Installation Instructions:

DC6-48-60-0-8C-EV

Contents

1.0 Copyright

1.1 Disclaimer

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1.2 Warnings

Please read this manual prior to use to become familiar with the product's numerous features and operating procedures. To maintain the maximum degree of safety, follow the sequences as outlined.

Before using the product, read all instructions and cautionary markings on the product and on any equipment connected to the product.

CAUTION:

Unless otherwise noted, product usage that is not recommended or sold by the product manufacturer can result in risk of fire, electric shock, or injury to persons.

Do not operate the product if it has been damaged in any way. Return damaged products to their manufacturer for repair or replacement.

Do not disassemble the product as incorrect reassembling can risk electrical shock or fire.

Do not bend fiber-optic cables beyond their minimum bend radius. Bending the cables beyond their minimum bend radius can damage the cables and cause problems that are difficult to diagnose.

Do not let fiber-optic cables hang free from the connector. Do not allow fastened loops of cables to dangle, which stresses the cables at the fastening point.

WARNING:

Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

Do not stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.

Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on a loop helps cables maintain their shape.

Disconnect or disable the DC power source to the product prior to beginning its installation. Ensure that the DC power source to the product remains de-energized until the completion of the installation and after all connections have been verified to be correctly configured.

Electrostatic sensitive devices. ESD mitigative procedures, such as wearing wriststraps are to be used during installation and maintenance.

For conditions other than those described above, please contact a Raycap Account Representative at (208) 777-1166, (800) 890-2569 or www.raycap.com

Thank you for choosing quality products from Raycap.

2.0 Introduction

In a split Radio Base Station (RBS) architecture the typical RBS consists of a Base Band Unit (BBU) and Remote Radio Heads (RRH) connected by cabling. Power to the RRH is provided through copper cables traveling from the DC power plant to the top of the tower or roof top. This creates a conductive path, making the active equipment at the top and the base of the site vulnerable to damage by direct lightning strikes. Protection systems installed in front of the PDU (DC power plant) and the RRH must be able to withstand direct lightning currents in order to protect the sensitive equipment. Raycap's RRH solutions featuring Strikesorb® SPD technology significantly enhance the reliability & availability of the RRH site by providing superior electrical protection at the RRH and DC power plant, while providing flexible fiber optic and power cable management solutions.

3.0 OVP Package Contents

1 each

- Dome Cover
- Dome Base
- Dome Base Clamp
- Sealing O-Ring
- Metal Mounting Base (already attached to Dome Base)
- Pre-terminated Lanyard
- Carabiner for Lanyard
- Sheet of 21 blank labels for installer use
- Oval Gasket: Power (for 2 trunks) 8AWG
- Oval Gasket: Power (for 2 trunks) 6AWG
- Oval Gasket: Power (for 2 trunks) 4AWG
- Oval Gasket: Fiber (1 trunk-18 pair)
- Oval Gasket: Fiber (2 trunks-12 pair + 6 pair)
- 10-24 Hex Nut, Silicon Bronze, Qty 85
- Lockwasher #10, External Tooth, Silicon Bronze, Qty 85
- Flatwasher #10, Silicon Bronze, Qty 56
- Ground Lug - #2, Dual ¼" Stud, 1" P, Long, w/o window

3.1 Prerequisites

This Document describes how to install the DC6-48-60-0-8C-EV on-site and how to mount, and connect it to external interfaces.

Installers of Raycap's RRH surge protective and fiber/power management solutions must be industry professionals who have attended training on the proper handling, installation and cleaning of fiber-optic cable, and attended training on the installation of the equipment by Raycap and/or the mobile operator. Installers are required to read this installation guide thoroughly prior to installation of the Raycap RRH protection equipment.

3.2 Tools & Supplies

1/2" nut driver (oval gasket)

7/16" Nut Driver to install ground lug

Torque wrench/tool

2 each 17mm open end wrench (one for each side on mounting bracket for mounting to 2"-4" pole)

Recommended Banding Tools:

- Site Pro: Strapping- part # WRL100
- Site Pro: Clamps- part # BU254-25
- Site Pro: Heavy Banding Tool- part # T001

Procedure

Mounting the Bracket

Dome unit is to be mounted at least 10' above ground.

4.1 ***Option 1: Pole Mount***
Using Pre-installed existing hardware, mount bracket to 2" to 4" diameter pole.

4.2 ***Option 2: Monopole***
Remove supplied nut and bolt pole Hardware from Bracket. Use 1" stainless steel bands (not supplied) through slots on bracket to mount to monopole.

4.3 ***Option 3: Unistrut***
Using hardware from mounting bracket, mount to Unistrut (not supplied).

Note: Port size and configuration of dome may vary from what is shown.

