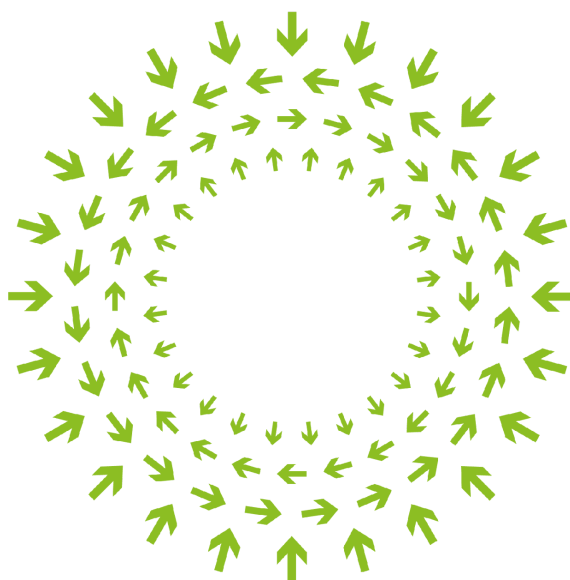




OPEN

Compute Project

ORW Project: Rack and Power

Open Rack Wide (ORW)

Revision V1.0.1

Base Specification

Effective May 5, 2026

Author(s): Rich Banyard, Darryl Daniel

Version History

Date	Version #	Author(s)	Description
10 OCT 2025	0.9.0	Rich Banyard Darryl Daniel	Initial preliminary draft
10 MAR 2026	0.9.0-rc5	Rich Banyard Darryl Daniel	preliminary draft; removed Meta Design Specification; Updated all drawing views & added tolerances; formatting updates
28 APR 2026	1.0.0	Rich Banyard Darryl Daniel	Initial release
05 MAY 2026	1.0.1	Darryl Daniel	Updated embedded dimensional views

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1. License

1.1. Open Web Foundation (OWF) CLA

Contributions to this Specification are made under the terms and conditions set forth in **Modified Open Web Foundation Agreement 0.9 (OWFa 0.9)**. (As of October 16, 2024) (“Contribution License”) by:

Rittal CSM
Meta Platforms Inc.

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Notes:

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1.2. Acknowledgements

The Contributors of this Specification would like to acknowledge the following for their feedback:

Brendan Blackford, Rittal CSM
Glenn Charest, Meta Platforms Inc
Paul Clements, Rittal CSM
Cecilia Galvan, Meta Platforms Inc
Ben Kim, Meta Platforms Inc
Dmitriy Shapiro, Meta Platforms Inc
Saurabh Kulkarni, Meta Platforms Inc

2. Compliance with OCP Tenets

2.1. Openness

The ORW specification was developed with the Rack and Power community to provide a future proof base rack to support the changing needs and requirements of larger IT Gear platforms. All components needed to build an entire rack system are incorporated into the base specification.

2.2. Efficiency

The ORW specification is defined such that it will be used for many years, allowing it to support current IT equipment and those to be developed in the future. Racks built to this specification should allow the use of legacy equipment allowing users to reuse products repeatedly.

2.3. Impact

ORW is used as a fundamental basis for many OCP contributions that will be built on top of the specification. These contributions will be able to be submitted by all working groups within OCP.

2.4. Scale

The ORW base specification is designed to provide a base frame for large scale deployments of racks. By sharing common and interchangeable parts, the community can build at scale while leveraging components from each other.

2.5. Sustainability

The frame design has application in multiple IT industry domains and, as a result, has the potential to enable more rack reuse in these different areas.

3. Overview

ORW Base Specification is designed to support the growing needs of densely populated IT gear racks, requiring a larger footprint than a traditional ORv3 based IT gear rack. It is the starting point of defining IT equipment and accessory specifications for large format racks within the Open Compute Project ecosystem. This specification defines the key interfaces for IT equipment.

Any statements using:

SHALL must meet this requirement to comply with the specification

SHOULD are recommended to meet this requirement but are not required

MAY are suggested if the rack supplier is interested in meeting for interoperability between solutions

4. Base Specification for ORW Rack Frame

4.1. Description

This Base Specification details the minimum requirement which must be met to allow basic equipment rails, IT gear equipment, busbars, and other accessories to be integrated with the ORW Rack Frame. It defines critical dimensions and tolerances as well as physical interface requirements for hardware compatibility.

4.2. Mechanical Requirements

There are no prescribed requirements in the base specification for external frame dimensions such as depth, height, base geometry, or maximum payload capability. These parameters may vary per end user requirements, and may be defined in separately contributed ORW Design Specifications for a unique implementation of the frame. Other factors which should be considered during implementation of the Base Specification include rack payload configurations, packaging considerations, shipping and logistics, rack movement, and infrastructure constraints. These factors may influence overall rack footprint, height, feature set, and maximum packaged weight.

4.2.1. Critical Frame Interface Dimensions

The dimensions and tolerances specified in the cross-section below are critical interfaces for all hardware used in conjunction with the ORW frame including IT equipment, busbars, accessories such as rails.

Note: For full resolution drawings of each embedded dimensional view, refer to Appendix A.

DATE: 2008.12.15
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

SECTION Z-Z

DETAIL A

ORW RACK

SCALE 0.13 @ A3

4.2.2. Vertical OU & RU Spacing

Page 10

The drawings include:

- DETAIL C:** Typical of front & rear inner verticals, scale 1:0. Shows hole spacing and dimensions.
- DETAIL D:** Typical of front & rear inner verticals, scale 0.75. Shows hole spacing and dimensions.
- DETAIL E:** Scale 0.15. Shows a side view of the rack structure.
- FRONT OF RACK:** Scale 0.050. Shows the front elevation of the rack with various components and dimensions.
- SECTION Y-Y:** Scale 0.050. Shows a cross-section of the rack.
- DETAIL F:** Scale 0.2. Shows a detail of the rack structure.

Dimensions and notes include:

- 19.8841 33 DATUM A TO HOLE C MEASURING AT 1, 23 & 44 0.0 POSITIONS BOTH SIDES OF RACK
- EXT. 360.91 HOLE TO HOLE FRONT INNER HOLE TO REAR INNER HOLE BOTH SIDES OF RACK
- 44.4340 45 HOLE TO HOLE FRONT TO REAR
- SCALE 0.13 @ A3
- DATE: 01.13
- PROJECT: ORW RACK
- DESIGNER: O.R.W.
- CHECKER: O.C.P.
- SCALE: 0.13 @ A3
- DATE: 01.13
- PROJECT: ORW RACK
- DESIGNER: O.R.W.
- CHECKER: O.C.P.

