

Enabling 1MW+ IT Gear Rack Power

Hal Loket, Technologist, TE Connectivity

Aniket Singh, Global Product Manager, TE Connectivity



Agenda

- Introduction
- Interface (Design Overview)
- Touch Safety & Mating Sequencing
- Thermal Testing and Simulation Data
- Future Technology
- Call to Action

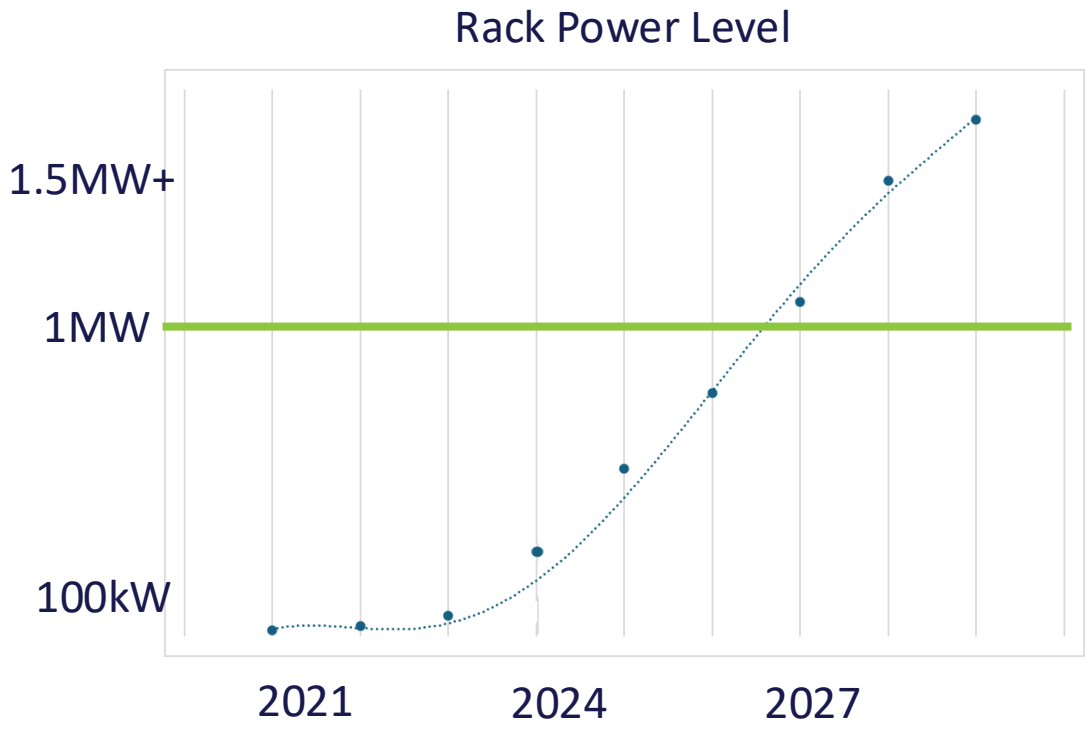




Note: The TE products shown and discussed in this presentation are shown for reference only and are not currently licensed Contributions to any OCP specification.

