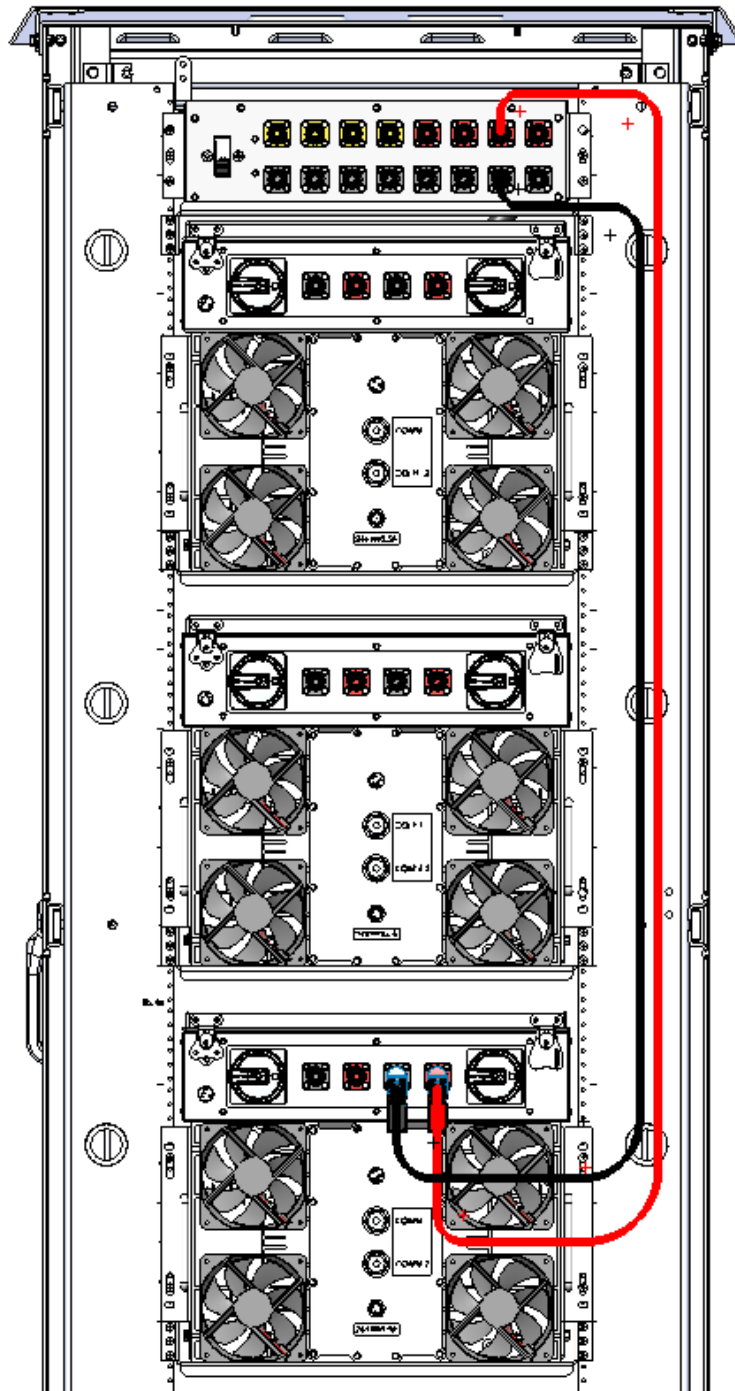


FIGURE 28: SURLOK CABLING ROUTED TO SECONDARY (OUTPUT) FEED #3





- (2) 8-foot SurLok Cables for SPOT #4 shown in Figure 29.
  - Routed along right-side stanchion

