

OPEN

Compute Project

Rack / Busbar Interface ORV3

Rev. J

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1. License

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1.1. OPTION A: OCP CLA

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Paul Clements, Rittal

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1.2 Acknowledgements

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

Facebook
Amphenol

2. OCP Tenets Compliance

2.1. Openness

Submittal of the specification to the O.C.P. Community, for open usage.

2.2. Efficiency

Standardising the interface between the Bus bar and the Frame weld assembly, ensuring universal fitment.

2.3. Impact

Standardisation of the interface between the Bus bar and the Frame weld assembly will impact the following: -

- Ensure fitment: - Between Frame weld assembly and the Bus bar assembly.
- Quality issues: - Reduced through defining clear acceptable tolerance for all interfacing geometry.
- Updating the existing OCP V2 Rack interface specification around the modified geometry for OCP V3.

2.4. Scale

Conformity to the specification will ensure Bus bar suppliers and frame weld suppliers can work independently, whilst ensuring bus bar fitment into the frame weld assembly at point of assembly.

3. Revision Table

| Date | Revision # | Author | Description |
|-----------|------------|-----------------|---|
| 04/Oct/21 | J | Paul Clements | Update to latest O.C.P. inc. Transfer to Google Docs. |
| 29/Jun/21 | I | Dmitriy Shapiro | Format / Power updates |
| 28/Jun/21 | H | Paul Clements | Interface definitions |
| 05/May/21 | G | Paul Clements | General updates |
| 23/Apr/21 | F | Paul Clements | Tolerance updates |
| 20/Apr/21 | E | Paul Clements | Tolerance updates |
| 19/Apr/21 | D | Paul Clements | Geometry updates |
| 15/Apr/21 | C | Paul Clements | General updates |
| 06/Feb/21 | B | Paul Clements | Geometry updates |
| 02/Feb/21 | A | Paul Clements | Initial Release |

4. Scope

This document defines specific geometrical requirements at both the busbar and frame weld interface regions, ensuring the nominal position of the bus bar is optimal for equipment interfacing. Any component variation is controlled within acceptable limits defined in this specification, ensuring fitment is not impacted by component variation.

Busbar voltage does not impact this specification, as 12V or 48V busbars are supported.

This specification is supplementary to the Open Rack Standard for v3.

This specification covers single power zone bus bars, multiple power zones may be covered in future updates.

5. Overview

This specification concentrates on the Busbar / frame weld interface for O.C.P. v3. The Overall bus bar requirements will be defined in the Open Rack Standard for v3.

6. Rack Compatibility

This specification is unique to O.C.P. v3. Generations of rack NOT compatible include O.C.P. v2 & O.C.P v1.

7. Busbar definition

To clarify busbar specification a generic part numbering system is applied and defined as follows:

Bv3OCP-48-AAA-BBBB

Busbar part number format - example

Sections are broken down as follows:

Bv3OCP: Bus bar for OCP v3

48: identifies the required Voltage, i.e. 48V.

AAA: identifies the required power rating per Busbar, i.e. 018.0 for 18.0kw etc.

BBBB: identifies rack frame interface, from base to canopy i.e. 2141 is 2141mm between base face (B1) to Canopy face (C1), see figures 3, 6, & 10.

from above **Bv3OCP-48-18.0-2141**

Defines a 48V OCP v3 Bus bar for 18kW, 2141 height (x1)

This part number must be displayed on the Busbar cage assembly.

7.1 Physical Specifications

7.1.1 Rack interface Bottom.

The lower interface feature in the rack should be as defined in Figure 1,2 & 3. Dimension 818.93 is controlled from the equipment latching surface, Datum A as defined in the ORS v3 Figure xxx.