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4.3. Busbar

4.3.1. 48V Busbar Geometry

Page 12

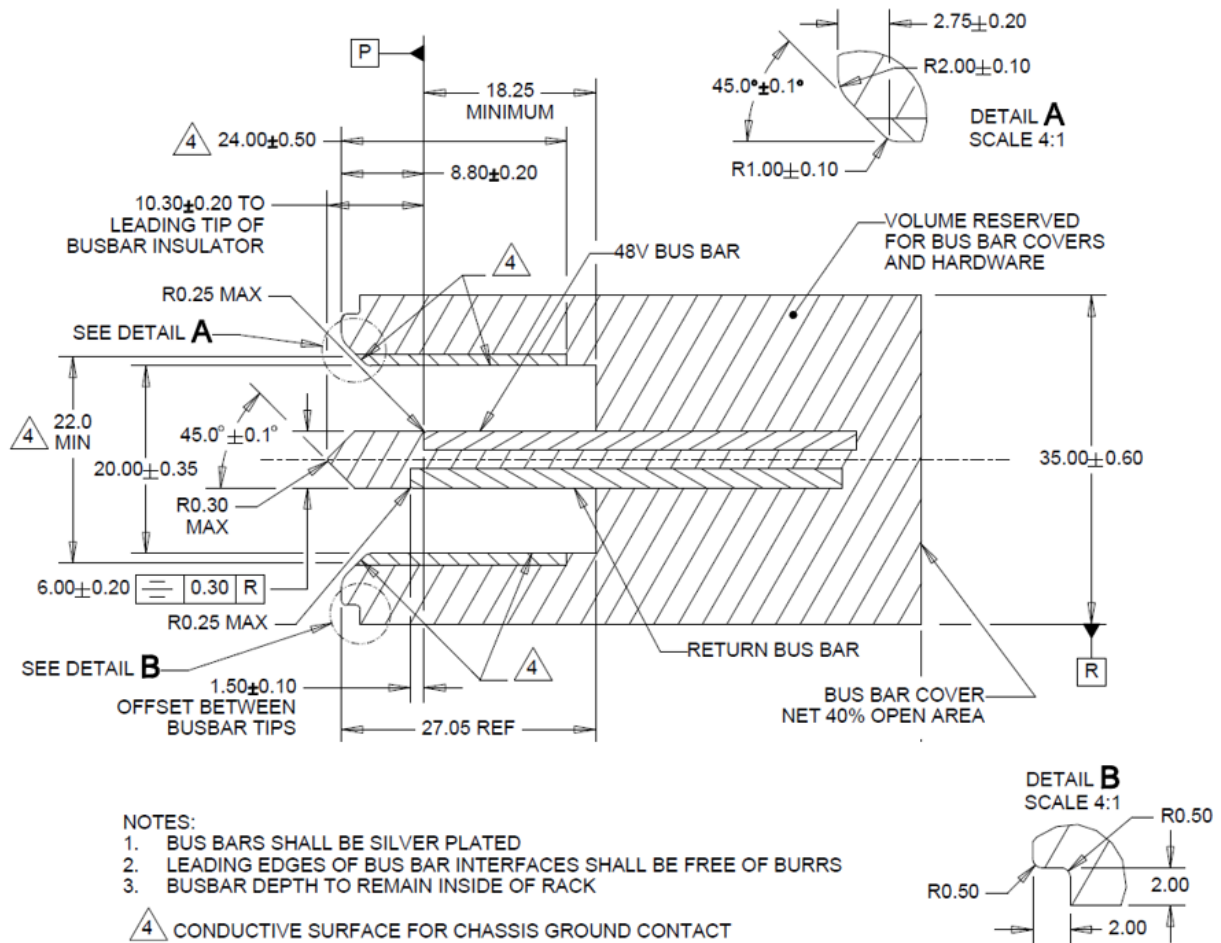


Figure 4.3.1.1 48V Busbar Cross-section

4.3.2. Ground Path

The electrically conductive surface of the busbar (Note 4) as defined in Figure 4.3.1.1 above SHALL have a continuous electrically conductive path to the frame of the rack. The ground path SHALL pass rust grade 6 per ASTM D610-01 after 48 hours of salt spray per ASTM B117-07.

4.3.3. Busbar Interfaces to the Rack Frame

The geometry of the 48V busbar that provides power to the IT Gear has standardized interfaces between the rack and the busbar to allow for

interoperability between the components. The rack MAY incorporate these features at the rack builders discretion.