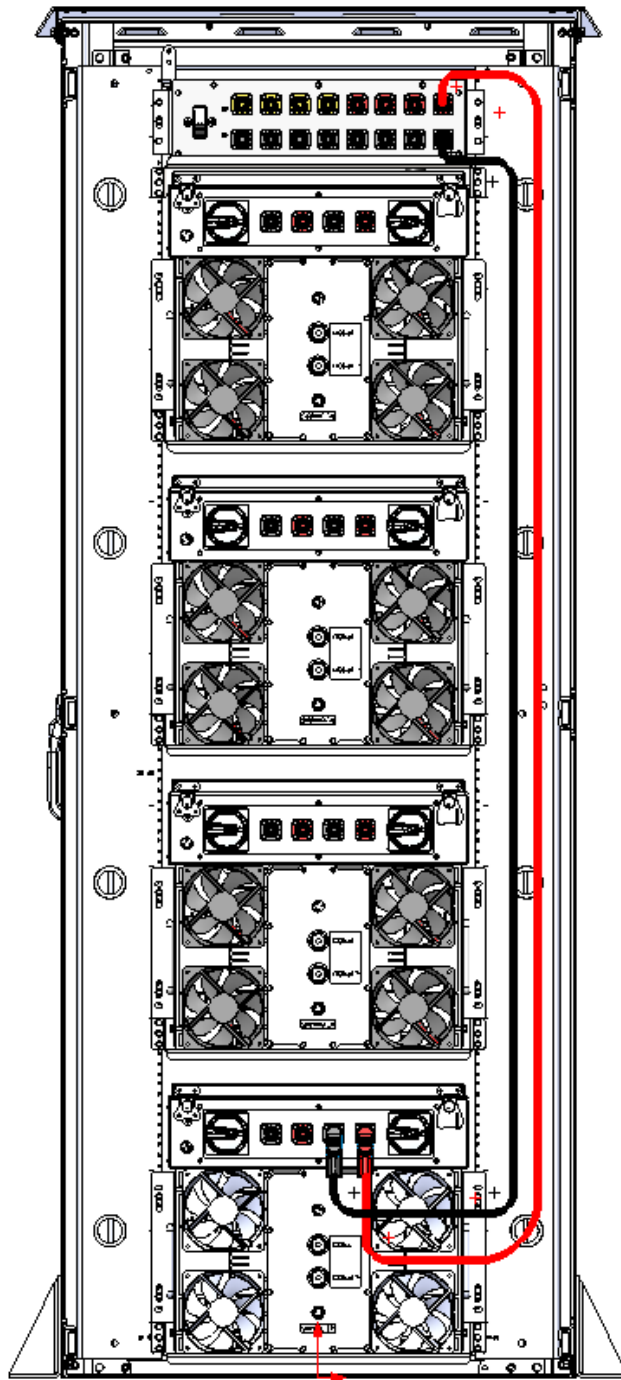


FIGURE 29: SURLOK CABLING ROUTED TO SECONDARY (OUTPUT) FEED #4



8.b.iii. Connect Customer Primary (Input), Secondary (Output), and Ground Cables to Junction Box

 Ensure all cables are disconnected from power before handling

- The Rebling terminals on the junction box require a cable lug with an M8 clearance ID
- Rebling terminals support a maximum 4/0 AWG cable when the safety cover is used and maximum 350 KCMIL gauge when the connection is left bare.
- Tighten each Rebling terminal with a 13mm socket.
- Make sure each lug is secured and secure the cable appropriately as routed to conduit.

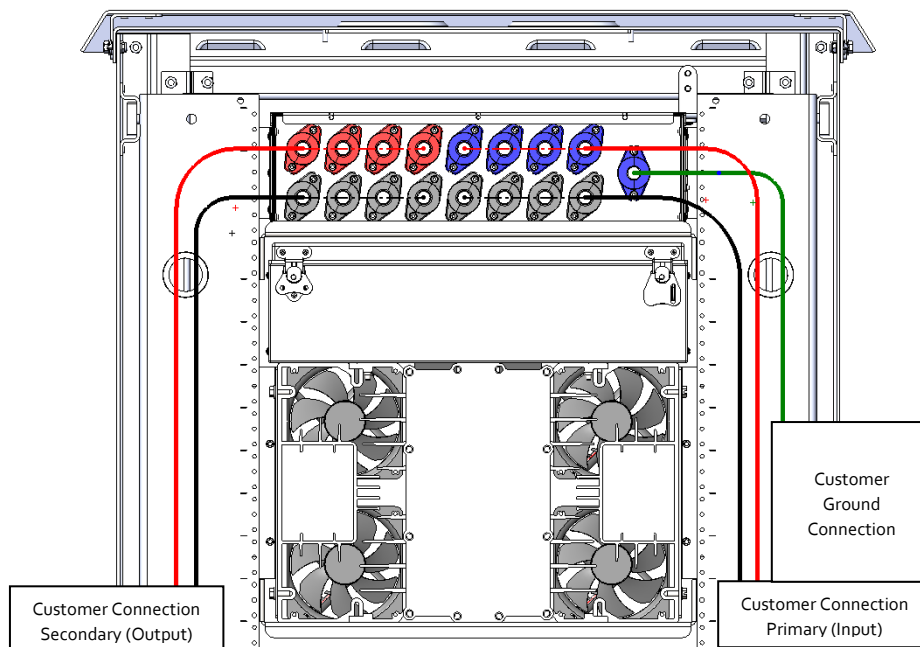


FIGURE 30: REAR VIEW OF CUSTOMER CONNECTIONS TO JUNCTION BOX

- Connect Customer Primary (Input) cables (Figure 30)
  - Customer Primary (Input) Positive lead connects to one of the blue Rebling terminals on the top right of the junction box
    - (Red line routed to the right)
  - Customer Primary (Input) Negative lead connects to one of the black Rebling terminals on the bottom right of the junction box
    - (Black line routed to the right)
- Connect Customer Secondary (Output) cables (Figure 30)
  - Customer Secondary (Output) Positive lead connects to one of the red Rebling terminals on the top left of the junction box



- (Red line routed to the left)
- Customer Secondary (Output) Negative lead connects to one of the black Rebling terminals on the bottom left of the junction box
- (Black line routed to the left)
- Connect Customer Ground Cable (Figure 30)
  - The system ground connects to the blue Rebling terminal centered vertically on the right side
  - (Green line routed to the right)

## 9. Wiring Communication Cables to PODD

SPOT/BOSS-BOX communications run through CAT5 cables that connect all SPOT units to the PODD (Figure 31: RJ-45 Daisy Chain)

- Connect the (4) SPOT units inside the box using (3) 2-foot CAT5 cables with RJ-45 STP connectors.
  - These cable runs should be internal to the cabinet.
- One end of the SPOT unit daisy chain will be connected to the PODD
  - Connect the 6-foot long CAT5 cable installed through the enclosure wall in Section 3 to the SPOT.
- The other end of the SPOT communication daisy chain will be terminated using the provided RJ-45 Termination Dongle.

