



# Open19 System Level Specification

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## 1 Open19 Platform Overview

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### 1.1 General

The purpose of this document is to fully describe the Open19 platform and the components of its infrastructure. The specification will use a single instance of the platform as an example, which includes:

- Two 12RU cages
- One power shelf
- One Open19 switch
- 12RU power and data cabling solutions

While we'll focus on the above configuration in this document, we want to be clear that the Open19 platform can be configured per site and per specific adoption requirement. For example, some implementations will integrate two aforementioned items per rack, and some will go for a dual 8RU solution in a rack. We will mention different options that are currently available for buildout. The current solution needs to be fit into a 19-inch rack with 36 to 52 rack units and a minimum depth of 1000 mm, which is the only requirement for installing the Open19 platform.

Refer to the server specification for detailed description of different servers' form factors for the Open19 platform.

### 1.2 Open19 Platform Background

The Open19 platform is an open standard to define a new server form factor. It is a standard that also defines data and power distribution but not the internal design of the servers to enables server design partners to innovate and build their own servers to create a competitive landscape.

The Open19 platform has the following key goals:

- Create an open standard for 19-inch rack environment for server, storage, and networking.
- Optimize rack deployment cost.
  - Reduce common infrastructure cost by 30% to 40%
  - Reduce server cost by 15% to 20%
- Enable faster rack integration.
  - 7 to 10 times faster
- Build an ecosystem that can consolidate requirements and volumes with a high adoption level.
- Accommodate with different sizes of data centers and edge solutions.

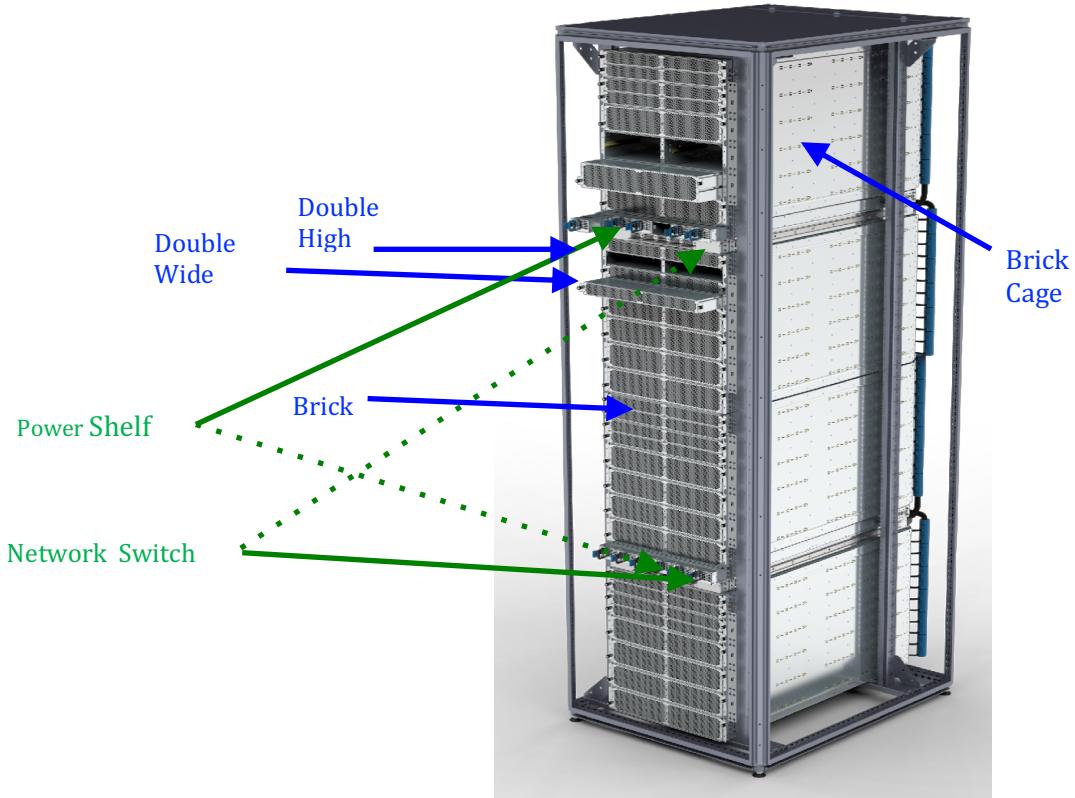
### 1.3 Open19 Description

The Open19 project offers operators of data centers and edge solutions an optimized open platform. This platform is meant to be installed to any existing or new 19-inch rack and targeted to operate as a standalone disaggregated platform that only requires a 19-inch rack and 10°C to 40°C operating environment.

The Open19 platform has four main building blocks and two optional ones:

- Any 19-inch 4-post rack – The Open19 standard does not specify the rack. Any rack that is EIA compatible and at least 1000mm deep can be used.
- Brick cage – A structure that creates the common, cross supplier, and form factor.
- Data cable and power cable for the servers creating blind mate connectivity with predefined pinouts.
- Bricks – The Open19 platform defines four form factors:
  - Brick- 1RU half width
  - Double Wide Brick (DW) – 1RU full width
  - Double High Brick (DH) – 2RU full width
  - Double High Half Width Brick (DHHW) – 2RU half width
- Power shelf – There are two types. One is up to 19.2KW in 1RU, the other is up to 38.4KW in a 2RU.
- Network switch – Eliminate the need for server DAC (Direct Attach Cable). The switch is optional but highly recommended. Standard switch can be used with the appropriate data cable.
- Battery backup unit (BBU) – This is optional.

The following diagram shows the components of the Open19 platform in a rack.



**Figure 1 :Rack Level Open19 Platform Overview**

The following sections describe the system level specification. Refer to the Open19 server level specification for additional information.

## 2 Rack Level Specifications

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The Open19 platform fits into any 19-inch 4-post rack that is EIA (Electronic Industries Alliance) compliant. The rack enclosure with rackmount rails is 17 3/4" (450.85 mm) long and 1.75" (44.45 mm) high.

The Open19 platform enables the use of non-Open19 gear and maintains full compatibility to any gear that fits into the standard 19-inch EIA rack. The Open19 platform maintains full compatibility to the standard industry RU definitions (as described above).

No special adaptation is required for installing the Open19 platform into the rack. Also, there is no restriction on the rack height. Noted that the rack height will affect the number of a server's available slots.

The Open19 platform does not require any special cooling features in the rack. All the components in the Open19 platform are self-sustained. Any solution that will enhance the cooling capabilities in the rack or at the data center level will enable the components in the rack to operate with a lower self-cooling system power consumption.

The Open19 platform does not need any cable management system or PDU allocated space in the rack, which enables a wider variety of racks to be considered.



Figure 2 :**Standard 19” Rack**

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### **3 Open19 Platform - Cages**

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The Open19 platform defines a new, installable element for building the infrastructure. This element is a server cage. The purpose of server cage is to create standard form factors for supplier agnostic servers. The cages are universal and configurable to accommodate any server that is compliant with the Open19 standard. The current cage design requires the server to be 2RU or smaller in height.

Future cages can be built to accommodate servers with different dimensions, as long as the standard rack unit (RU) is kept as the base building block dimension increments.

The Open19 platform cages are passive elements in the overall solution. They set the server form factors, create an opening for the snap-cables to fit into the solution, and provide a blind-mate connectivity for the servers.

### 3.1 Cages Modularity

The cages may apply any modularity model to accommodate the needs. The first version of cages is targeted at a high-density solution with 2RU modularity enabling the following server form factors for each 2RU section:

- 4x Bricks – Half width 1RU server
- 2x Double high bricks – Half width 2RU server
- 2x Double wide bricks – Full width 1RU server
- 1x Double high brick– Full width 2RU server

The current released package supports two form factors – 12RU cage and 8RU cage. All servers are fully interchangeable between these two form factors. The use of the two form factors enables full rack space utilization from 36RU racks to 52RU racks. The following images show the front and rear views of a 12RU cage.



Figure 3 :12RU Cage Front View



**Figure 4 :12RU Cage Rear View**

## **3.2 12RU Cages Detailed Specification**

### **3.2.1 12RU Cage Dimensions**

A 12RU cage is intended to be installed to a 19-inch 4-post rack. It is supposed to be constructed to the overall dimensions as shown below:

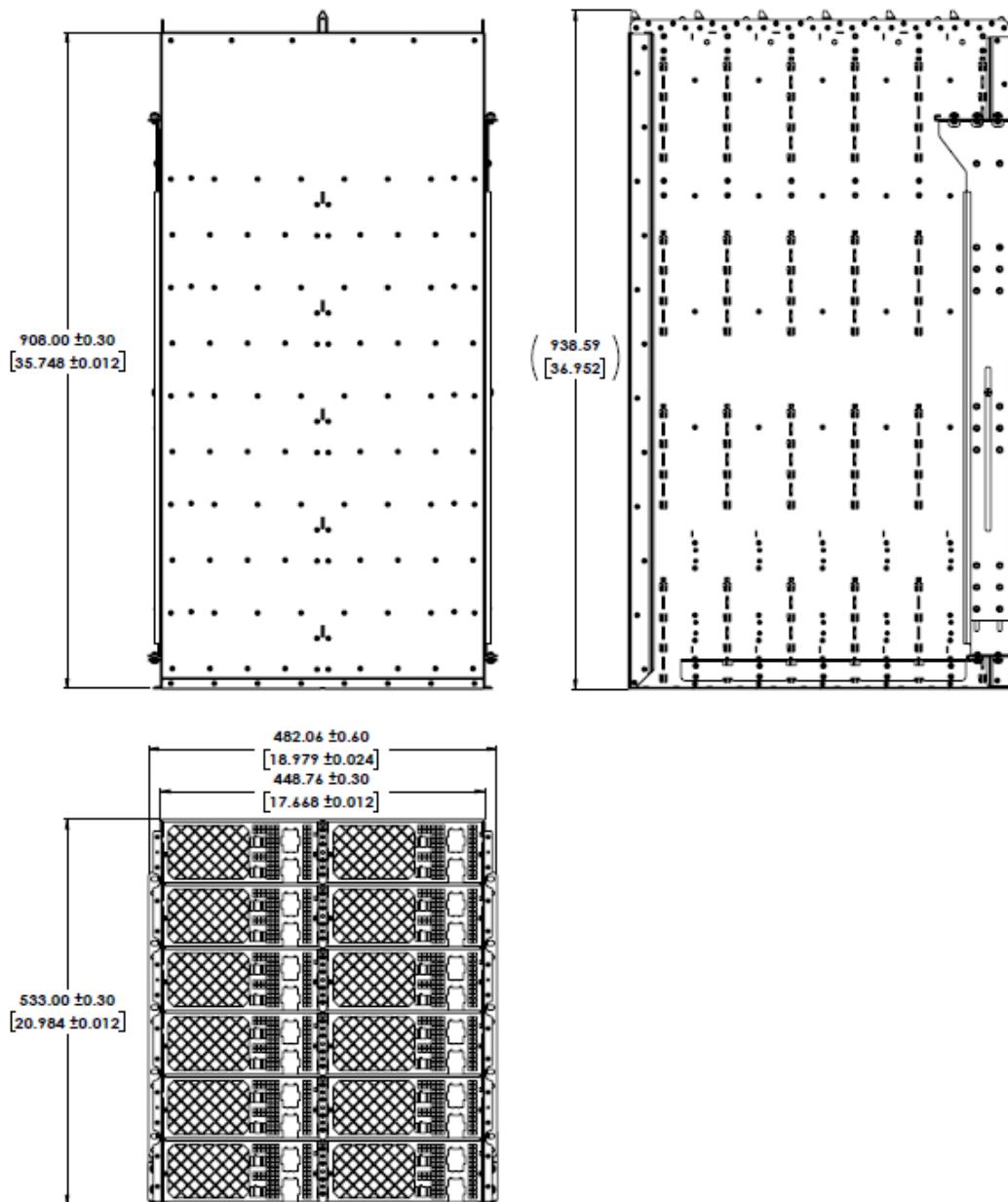


Figure 5 :12RU Cage Dimensions

### 3.2.2 Cage Partitioning

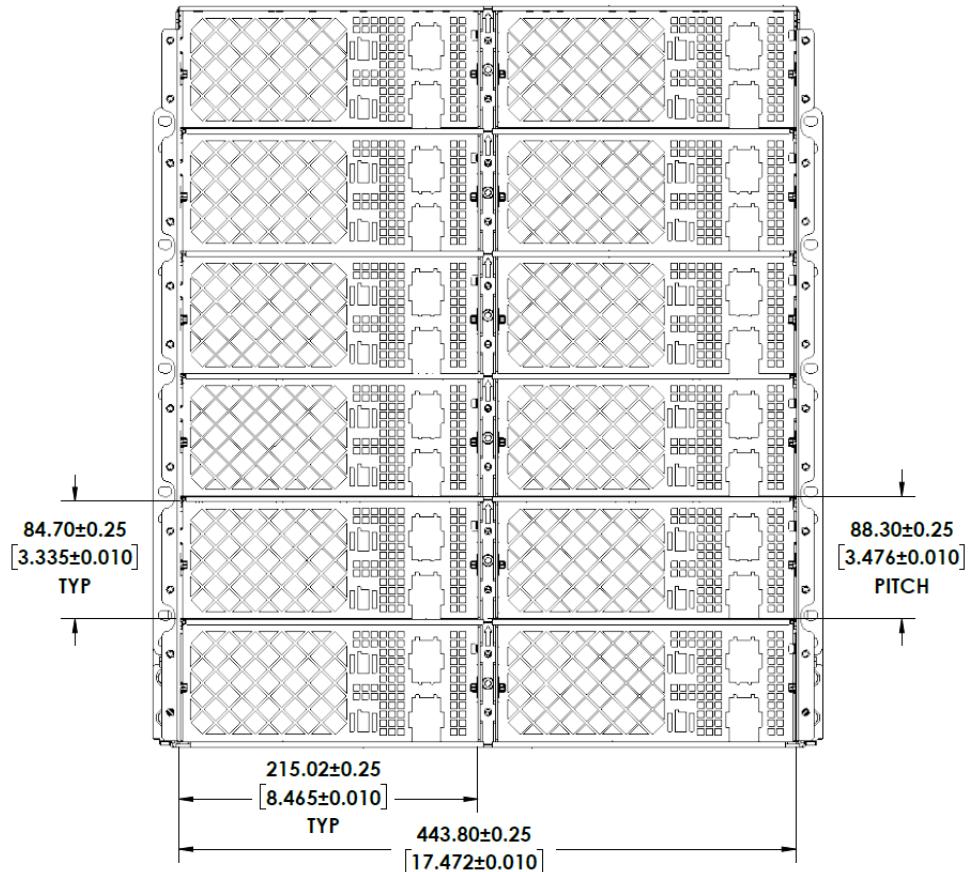
The 12RU cage is divided into six sections. Each section can accommodate one of the following:

- One 2W2H brick
- One or two 2W bricks

With a Center Divider (CD) installed, each section can accommodate one of the following:

- One to four bricks
- One or two 2H bricks
- One 2H brick, plus one or two bricks

Each section should meet the following dimensions:



**Figure 6 :12RU Cage Partitioning**

### 3.2.3 Center Divider

The Center Divider (CD) is installed to support the use of bricks and 2H bricks. Fully insert the CD in the cage and lock it into the horizontal panels above and below by tightening a single M5 socket head cap screw (accessible through a hole at the front of the CD). The screw should be torqued to 5.1 N·m (45 lb-in) before the section is loaded with bricks.

To install the CD, use rub strips on the lower panel as insertion guides. The final 30mm of travel is guided by lead-in tabs at the end of the CD; these tabs help engage windows on the rear of the cage.

To remove the CD, fully back off the M5 screw to disengage the CD hooks from the horizontal panels. Now the CD can be manually extracted out of the cage.

Each CD has two Southco D9-63-11 self-clinching receptacles on the front that secure bricks with quarter-turn fasteners.