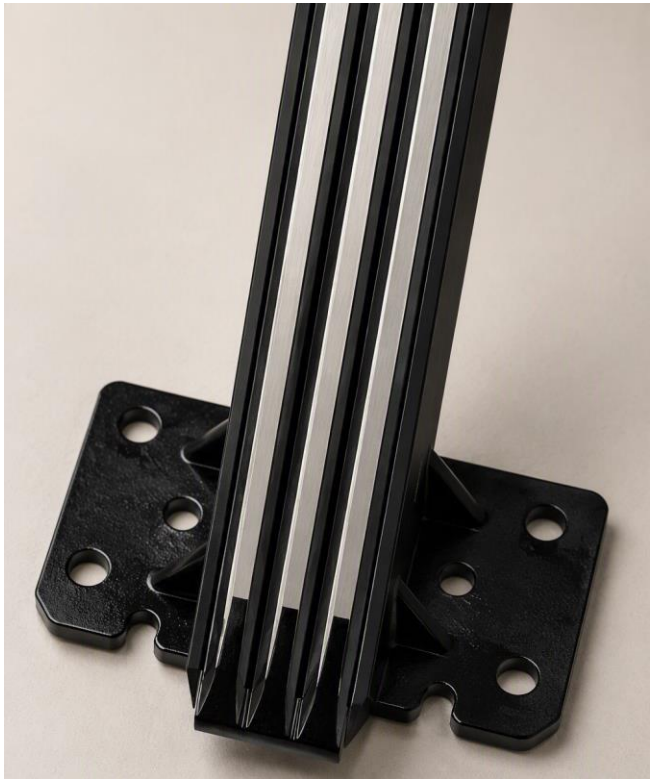
Introduction

- Rack power needs are increasing due to chip TDP and density requirements
- New rack power architectures and standards needed to enable this rise
  - 1MW+ latest rack architectures



Introduction

- Acknowledgement: Diablo OCP standard driven by Meta, Microsoft, and Google
  - Voltage increase from 48V to 800V net keeps current levels in check
  - Primary connectivity focus is the power rack in the sidecar, AC & DC input connections
- Our intent is to help fill the gap for the busbar mating interface on the IT gear rack



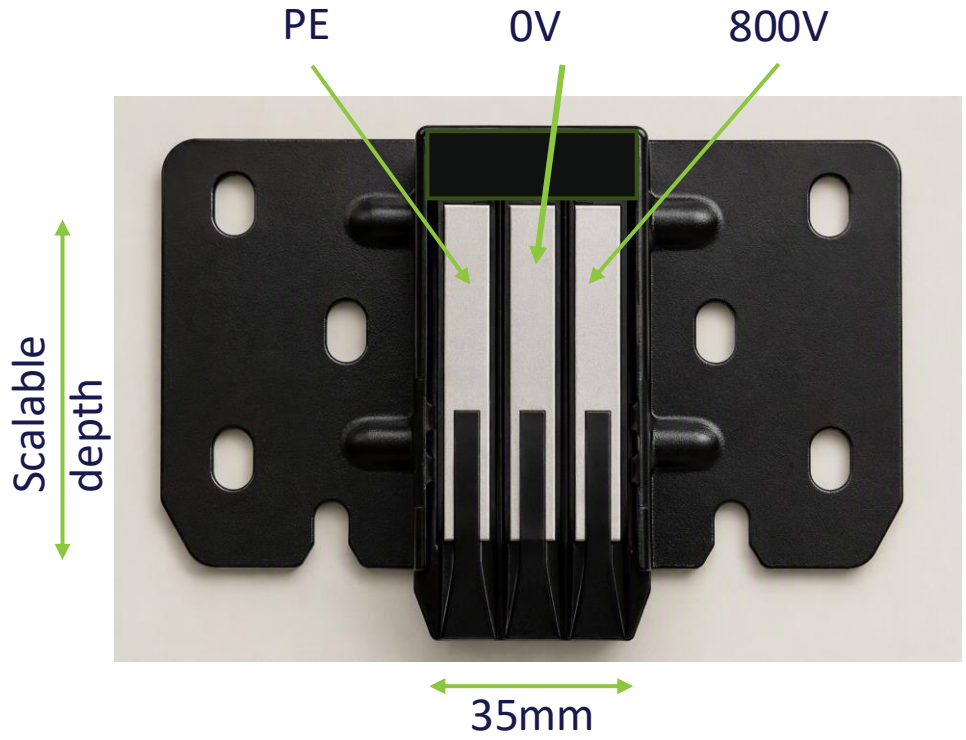
Note: The TE products shown and discussed in this presentation are shown for reference only and are not currently licensed Contributions to any OCP specification.

800VDC DC IT Rack Busbar Interface

IT Rack Busbar Interface follows standard 35mm ORv3 Busbar width and enables 0-800VDC