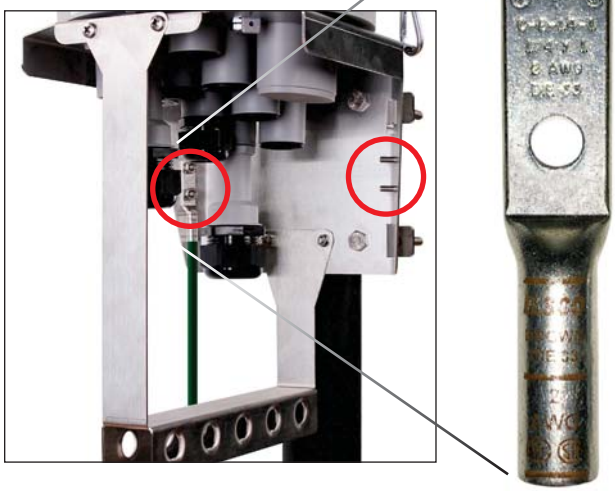
Ground Cable Installation

5.1 Attach #2 ground cable to #2, Dual 1/4" Stud, 1" P, Long, w/o window, ground lug on frame as shown. Ground lug can be mounted to either grounding location. Using the included lock washers, tighten nuts with a 7/16" nutdriver.

Note: Glands removed for clarity.

Torque: 65 in-lbs

5.2 Ground cable installation complete.



Pre-wiring preparation procedure

6.1 Ensure the lanyard from dome to bracket base is secure.

6.2 Remove the clamp ring, secure around bracket.

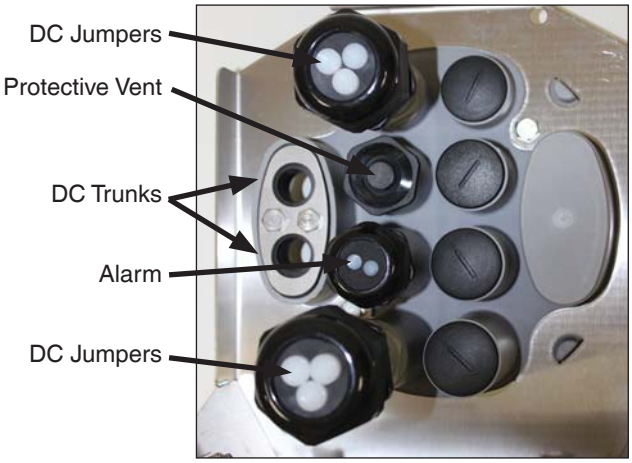
6.3 Remove dome cover and set aside.

6.4 Verify the mounting bracket is secured to the plastic dome base in the two locations indicated.

Torque: 120 in-lbs

Procedure
Port Definitions

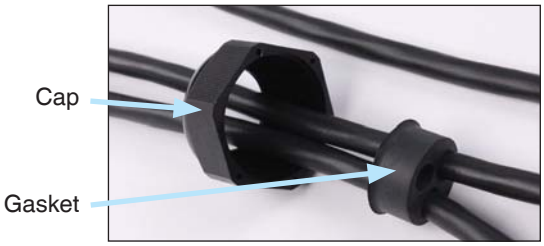
7.1 See picture to identify ***Base Port*** Assembly Definitions



DC Trunk Ovals

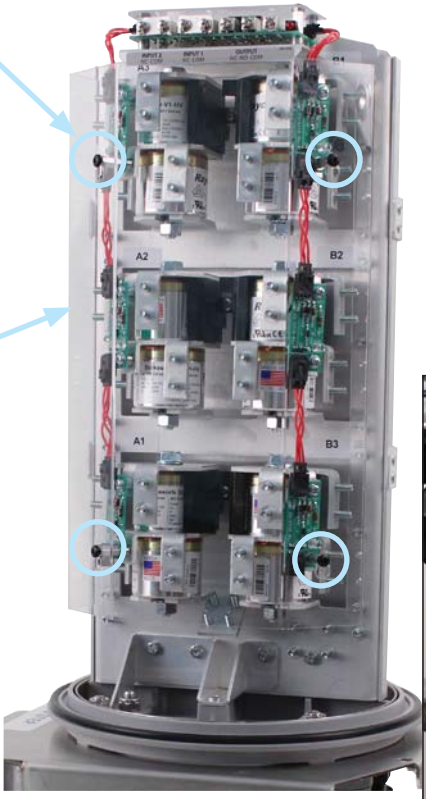
Note: when using the 6AWG gasket, use steel plates that come with the 8AWG gasket.

7.2 See picture to identify ***DC Power Port Cap*** Assembly Definitions



Procedure
Removing and Securing Touch Guards

8.1 The touch guard is secured with a philips screw on each stand-off (4). Loosen each philips screw and slide touch guard up then off from each screw head.