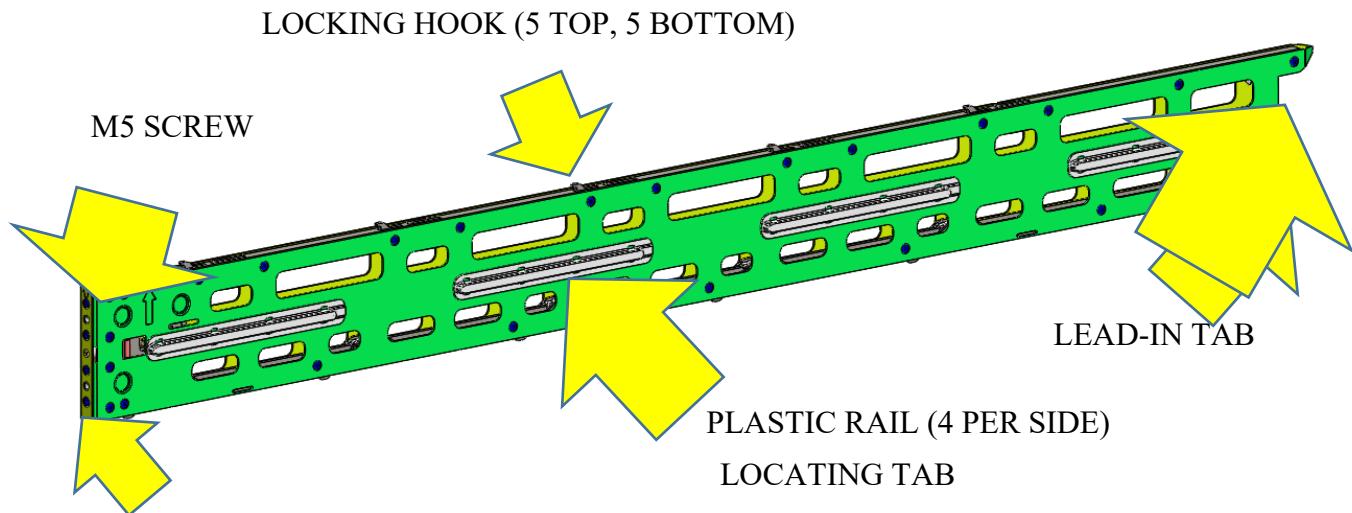


Figure 7 :Center Divider View

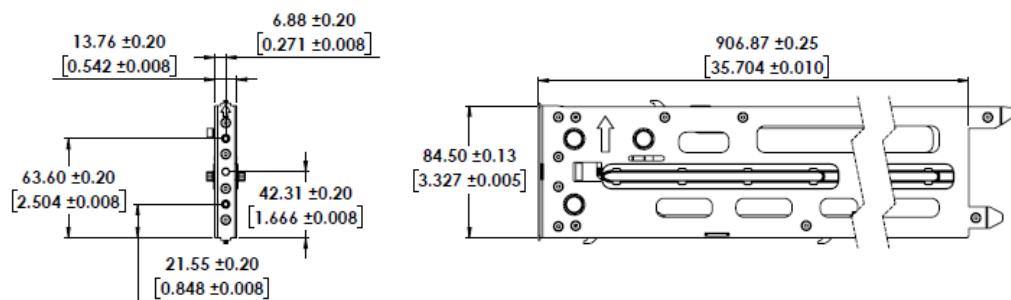


Figure 8 :Center Divider Dimensions

### 3.2.4 Horizontal Divider

The Horizontal Divider (HD) partitions the cage into sections and supports a level of bricks. The HD is constructed of a stack of sheet metal panels riveted together to provide rigidity. The upper panel in the stack has a rear wall formed up that adds rigidity to the cage structure and accurately locates the blind-mate server power and signal cable connectors. Tabs protruding from the main panel engage slots in the side walls to promote better assembly tolerance.

Self-adhesive strips are installed on each HD to provide a low-friction surface on which server bricks can ride and provide installation guides for the CDs.

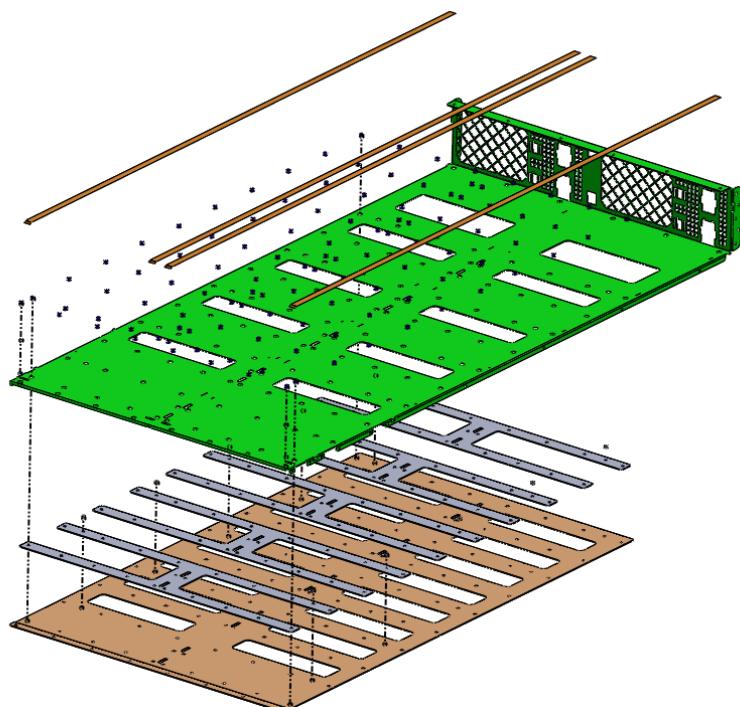


Figure 9 :12RU Horizontal Divider

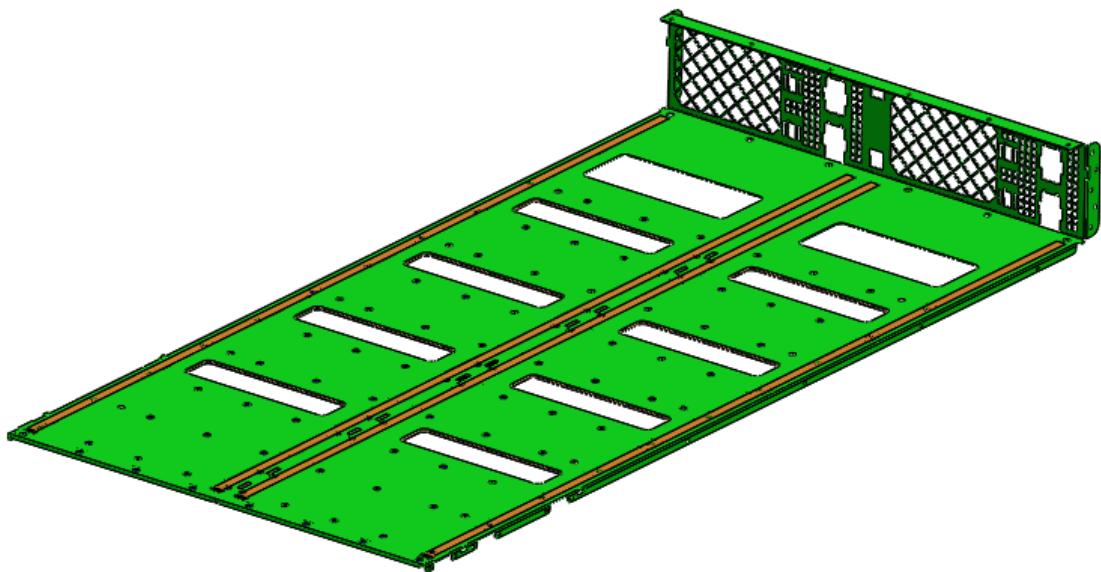


Figure 10 :12RU Horizontal Divider 2

### 3.2.5 Interconnect

The sheet metal rear wall of the cage accommodates the snap-in housings of the power and data cable connectors.



Figure 11 :**System Level Cables**

Power Shelf Cable Connector – Amphenol DWR-P1C-B3Q00-102

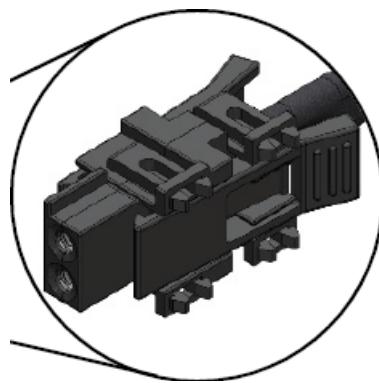
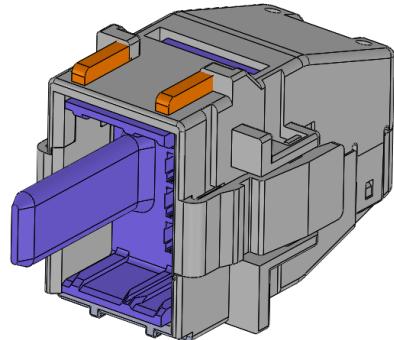


Figure 12 :**Power Snap-in Connector**

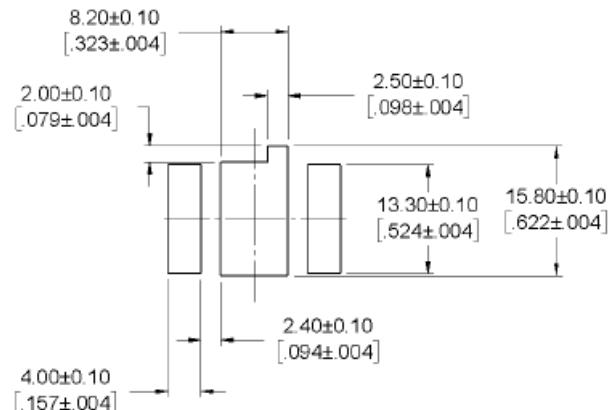
Signal Cable Connector – Molex Impel 4Pr X 2 with Guide Pin part number 171320-9032



**Figure 13 :Data Snap-in Connector**

Connector cutouts are sized and positioned within the cage as shown in Figure 12.

### 3.2.6 Power Connector Cutout



**Figure 14 :12RU Power Cutout**

Note: Refer to the full cables' specifications in section 4.3.

### 3.2.7 Signal Connector Cutout

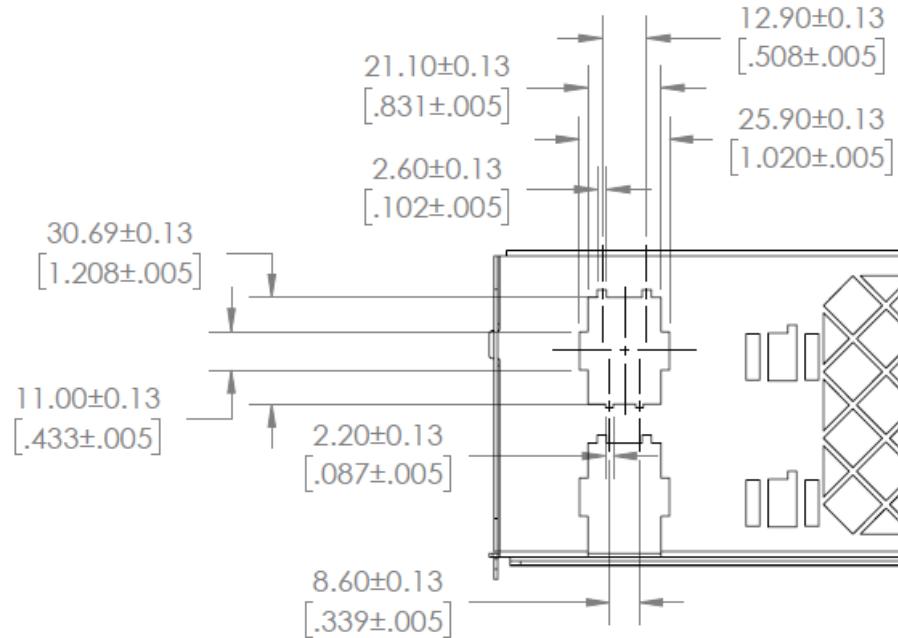


Figure 15 :12RU Data Snap-in Connector Cutout

### 3.2.8 Cutout Locations on Cage Rear Panel

Noted that reference surfaces are the inside surface of a side panel and the top surface of a horizontal divider.

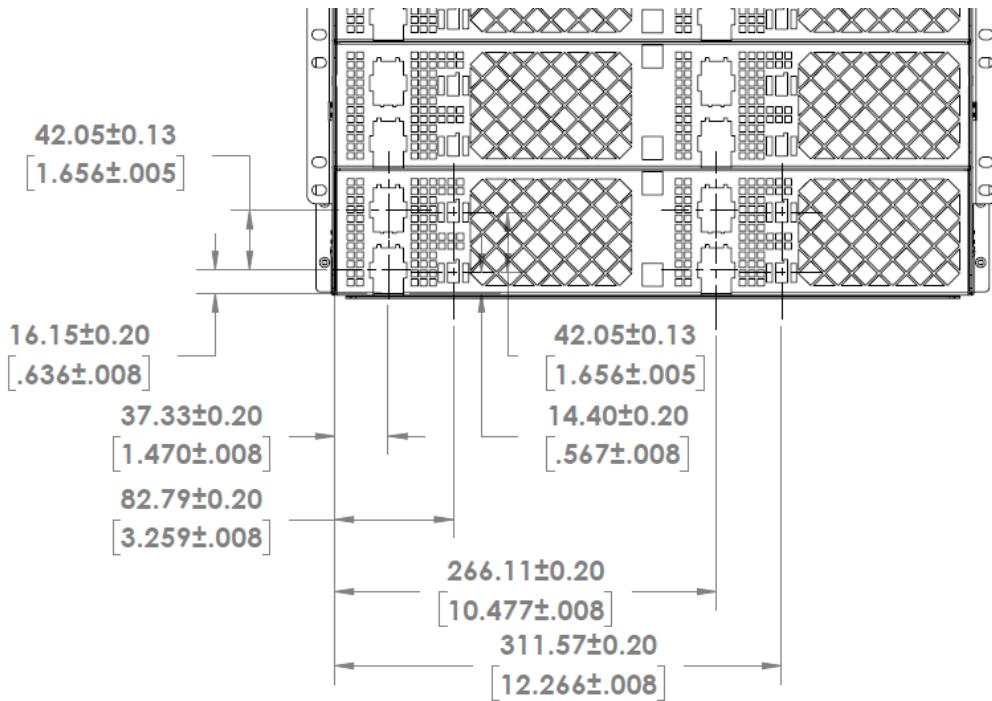


Figure 16 :Cutout Locations on Cage Rear Panel

### 3.2.9 Brick Retention

Each side wall contains twelve Southco D9-63-11 self-clinching receptacles that secure bricks with quarter-turn fasteners. They are located as shown below:

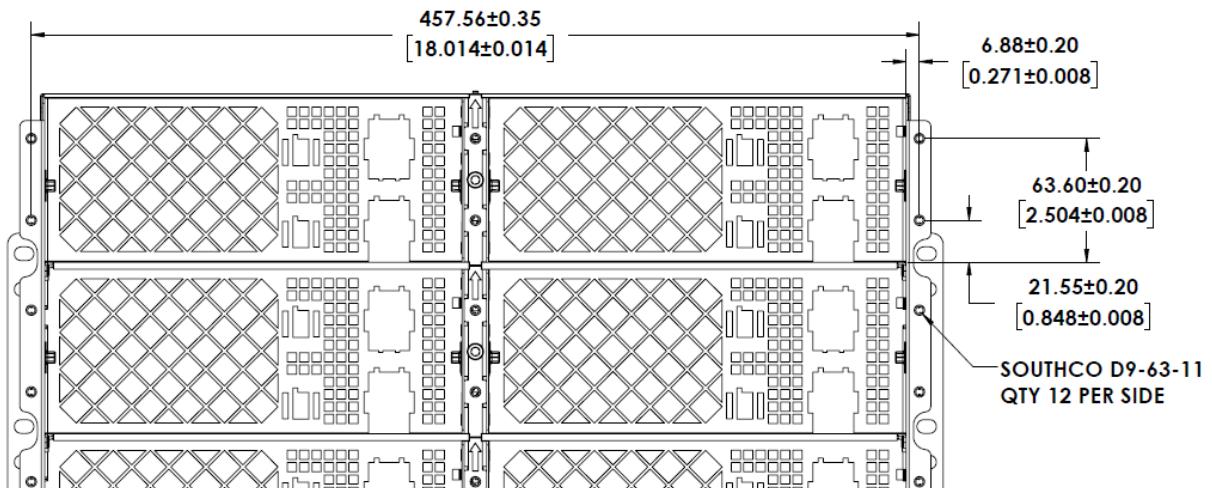


Figure 17 :Brick Retention

### 3.2.10 Mounting Ear Positions

The primary cage mounting ear is positioned 40mm behind the front face of the cage side wall. Two additional positions are provided – 100mm and 200mm from the mounting ear surface to the front face of the cage side wall.