0-800VDC
250 kW – 1.6 MW+

Touch Safe Design



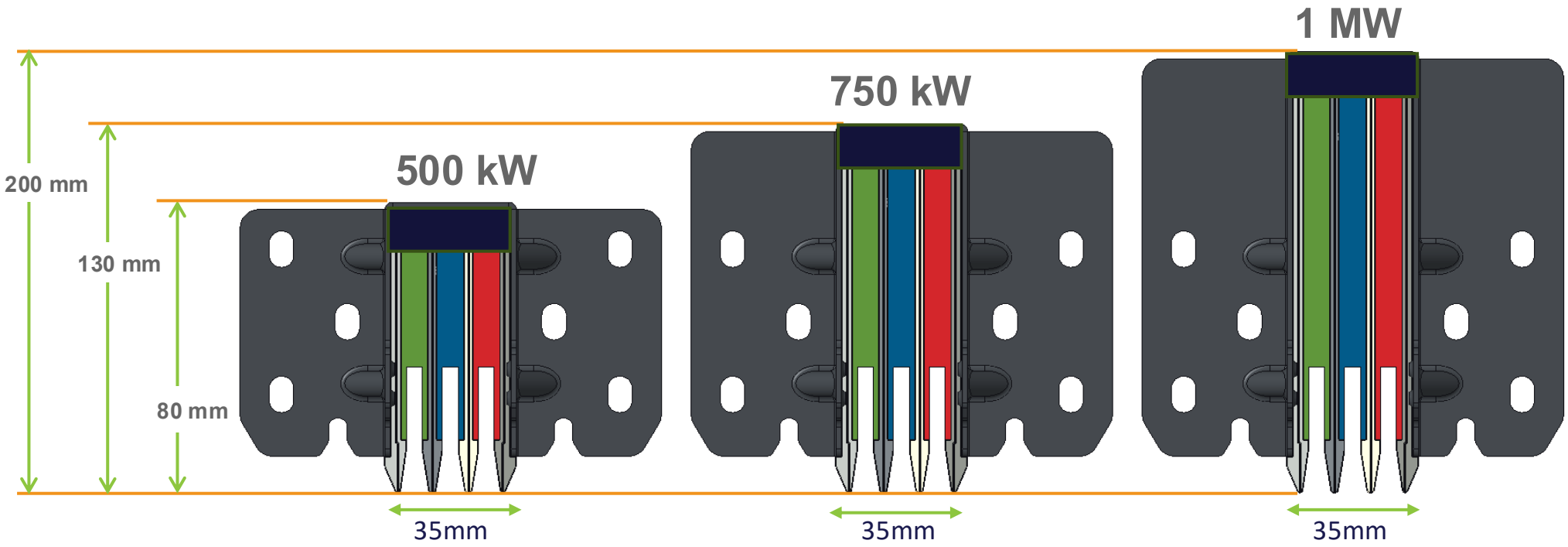
35mm = ORV3 width

Scalable depth for higher power needs

- PE cross section can be optimized to meet various fault current requirements

Note: The TE products shown and discussed in this presentation are shown for reference only and are not currently licensed Contributions to any OCP specification.

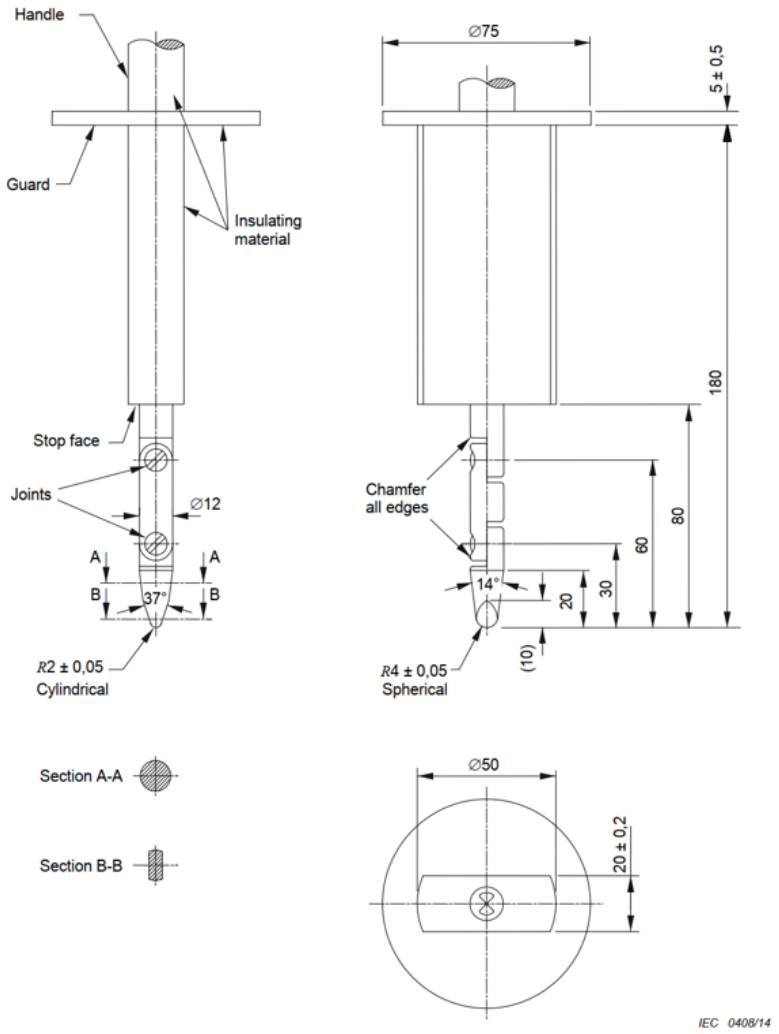
800V DC IT Rack Busbar Interface – Scalable Depth