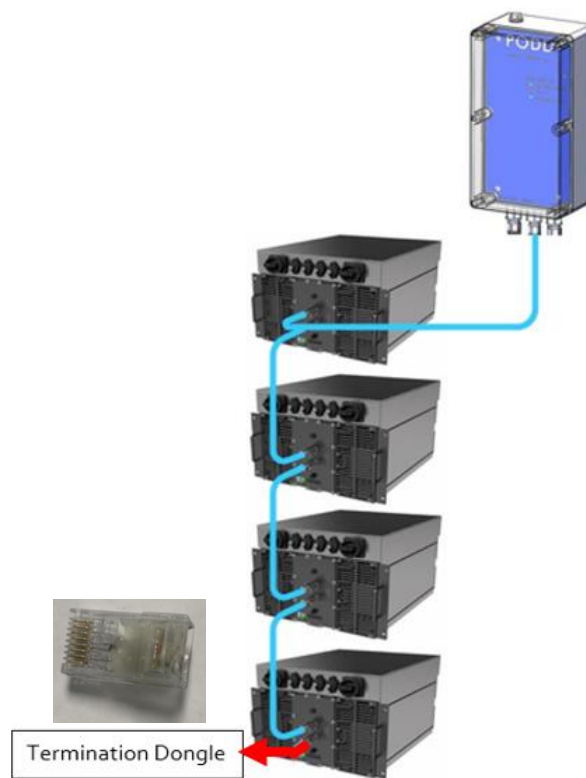


FIGURE 31: RJ-45 DAISY CHAIN



- Communication cables can be connected to the PODD without removing the clear cover on the PODD enclosure.
- To connect a communication cable to a PODD RJ-45 ECS connectors (Figure 32):
  - First remove the waterproof cap and grommet
  - Then feed the cable through the removed cap and grommet
  - Finally, replace the cap and grommet, tightening to reseal the port



FIGURE 32: PODD WIRING



It is important to carefully reinstall the cap without damaging the plastic thread

- Connect communication cables to the PODD:
  - The 6-foot CAT5 cable installed through the enclosure wall in Section 3 will be plugged into the PODD's "ModbusRTU" port
  - Customer Facility connections can be made to the WAN port.



## Grounding

### PODD Grounding

- The external ground lug is found next to the three RJ-45 connectors on the bottom of the PODD (Figure 33)
- Bare copper cable without insulation can be used to connect the lug to earth ground
- This MUST be connected to Earth ground. Not properly grounding the PODD can cause the PODD to malfunction and be damaged



FIGURE 33: PODD DEVICE GROUNDING

### Cabinet and Rack Grounding

- Main earth ground must be connected to the cabinet chassis.
- Ensure all components of the cabinet are grounded:
  - Main enclosure
  - 19" Rack frame
  - Both front and rear doors
- Paint at the grounding points should be scraped away to ensure best possible contact between conductors

### SPOT/BOSS Grounding

- The SPOT chassis ground lug connections can be found near the upper right corner of the SPOT units (Figure 34)
- Bare copper cable without insulation can be used to connect the ground lugs together and to the earth ground
- These MUST be connected to Earth ground. Not properly grounding the SPOT can be dangerous for SPOT/BOSS-BOX operators



FIGURE 34: SPOT UNIT GROUNDING



## Optional: BOX Door Modification

### Purpose

Temperature increases within the BOX are liable to derate the power equipment and reduce system efficiency. Given that the cabinet is a weather rated enclosure, optional modifications have been specified to improve airflow through the cabinet and allow for better heat dissipation.

This is typically necessary in warm climates and deployments where special considerations for temperature are warranted. Please contact Alencon Systems for more information and/or assistance in deciding to include this option with your BOX system.



FIGURE 35: BOX CABINET WITH DOOR HOOD MODIFICATION



### Modification Criteria

Only skilled professionals with experience using heavy duty power tools should perform modification of the SPOT/BOSS-BOX. Instructions should be followed exactly; improper modification of the cabinet could void the warranty of the SPOT/BOSS-BOX and any or all its component parts.

If any instructions are unclear, or additional information is required during the process, please contact Alencon Systems LLC for assistance, see Appendix C.