8.2 Temporarily secure to unit as shown in the photo to the right.

Procedure

Installing DC Trunk (6AWG and 8AWG)
Note: See Addendum for installing 4 AWG Power Trunk (Pages 22 and 23)

9.1 Feed cable trunk through oval power gasket.

Note: *Oval power gasket is not a strain relief device.*

9.2 Feed enough of the trunk to strip and connect to the power connectors.

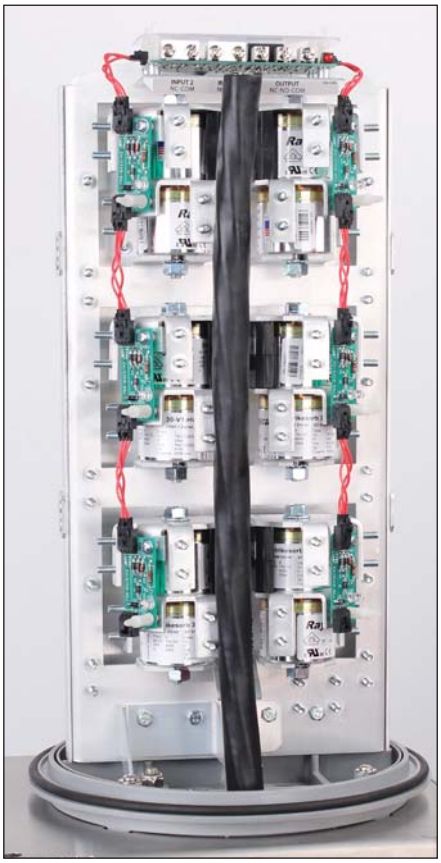
Allow extra length for some settling of power trunk due to weight.

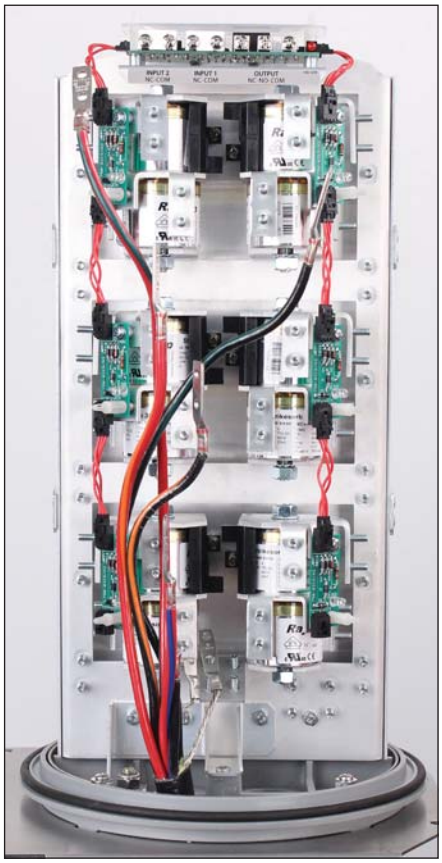
Note: 6 AWG oval gasket will replace standard power gasket when installing 6 AWG trunks.

A3

A2

A1





B1

B2

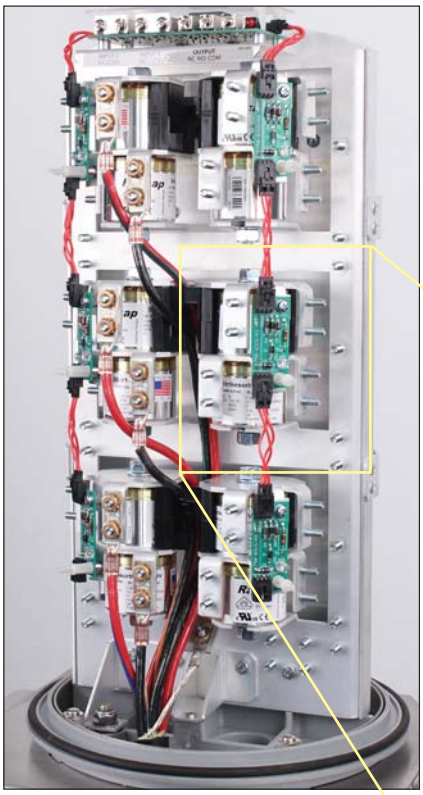
B3

*Jumper Cables not shown for clarity

9.3 Insert and secure oval power gasket with ½" nut driver creating a tight seal.

Note: If only one DC trunk cable is installed, plug the remaining oval gasket hole with a short section of DC trunk cable and seal the cut end with tape.

9.4 Connect wires according to *AT&T established color guide below.*
Note: For -48V and Return connections, use sil-bronze flat washer. For Ground and Shield connections, use external tooth lock washer combination.



-48V Supply **Red**/**Green** Wire
A3
Return **Black**/**Green** Wire

-48V Supply **Red**/**Blue** Wire
B1
Return **Black**/**Blue** Wire

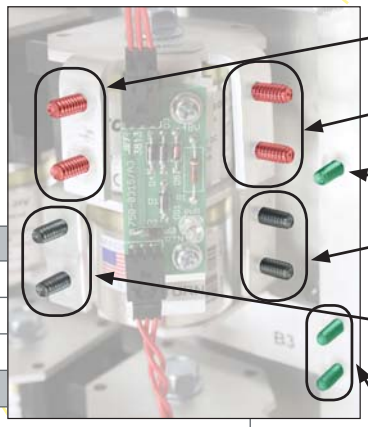
-48V Supply **Red**/**Orange** Wire
A2
Return **Black**/**Orange** Wire