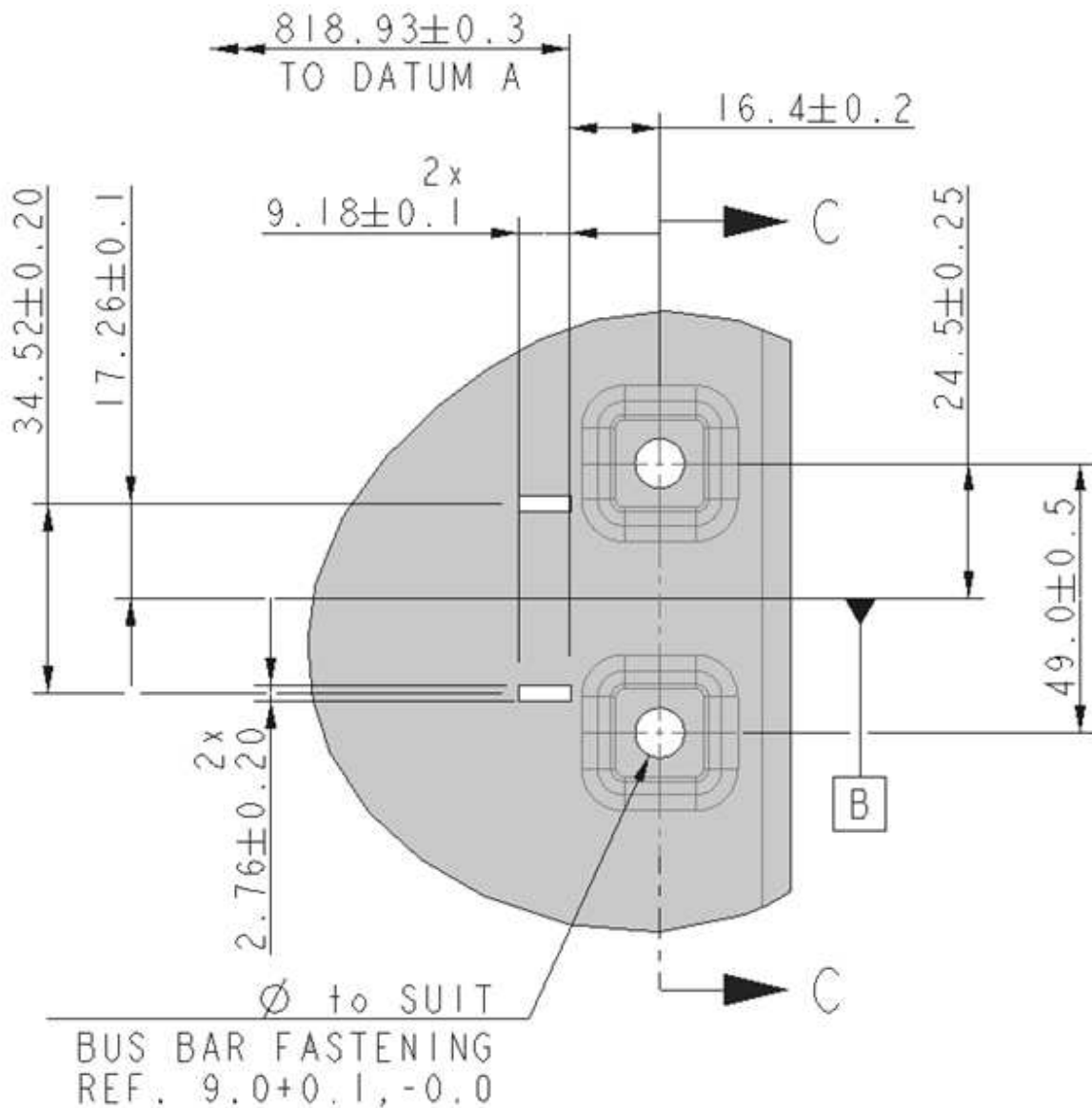


Figure 1: Partial Plan view on base tray rear of Busbar interface

All dimensions are typical across features and features are typical for each busbar interface.

Paint is included, influencing the dimensions (typically 120μ per paint layer)

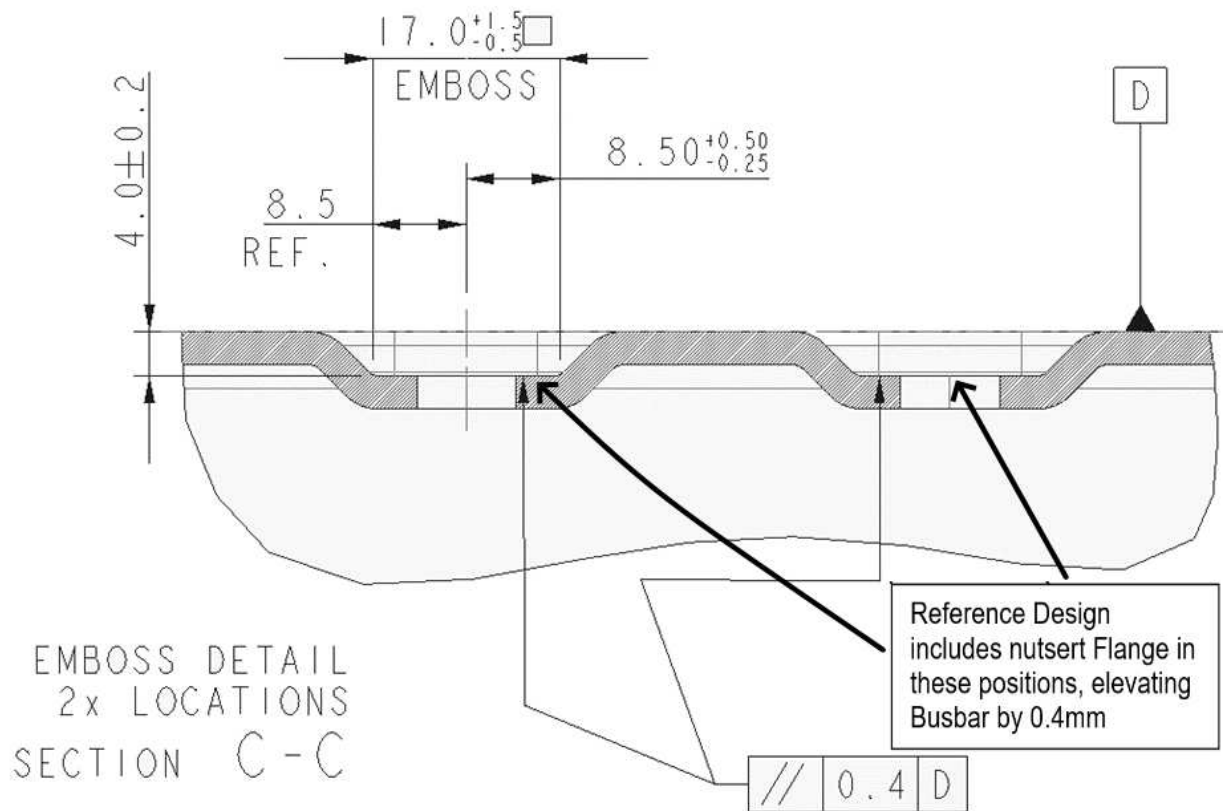


Figure 2: Section through embosses on Figure 1.