Power capacity	Rated current	Busbar Dimensions (L*W*H)
500 kW	~625 A	2134mm * 35mm * 80mm
750 kW	~937 A	2134mm * 35mm * 130mm
1 MW	~1250 A	2134mm * 35mm * 200mm

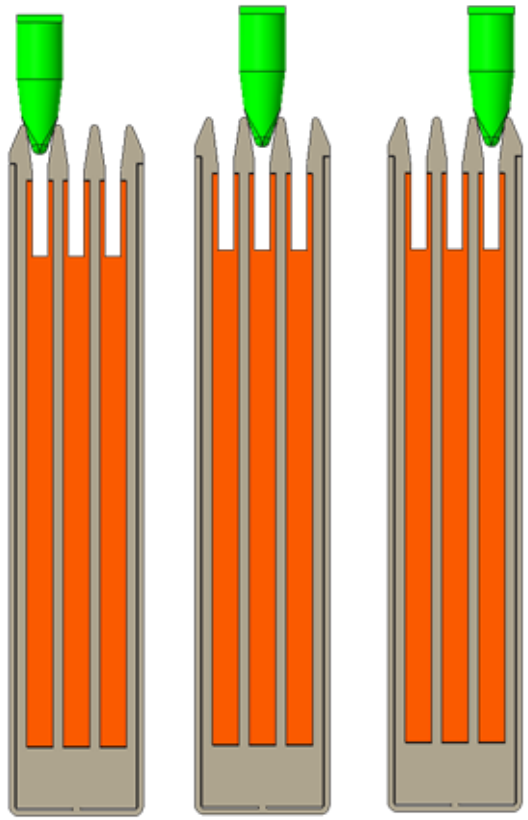
Note: The TE products shown and discussed in this presentation are shown for reference only and are not currently licensed Contributions to any OCP specification.