### Required Tools List:

- Reciprocating Saw
- Straight Die Grinder
- Metal Hand File
- Adjustable Wrench
- Phillips Screwdriver
- Center Punch
- Power Drill with 5/32-inch bit
- Small Flathead Screwdriver

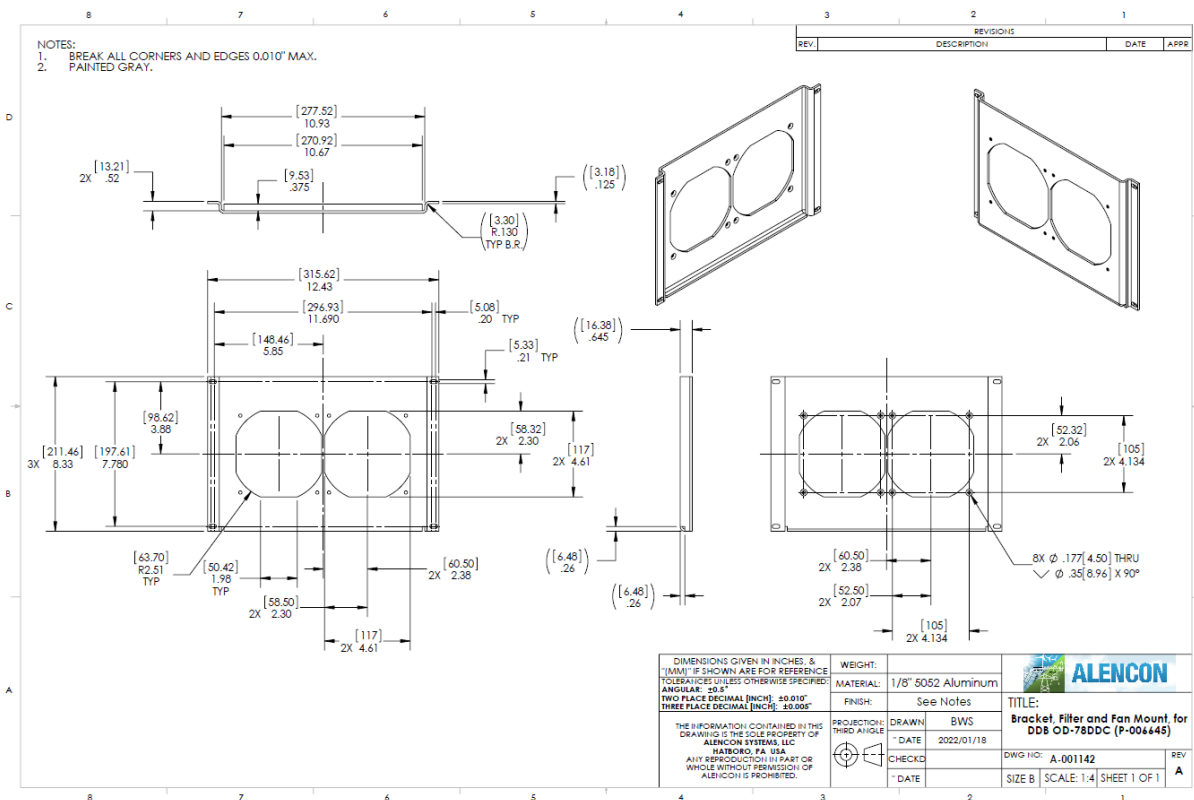
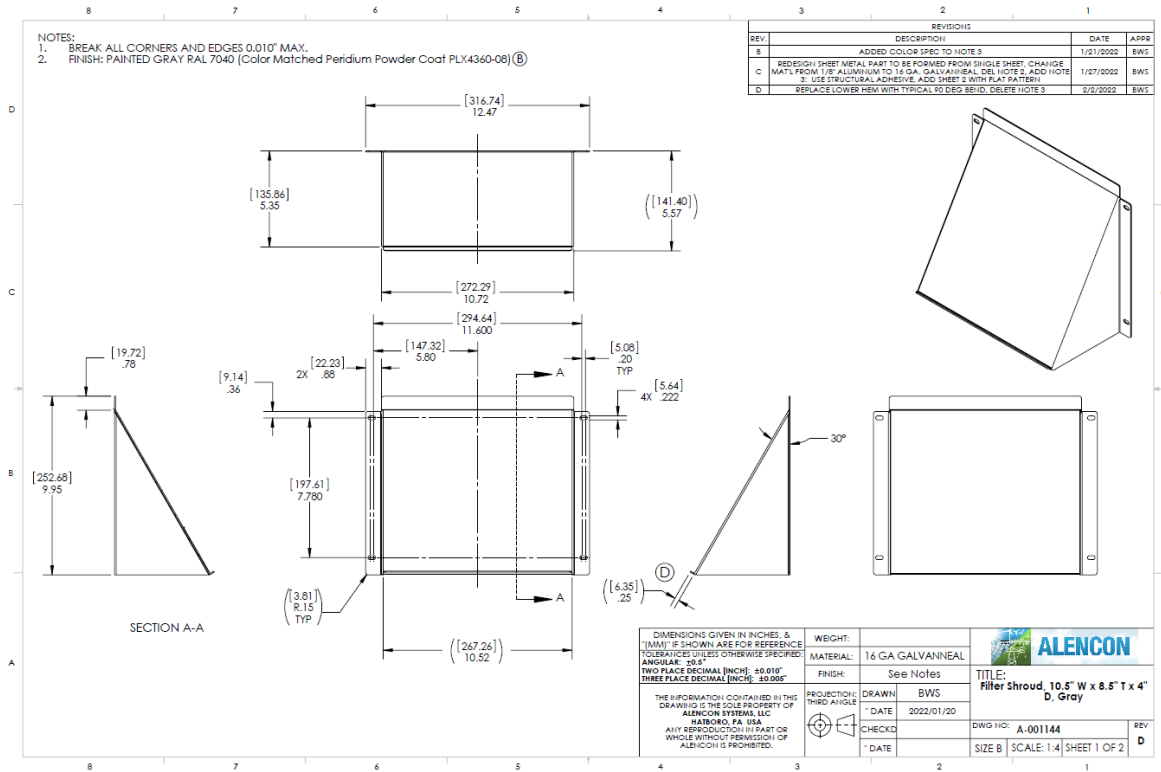
### Additional Supplies:

- Clear Silicone Caulk
- Masking tape
- Sharpie pen
- Zip-ties, plastic mounts, and/or Velcro tape for cable management

### Deliverables – Bill of Materials

The necessary additional components for the BOX door modification are as follows:

- 8 Door Hoods (see figure 36)
- 4 Fan plates with 2 fans each installed (see figure 37)
- Cable harness for fan power
- Mornsun PV200-27B24 Power Supply (with mounting hardware and pre-made cables)







## Modification Procedure:

### 1. Removing Internal Filter Plates

- On the inside of front and rear doors, there are filter plates lined up behind each panel of louvers (see figure 38).
- Use a Phillips screwdriver to remove 4 corner bolts from each filter plate and remove all 8 filter plates.
- 4 rear door filter plates and all 8 filters will be reinstalled later so make sure to store them safely along with the mounting hardware.



**FIGURE 38: BOX CABINET WITH EXTERNAL LOUVER PANELS AND INTERNAL FILTER PLATES**

### 2. Measure Cut-outs

- Use masking tape to cover the cutting area around each louver panel from the inside of the cabinet door.
- Re-attach the front door filter plates backwards over the masking tape cover, so that the window is flush to the door (see figure 39).
- Use permanent black marker to mark the internal perimeter of the filter plate window on the masking tape beneath.
- Repeat this for all 8 louver panels on both cabinet doors (see figure 40).