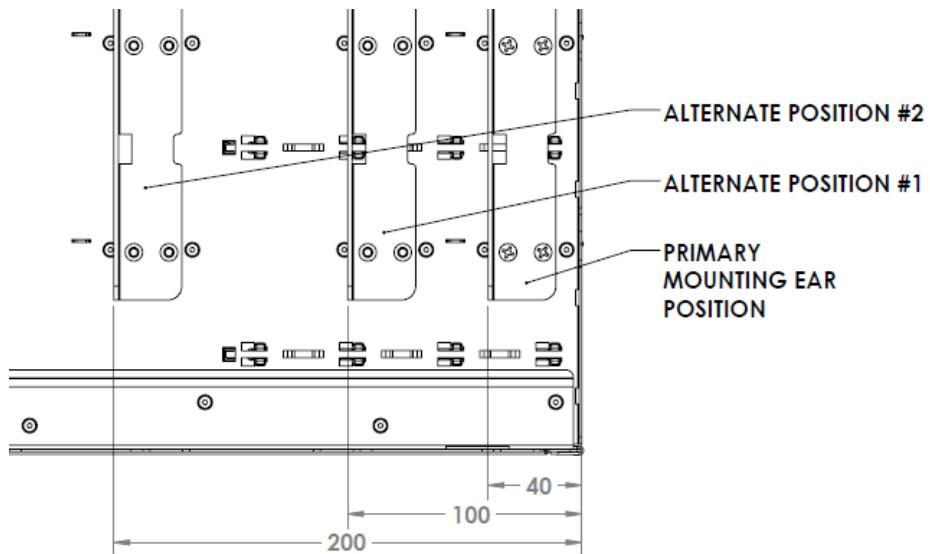


Figure 18 :12RU Mounting Ear Position

### 3.2.11 Design Requirements

Formed ridges are provided along the top and bottom covers to prevent plastic slider tabs from damage when installing a cage into a rack.

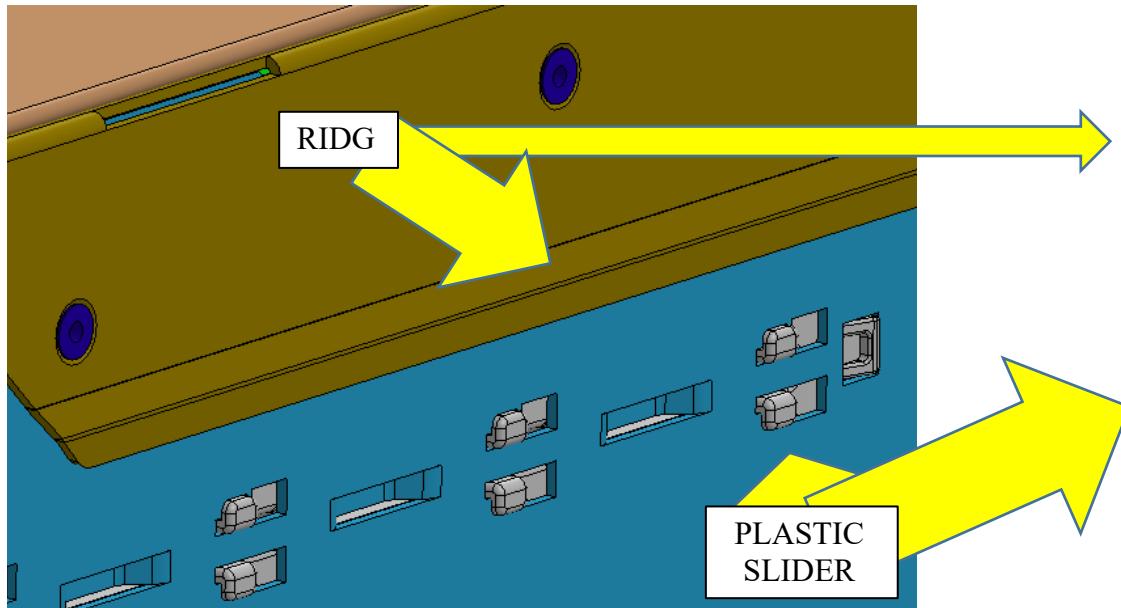
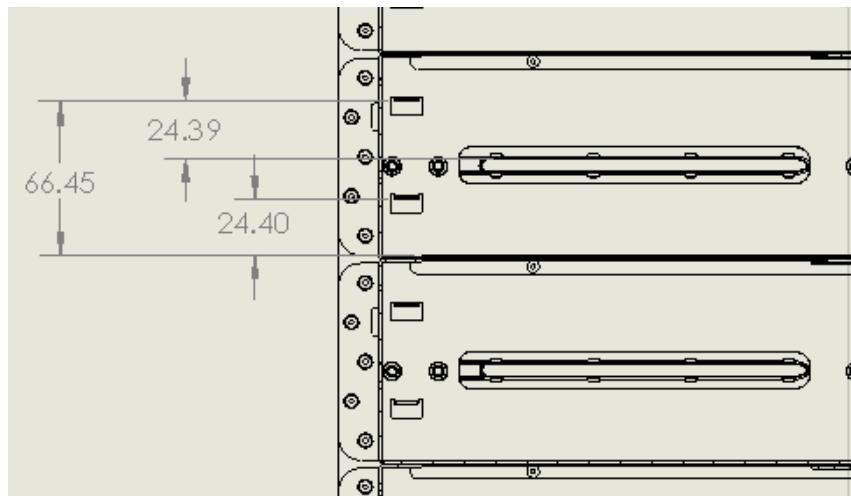


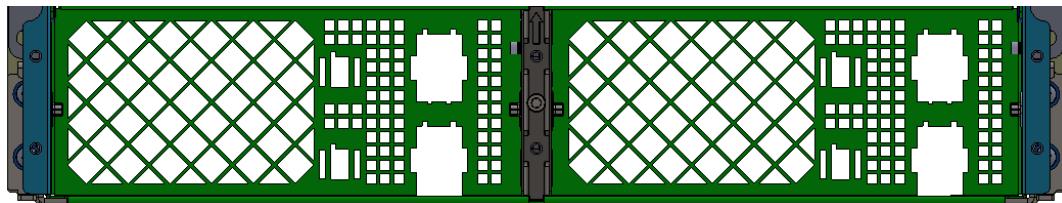
Figure 19 :8RU Design Requirements

Keying stops are provided in the right and left rear corners of each cage section. These stops (bent tabs) interface with notches in the brick sides to provide a positive stop during brick insertion and prevent over insertion or possible connector damage. They are positioned as shown below:



**Figure 20 :12RU Cage Keying**

Holes are provided in the rear panel for cooling airflow.



**Figure 21 :12RU Cage Front-View Airflow Opening**

### 3.2.12 Installation Rails

Rails are provided to support the cage during installation and use. Hook the rails into square holes of the rack posts to facilitate rail installation. Securely screw the rails to the rack, both front and rear, to ensure load carrying capacity. Rails should not protrude below the bottom surface of the cage.

Installing rails shall accommodate a range of rack post spacing from 28.5" to 36.0". For other types of racks, a modified version of the rail can be developed.

The rails should support:

- Bare cage installed in a rack during shipping – cage mounting ear screws must secure cage in the rack
- Bare cage installed in a data center rack – cage mounting ear screws not installed
- Fully populated cage during installation into a rack
- Fully populated cage during use – cage mounting ear screws must secure cage in the rack

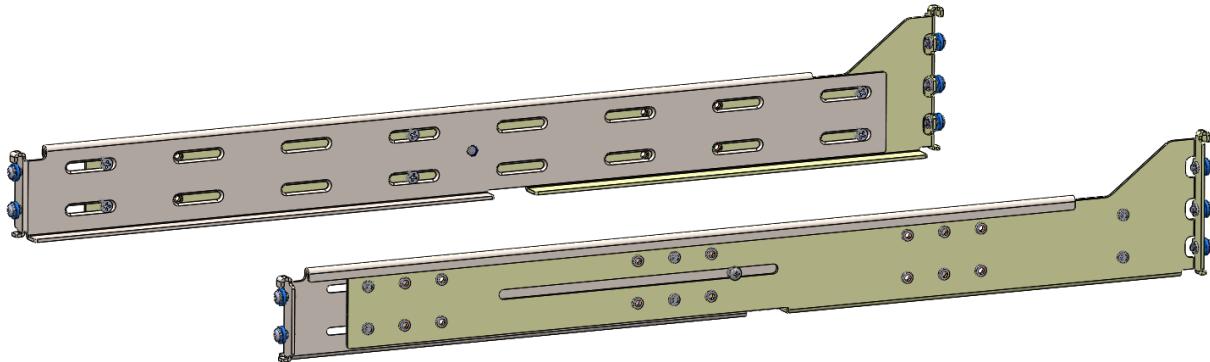


Figure 22 :**12RU Installation Rails**

### 3.2.13 Materials

The 12RU cage is designed to be constructed of SGCC sheet metal. 1.2mm is the primary thickness used throughout, with 0.8mm used on the top cover assembly, 1.6mm used on some center divider parts, 1.88mm used for the cage mounting brackets and 2.38mm for the rails.

Two molded plastic parts are used on the cage assembly.

- Sliders are used on the cage side walls and CDs to support bricks; 96 sliders are used in a cage that is fully populated with CDs. Molded in Ultem 1000 resin.

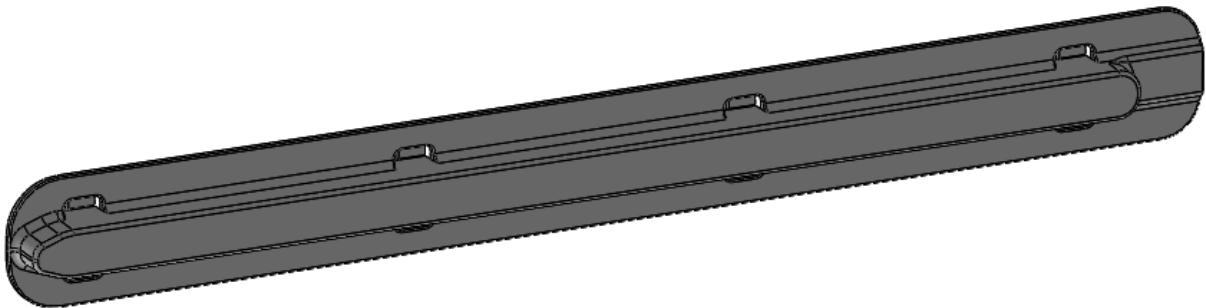


Figure 23 :**Plastic Material**

- Dowel Pin Inserts are used in 10 places on each CD. Molded in Ultem 1000 resin.

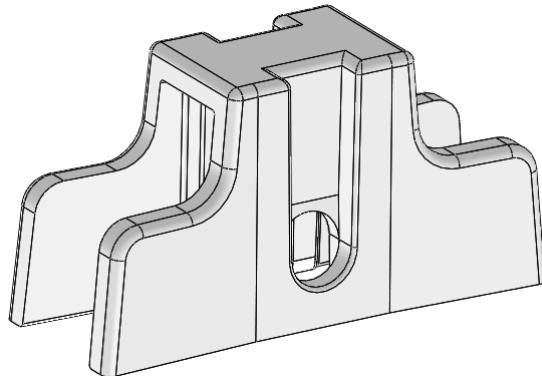


Figure 24 :**12RU Cage Divider Material**

- Low-friction strips used on the horizontal dividers are made of black FR700-701 polycarbonate sheet with 3M 467 PSA applied.

### **3.2.14 Cage Load Capacity**

The 12RU cage can accommodate 24 bricks weighing a maximum of 25 lbs each.

### 3.3 8RU Cages Detailed Specification

#### 3.3.1 8RU Cage Dimensions

An 8RU cage is intended to be installed to a 19-inch 4-post rack. It is supposed to be constructed to the overall dimensions shown below:

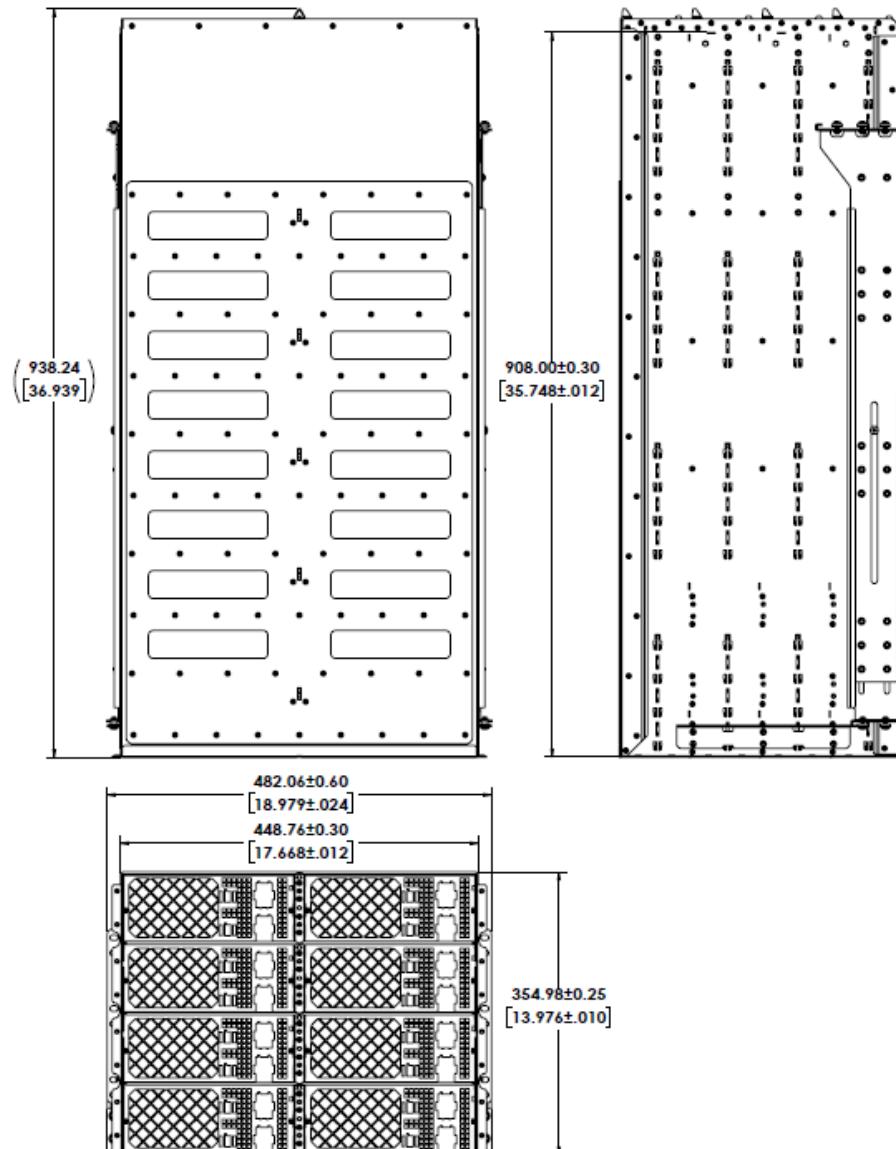


Figure 25 :8RU Cage Dimensions

### 3.3.2 Cage Partitioning

The 8RU cage is divided into four sections. Each section can accommodate one of the following:

- One 2W2H brick
- One or two 2W bricks

With a CD installed, each section can accommodate one of the following:

- One to four bricks
- One or two 2HHW bricks
- One 2HHW brick, plus one or two bricks

Each section should meet the following dimensions:

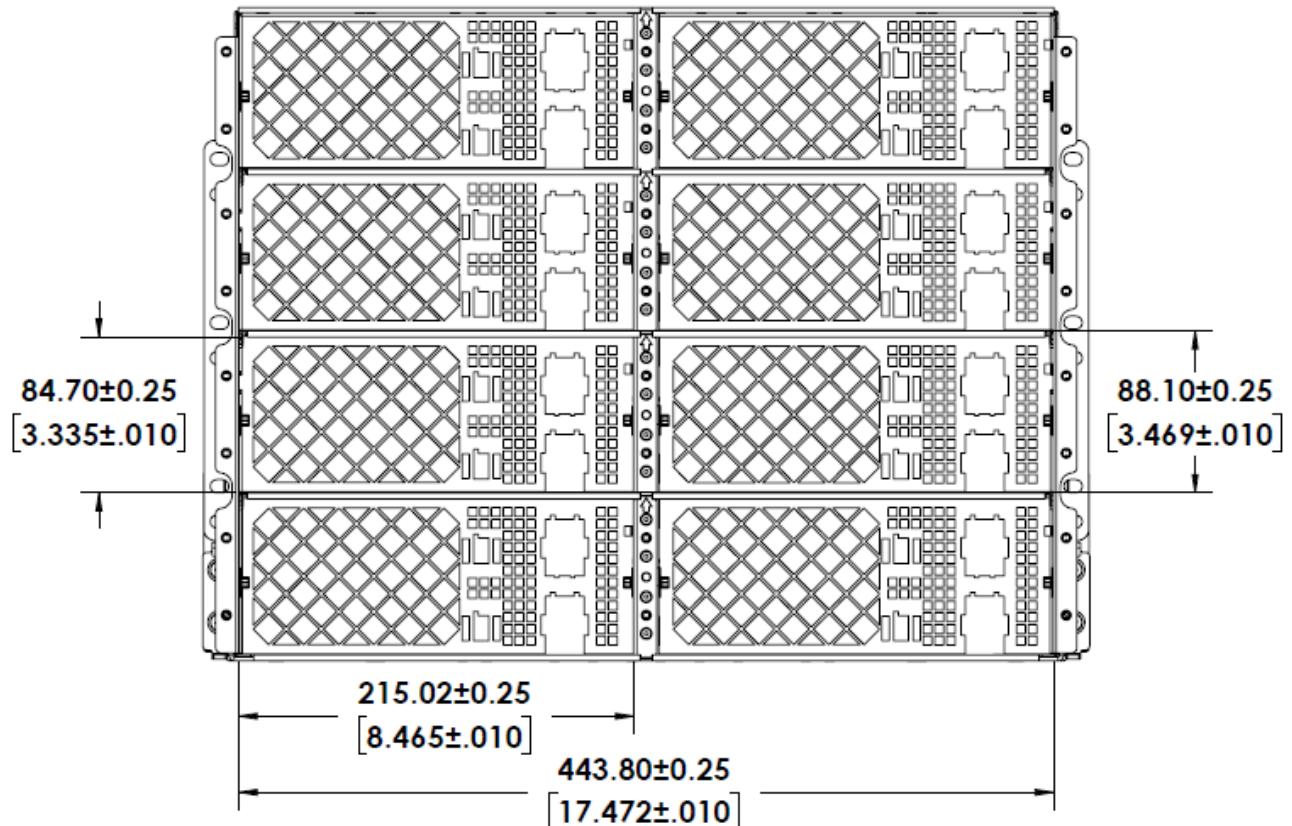


Figure 26 :8RU Cage Partitioning

### 3.3.3 Center Divider

The Center Divider (CD) is installed to support the use of bricks and 2H bricks. Fully insert the CD in the cage and lock it into the horizontal panels above and below by tightening a single M5 socket head cap screw (accessible through a hole at the front of the CD). The screw should be torqued to 5.1 N·m (45 lb-in) before the section is loaded with bricks.

To install the CD, use rub strips on the lower panel as insertion guides. The final 30mm of travel is guided by lead-in tabs at the end of the CD; these tabs help engage windows on the rear of the cage.

To remove the CD, fully back off the M5 screw to disengage the CD hooks from the horizontal panels. Now the CD can be manually extracted out of the cage.

Each CD has two Southco D9-63-11 self-clinching receptacles on the front that secure bricks with quarter-turn fasteners.

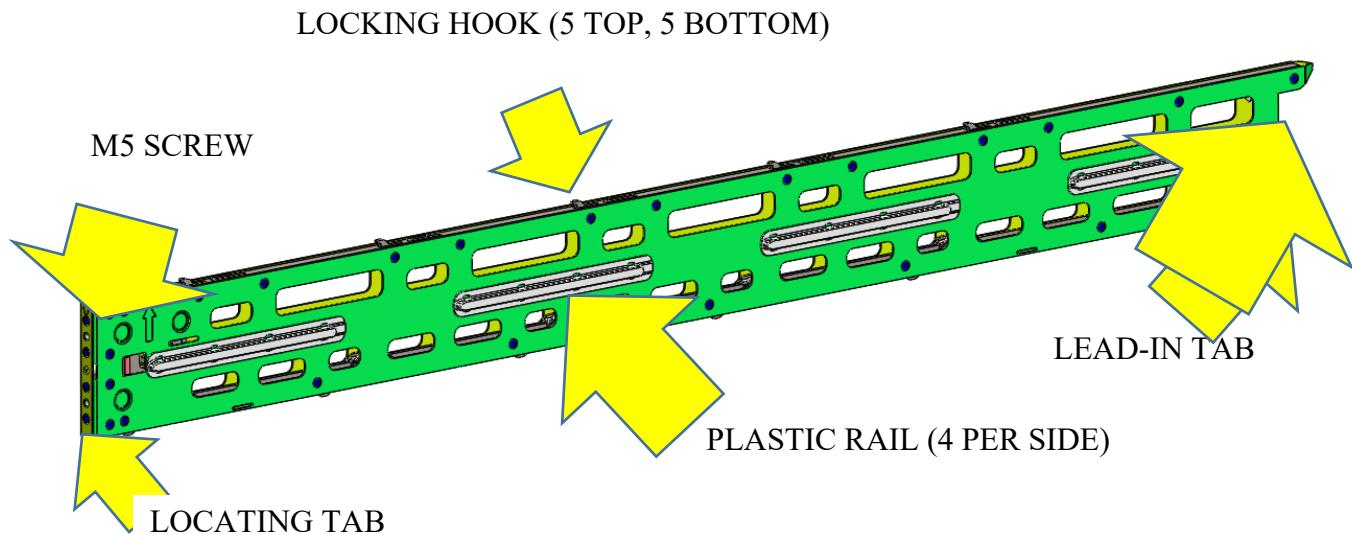


Figure 27 :8RU Center Divider

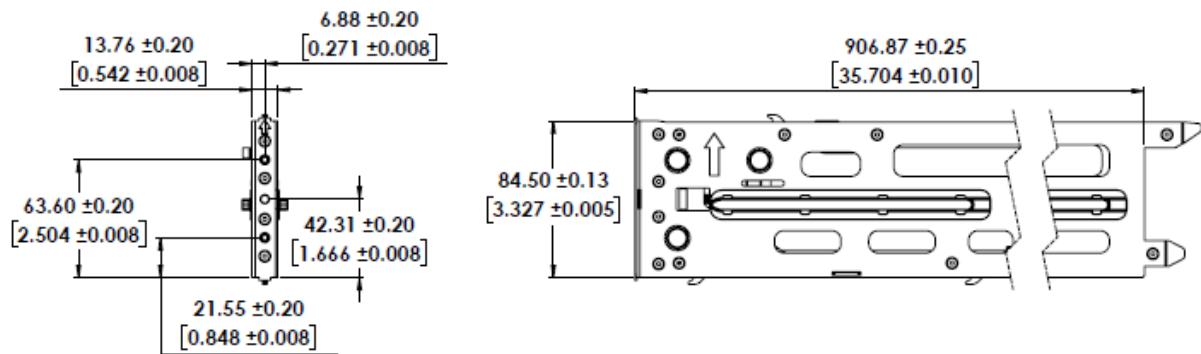


Figure 28 :8RU Cage Vertical Divider 2

### 3.3.4 Horizontal Divider

The Horizontal Divider (HD) partitions the cage into sections and supports a level of bricks. The HD is constructed of a stack of sheet metal panels riveted together to provide rigidity. The upper panel in the stack has a rear wall formed up that adds rigidity to the cage structure and accurately locates the blind-mate server power and signal cable connectors. Tabs protruding from the main panel engage slots in the side walls to promote better assembly tolerance.

Self-adhesive strips are installed on each HD to provide a low-friction surface on which server bricks can ride and provide installation guides for the CDs.

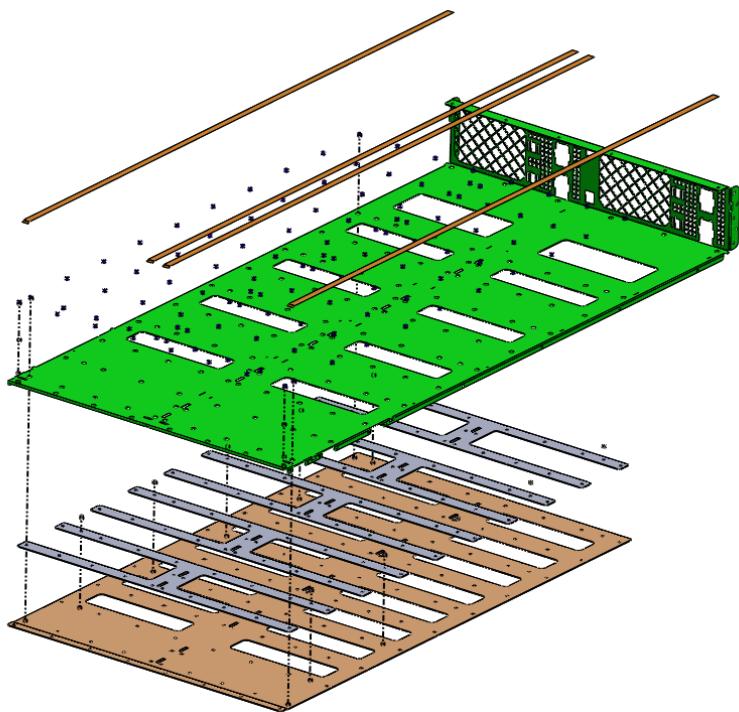


Figure 29 :12RU Horizontal Divider 1

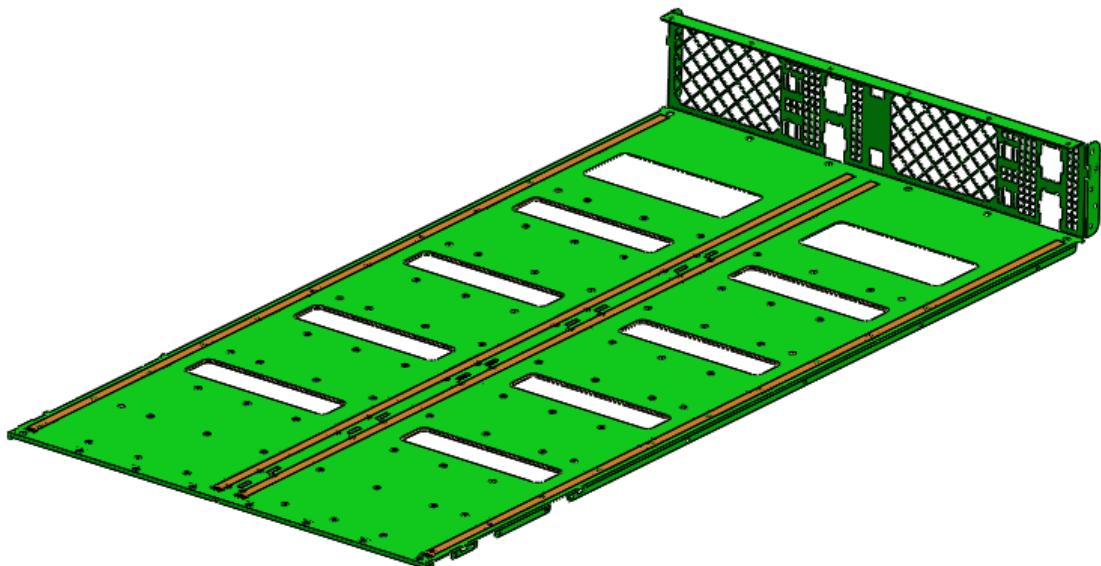


Figure 30 :12RU Horizontal Divider 2

### 3.3.5 Interconnect

The sheet metal rear walls of the cage accommodate the snap-in housings of the power shelf and signal cable connectors.



Figure 31 :8 RU system level cables

Power Shelf Cable Assembly – Amphenol DWR-P1C-B3Q00-102

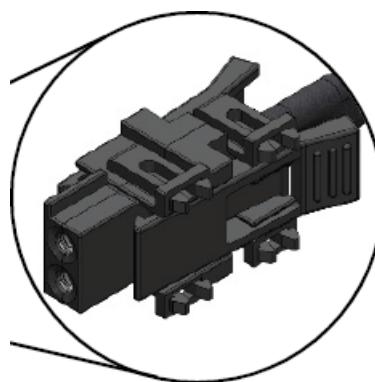


Figure 32 :Power Snap-in Connector

Signal Cable Connector – Molex Impel 4Pr X 2 with Guide Pin part number 171320-9032

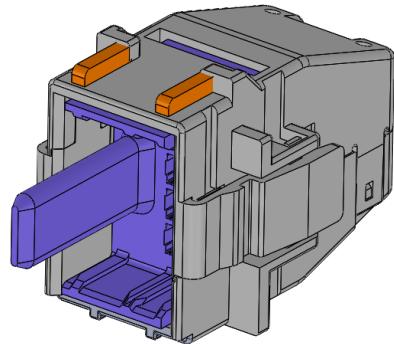


Figure 33 :Data Snap-in Connector

Connector cutouts are sized and positioned within the cage as shown in Figure 31.