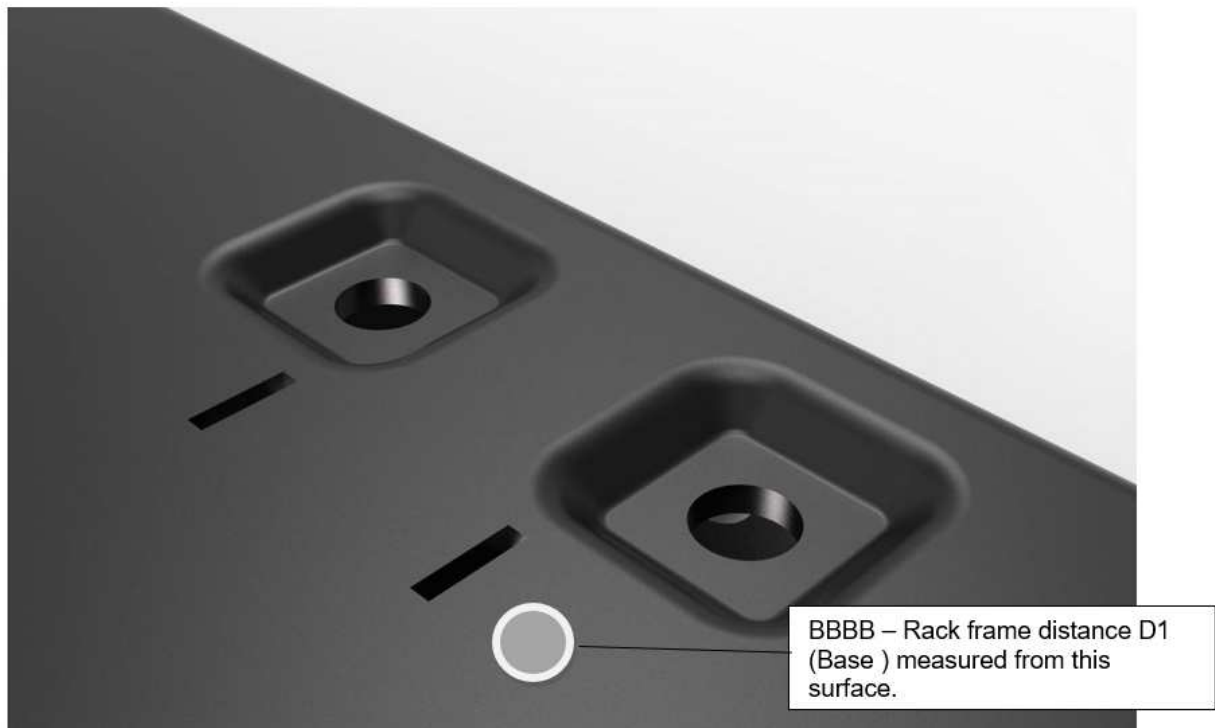


Figure 3: Image of Rack lower interfaces for clarity.

7.1.2 Rack interface Top.

The upper interface feature in the rack should be defined as follows in Figures 4, 5 & 6.

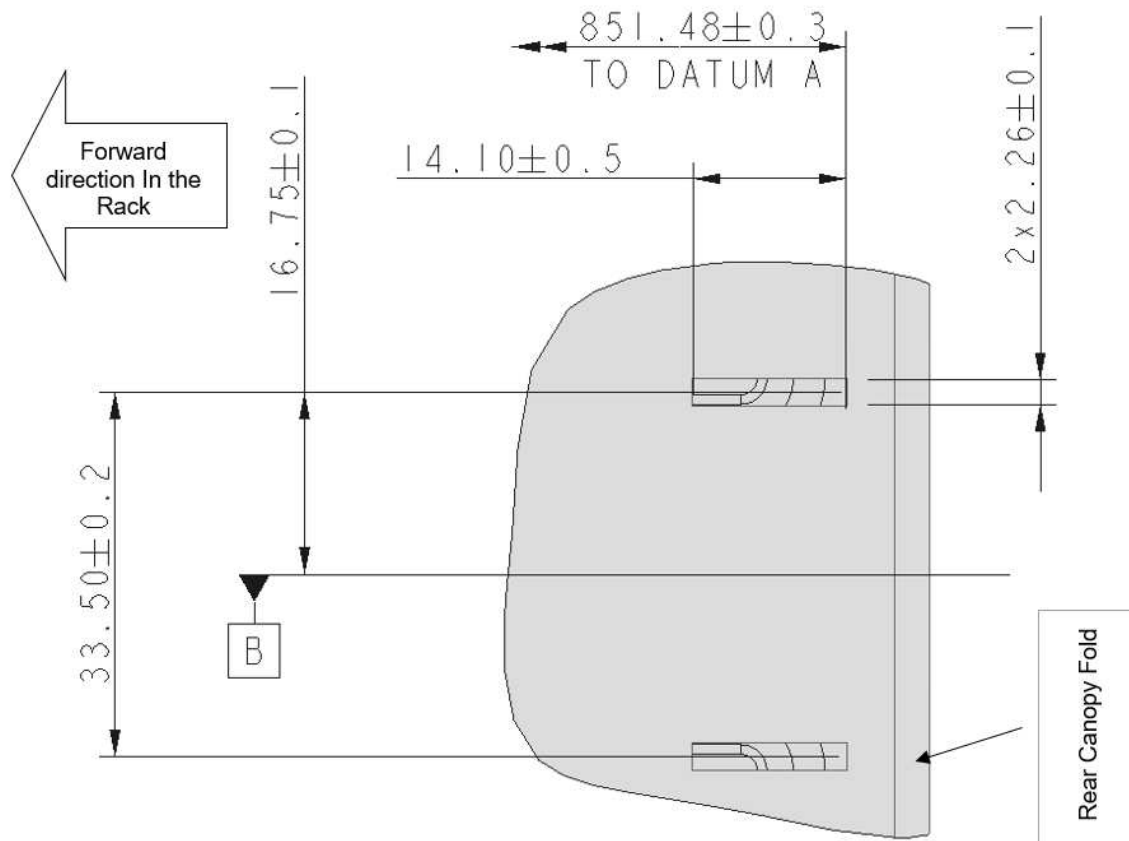


Figure 4: Plan view, Canopy – Rear Detail

Paint is included, influencing the dimensions (typically 120μ per paint layer)