# Alencon SPOT/BOSS BOX + Junction Box Installation Manual



FIGURE 39: FILTER PLATE BACKWARDS FOR STENCIL

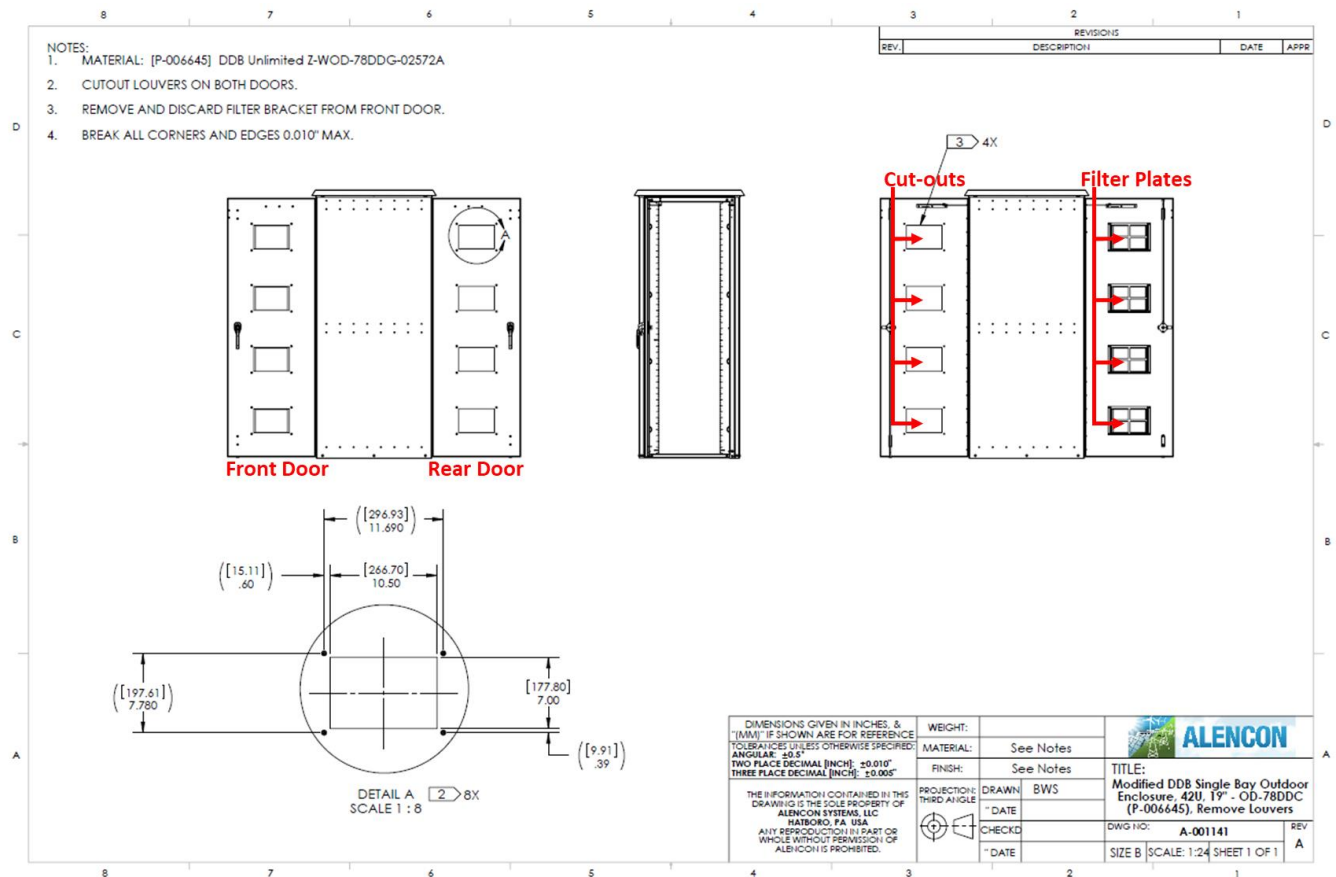


FIGURE 40: BOX CABINET INTERNAL FILTER PLATES AND CUT-OUTS



### 3. Cut-out Door Louvers

- Use the straight die grinder to make a primary incision on each of 4 cuts as marked by the black marker stencil on the masking tape (see video @ [YouTube](#)).
- Use a reciprocating saw to follow the black marker stencil and make 4 straight cuts out of the door (see video @ [YouTube](#)).
  - **Note:** Despite what is shown on the referenced videos, cuts should be made from the inside of the cabinet doors to avoid scratching the outside of the cabinet and damaging the coating.
- Louver panels can be pushed out of the door after 4 cuts are complete.
- A metal hand file should be used to smooth the edges of each window cut-out to avoid injury resulting from sharp edges.
- Repeat this process for all 8 louver panels on front and rear doors.

### 4. Install Filter Plates and Hoods (Rear Door)

- Place a hood on the door exterior and line up the 4 corner holes to the bolt holes on the door.
- Hardware that was placed to the side in step 1 can be used to fasten the hoods, and filter plates back on to the door (see figure 41), filter plate should have bottom bracket down to hold the filter in place.
- Filter can be set in place before the plate is fastened or can slide in after, gasket side should be oriented towards the door.
- Repeat to cover all 4 cut-outs on the cabinet's rear door.
- Use silicone caulk to create a water-tight seal around each hood on the rear door (see figures 42).



FIGURE 41: FILTER PLATE



**FIGURE 42: SILICONE CAULK SEAL ON DOOR HOODS**

#### 5. Install Fans and Hoods (Front Door)

- Place a hood on the door exterior and line up the 4 corner holes to the bolt holes on the door.
- Hardware that was placed to the side in step 1 can be used to fasten the hoods, and fan plates to the door (see figure 43), fan plate should have bottom bracket down to hold the filter in place.
- Filter can be set back in place before the plate is fastened or slide in after, gasket side should be oriented towards the door.
- Repeat to cover all 4 cut-outs on the cabinet's front door.
- Use silicone caulk to create a water-tight seal around each hood on the rear door. Make sure to cover the open corners, top and side seams (see figure 42).