-48V Supply **Red**/**Orange** Wire
B2
Return **Black**/**Orange** Wire

-48V Supply **Red**/**Blue** Wire
A1
Return **Black**/**Blue** Wire

-48V Supply **Red**/**Green** Wire
B3
Return **Black**/**Green** Wire

Note: Wire from top down (A3-A1)



-48V In (from Trunk)
-48V Out (to Sector)
Drain (Jumper)
Return Out (to Sector)
Return In (from Trunk)
Ground (Jumper)

***All lugs 5/8 pitch with #10 stud size**

#8 Power Trunk	RRH QTY	Double Lugs for Power	Double Lugs for Ground	Lugs for Drain
	6	12 Lugs (8AWG)	1 Lug (10-14AWG)	1 Lug (10-14AWG)
Burndy P/N #		YA8CL-2TC10	YAV10-2TC10	YAV10-2TC10
Panduit P/N #		LCD8-10A-L	LCD10-10A-L	LCD10-10A-L
#6 Power Trunk				
	6	12 Lugs (6AWG)	1 Lug (8AWG)	1 Lug (10-14AWG)
Burndy P/N #		YA6CL-2TC10	YA8CL-2TC10	YAV10-2TC10
Panduit P/N #		LCD6-10A-L	LCD8-10A-L	LCD10-10A-L
#4 Power Trunk				
	6	12 Lugs (4AWG)	1 Lug (8AWG)	1 Lug (10-14AWG)
Burndy P/N #		YA4CL-2TC10	YA8CL-2TC10	YAV10-2TC10
Panduit P/N #		LCD4-10A-L	LCD8-10A-L	LCD10-10A-L
#12 Power Jumper				
	1	2 Lugs (12AWG)	1 Lug (10-14AWG)	1 Lug (14-16AWG) Single Hole
Burndy P/N #		YAV10-2TC10	YAV10-2TC10	TP14-10
Panduit P/N #		LCD10-10A-L	LCD10-10A-L	PN14-10R-C
#10 Power Jumper				
	1	2 Lugs (10AWG)	1 Lug (10-14AWG)	1 Lug (14-16AWG) Single Hole
Burndy P/N #		YAV10-2TC10	YAV10-2TC10	TP14-10
Panduit P/N #		LCD10-10A-L	LCD10-10A-L	PN14-10R-C

9.5 Left side DC trunk installation complete. Repeat to install right side DC trunk.
Note: Wire from top down (B1-B3)

Close-up of DC trunk left side ground and drain installation.

Close-up of DC trunk right side ground and drain installation.

Procedure

Installing DC Jumpers

10.1 Feed jumpers through power gasket, clamping claw and cap.

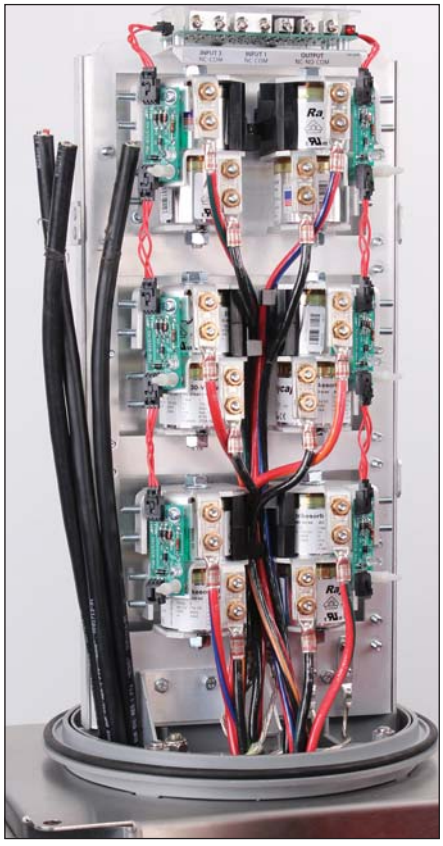
10.2 Feed enough of the cable through to strip and connect to the power connectors.

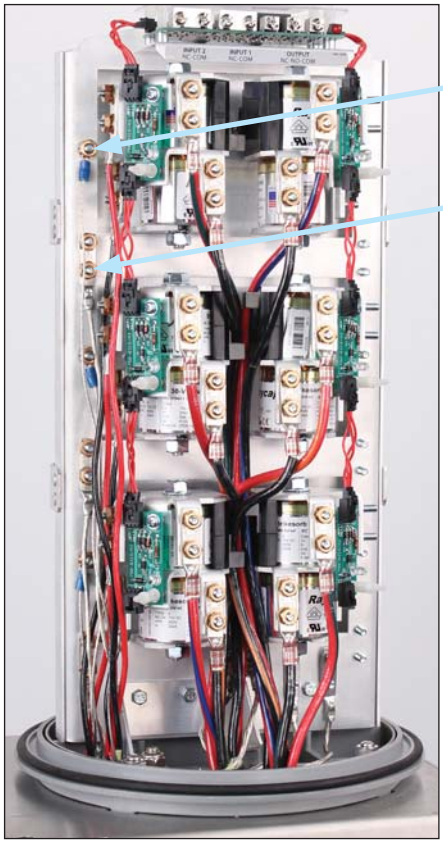
10.3 Connect wires according to *AT&T established color guide below.*