### 3.3.5.1 Power Connector Cutout

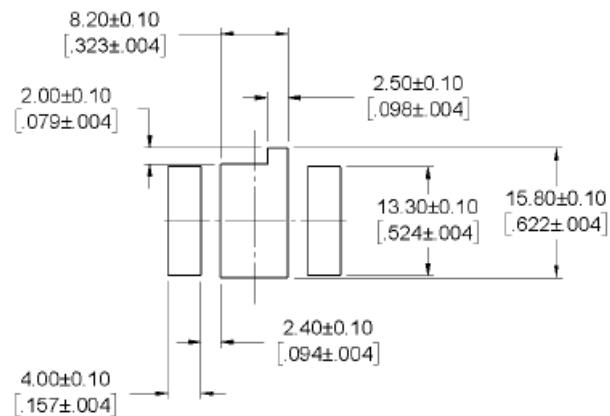


Figure 34 :8RU Power Connector Cutout

### 3.3.5.2 Signal Connector Cutout

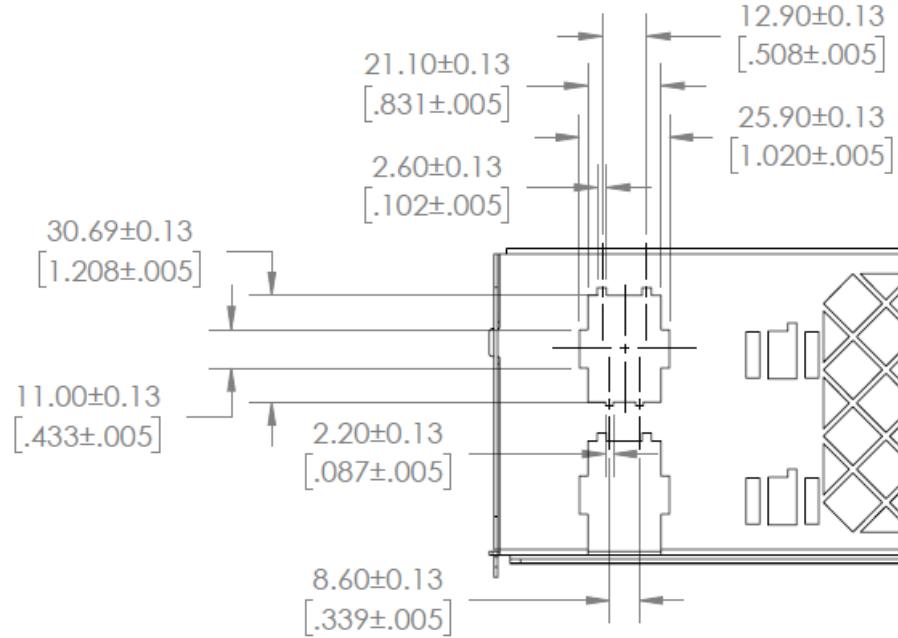
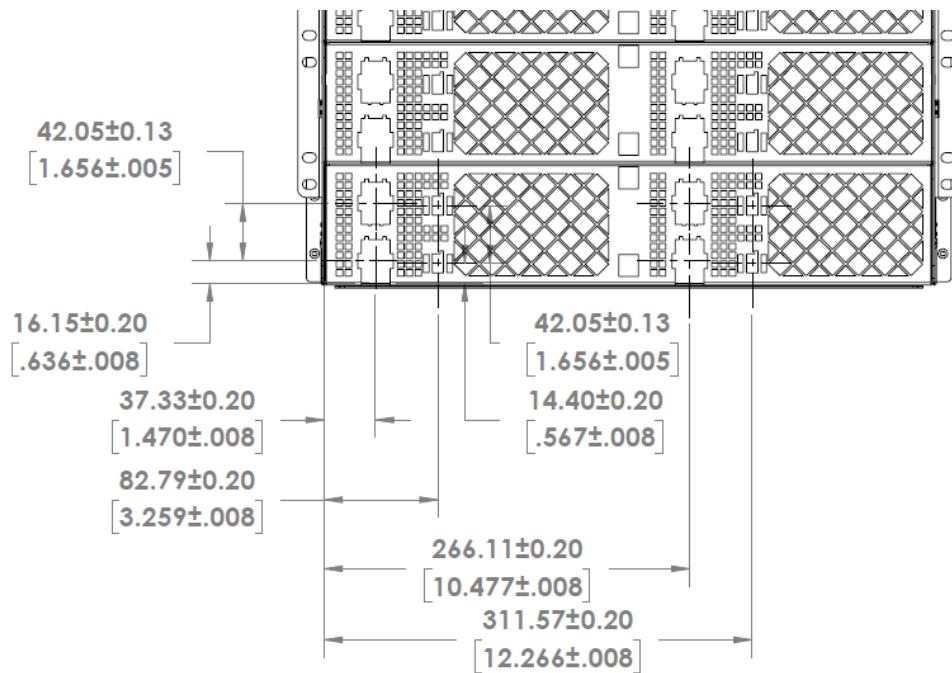


Figure 35 :8RU Data Connector Cutout

### 3.3.5.3 Cutout Locations on Cage Rear Panel

Noted that reference surfaces are the inside surface of a side panel and the top surface of a horizontal divider.



**Figure 36 :8RU Cutout Locations on Cage Rear Panel**

### 3.3.6 Brick Retention

Each side wall contains eight Southco D9-63-11 self-clinching receptacles that secure bricks with quarter-turn fasteners. They are located as shown below:

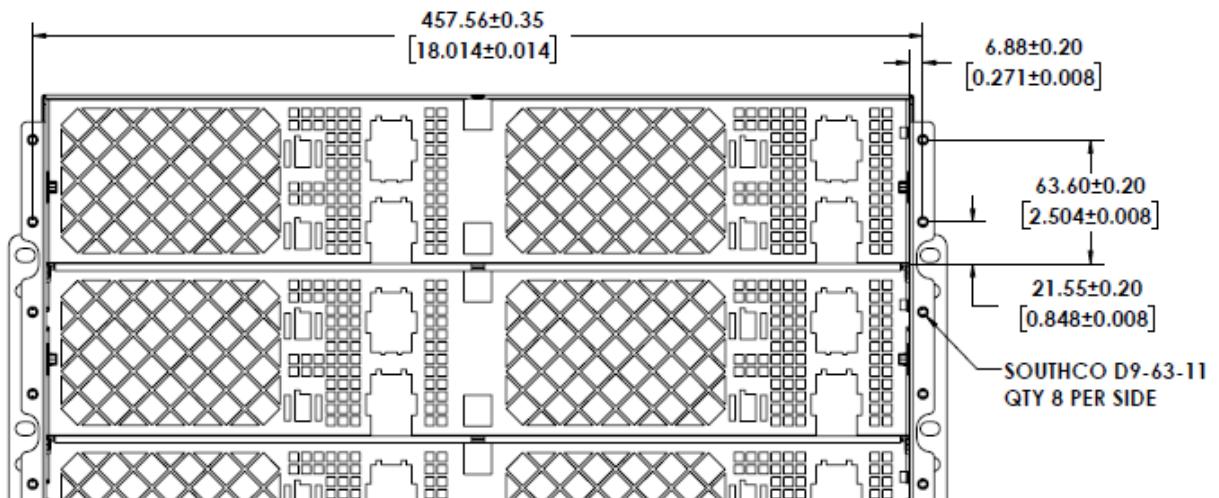


Figure 37 :8RU Cage Brick Retention

### 3.3.7 Mounting Ear Positions

Primary cage mounting ear is positioned 40mm behind the front face of the cage side wall. Two additional positions are provided – 100mm and 200mm from the mounting ear surface to the front face of the cage side wall.

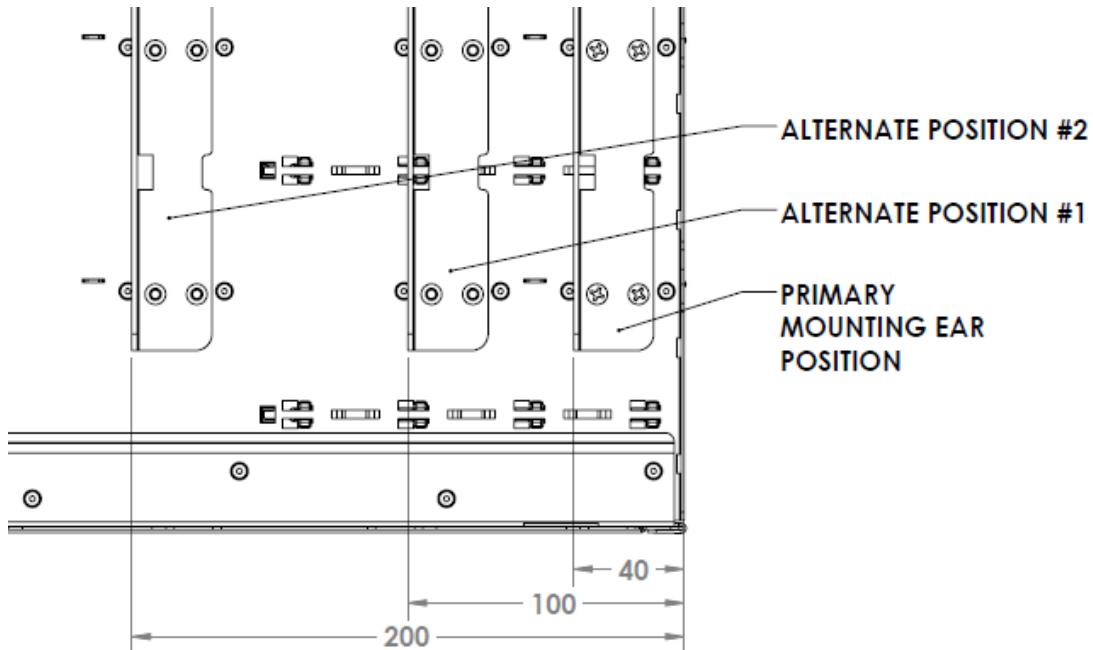
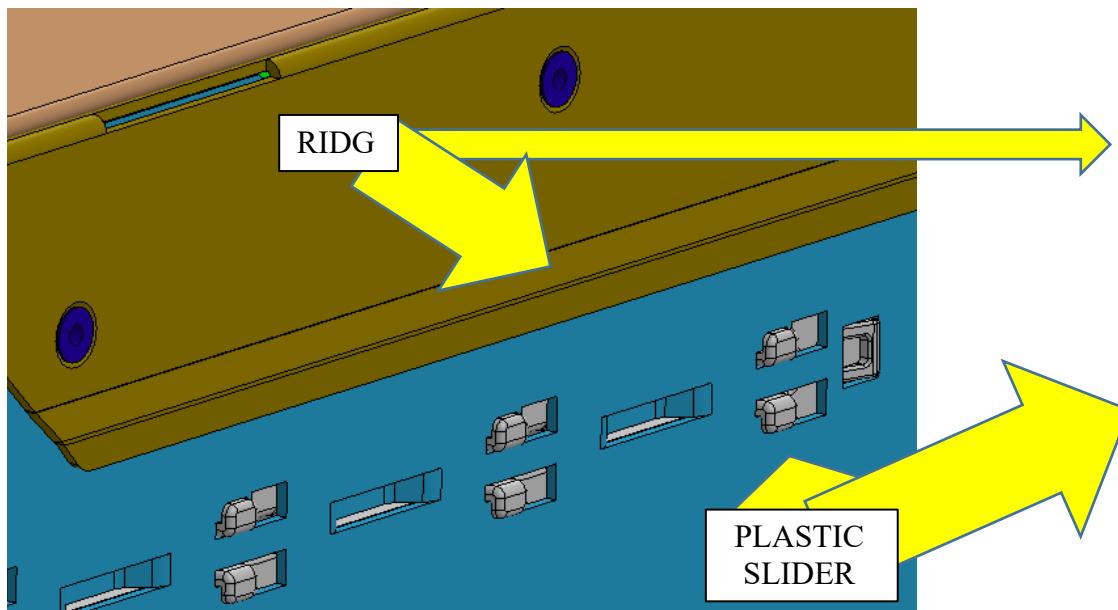


Figure 38 :12RU Cage Mounting Ears Locations

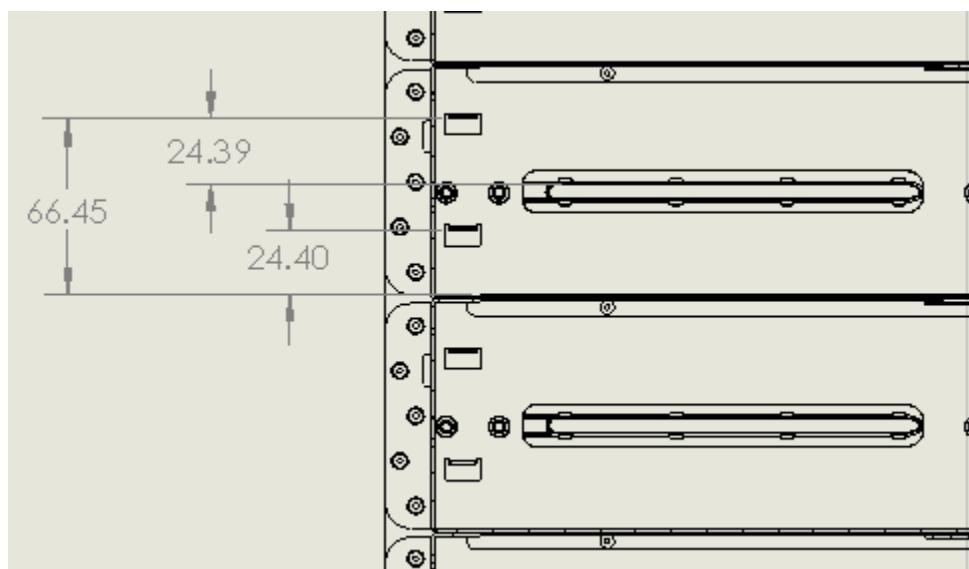
### 3.3.8 Design Requirements

Formed ridges shall be provided along the top and bottom covers to prevent plastic slider tabs from damage during installing a cage into a rack.



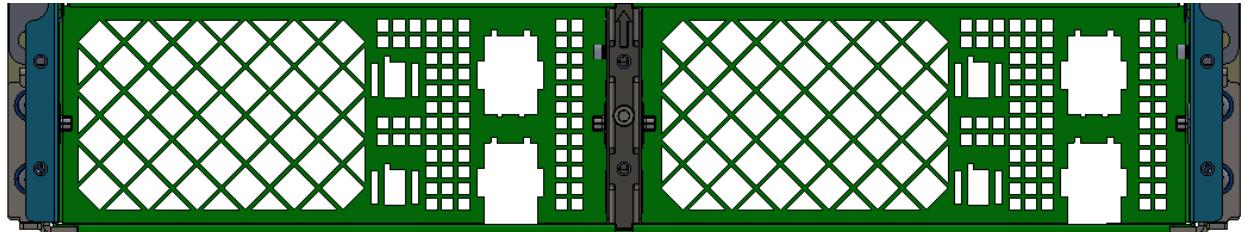
**Figure 39 :8RU Cage Design Requirements**

Keying stops are provided in the right and left rear corners of each cage section. These stops (bent tabs) interface with notches in the brick sides to provide a positive stop during brick insertion and prevent over insertion or possible connector damage. They are positioned as shown below:



**Figure 40 :8RU Cage keying**

Holes are provided in the rear panel for cooling airflow.



**Figure 41 :8RU Cage Front-View Airflow Opening**

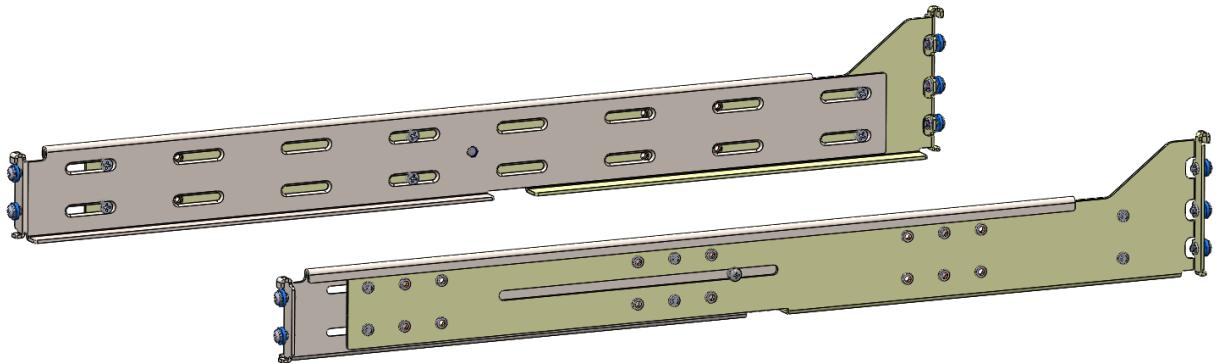
### 3.3.9 Installation Rails

Rails are provided to support the cage during installation and use. Hook the rails into square holes of the rack posts to facilitate rail installation. Securely screw rails to the rack, both front and rear, to ensure load carrying capacity. Rails should not protrude below the bottom surface of the cage.

Installing rails shall accommodate a range of rack post spacing from 28.5" to 36.0".