4.3.3.1. Lower Busbar Interfaces to the Rack Frame

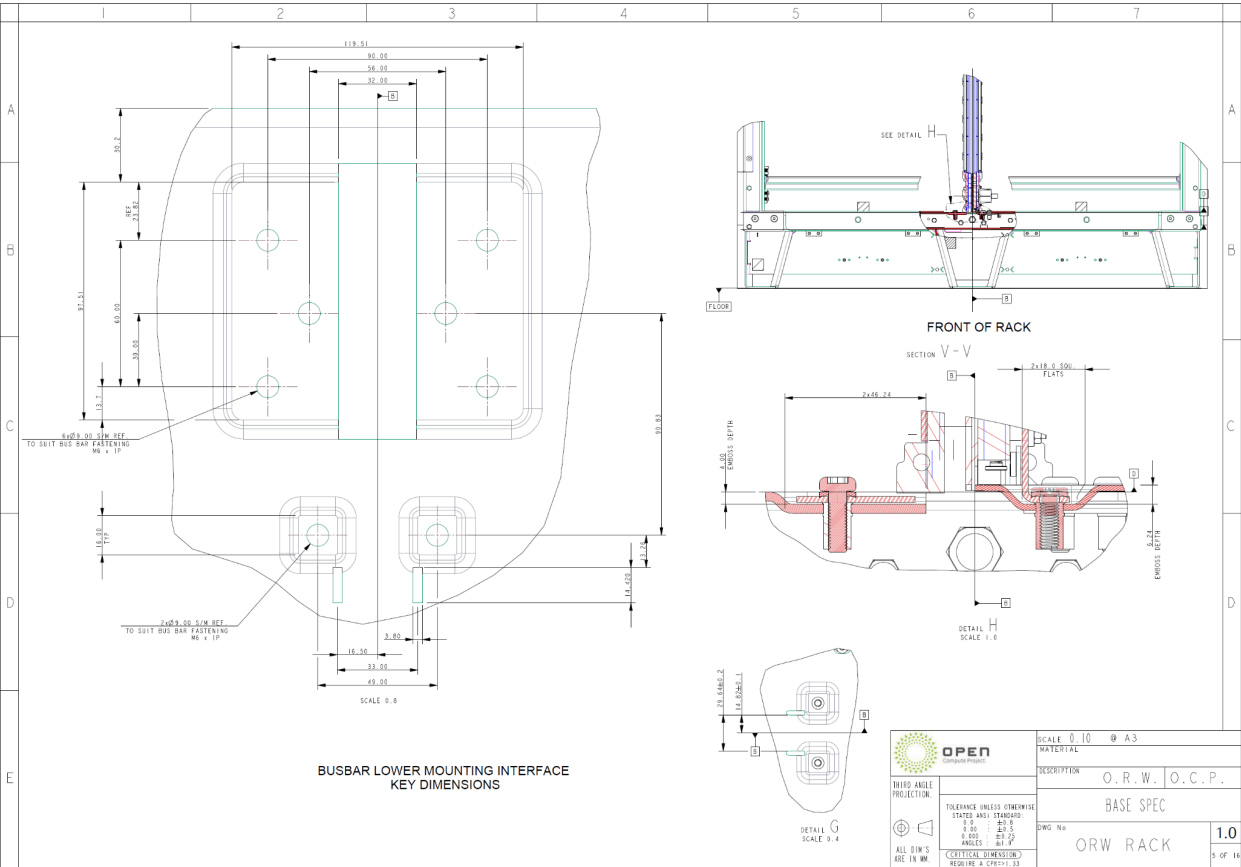


Figure 4.3.3.1.1 Rack/busbar interfaces in the rack bottom plate

4.3.3.2. Upper Busbar Interfaces to the Rack Frame

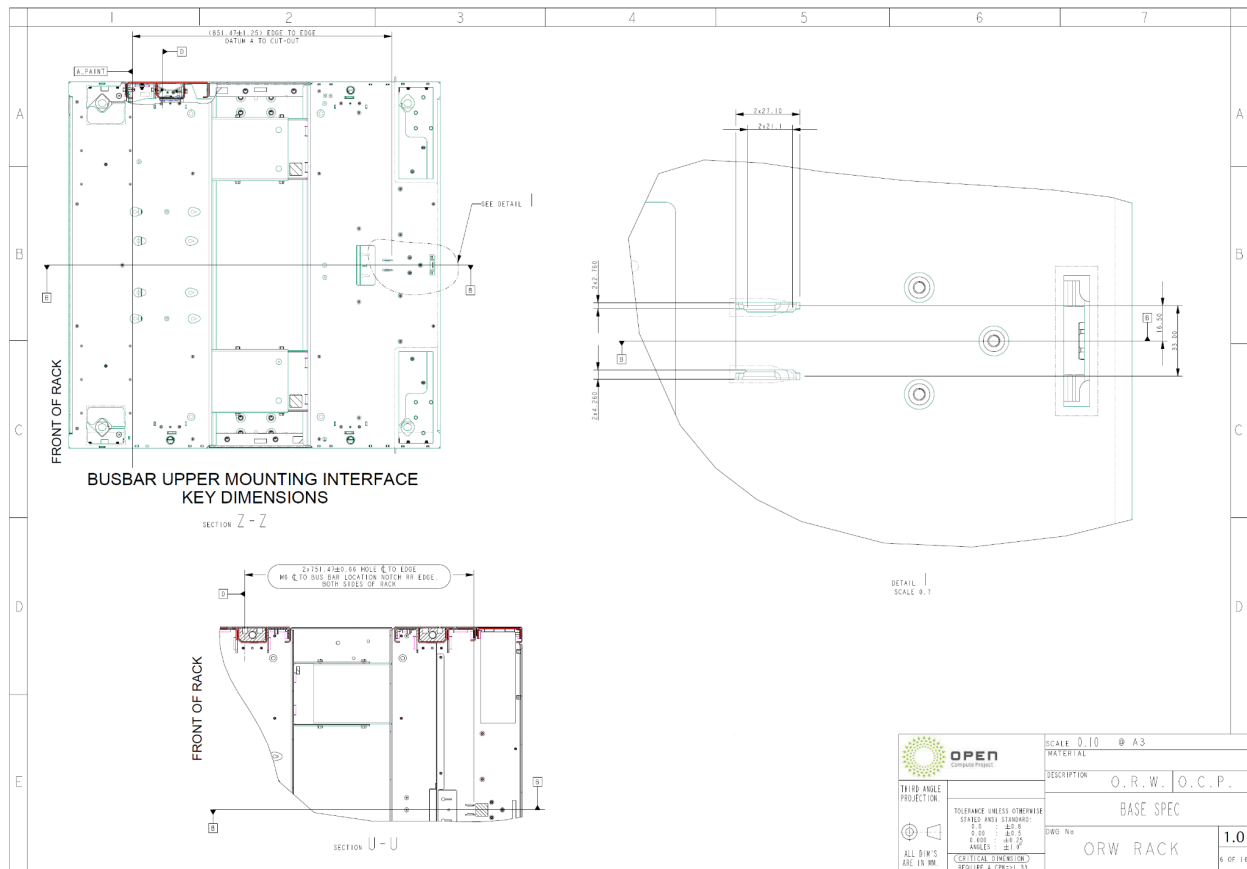


Figure 4.3.3.2.1 Rack/busbar interfaces in the rack top canopy (LOOKING FROM BELOW CANOPY)

4.4. Fastener Requirements

4.4.1. All Ø4.5mm holes (before paint) in the rack are designed for steel M5 thread-forming screws per DIN 7500. Holes to have minimum strip out torque of 6.25 N-m. Nominal torque required is 5 N-m and supports a minimum of 5 cycles of tightening & untightening.

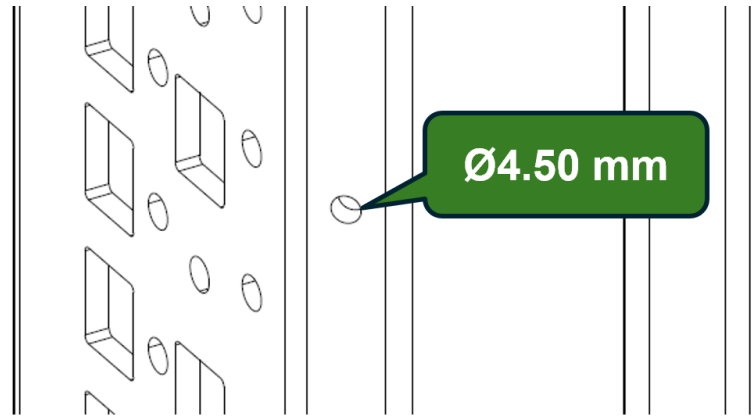


Figure 4.4.1.1 Holes on inner vertical for thread-cutting screws

- 4.4.2. All Ø5.4mm holes (before paint) in the rack are designed for M6 thread-forming screws per DIN 7500. Holes SHALL have minimum strip out torque of 6.25 N-m. Nominal torque required is 5 N-m and supports a minimum of 5 cycles of tightening & untightening.
- 4.4.3. M6 threaded holes in inner vertical frame members are designed for M6 x 8 mm (min) machine screws. Holes SHALL have minimum strip out torque of 8 N-m. Nominal torque required is 5 N-m.

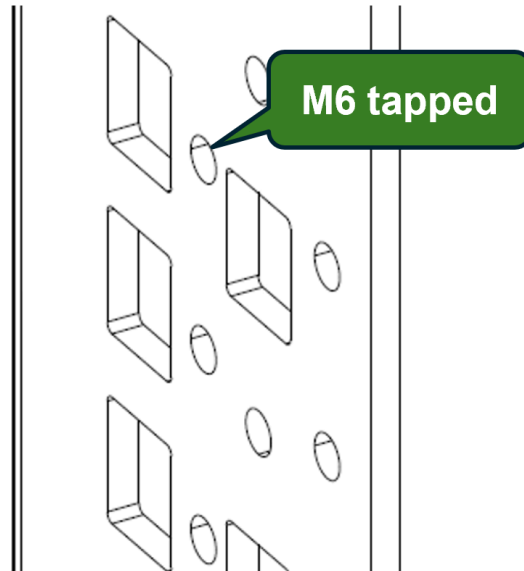


Figure 4.4.3.1 M6 tapped holes on inner verticals

- 4.4.4. **Busbar Upper Mounting Screws:** The M5 threaded holes for mounting the busbar at the top are designed to utilize (qty 4x) M5 x 8mm (Min) pan head machine screws. Holes SHALL have minimum strip out torque of 6.8 N-m. Nominal torque required is 5 N-m.

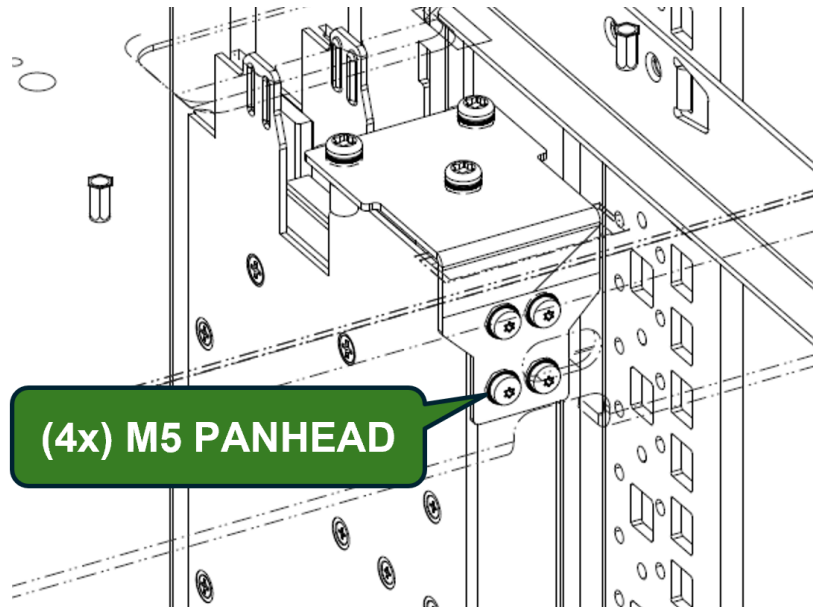


Figure 4.4.4.1 Upper busbar fasteners (Canopy shown as wireframe for clarity)

- 4.4.5. **Busbar Lower Mounting Screws:** The (qty 8x) M6 threaded holes for mounting the busbar at the bottom are designed to take (qty 2x) M6 x 10mm (Min) ultra low head machines screws in the front positions, and (qty 6x) M6 x 10mm (Min) pan head screws in the rear positions. Holes SHALL have minimum strip out torque of 8 N-m. Nominal torque required is 5Nm.