-48V Supply **Red** Wire
A3
Return **Black** Wire

-48V Supply **Red** Wire
A2
Return **Black** Wire

-48V Supply **Red** Wire
A1
Return **Black** Wire





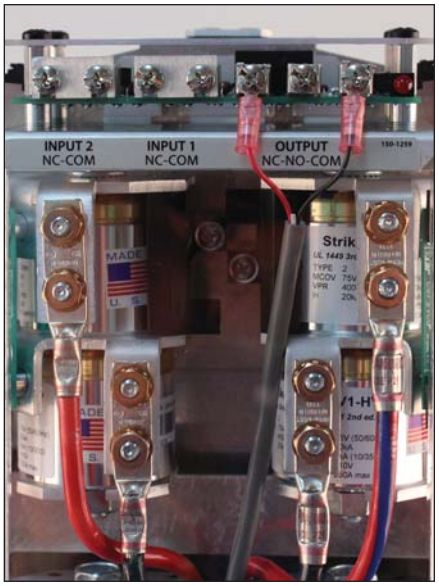
Drain (single lug)
B1
Ground (double lug)
B2
B3

13.4 Left side DC jumper installation complete. Repeat to install right side DC jumpers.

Procedure

Installing Squid Alarm Cable

11.1 Feed alarm cable through alarm port and connect to alarm board as shown.



Alarm Cable Wiring for one or more Squids.

See AT&T DOC: RF-HW-2014-214 NP&E National RAN Field Notice: Tower Top SQUID, Fiber and DC Trunk Cables.

11.2 The 1st Squid installed will be alarmed to the lowest band (or first installed) RRH/RRU on the Alpha sector.

In the event the alarm cable cannot be connected to Alpha, it will be acceptable to alarm to the closest physical sector on an exception basis.

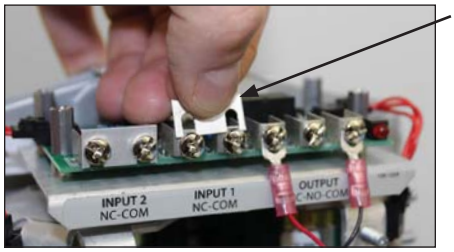
11.3 The 2nd Squid installed will be alarmed to the lowest band (or first installed) RRH/RRU on the Beta sector.

11.4 The 3rd Squid installed will be alarmed to the lowest band (or first installed) RRH/RRU on the Gamma sector.

11.5 A RRH/RRU will never have more than one Squid alarmed on it.

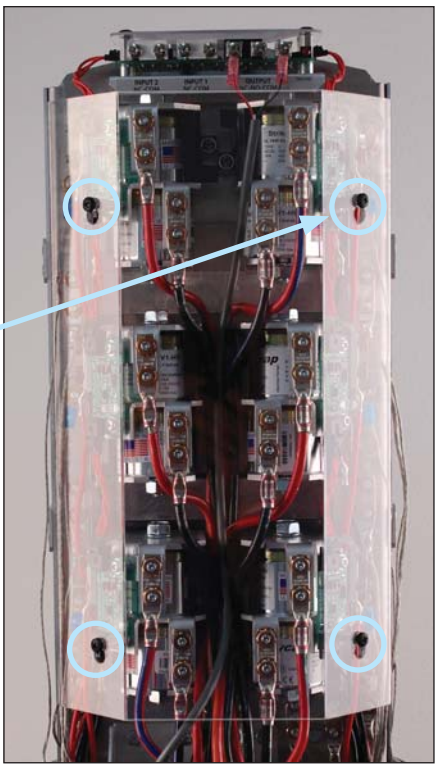
11.6 Squid alarms are not to be daisy chained.

Note: Bridge clips are necessary on INPUT 1 and INPUT 2 when no cables are present.