The rails should support:

- Bare cage installed in a rack during shipping – cage mounting ear screws must secure cage in the rack
- Bare cage installed in a data center rack – cage mounting ear screws not installed
- Fully populated cage during installation into a rack
- Fully populated cage during use – cage mounting ear screws must secure cage in the rack



**Figure 42 :8RU Cage Installation Rails**

### 3.3.10 Materials

The 8RU cage is designed to be constructed of SGCC sheet metal. 1.2mm is the primary thickness used throughout, with 0.8mm and 1.6mm used on some stiffener panels, 1.88mm used for the cage mounting brackets and 2.38mm for the rails.

Two molded plastic parts are used on the cage assembly.

- Sliders are used on the cage side walls and CDs to support bricks; 64 sliders are used in a cage that is fully populated with CDs. Molded in Ultem 1000 resin.

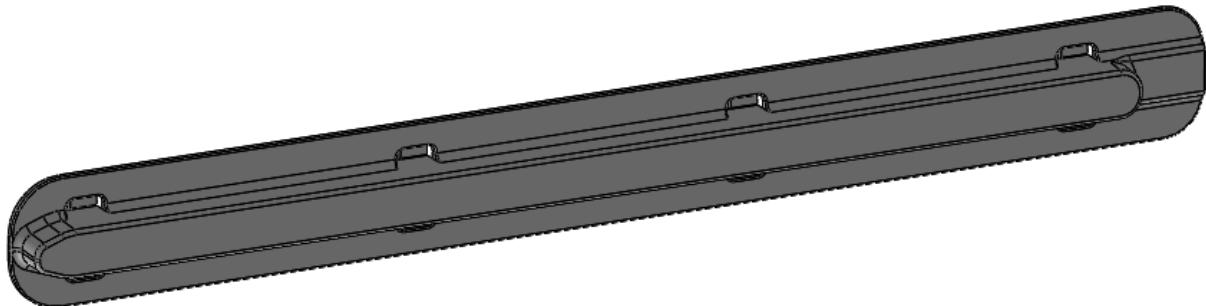
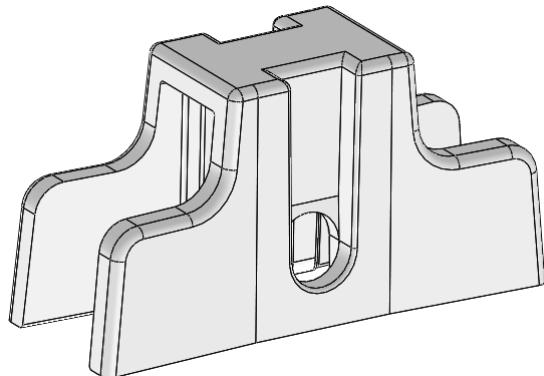


Figure 43 :**8RU Cage Materials 1**

- Dowel Pin Inserts are used in 10 places on each Cd. Molded in Ultem 1000 resin.



#### Figure 44 :8RU Cage Materials 2

- Low-friction strips used on the horizontal dividers are made of black FR700-701 polycarbonate sheet with 3M 467 PSA applied.

#### 3.3.11 Load Capacity

The 8RU cage can accommodate 16 bricks weighing a maximum of 25lbs each.

## 4 Open19 Cable System Specification

### 4.1 General

The Open19 platform is designed to create an optimized solution for power and data distribution. The cabling system creates a virtual server chassis by attaching the cages and building a blind-mate connectivity for power and data. The server installation is simple, and no cabling needed. With the simplicity, the cabling system has been designed to create a robust disaggregated platform and support data center installation in the future.

The cable system is all passive and does not need any EEPROM embedded to it.

### 4.2 Open19 Power Cabling System

The Open19 power cabling system is built out of 8-channel aggregation or 12-channel aggregation. Each bundle is an array of power distribution cables (feed and return) and carries 12V to the servers.

The cables and connectors are rated to carry 35A to each server.