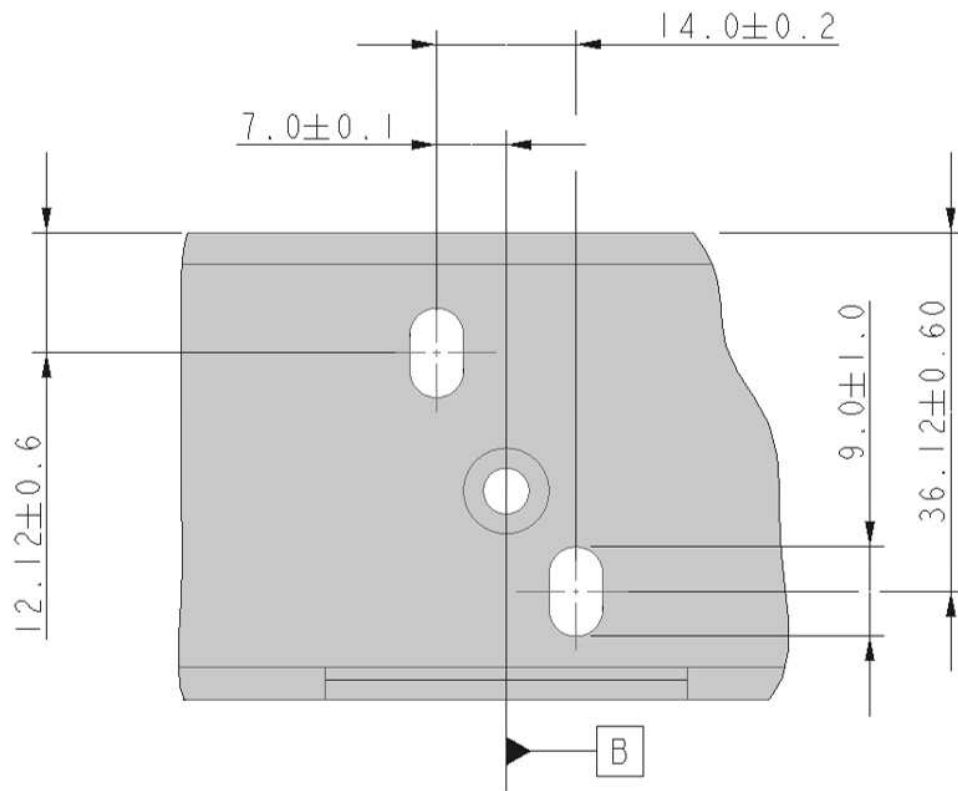


Figure 5: Rear side view of canopy, Details around Mid-plane B of rack

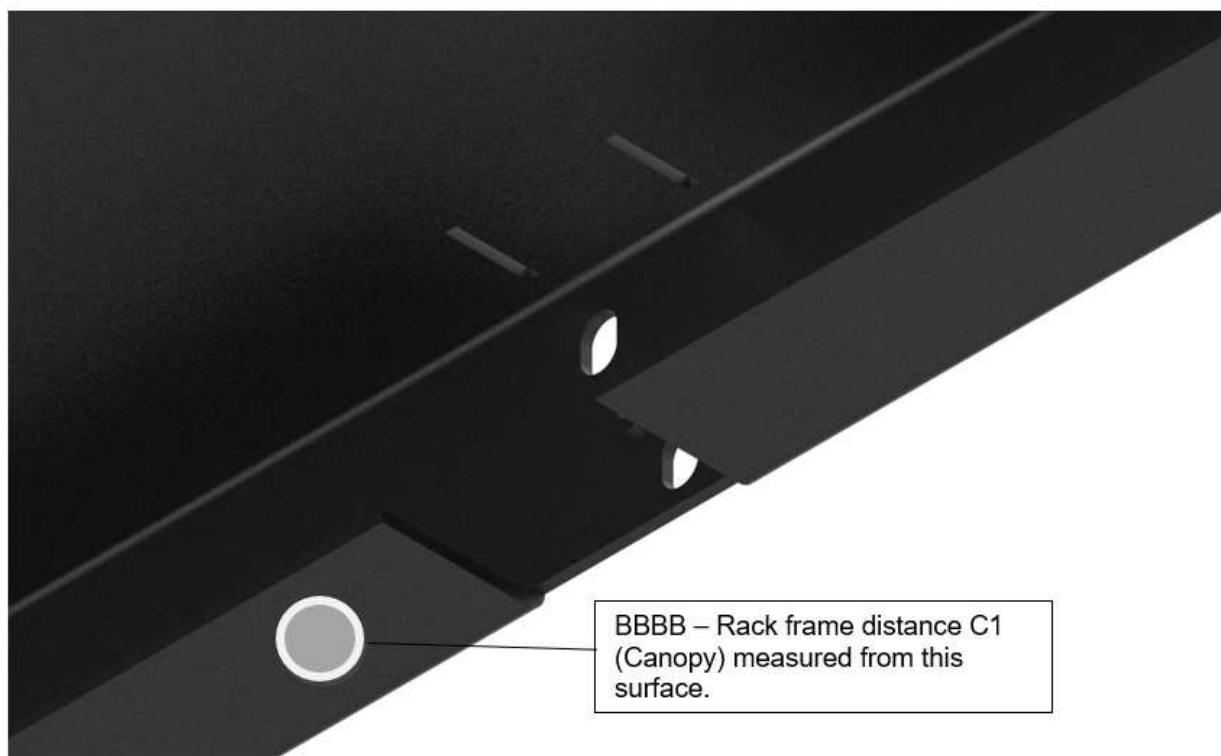


Figure 6: Image of Rack upper interface for clarity. (Underside of Canopy)

7.1.3 Busbar interface - Side

The features in the side of the Busbar cage assembly that interface with the Rack lower and upper interfaces are defined as follows in Figure 7.