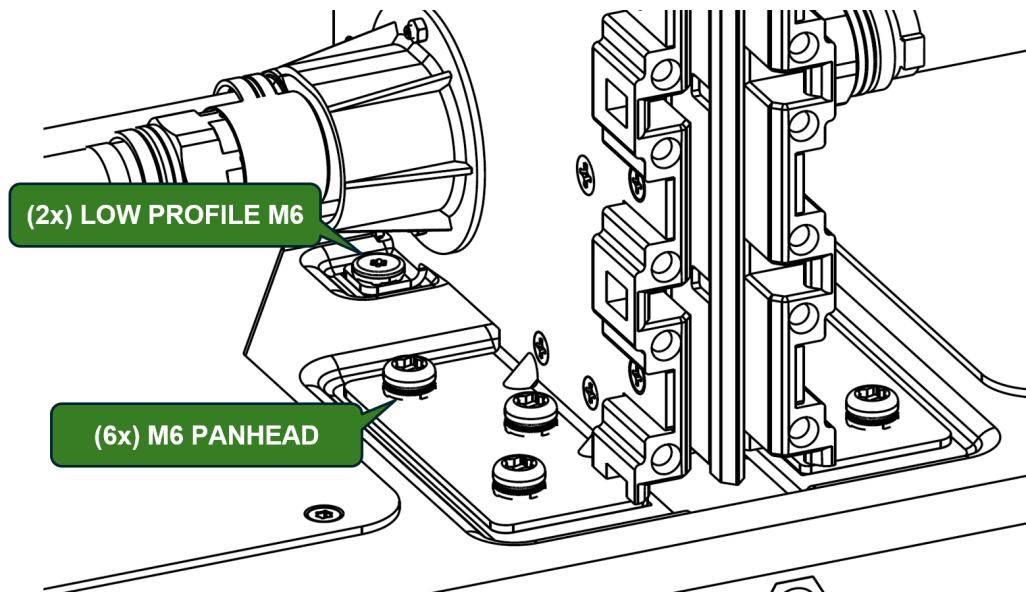


Figure 4.4.5.1 Lower busbar fasteners

4.5. Environmental Requirements

- 4.5.1. Operating Temperature: 10°C to 60°C
- 4.5.2. Long-term Storage: -40°C to 50°C and 5-95% RH
- 4.5.3. Short-term Storage: -20°C to 65°C and 10-80% RH
- 4.5.4. Operating Humidity: 85%max, 5°C dew point minimum

4.6. Color & Markings

4.6.1. Text & Font

Any text on the frame SHALL use the font MS Reference with a minimum size of 4mm

4.6.2. U Markings

All "U" markings (both OpenU and RU) SHALL be marked in a permanent and legible manner using a high contrast color with the lowest location marked as "1" and incrementing up the rack frame.

4.6.3. Color

This base specification does not dictate frame color. Design Specifications may indicate color/paint requirements per user requirements.

4.7. Electrical Grounding

4.7.1. Telco Ground Lug

Frame shall provide M5X0.8 threaded hole features as an electrical ground to mate with the following Data Center Telco Ground Lug specifications:

- Tin-Plated Copper (90C), 2-hole ground lug
- #8 AWG or 10mm² stranded wire
- UL 486C Power/ UL 467 Grounding
- CSAC22.2 No65 Power/No.41 Grounding
- IEC 61238-1

Approximate Dimensions:

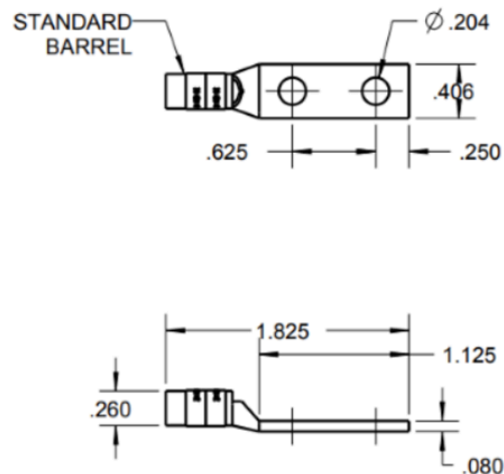


Figure 4.7.1.1 Threaded features and contact surface will comply with section 4.7.2

- 4.7.2. Conductivity of the ground path SHALL be protected from rust and corrosion over the life of the product. All ground points SHALL pass rust grade 6 per ASTM D610-01 after 48 hours of salt spray per ASTM B117-07.
- 4.7.3. Green grounding screws SHALL be provided with the rack and have a hex head 8mm across the flats.

- 4.7.4. Ground points SHALL be located per 3D CAD on the top surface of the rack for overhead grounding and the rear base surface to support underfloor grounding
- 4.7.5. IT Gear Ground Path
 - 4.7.5.1. Rack SHALL provide a supplemental electrically conductive path from the IT equipment in the rack to the rack grounding lug on the top of the rack.
 - 4.7.5.2. This path SHALL not pass through any surfaces that are not protected from rust and corrosion such as un-plated surfaces.

4.8. Environmental & Regulatory

Unless otherwise stated, the ORW Frame SHALL meet the following requirements:

- 4.8.1. CB Certification (Certificate Body) with country deviations in accordance with IEC62368-1
- 4.8.2. UL62368-1:2019, EN/IEC 62368-1:2020+ A11/2020: Hazard-based performance standard for Audio video, IT & Communication Technology Equipment.
- 4.8.3. CE Mark
- 4.8.4. RoHS Directive (2015/863/EU); aims to reduce the environmental impact of EEE by restricting the use of certain substances during manufacture.
- 4.8.5. Substances of Concern In articles as such or in complex objects (Products), the vendor SHALL provide the declaration of compliance document stating that a product doesn't contain any substances regulated by EPA 40 CFR751
- 4.8.6. REACH Regulation (EC) No 1907/2006; registration with the European Chemicals Agency (ECHA), evaluation, authorization and restriction of chemicals.
- 4.8.7. All plastic materials rated UL94V-0 or better from UL recognized suppliers

4.9. Electrical Requirements for IT Gear

4.9.1. Input Voltage Specification

The expected nominal input voltage delivered by the Open Rack V3 Power Shelf is 51VDC. The IT gear power delivery subsystem SHALL accept and operate normally with an input voltage tolerance range between 46V and 52V.

4.9.2. Input Power Delivery Power Sequence Requirements

As part of the Open Rack V3 architecture, a new bus bar connector has been designed to improve upon last generation challenges and incorporate new features such as the ability to monitor voltage drop of the input power cable assembly.

The Open Rack V3 IT Gear Input Connector has total of 4 connections which SHALL have the following minimum ratings:

- * Power Path (required), 100A continuous
- * Power Return Path (required), 100A continuous
- * Strength of PE (Protective Earth) bonding (required), 200A for 6 minutes with smaller than 2.5V voltage drop

- * Power Sense (required), 1.5A continuous
- * Temperature Sense (required)

In addition to the power and power return connections, the connector may incorporate outer ground pins depending on the specific design requirements:

1. The ORW 50V return busbar is grounded to the busbar cage, which is connected to the rack frame.
2. For IT gears with a 50V input return grounded to the IT chassis, the IT chassis is then grounded to the rack through the 50VRTN input. The input busbar clip external ground contacts should be removed to avoid sharing current with the Medusa cable. The IT chassis should maintain a solid ground bonding between the 50VRTN and the chassis. For example, the IT gear Power Distribution Board (PDB) and Motherboard (MB) screws connecting 50VRTN to chassis shall be tightened and keep good contact with the 50VRTN copper plane.
3. For IT gears with a 50VRTN floating to the chassis, the busbar clip with ground contact should be used to connect the IT gear chassis to the rack. In this case, the load current will not flow through the busbar clip ground contact since 50VRTN is floating in the IT gear.

There is a fifth connection that MAY be populated:

* Ground Return Sense (optional) 1.5A continuous

4.9.3. Voltage sense signals (optional)

The ORW Frame specification uses the same voltage sense signals (optionally) as defined in the Open Rack Base Specification Version 3. The new connector requires IT gear designs to make use of the power sense line to control the on & off behavior of power entry circuitry such as hot swap and/or load switches. This implementation ensures that the IT gear does not attempt to begin powering on until the input connector is fully asserted into the bus bar and is powered off before removal to prevent arcing events.

With the addition of the power and ground return sense lines, it SHALL be possible to implement a differential voltage sensing scheme to monitor the voltage drop of the input power cable assembly (e.g. from bus bar to IT gear connector). Additional circuitry such as differential voltage sensors and remote telemetry reporting capability SHALL be required to realize this monitoring implementation. This is an optional feature for Open Rack V3, but it is highly recommended to enhance the platform's health monitoring and thermal event mitigation capability.