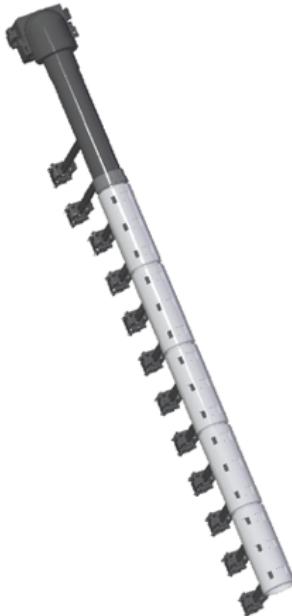


Figure 45 :Open19 Power Cable 1



Figure 46 :Open19 Power Cable 1

#### 4.2.1 Power Cable Detailed Specifications

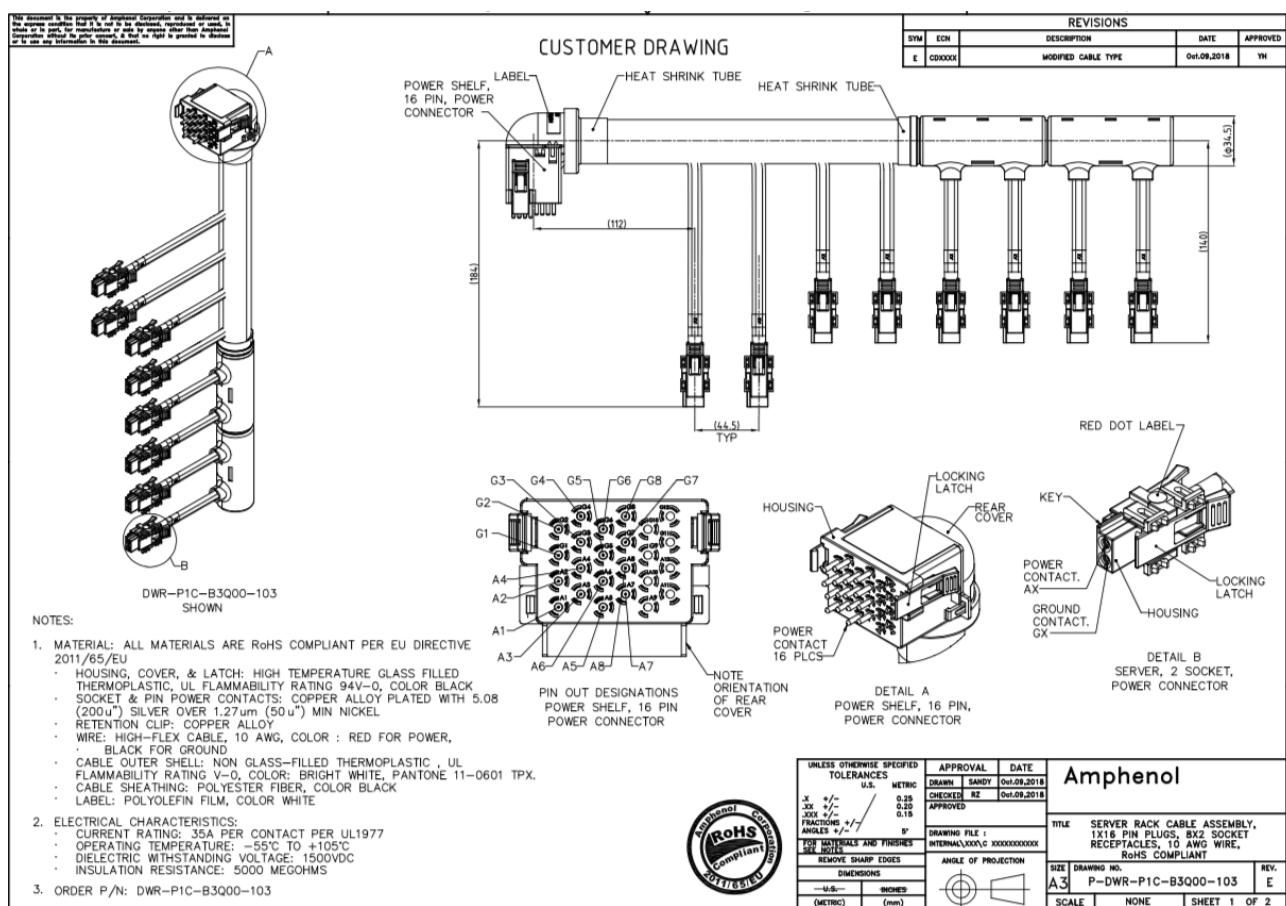


Figure 47 :Open19 Power Cable (8RU) Detailed Specification 1

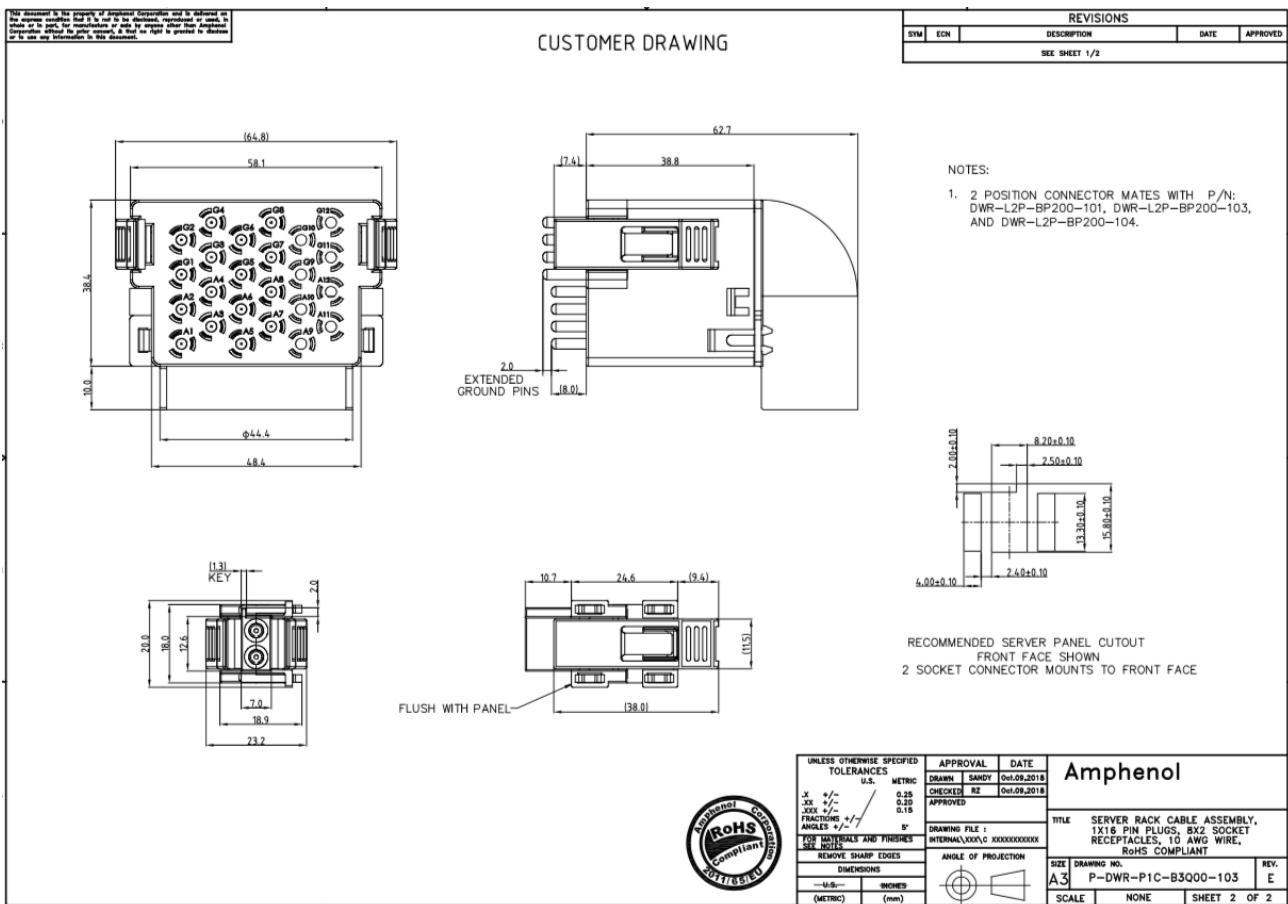


Figure 48 :Open19 Power Cable (8RU) Detailed Specification 2

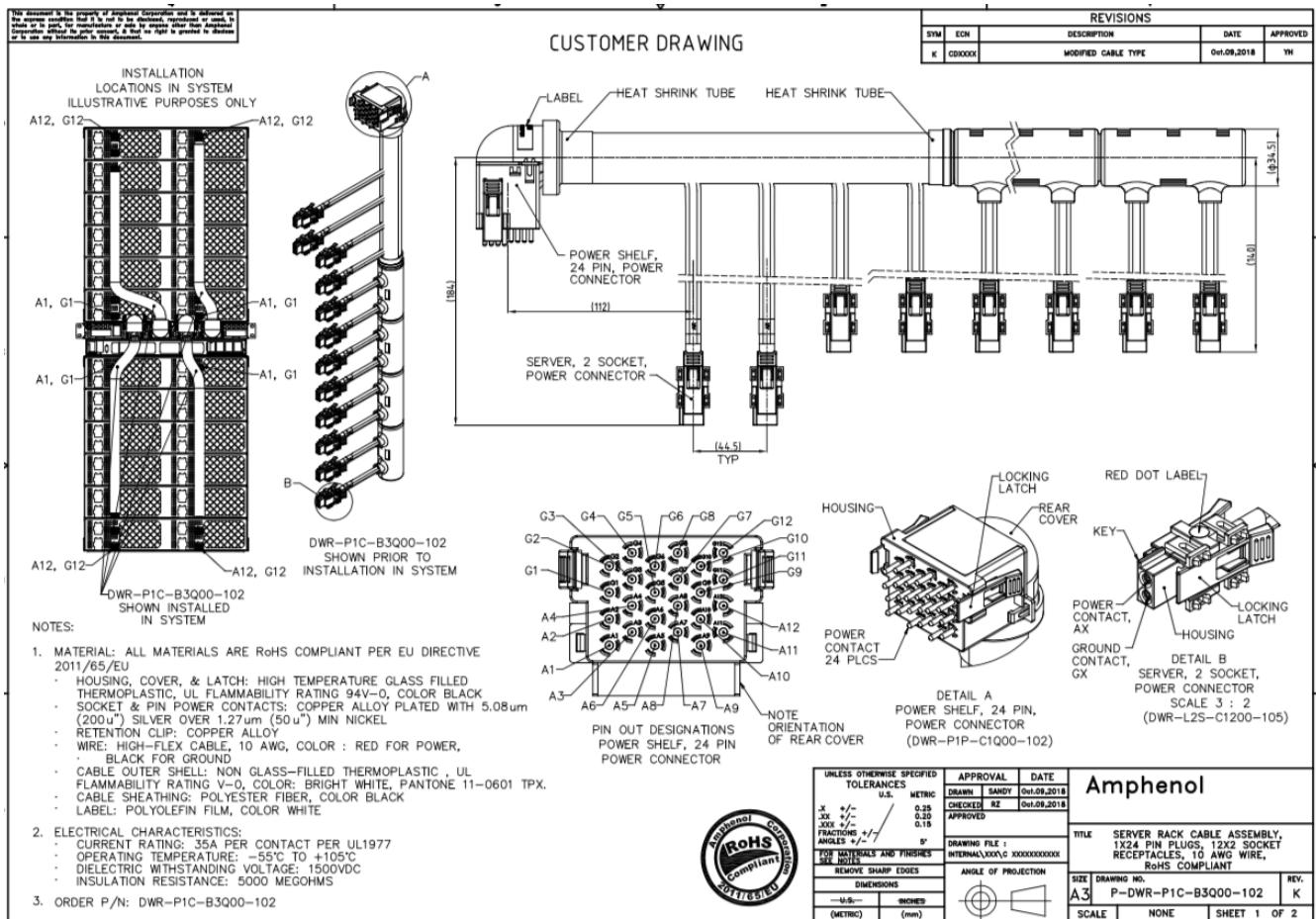


Figure 49 :Open19 Power Cable (12RU) Detailed Specification 1

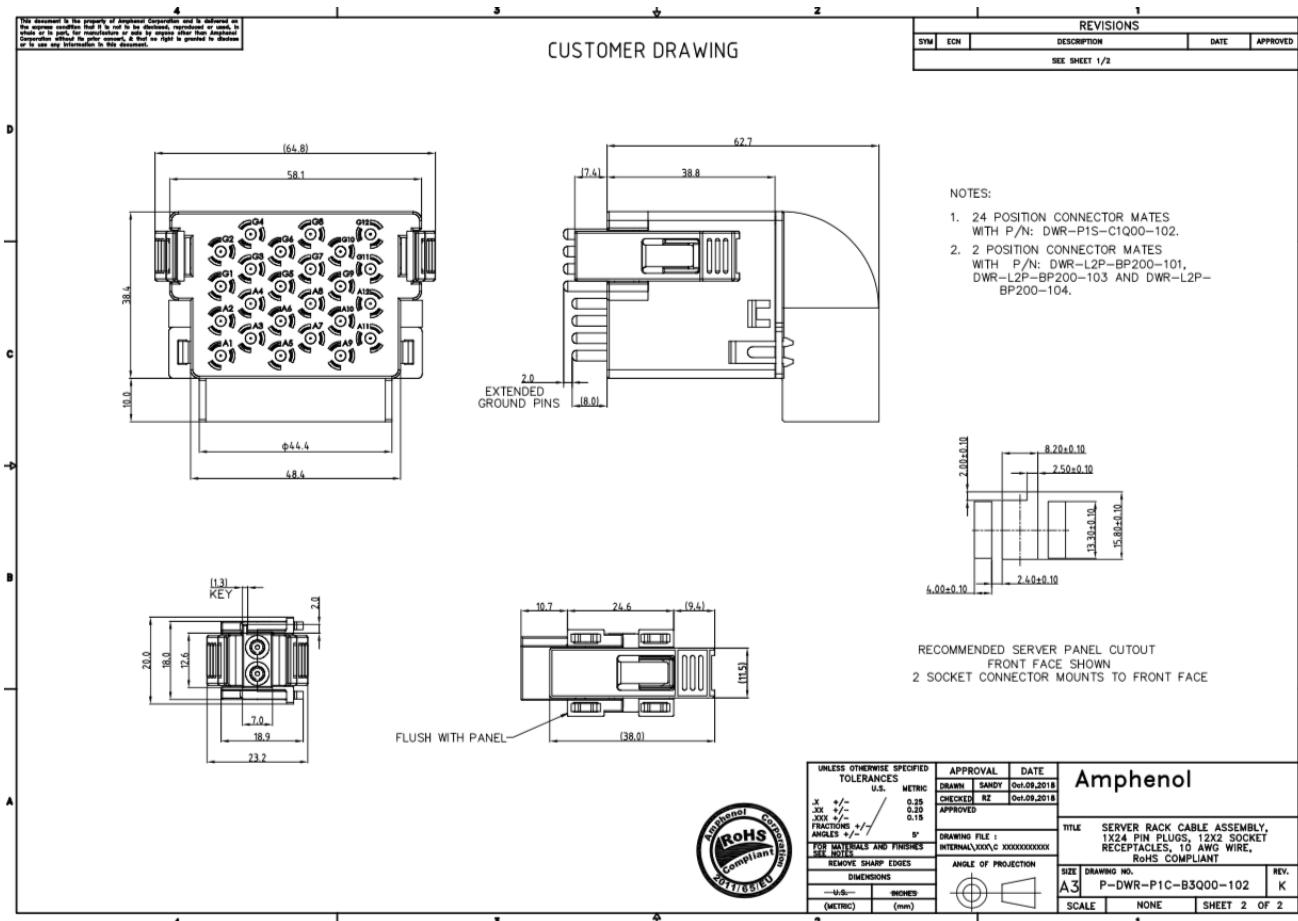


Figure 50 :Open19 Power Cable (12RU) Detailed Specification 2

## 4.2.2 Power Cable Pinout

### 4.2.2.1 Server-side Connector

Open19 Backplane Power connector				
Signal Description	Net name	Pin No	Net Name	Signal Description
12V Backplane power	VDD12V_BP	A1	G1	Ground

Table 1: Server Power Connector Pinout

#### 4.2.2.2 Power Shelf Connector

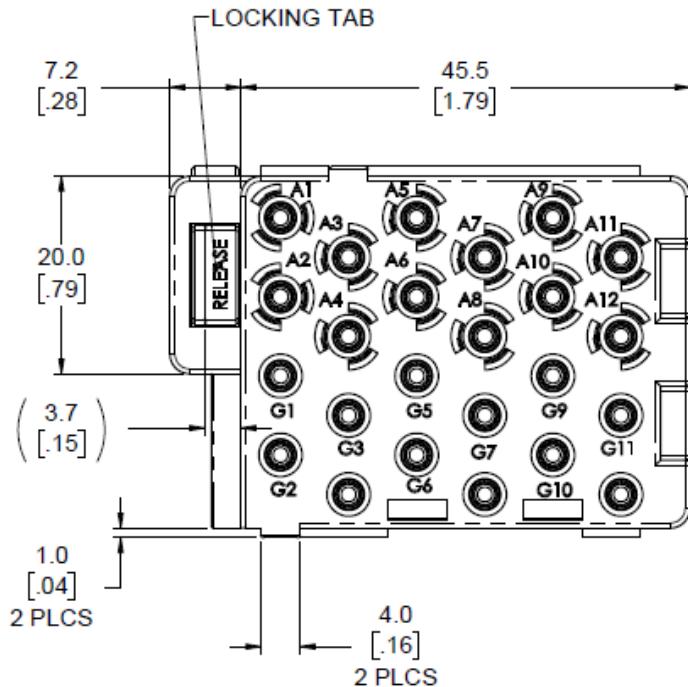


Figure 51 :Open19 Power Shelf Output Connectors Pinout (External View)

Pin Number	Pin Description	Output voltage	Current rating
A1..A12	Output low voltage distribution pin	12v	35A
G1...G12	Return (GND) pin for the corresponding output pin	GND (Return)	35A
Release	Mechanical latch pin	N/A	N/A

Table 1: Power Shelf Output Connector Pinout

### 4.3 Open19 Data Cabling System

The Open19 data cabling system is built out of 8 or 12 independent cable plane connectors, each of which carries 8 differential pairs of 4 TX and 4 RX. The cables are rated to fully function at 50G PAM4, enabling up to 200G per server connector. The cables are plugged to high density connectors (96 differential pairs) dedicated to the bolt switch.



Figure 52 :Open19 12RU Data Cable 1

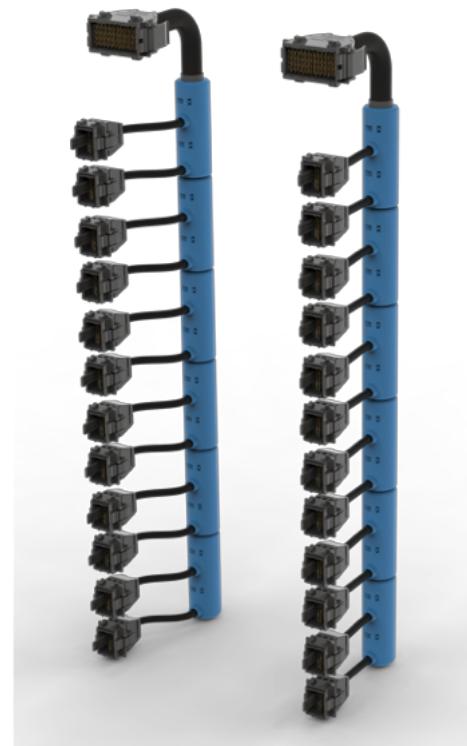
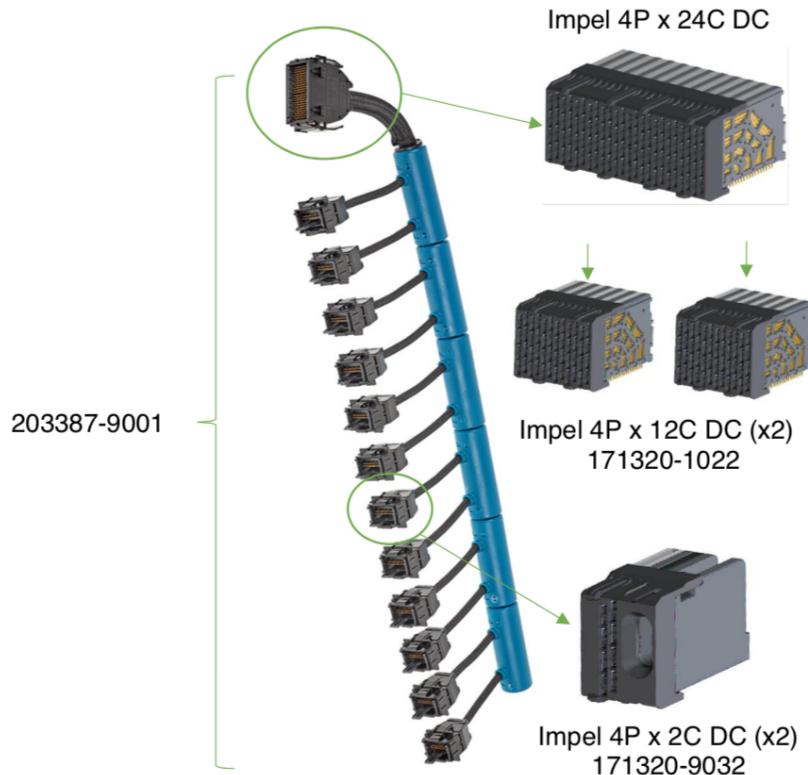


Figure 53 :Open19 12RU Data Cable 2

UL FILE: E72548



**Design Intent:**

Total of 96 Differential Pairs with one switch connection breaking out to 12 server connections per data cable.

Figure 54 :Open19 12RU Data Cable 3

### III. MATERIAL CHARACTERISTICS

**30AWG 90 Ohm Twinax Construction**

<b>Conductor:</b>	30AWG Solid SPC
<b>Drain:</b>	30AWG Solid SPC
<b>Shield:</b>	Aluminum / Polyester
<b>Jacket:</b>	Polyester, Heat Sealed

<b>Contacts:</b>	Copper alloy with 0.76µm (30µINCH) minimum Gold over 1.27µm (50µINCH) minimum Nickel plating
<b>Backshell/Spines:</b>	PC+ABS
<b>Woven Wrap:</b>	Polyester fiber, black

Figure 1 : Open19 12RU  
Data Cable Materials

#### 4.3.1 Power Cable Detailed Specifications

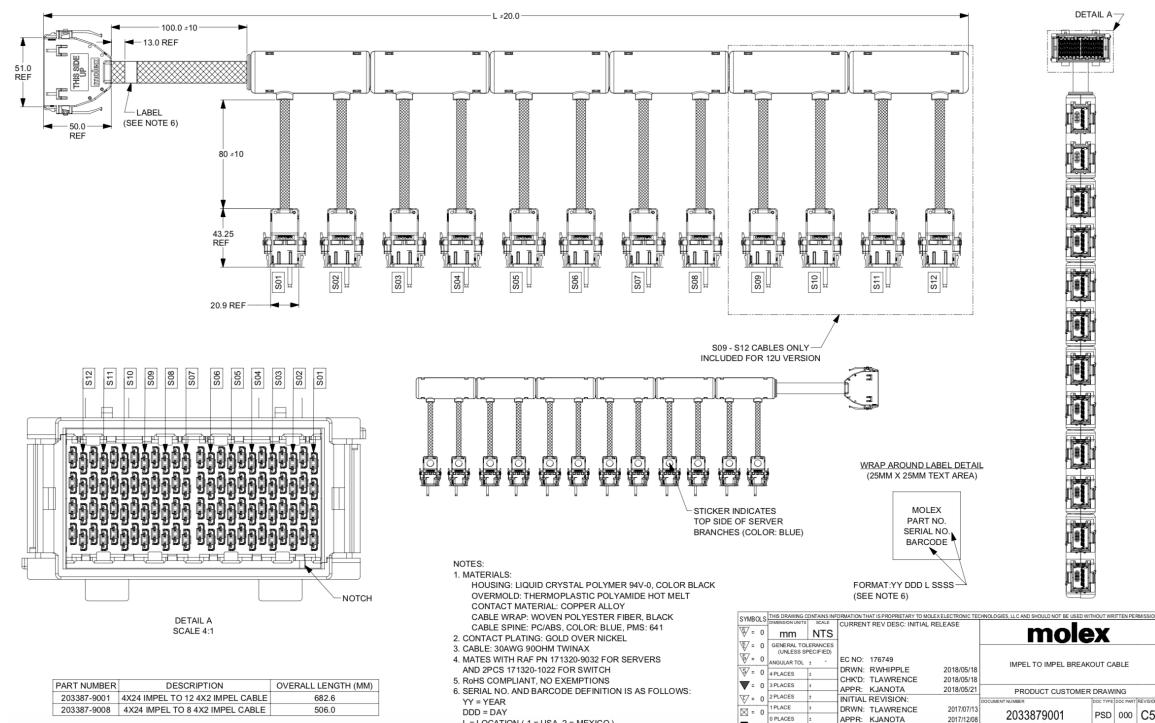


Figure 55 :Open19 Data Cable (12RU) Detailed Specification 1

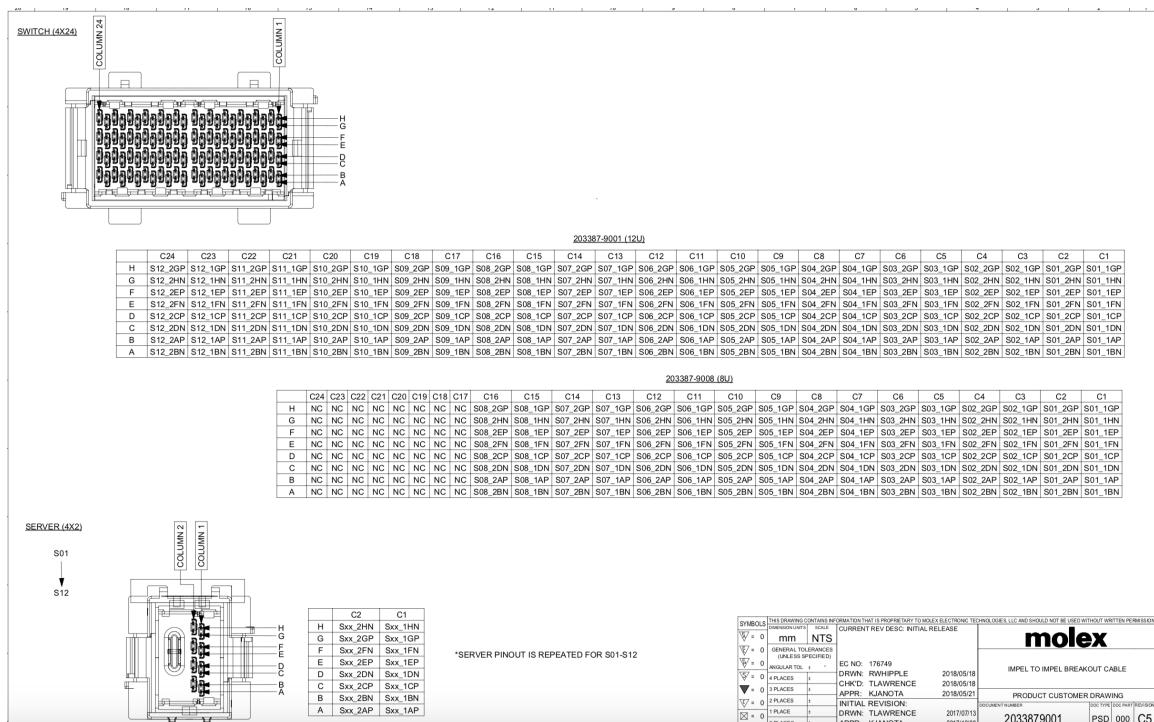


Figure 56 :Open19 Data Cable (12RU) Detailed Specification 2

### **4.3.2 Data Cable Pinout**

#### 4.3.2.1 Server-side Connector

Open19 Backplane Data connector				
Signal Description	Net name	Pin Number	Net Name	Signal Description
Optional Console port	Console TX	B1	B2	Console RX
	SPARE (NC)	A1	A2	SPARE (NC)
Switch to Server (1G)	GE_SWITCH_BP_TX_N	D1	D2	GE_SWITCH_BP_RX_N
	GE_SWITCH_BP_TX_P	C1	C2	GE_SWITCH_BP_RX_P
Server to Switch port1 (25G TX)	SERV1_TX_P	F1	F2	SERV2_TX_P
	SERV1_TX_N	E1	E2	SERV2_TX_N
Switch to Server port1 (25G RX)	SERV1_RX_P	H1	H2	SERV1_RX_P
	SERV1_RX_N	G1	G2	SERV1_RX_N
Ground Pin	GND	GND1...GND18		GND
				Ground Pin

**Table 2: Data Connector Pinout for Specialty Switch**

Open19 Backplane Data connector				
Signal Description	Net name	Pin Number	Net Name	Signal Description
Server to Switch port3 (25G TX)	SERV3_TX_P	B1	B2	SERV4_TX_P
	SERV3_RX_N	A1	A2	SERV4_RX_N
Server to Switch port3 (25G RX)	SERV3_RX_P	D1	D2	SERV4_RX_P
	SERV3_TX_N	C1	C2	SERV4_TX_N
Server to Switch port1 (25G TX)	SERV1_TX_P	F1	F2	SERV2_TX_P
	SERV1_RX_N	E1	E2	SERV2_RX_N
Switch to Server port1 (25G RX)	SERV1_RX_P	H1	H2	SERV1_RX_P
	SERV1_TX_N	G1	G2	SERV1_TX_N
Ground Pin	GND	GND1...GND18		GND
				Ground Pin

**Table 3: Data Connector Pinout for Standard Switch**

## 5 Open19 3.2Tbps Switch Specification

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This document roughly describes the Open19 3.2T bolt switch. Refer to the Bolt switch contribution for more details on the switch.