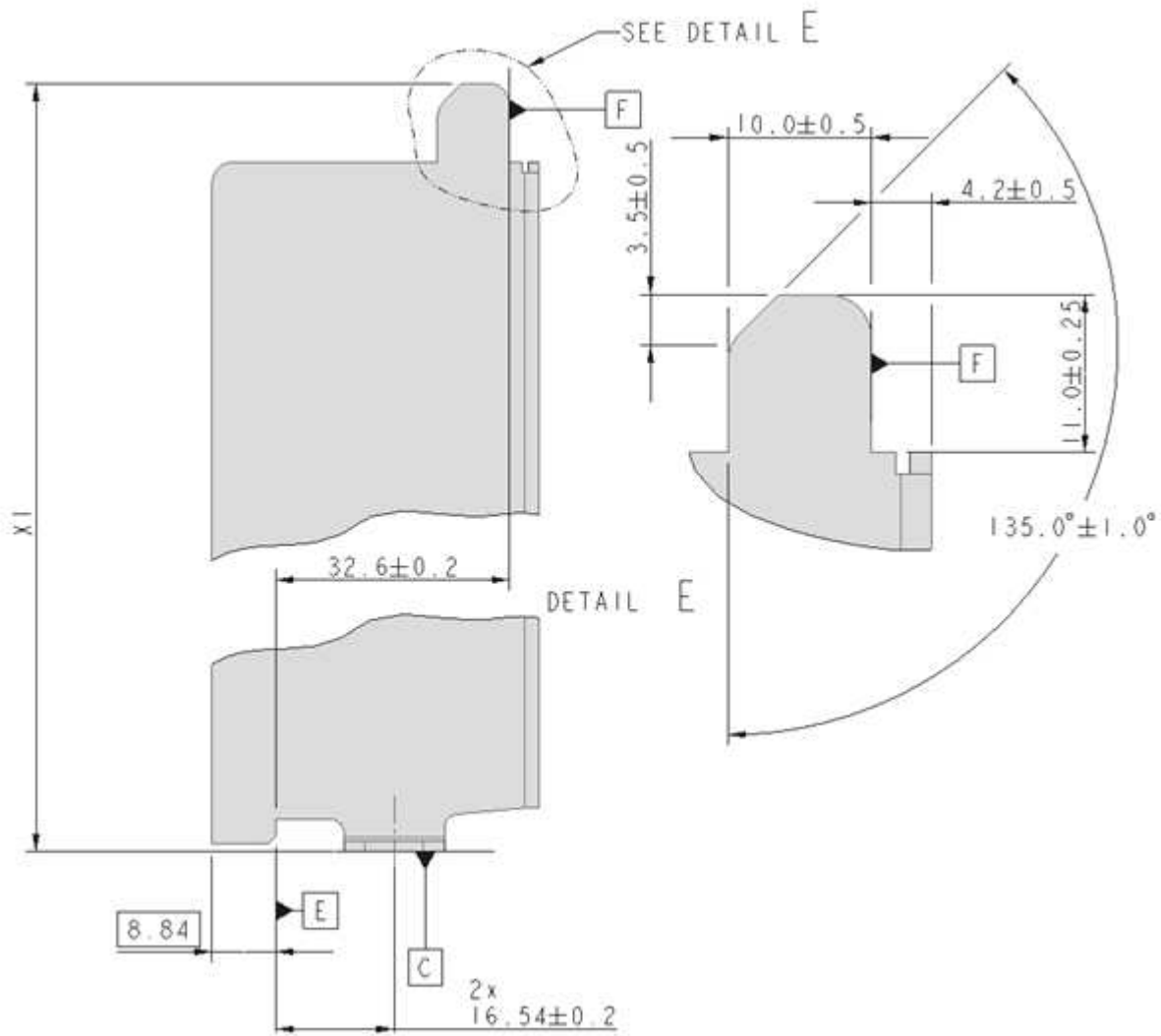


Figure 7: Busbar lower and upper interface – Side view

7.1.4 Busbar interface - Bottom

The features in the bottom of the Busbar cage assembly that interface with the Rack bottom interfaces are defined as follows in Figure 8.