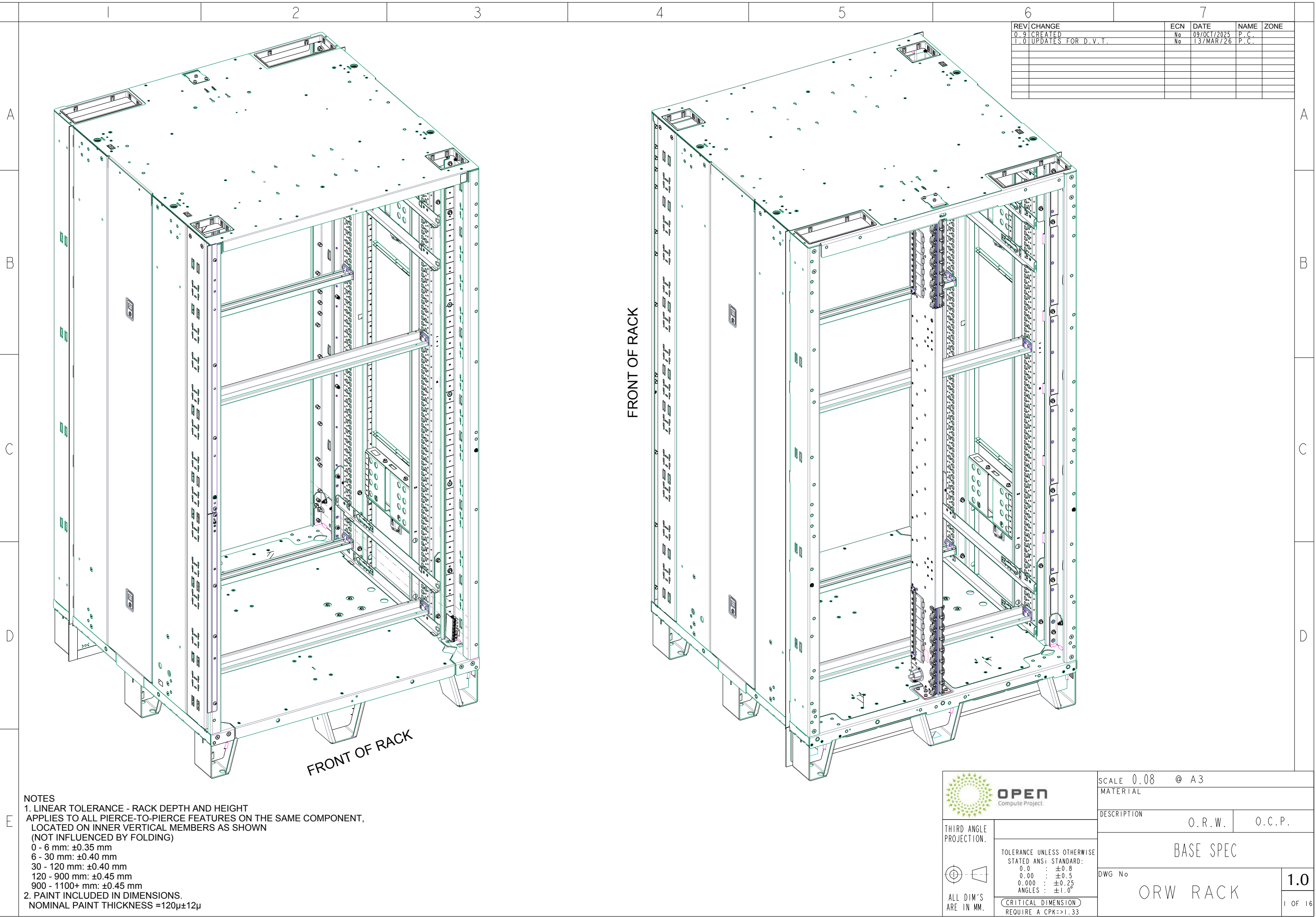
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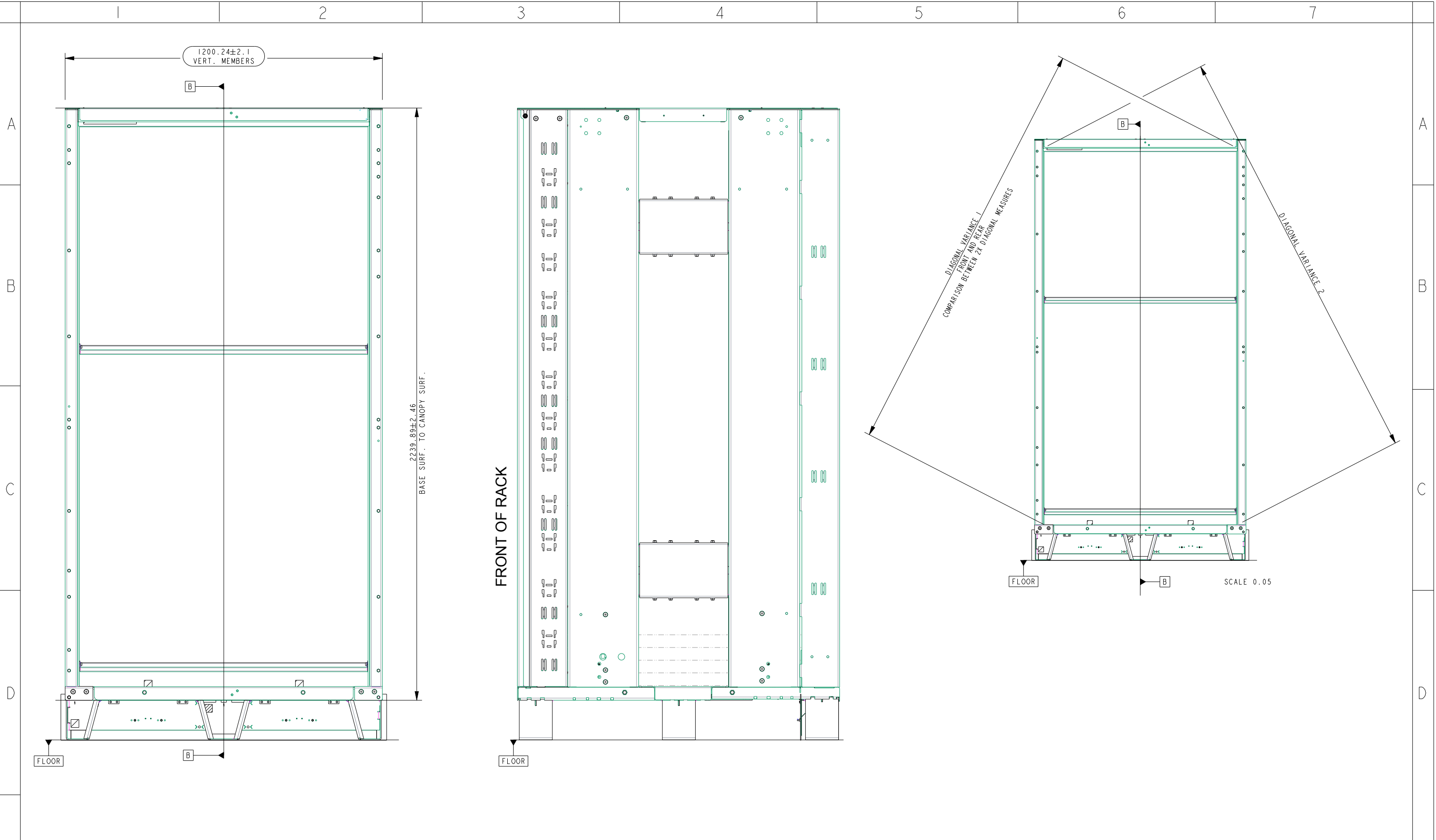
Refer to the latest available revision of the following specifications:

- [1] Open Rack V3 Base Specification
 - [2] Meta Open Rack Frame V3 Specification
 - [3] Open Rack Wide IT Gear Design Guide (*In Progress*)
 - [4] Open Rack Liquid Cooled Busbar Specification (*In Progress*)
 - [5] PBMC (Pivoting Blind Mate Coupling) Preliminary Design Basics ([link](#))
-