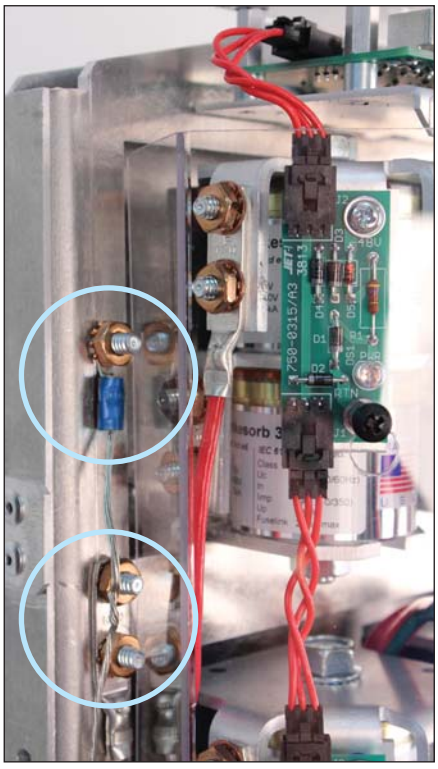


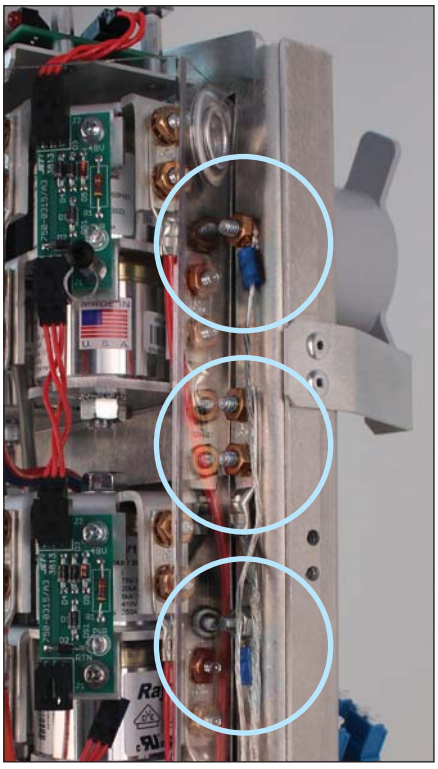
Procedure
Installing Touch Guards

12.1 The touch guard is secured with a philips screw on each stand-off (4). Place touch guard into position over each screw head, slide touch guard down, then tighten each screw.



Note: Ensure ground wires are in front of the touch guard to prevent unwanted wire contact.



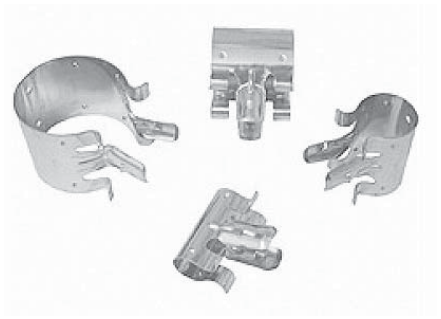


Procedure

Securing Fiber and DC Cables to Mounting Base

13.1 The strain relief bar is designed to accept common cable snap in hangers.

13.2 ***Procedure hardware (hangers, clamps, grommets, etc.) from approved cable manufacturers***



Securing Dome Cover and Dome Base Clamp

14.1 Position o-ring to create seal for Cover as shown.

14.2 Secure dome cover and dome base clamp.

Note: *It is recommended to lock the clamp to avoid unwanted or unauthorized access to the interior components.*

Lock Option

14.3 Installation complete.

Addendum 1
4-AWG Trunk Cable

See Page 16 for proper lug identification

Procedure

A1.1. Feed trunk cable through oval power gasket.

Note: *4-AWG oval power gasket is required for proper installation. Oval power gasket is not a strain relief device.*

Feed enough of the trunk to strip and connect to the power connectors.

A1. 2. Cut cable to where it inserts completely into lug barrel when lug is located at A3 -48 terminal of A3.

A1. 3. Strip outer jacket to the base of the dome.
(Make sure not to damage jacket of inner conductors or ground and drain wires.)

A1. 4. Strip A3 outer cable jacket 3.875"- 4.00".
(Make sure not to damage the wire strands under jacket)