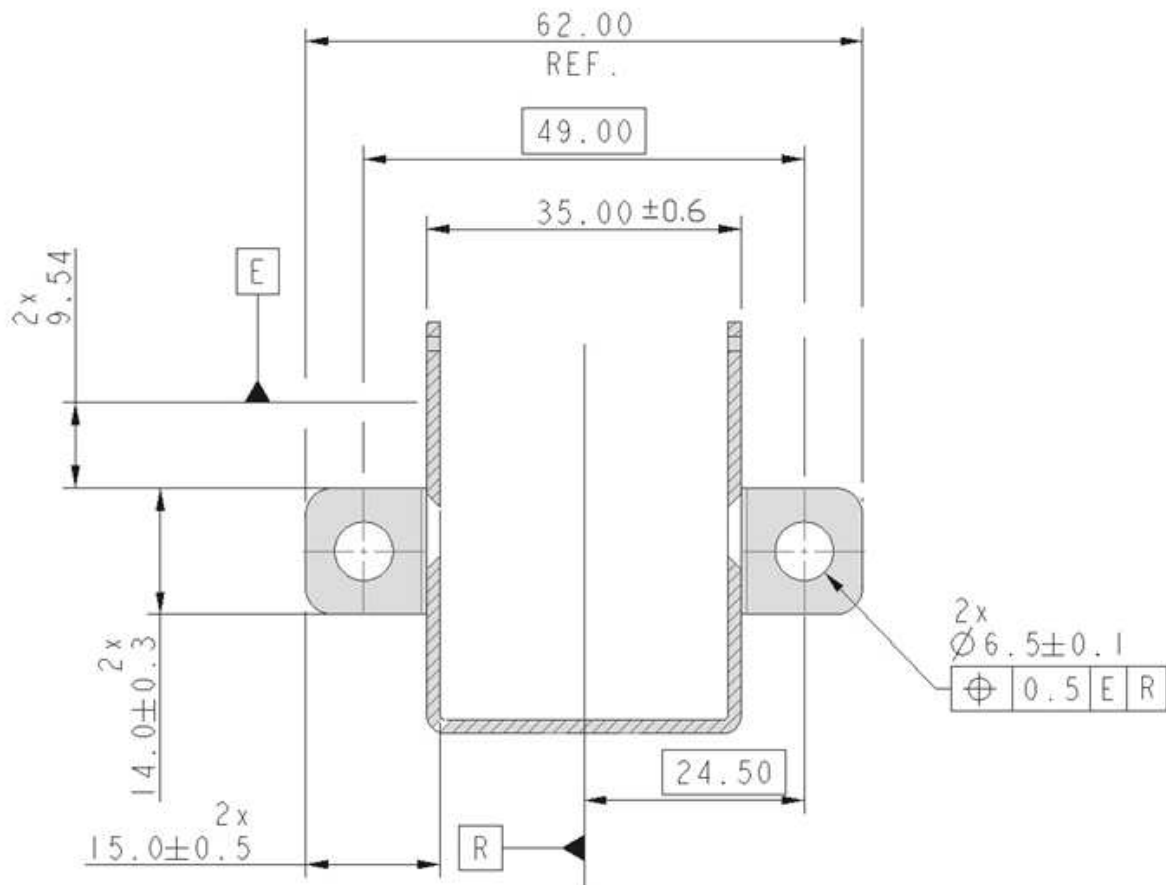


Figure 8: Busbar lower interface – Plan sectional view

7.1.5 Busbar interface - Top

The additional features in the Busbar cage assembly that interface with the Rack upper interface are defined as follows in Figure 9

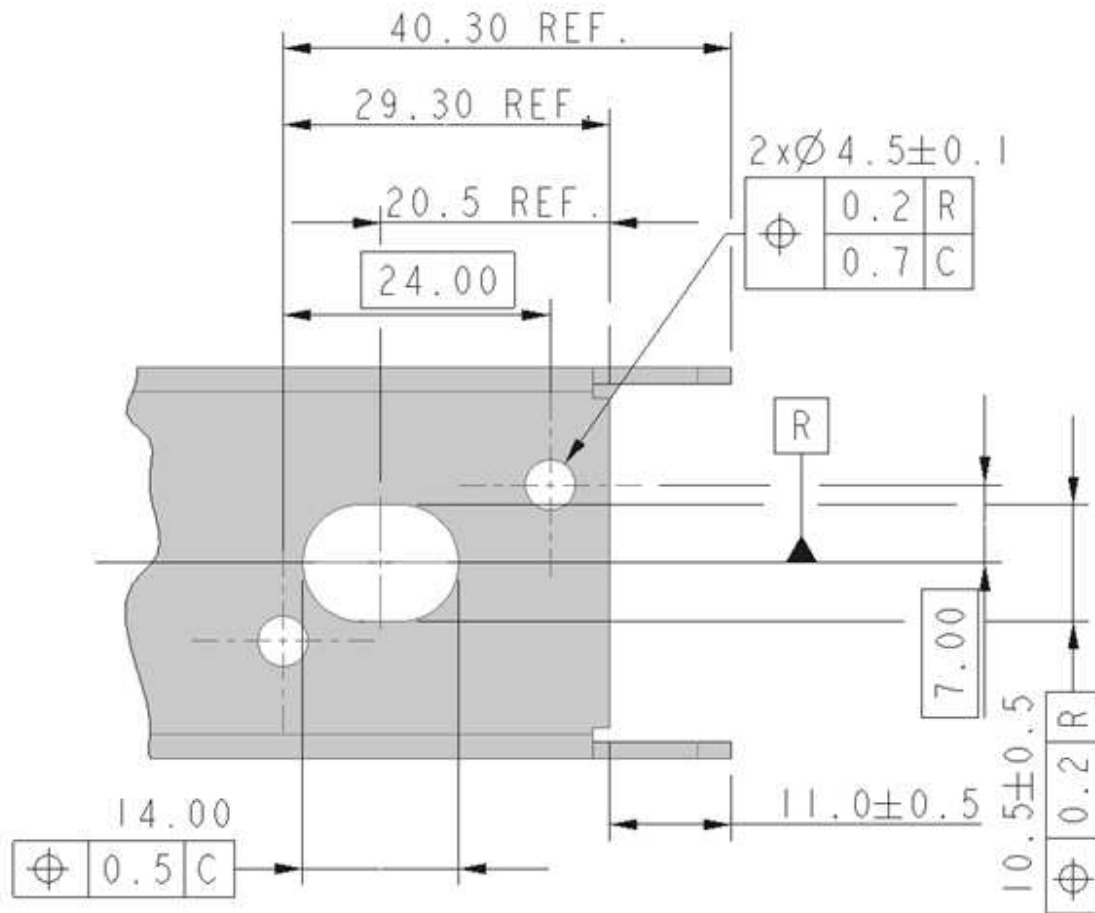


Figure 9: Busbar upper Rear interface fixing points.(Viewed from Bus bar rear, as assembled in the rack)