# Alencon SPOT/BOSS BOX + Junction Box Installation Manual



FIGURE 43: FAN PLATE

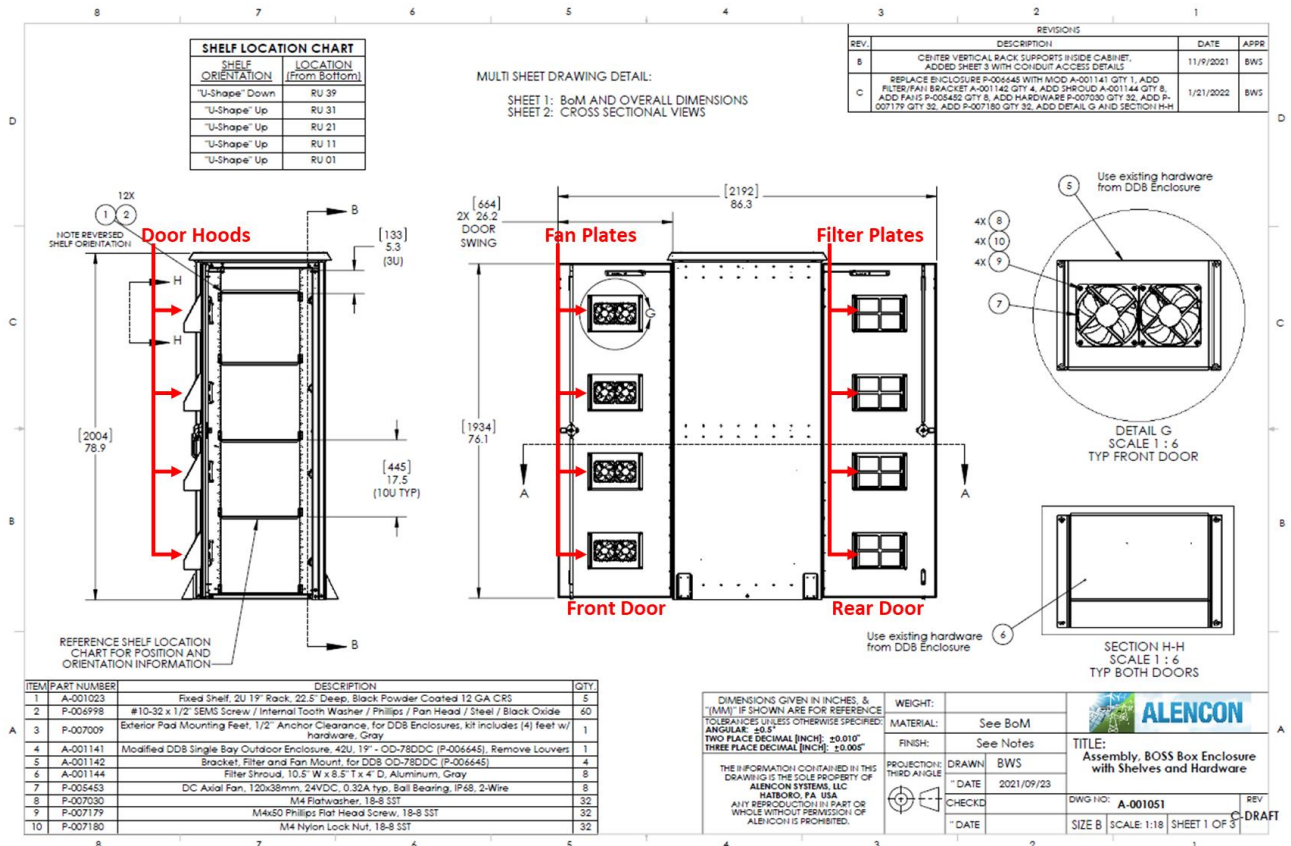


FIGURE 44: MODIFIED BOX CABINET





## 6. Install Power Supply

- Mornsun power supply should be mounted to the inside wall of the cabinet (figure 45).
- Line up the power supply so that the green terminal block faces to the cabinet's rear.
- Use center punch to mark out 4 mounting holes, see dimensions in figure 46.
- Use 5/32-inch bit to drill 4 mounting holes for the Mornsun power supply.
- Fasten power supply to the cabinet using included hardware, as arranged in figure 47.
- "Power In" cables for the Mornsun supply will mate with Amphenol terminated cables coming from the cabinet's JBOX.



FIGURE 45: MORNSUN – CABINET MOUNTED

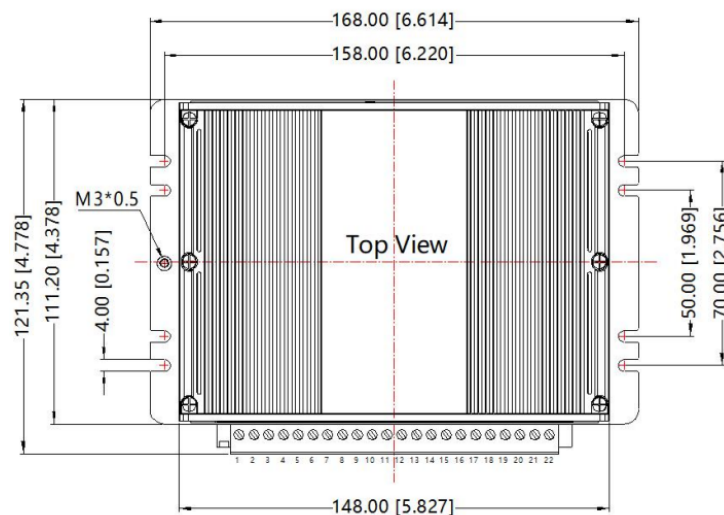
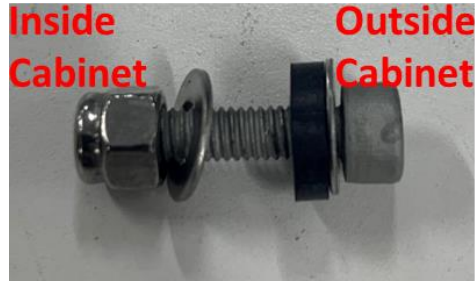


FIGURE 46: MORNSUN – DIMENSIONS



**FIGURE 47: MORNSUN POWER SUPPLY MOUNTING HARDWARE**

#### 7. Connect Wire Harness for Fans

- Blade terminated wires from cable harness can be connected to “Power Out” cables coming from the Mornsun supply. Green connects to negative, and blue connects to positive.
- Connect power to each fan using the white connectors, the length of each cable will dictate clearly which corresponding fan should be mated.
- Use plastic mounts and cable ties to manage the routing and secure the wire harness to the door. Ensure there is enough slack on the cable for the door to open and close fully.



**FIGURE 48: WIRE HARNESS FOR FANS**



## Maintenance

The SPOT/BOSS BOX is nearly maintenance free, but air filters must be kept clean to ensure proper air flow through the enclosure for essential equipment cooling.