❷ Cut cable to top of lug of **A3**

-48V Supply

A3:
-48V Supply
Red
Return
Copper Wrap

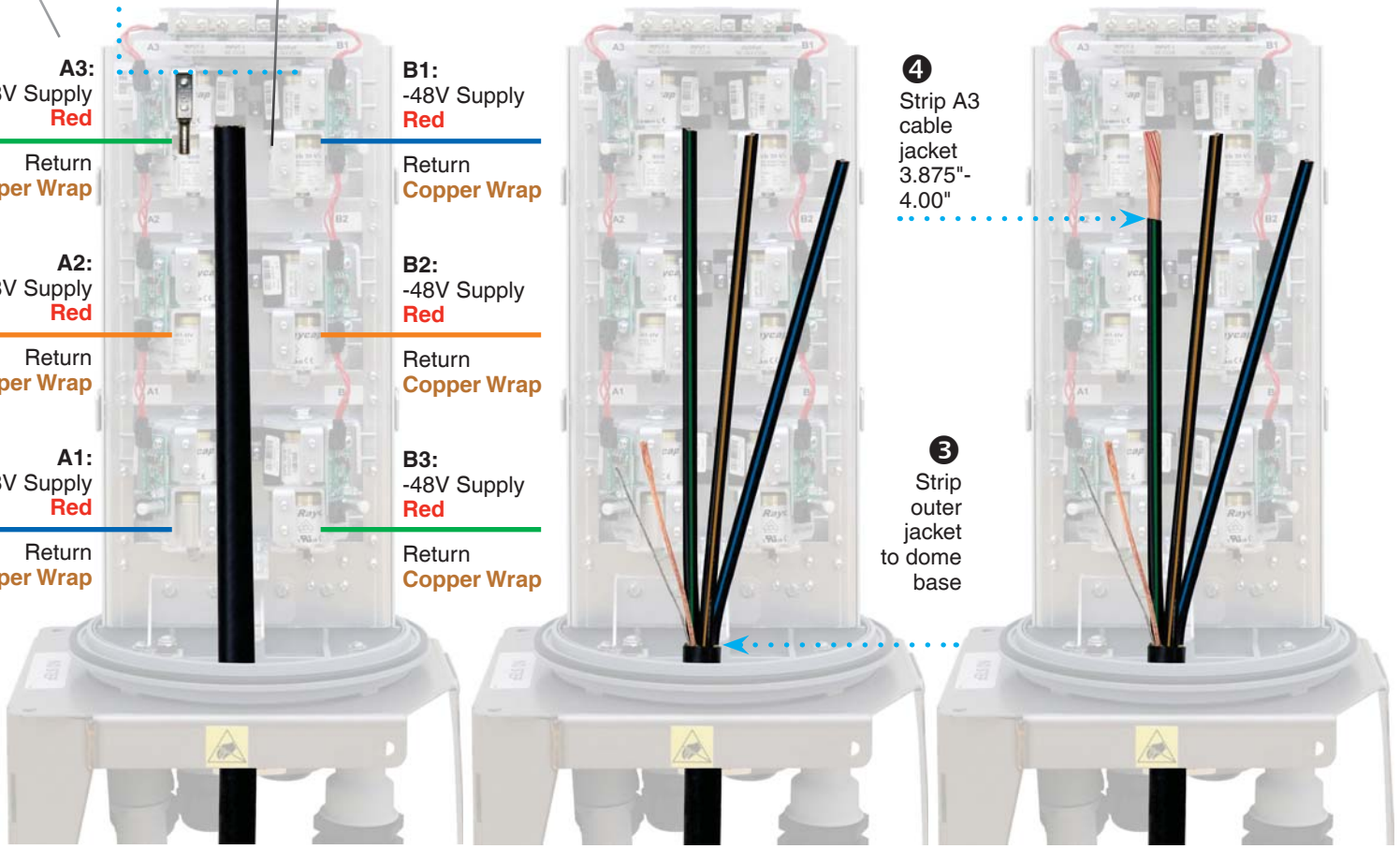
A2:
-48V Supply
Red
Return
Copper Wrap

A1:
-48V Supply
Red
Return
Copper Wrap

B1:
-48V Supply
Red
Return
Copper Wrap

B2:
-48V Supply
Red
Return
Copper Wrap

B3:
-48V Supply
Red
Return
Copper Wrap



❹ Strip A3 cable jacket 3.875"- 4.00"

❸ Strip outer jacket to dome base

Trace Jacket Colors:
Blue
Orange
Green

❶ Feed trunk cable through oval power gasket

Procedure

A1.5. Unwrap Return-wires from A3 -48V insulated cable, fan out Return-wires then twist into bundle.

A1. 6. Strip 0.75" of insulation from the red -48V wire and trim the exposed Return wire to a length of 2.25".

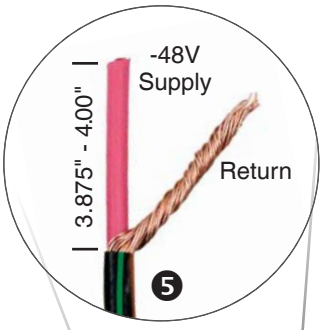
A1. 7. Slide boot on over cable. Short end over -48V Supply, long end over Return. On the return side, the boot will need to be pulled back for lug crimping. After crimping, roll boot over lug barrel.

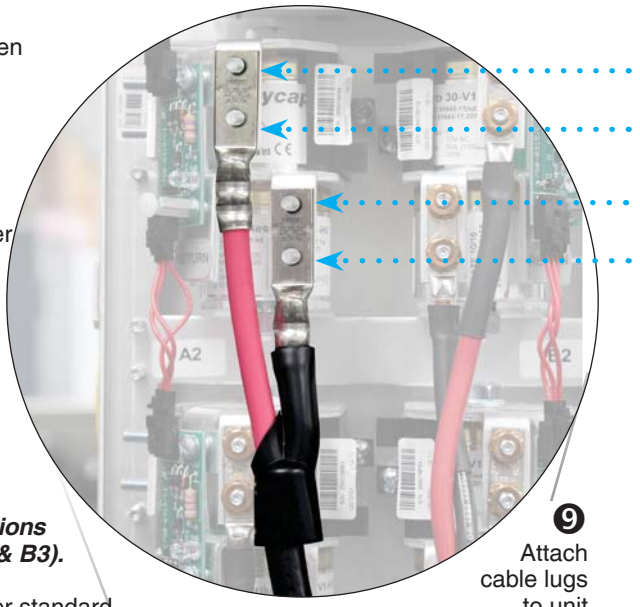
A1. 8. Attach lugs to both -48V and Return cables and crimp.