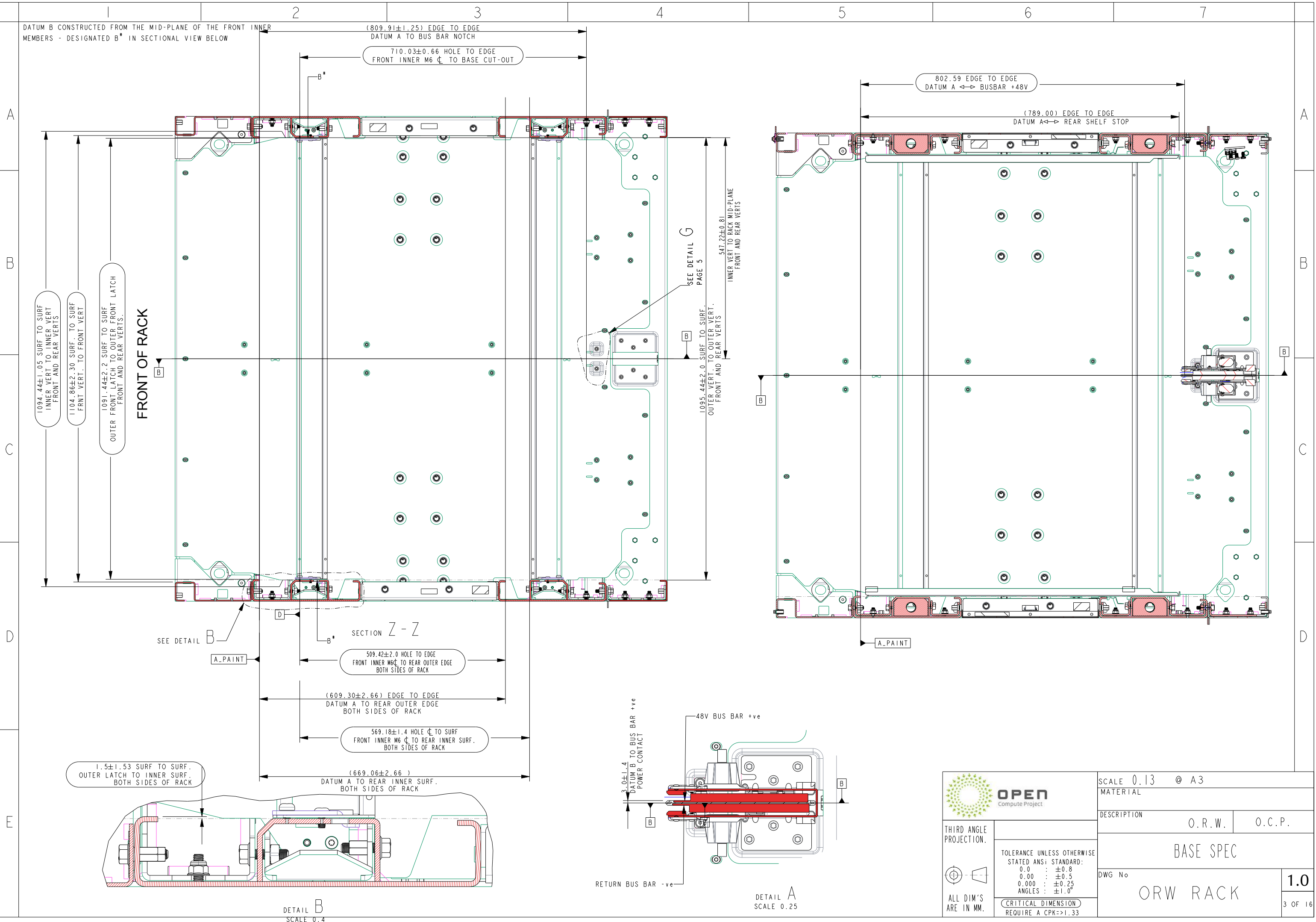
5. Appendix A - Full Resolution ORW Base Specification Drawing Images

The following pages are full resolution pages of the drawing views found in the previous sections of this specification.