- The filter change interval is dependent on the environment in which the SPOT Box is installed.
  - Recommended air filter inspection interval: **3 months**
  - Recommended air filter replacement: **12 months**



**Customer must take individual SPOT/BOSS BOX environment into consideration to adjust recommended air filter maintenance intervals.**

### Additional Maintenance:

If SPOT/BOSS BOX does not operate as expected, please contact Alencon Systems technical support for assistance with troubleshooting (see Appendix C).





## Appendix A - Safety Precautions

### A.1 Degree of Danger Symbols

	<b>Warning!</b>	<i>Warnings indicate conditions, which if not observed, can cause personal injury!</i>
	<b>Caution!</b>	<i>Cautions are included to help you avoid damaging hardware or losing data.</i>
	<b>Note!</b>	<i>Notes provide optional additional information.</i>

### A.2 Electrical hazards

#### A.2.1 Electric shock from live voltage



High voltages are present at the equipment and its components. Some maintenance work must be done when voltage is present. Failure to adhere to the safety messages may lead to severe or lethal injuries due to electric shock. To avoid electric shock from live voltage:

- Wear class 2 personal protective equipment.
- Always perform work in compliance with the regulations specified in 29 CFR, Chapter XVII, Part 1910 (OSHA), NEC, and NFPA 70E.
- Do not touch any live components of the equipment or the medium-voltage grid.
- Follow all instructions precisely.
- Observe safety messages.
- Before performing any work on the equipment, always disconnect the equipment if voltage is not absolutely necessary.
- After disconnecting the equipment, wait at least 10 minutes for the equipment's capacitors to discharge completely.
- Before performing work on the equipment, ensure that no voltage is present (with a Voltmeter or other measuring instrument).



### A.2.2 Danger due to Battery Voltage



BOSS-BOX is connected to high voltage batteries on both primary and secondary sides of the equipment. Before beginning to work on the BOSS-BOX, disconnect the batteries on both sides

### A.2.3 Electric shock caused by ground fault



If a ground fault occurs, plant sections that are supposedly grounded may in fact be live. Failure to adhere to the safety messages may lead to severe or lethal injuries due to electric shock. To avoid electric shock from ground faults:

- Ensure that no voltage is present before touching any components.
- Wear class 2 personal protective equipment.

### A.2.4 Electric shock due to damaged equipment



Operating damaged equipment can lead to hazardous situations that may result in serious or lethal injuries caused by electric shock. To avoid electric shock from damaged equipment:

- Only operate the equipment if it is in safe and technically faultless working order.
- Only operate the equipment if there is no visible damage.
- Regularly check the equipment for visible damage.
- Make sure that all external safety equipment is always freely accessible.
- Make sure that all safety equipment is in good working order.

## A.3 Environmental hazards

### A.3.1 Danger to life due to blocked escape routes

In hazardous situations, blocked escape routes can lead to serious injury or death. To avoid harm from blocked escape routes:

- An escape route of at least 3 ft. (915 mm) wide must always be available.
- Do not place any objects in the escape route area.
- Remove all tripping hazards from the escape routes.

### A.3.2 Damage to the equipment caused by dust or moisture penetration



Dust intrusion or moisture penetration can damage and impair the functionality of the equipment. To avoid damage from dust or moisture penetration:



- Do not open the equipment when it is raining or when humidity exceeds 95%.
- Perform maintenance on the SPOT/BOSS-BOX only when the environment is dry and free of dust
- Always cover electrical bus channel prior activating the equipment.

#### A.3.3 Danger to life due to electric shock when the equipment is unlocked

Unlocked equipment can be opened by unauthorized persons. This means that unauthorized persons have access to components on which lethal voltages are present. To avoid danger from unlocked equipment:

- Ensure that unauthorized persons have no access to the equipment.
- Always lock the equipment
- Keep the electrical bus channel covered

## Appendix B – Glossary

Word(s)/Acronyms	Definition
ALS	ALENCON Systems, LLC
DC	Direct Current
ESD	Electrostatic Discharge
ESS	Energy Storage System
FEED	Fused Electrical Disconnect
GFDI	Ground-Fault Detection
GND	System Ground Potential
HV	High Voltage
IP	Internet Protocol
LD	Leak Detector
PODD	Point of Data Distribution



<b>RTU</b>	Remote Terminal Unit. Microprocessor controlled electronic protocol to exchange data with other devices
<b>SCADA</b>	Supervisory Control and Data Acquisition system. Performed by transmitting telemetry data to a master system and by using messages from the master supervisory system to control connected objects
<b>SPOT</b>	String Power Optimizes and Transmitters
<b>SPOT/BOSS-BOX</b>	Container with (1) to (4) SPOT or BOSS units and Junction Box

## Appendix C – Technical Support and Assistance

Visit the Alencon Systems web site at [www.alenconsystems.com](http://www.alenconsystems.com) where you can find the latest information about the product. Contact your distributor, sales representative, or Alencon Systems' technical support if you need additional assistance. Please have the following information ready before you call:

- Product name, serial number, and LIN (all can be located on the product label)
- Description of your peripheral attachments including fusing and cables

For technical support please email: [support@alenconsystems.com](mailto:support@alenconsystems.com) or call +1 (215) 816-3366