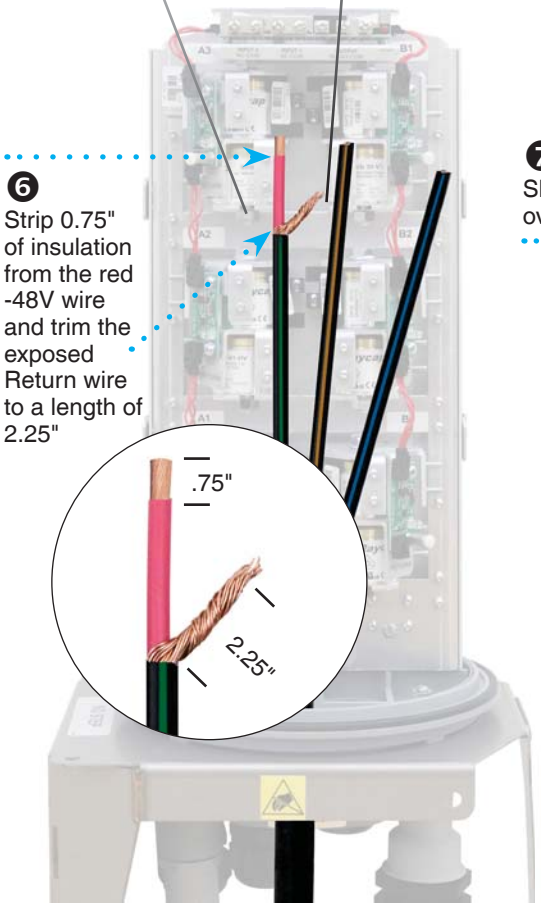
A1. 9. Attach cable lugs to unit.

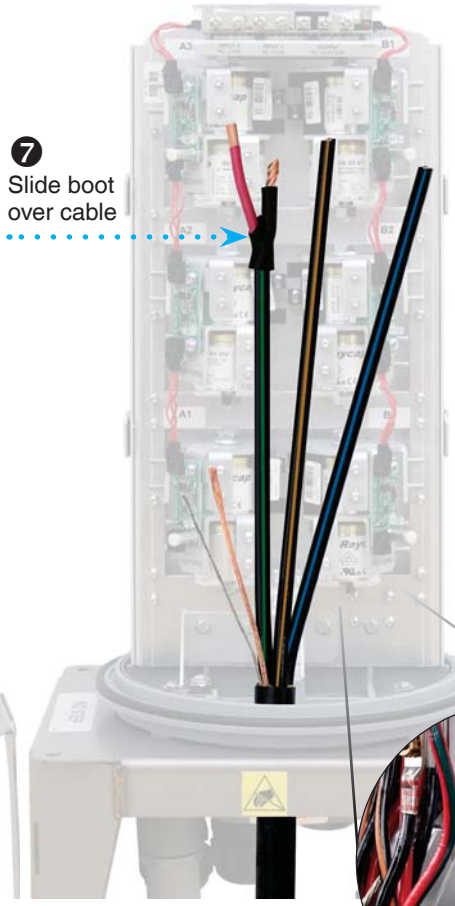
A1. 10. ***Repeat all 4-AWG Trunk Cable instructions for additional cables (A2, A1, B1, B2 & B3).***

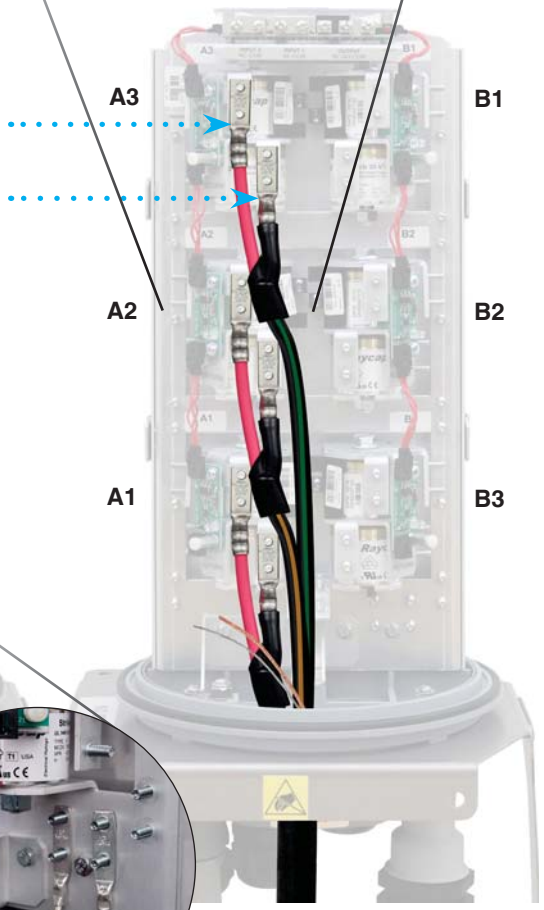
A1. 11. Attach ground and drain wires to unit per standard installation instructions.











Cut ground and drain wire to 4" and install as shown.

Notes