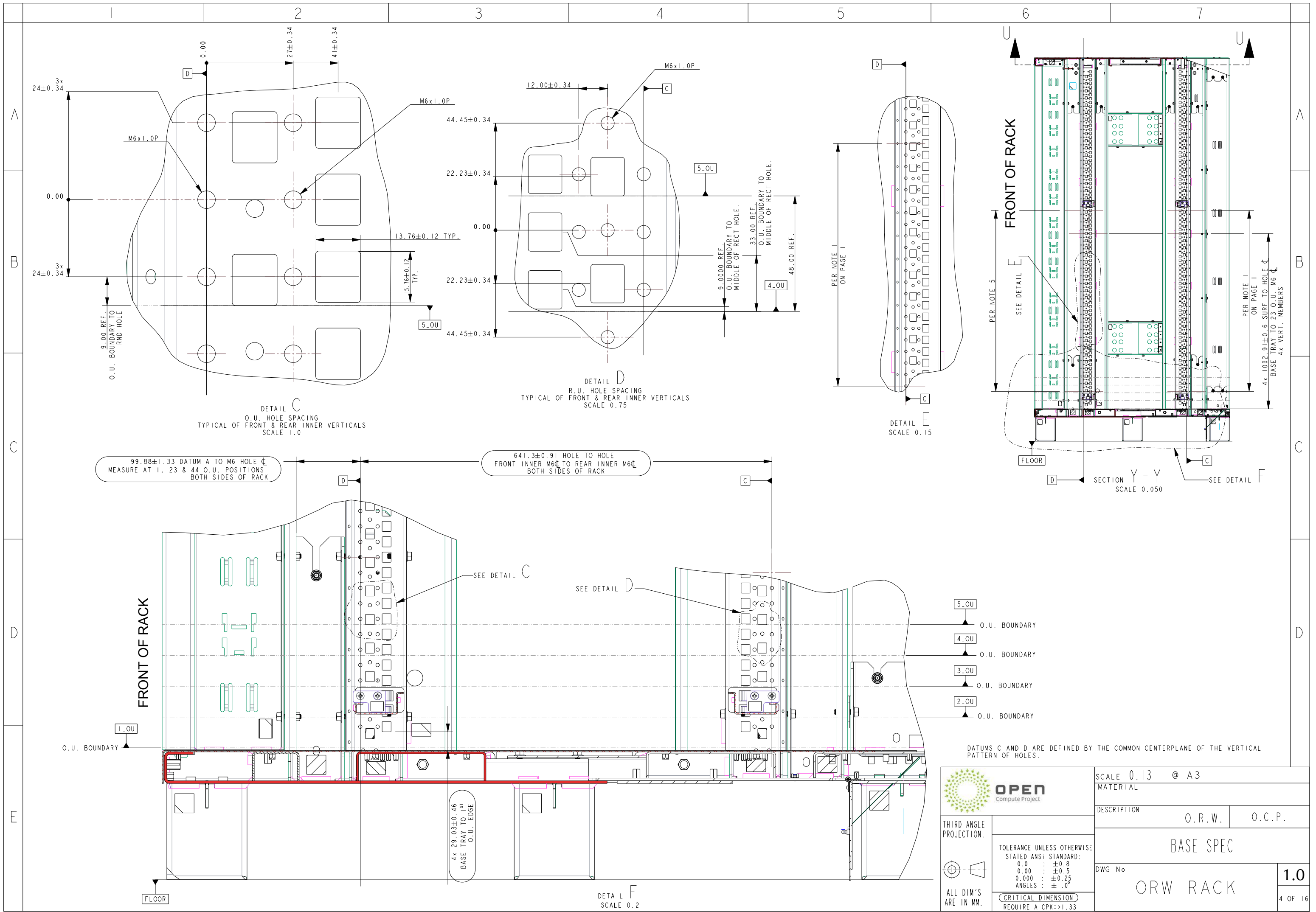




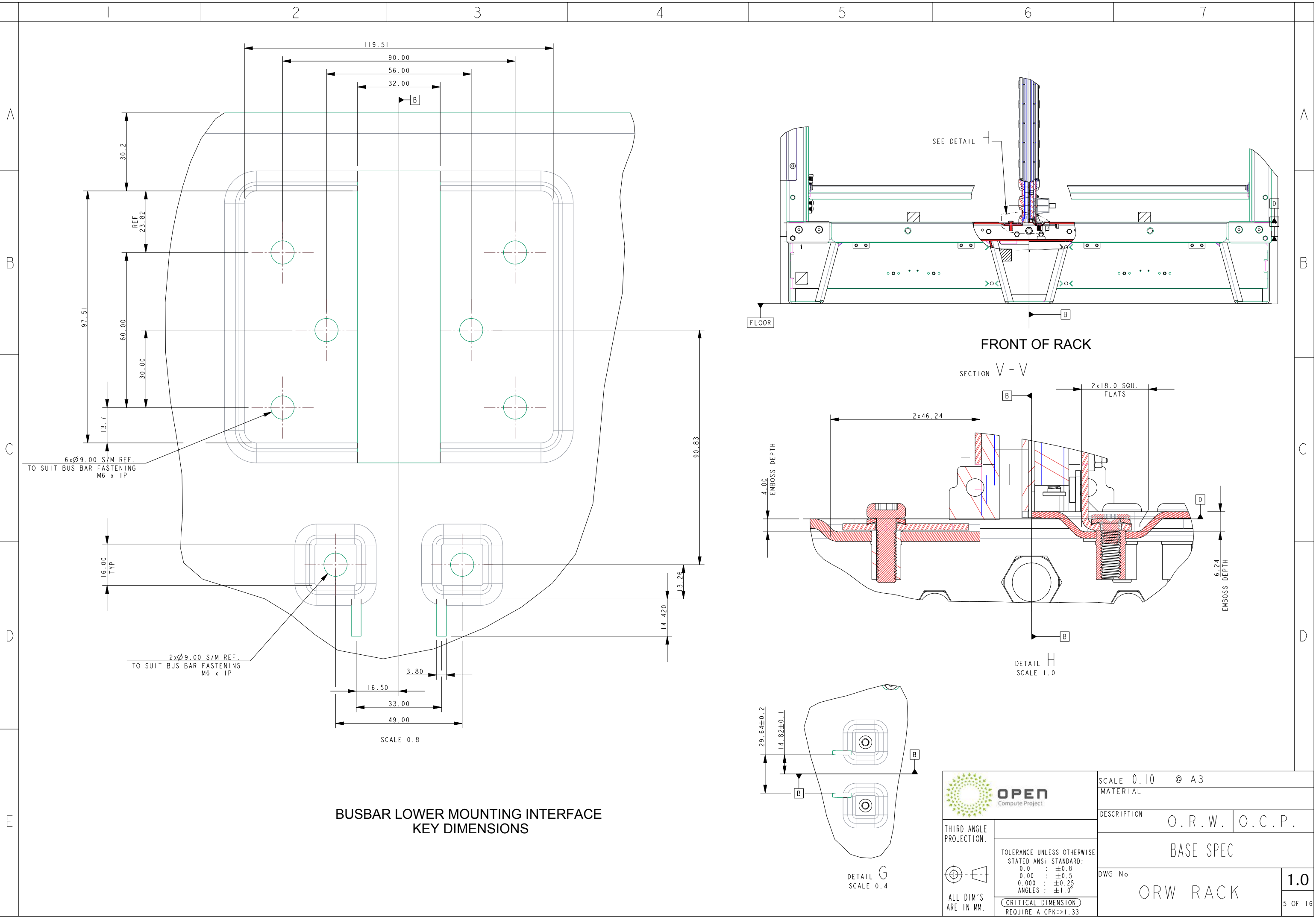
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	O.R.W. O.C.P.	
	BASE SPEC	
	DWG No	1.0
TOLERANCE UNLESS OTHERWISE STATED ANSI STANDARD:		2 OF 16
0.0 : ±0.8		
0.00 : ±0.5		
0.000 : ±0.25		
ANGLES : ±1.0°		
CRITICAL DIMENSION REQUIRE A CPK>1.33		
ORW RACK		



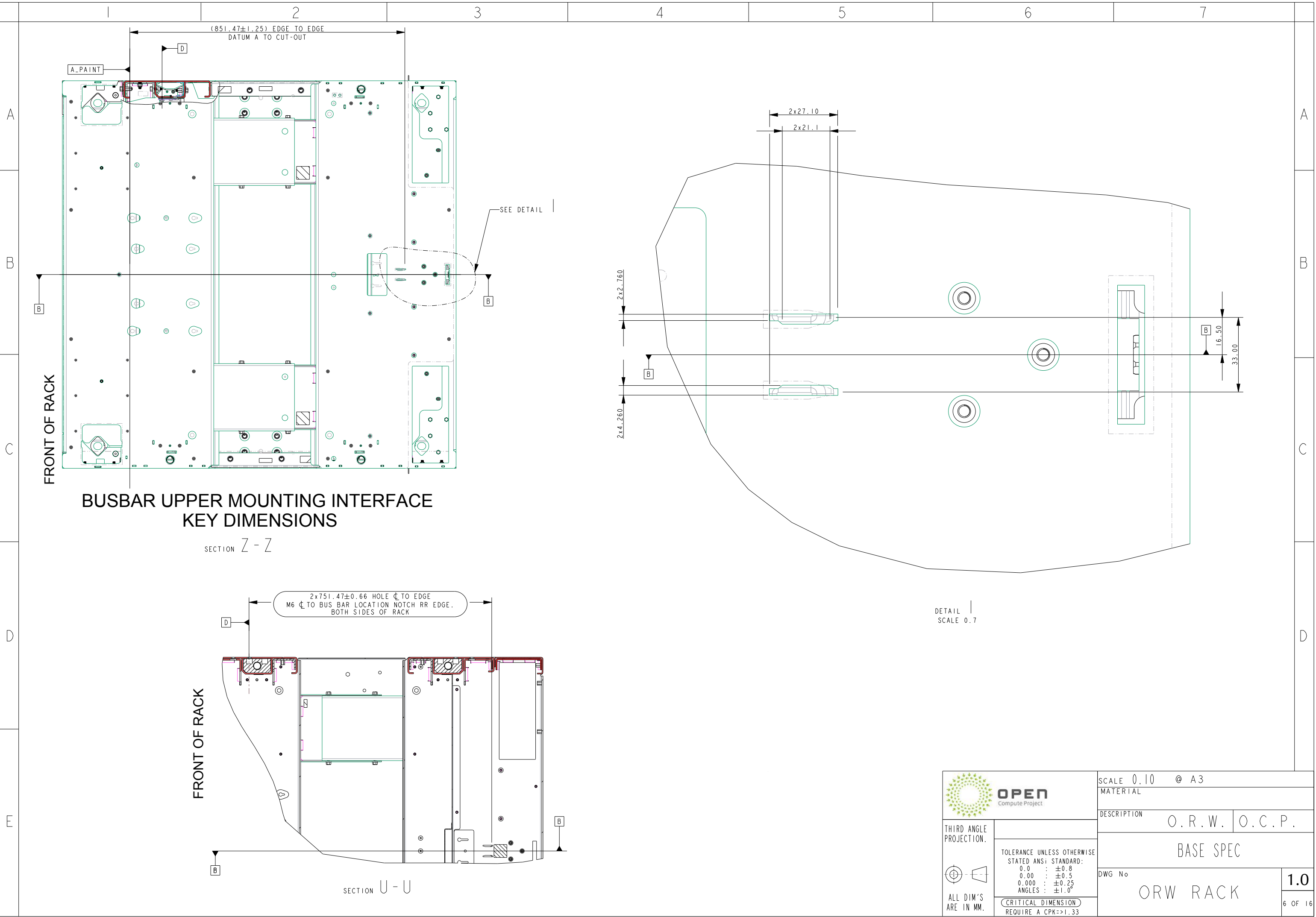
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SCALE 0.13 @ A3	
MATERIAL	
DESCRIPTION	O.R.W. O.C.P.
BASE SPEC	
DWG No	1.0
ORW RACK	
4 OF 16	



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0.00 : ±0.5		DWG No	
0.000 : ±0.25		ORW RACK	
ANGLES : ±1.0°		1.0	
ALL DIM'S ARE IN MM.		5 OF 16	
CRITICAL DIMENSION REQUIRE A CPK>1.33			

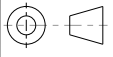
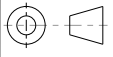