7.1.6 Busbar overall height

A full height Busbar will fit between the upper canopy and the lower base tray of the rack (C1 to B1), with the distance between the upper and lower fixing points as defined in Figures 10.

$$X1 = \text{BBBB} + 55.0\text{mm} \pm 0.5$$

Subsequent increase/decrease in height to be in full OU's

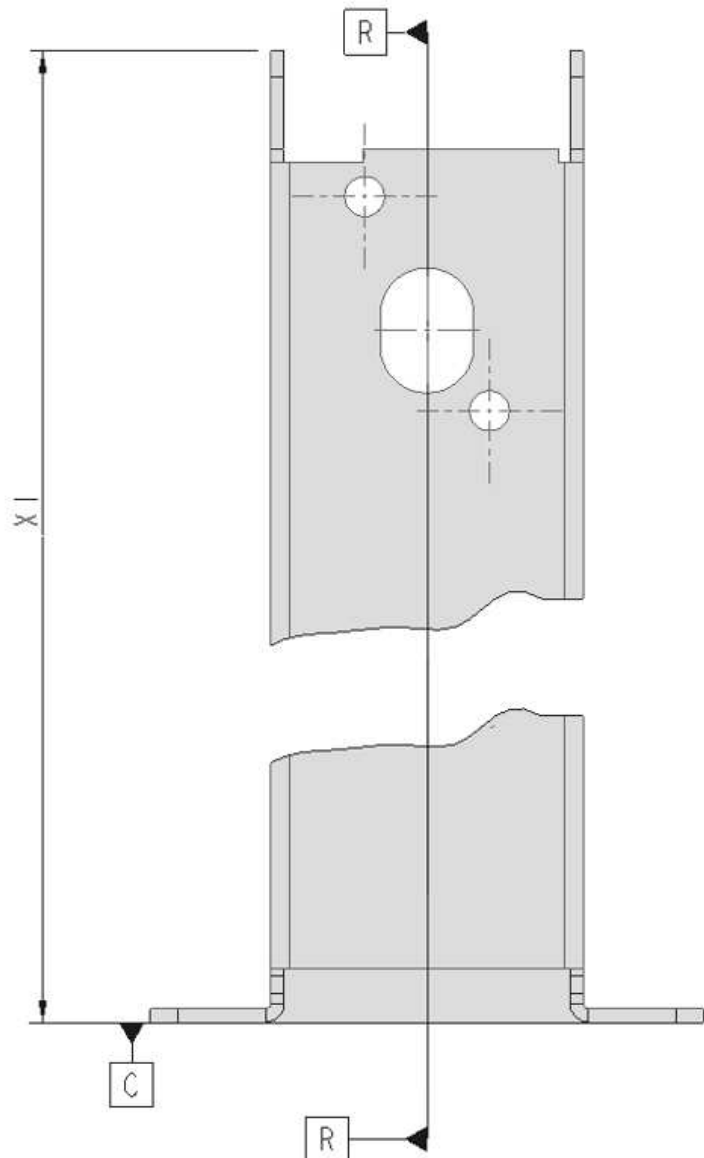


Figure 10: Rear broken view of Busbar fabricated cage detailing overall height between interfaces.

7.2 Mechanical fixing, Busbar to rack.

7.2.1 Upper positions

The busbar assembly is fixed to the rack framework with two M5 thread forming (DIN 7500) Pan Head screws including two Shake proof washers (DIN 6797 type A).

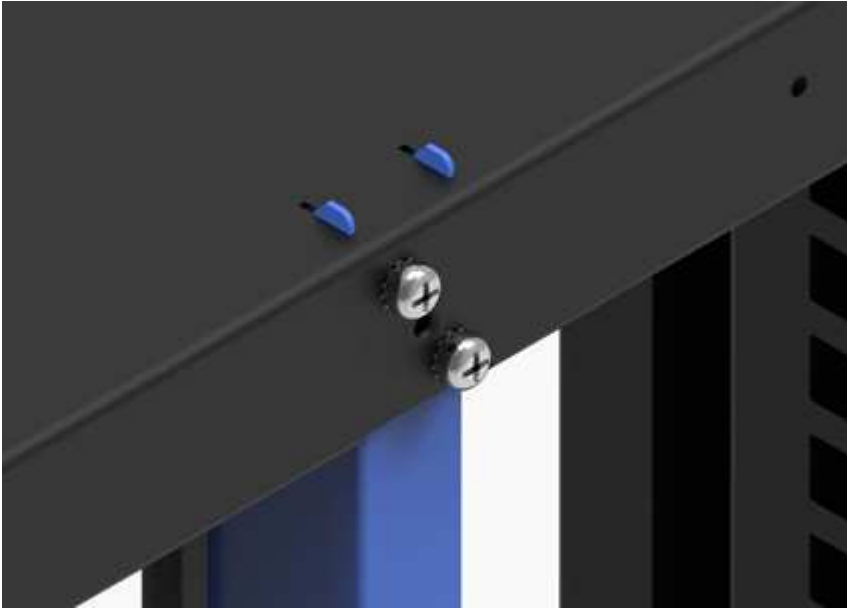


Figure 11 - Upper Bus bar Fastening (Blue bus bar shown for positional Clarity ONLY)

7.2.2 Lower positions

The busbar assembly is fixed to the rack framework with two M6 Ultra Low Head screws with Std Threads including two Shake proof washers (DIN 6797 type A).