Figure 57 :**Open19 Bolt Switch**

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## **6 Open19 Power Shelf Specification**

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The initial Open19 platform specification describes the 1RU power shelf that is rated for 19.2KW (given there are six modules of 3.2KW each). To build redundancy, the power shelf is either used in a 3+3 mode supporting 9.6KW or 5+1 mode supporting 16KW. The power shelf is fully redundant, including the following interfaces:

- 2 Universal input connectors (see specification below)
- 2 Independent RJ45 connectors for OOB 1GE network
- 4 High density Radsok® connectors for power distribution (see specification below)

This standard does not specify the internal implementation of the power system in the shelf and leave it open for implementation by each supplier. However, the standard

specifies the exterior mechanical requirements, internal controller system (BMC based), and external interfaces. See more details below.

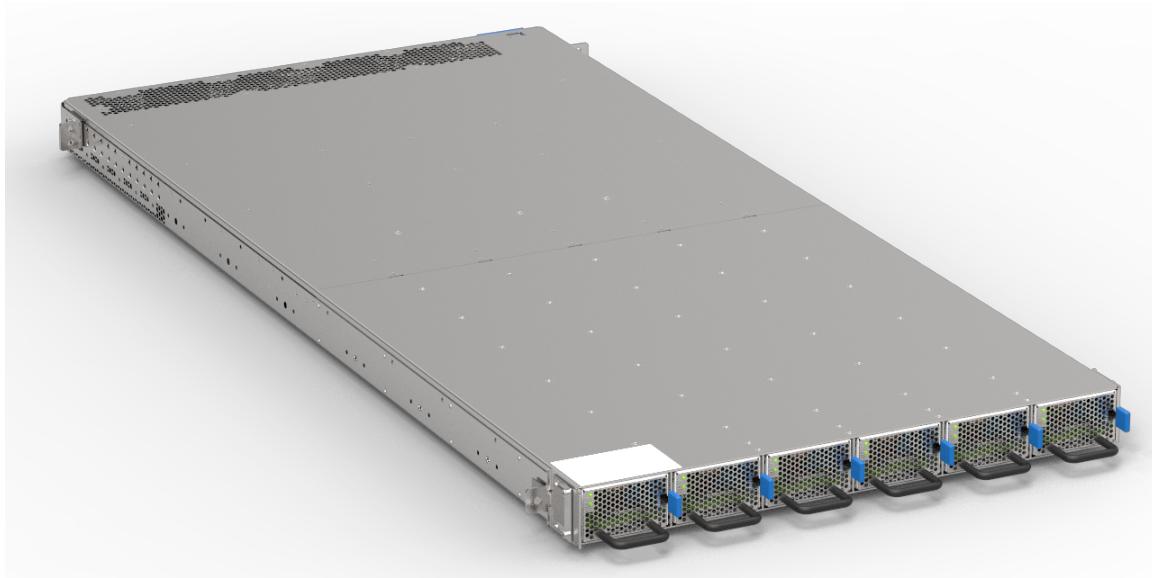


Figure 58 :Open19 Power Shelf Front View



Figure 59 :Open19 Power Shelf Rear View

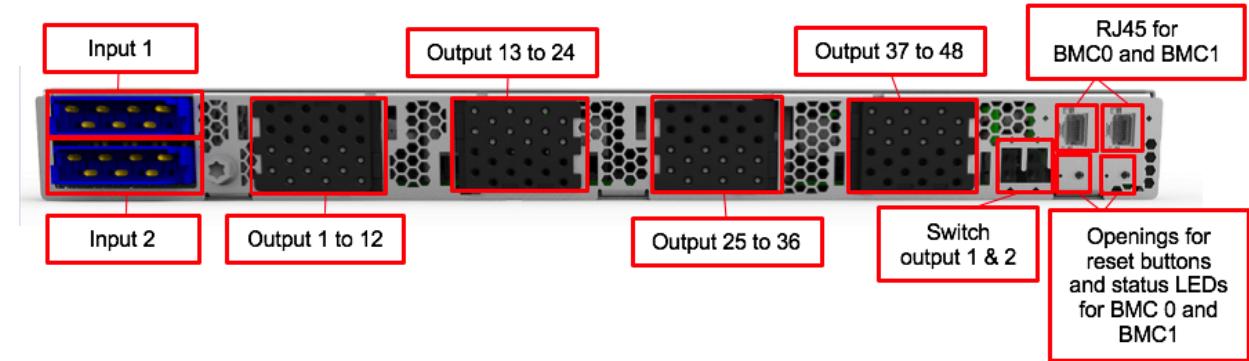


Figure 60 :Open19 Power Shelf Rear Connectors View

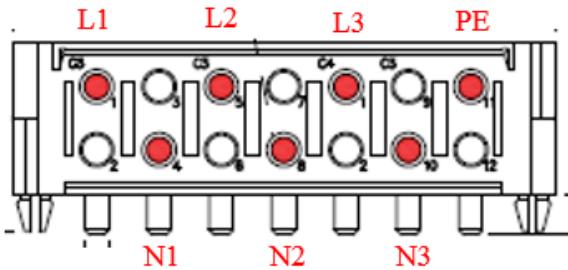
## 6.1 Universal Input Connectors

The shelf has two input connectors in the back panel. Each connector feeds a rail of 3 PSUs.

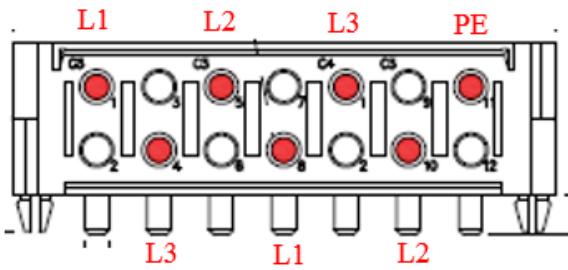
The input connector is a 14 Pin scorpion series from Positronic, vendor P/N SP5YYEY48M0LN9A1/AA-PA1342.

The following diagram shows different configurations for input connectivity to the power shelf (AC and DC options).

**3-Phase Wye connection pin arrangement:**



**3-Phase Delta connection pin arrangement:**



**HVDC connection pin arrangement:**

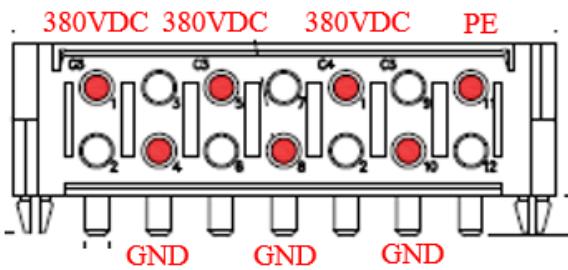


Figure 61 :Open19 Power Shelf Input Connectors Pinout

## 6.2 High Density Radsok® Output Connectors

The high-density connectors create an array for twelve 12v outputs and 12 return lines to a total of 24 pins; each connector is allocated to up to 12 server bricks.

The connector pins are rated to 35A per contact, enabling up to 400w per server (with 20w margin). Each output is associated by an eFuse inside the power shelf. It is out of scope for this specification to cover how to set the mapping of eFuse numbers to output. It should be set by each power shelf supplier.

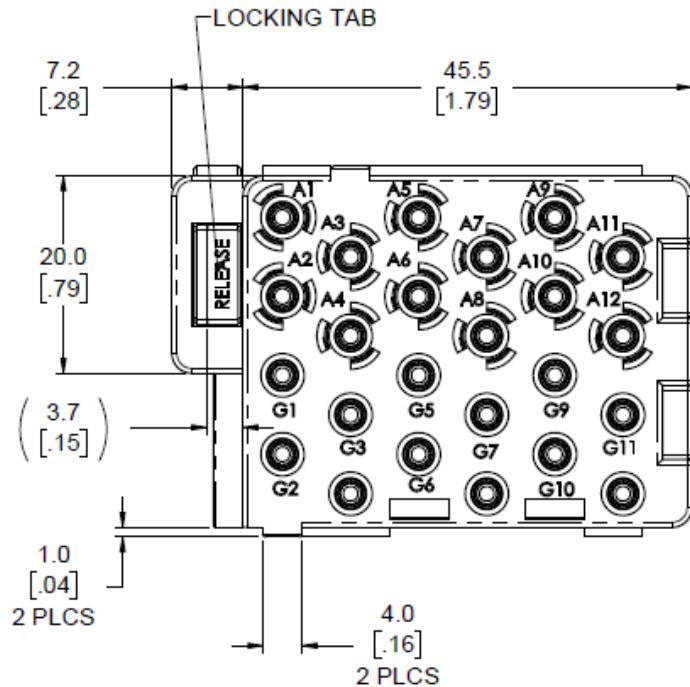


Figure 62 :Open19 Power Shelf Output Connectors Pinout (External View)

Pin Number	Pin Description	Output voltage	Current rating
A1..A12	Output low voltage distribution pin	12v	35A
G1...G12	Return (GND) pin for the corresponding output pin	GND (Return)	35A
Release	Mechanical latch pin	N/A	N/A

Table 1: Power Shelf Output Connector Pinout

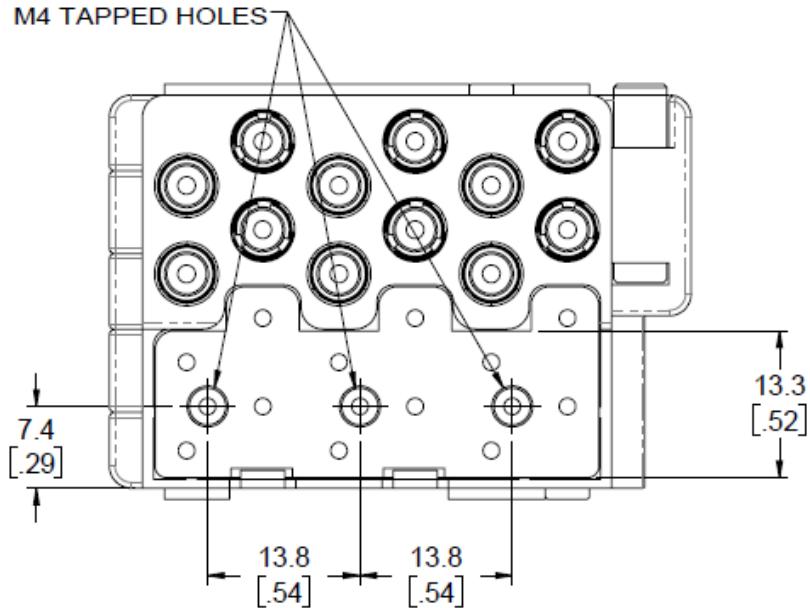


Figure 63 :**Open19 Power Shelf Output Connectors Pinout (Internal View)**

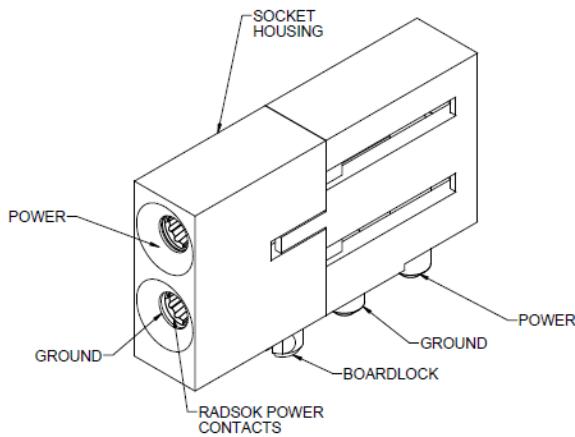
Note that the busbar on the bottom of the connector connects to all return Radsok® pins.

Refer to the cable section above for information on mating connectors.

### 6.3 Switch Output Connector

Each power shelf supports two 12v outputs for up to two networking switches (or other appliances). The two Switch Output connectors are placed on the back side of the shelf and accessible from the back side.

The part number of Switch Output connectors is Amphenol: P-DWR-P1S-BQ200-1A6.



#### Figure 64 :Open19 Power Shelf Switch Output Connectors

Refer to the cable section above for information on mating connectors.

### 6.4 Output Grounding

The main output should be isolated from the chassis ground.

### 6.5 Reset Buttons and LEDs

Each power shelf has two reset buttons and two status LEDs for each of the hot masters implemented inside the shelf. Refer to Figure 58 for the locations of reset switches and LEDs.

The LEDs next to the reset button shows the actual status of the BMC. The following color codes can be reflected in the LEDs:

- Both LEDs off – The shelf is not powered.
- Single LED off – Faulty associated CPU sub-system needs to be serviced.
- Orange LED – The associated CPU sub-system is booting.
- Green LED – The associated CPU sub-system booted successfully and active.
- Red LED – The associated CPU sub-system is experiencing a fault condition post boot and needs to be serviced.

### 6.6 RJ45 Connectors for OOB 1GE Network

Each power shelf has two RJ45 connectors that are connected to the two hot master shelf controllers and implement an Out of Band (OOB) Gigabit Ethernet (GE) network connection.

Both RJ45 Ge connectors are active at all times.

Refer to Figure 58 for locations of the connectors.

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## 7 Open19 Installation Process

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The Open19 platform defines a new way of building data centers and installing servers into racks. The Open19 platform enables a two-stage data center installation. The first stage is built out of the infrastructure components described in this specification and the second stage is server installation.

The Open19 platform has been designed to enable the infrastructure a simple and expedited installation. The infrastructure is everything except the servers and can be pre-build prior to server availability at a very small increment to the bare rack cost. Building the infrastructure first will give tremendous acceleration and simplicity in adding servers to the data center. This feature will also enable the build out of dark data centers.

It is out of scope for this specification to call out the installation process; however, we mention the process since we see it as one of the key values of the platform.

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## 8 Open19 Environmental Requirements

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The Open19 platform can operate in any data center environment with no special restriction or requirement. The only two environment requirements are:

- Ambient temperature of 10c-40c at sea level to 1000m elevation
- Unobstructed front and back airflow

Noted that while an enclosed rack is also supported for the Open19 platform, the required airflow per disaggregated component in the platform needs to be reviewed separately in case of obstructed airflow.