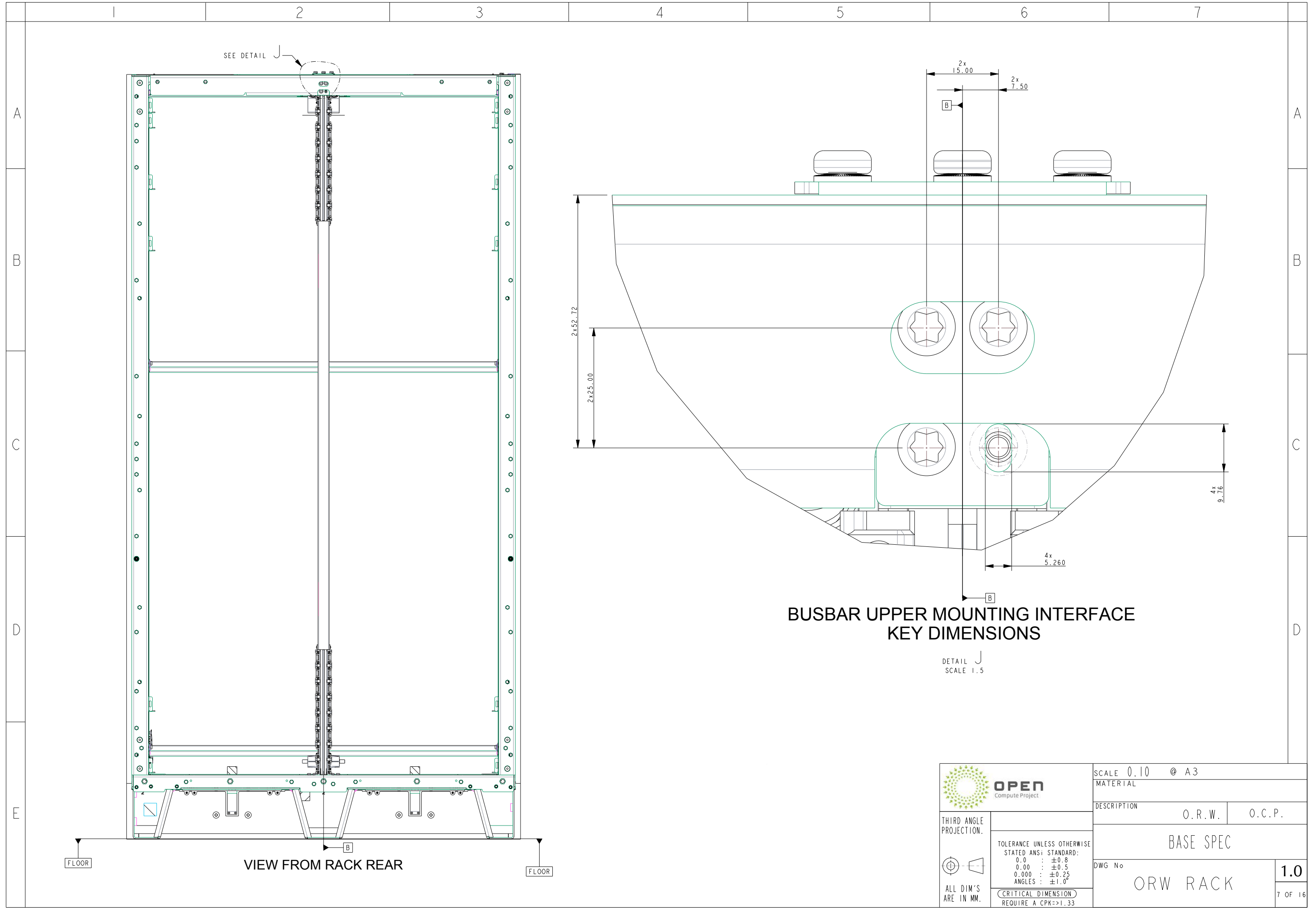
BUSBAR UPPER MOUNTING INTERFACE
KEY DIMENSIONS

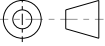
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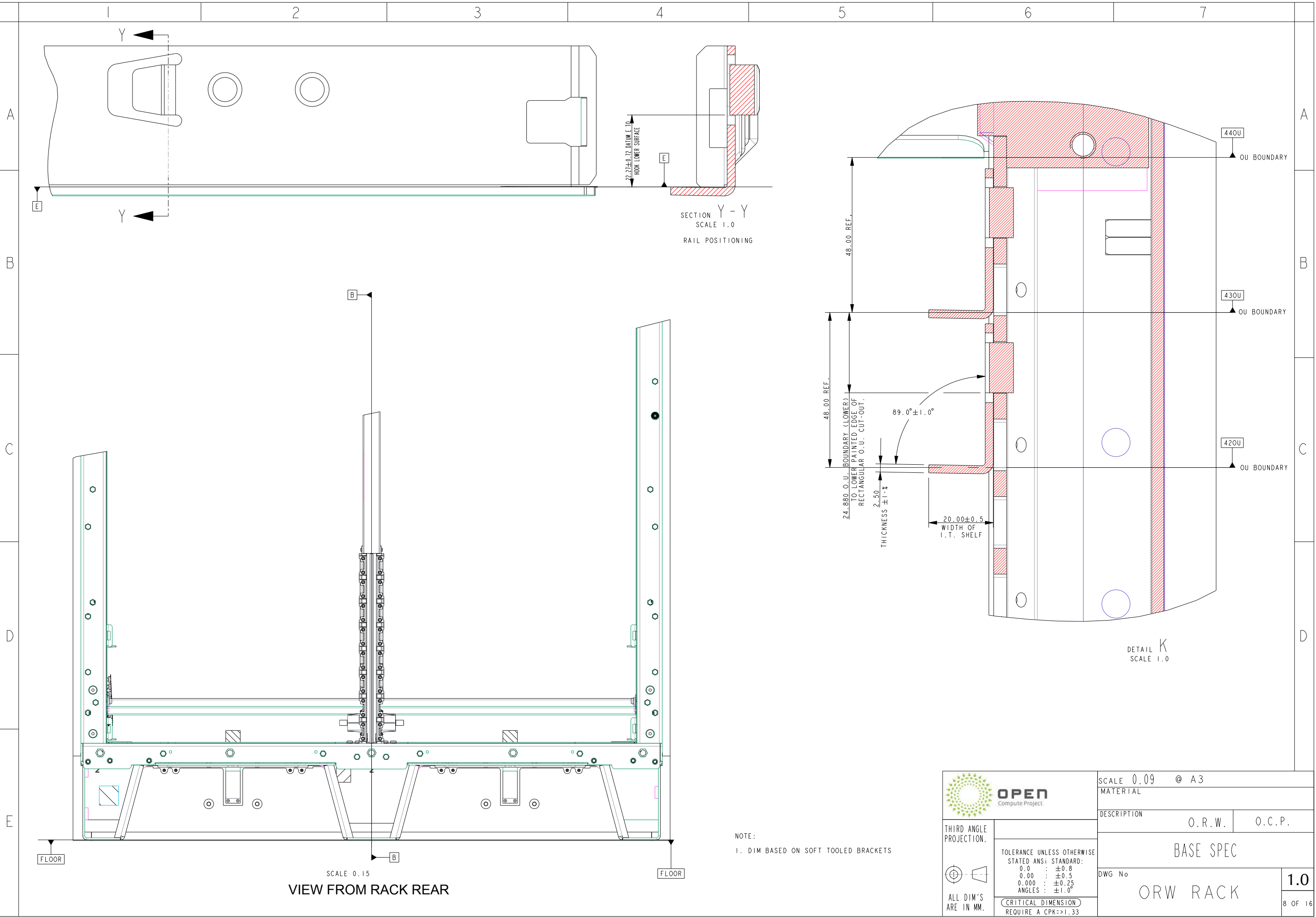
FRONT OF RACK

SECTION U - U

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		BASE SPEC	
 TOLERANCE UNLESS OTHERWISE STATED ANSI STANDARD: 0.0 : ±0.8 0.00 : ±0.5 0.000 : ±0.25 ANGLES : ±1.0° CRITICAL DIMENSION REQUIRE A CPK>1.33		DWG No	
		ORW RACK	
		1.0	
		6 OF 16	



	SCALE 0.10 @ A3	
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THIRD ANGLE PROJECTION.  ALL DIM'S ARE IN MM.	DESCRIPTION	
	O.R.W.	O.C.P.
	BASE SPEC	
	DWG No	1.0
TOLERANCE UNLESS OTHERWISE STATED ANSI STANDARD: 0.0 : ±0.8 0.00 : ±0.5 0.000 : ±0.25 ANGLES : ±1.0°	ORW RACK	
CRITICAL DIMENSION REQUIRE A CPK>1.33	7 OF 16	



NOTE:
1. DIM BASED ON SOFT TOOLED BRACKETS

 THIRD ANGLE PROJECTION.  ALL DIM'S ARE IN MM.	SCALE 0.09 @ A3	
	MATERIAL	
	DESCRIPTION	O.R.W. O.C.P.
	BASE SPEC	
DWG No		1.0
ORW RACK		8 OF 16