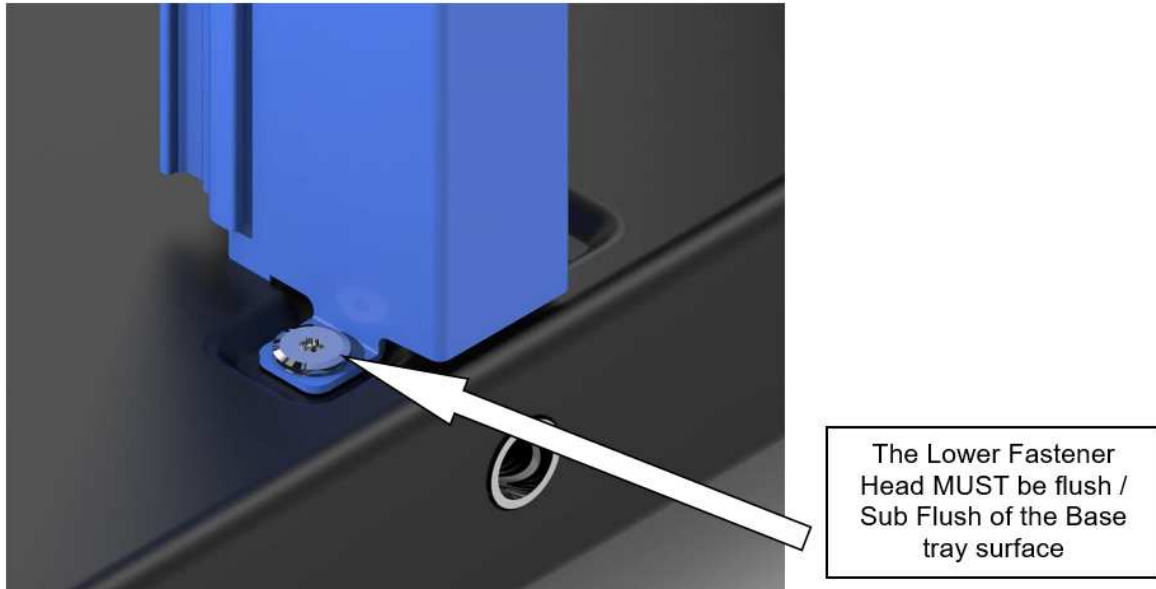


Figure 12 - Lower Bus bar Fastening (Blue bus bar shown for positional Clarity ONLY)

All fixings are to be secured with a torque of 5Nm. Grounding / Earthing requirement defined in the v3 Open Rack specification.

7.3 Bus Bar Example

The images below show a typical example of the Busbar



Figure 13 – Bus bar example – Isometric views

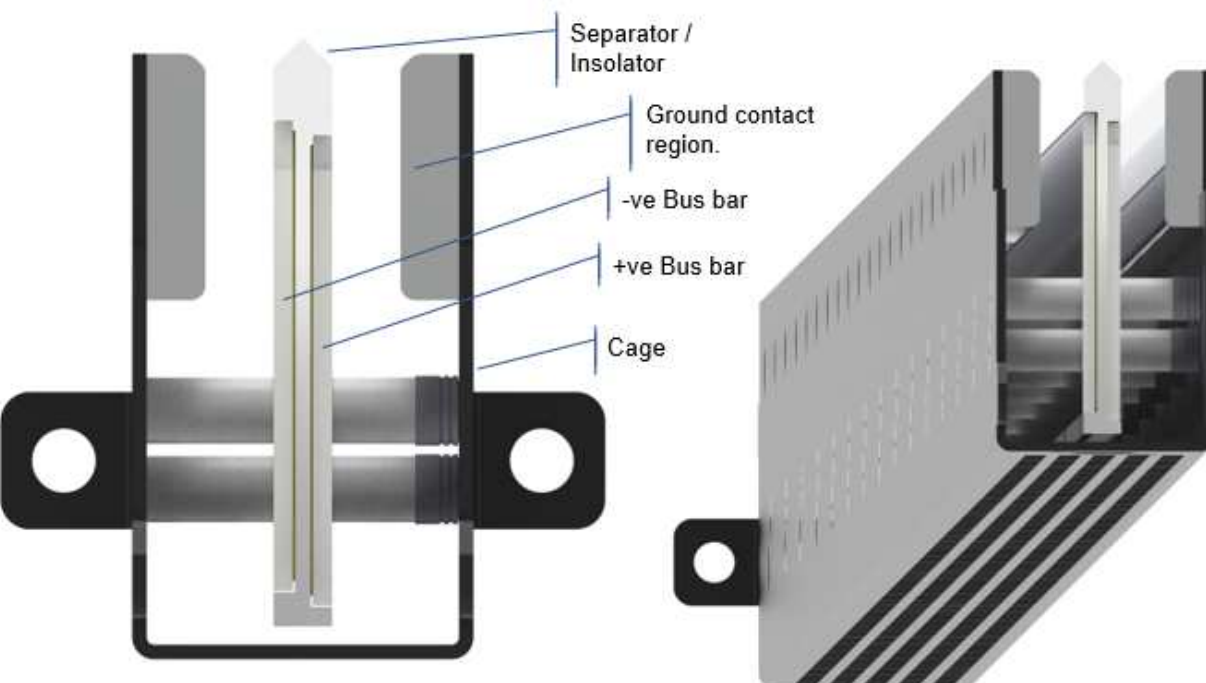


Figure 14 – Bus bar example – Plan view (Top) and Non Standard view

8. Thermal Design Requirements

Thermal design requirements of the bus bar are outside the scope of this specification

9. I/O System

I/O system design requirements of the bus bar are outside the scope of this specification.

14. Environmental and Regulations

Environmental and regulatory requirements of the bus bar are outside the scope of this specification.

21. References (recommended)

[1] Rack Bus bar interface, accepted date 2018, similar specification for O.C.P.v2, complete specification - <https://www.opencompute.org/documents/rittal-stand-alone-bus-bar>

[2] Open Rack Frame V3 Specification, v3 Rack specification -

<http://files.opencompute.org/oc/public.php?service=files&t=23cadcc803bba621c720b77c60e5b958>