Touch Safe Design Considerations

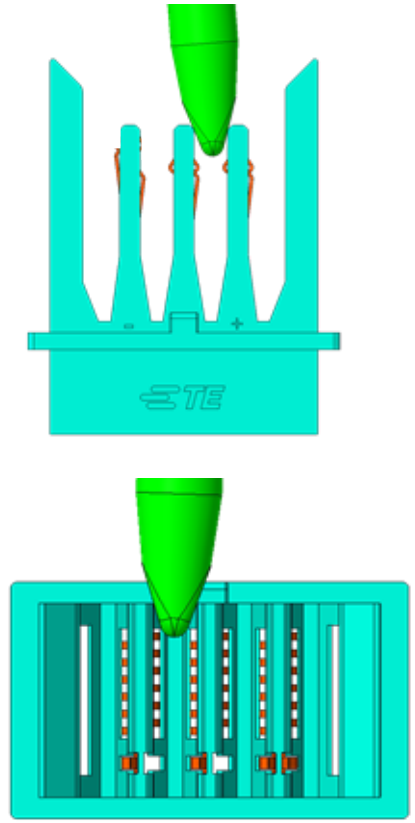


UL 62368 Finger Probe

Busbar



Connector

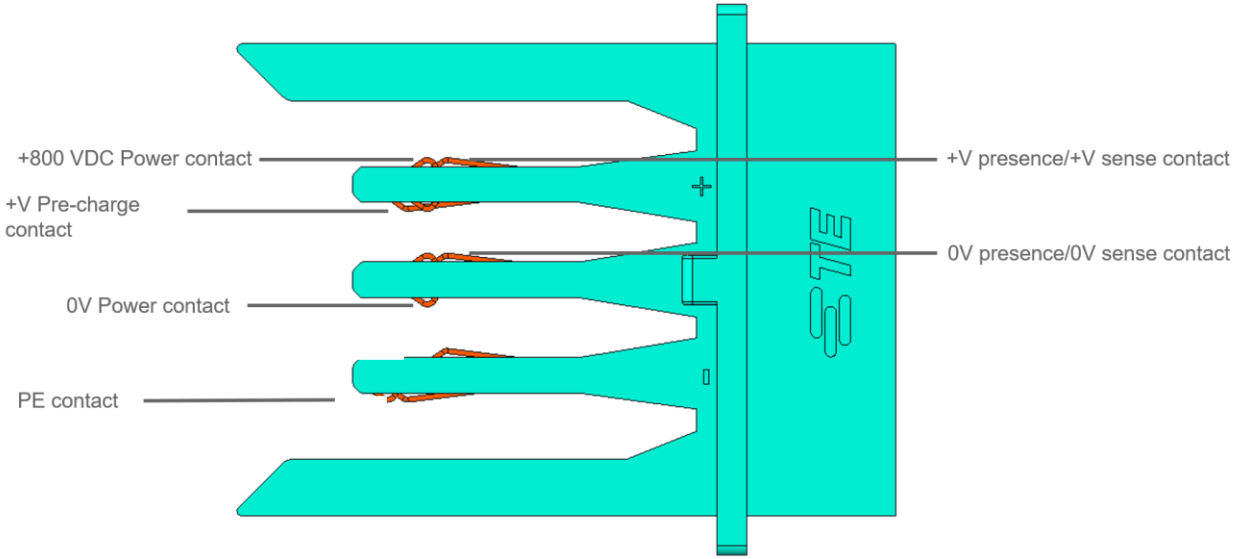


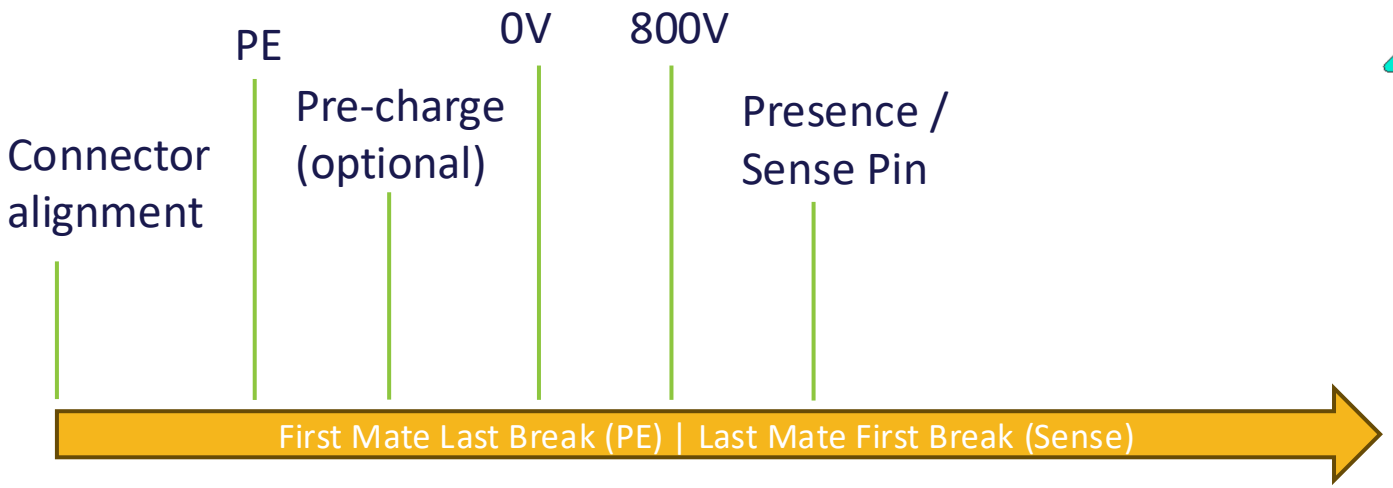
Note: The TE products shown and discussed in this presentation are shown for reference only and are not currently licensed Contributions to any OCP specification.

Mating Sequence

- Mating and un-mating sequence staggers the power and sense pin contacts

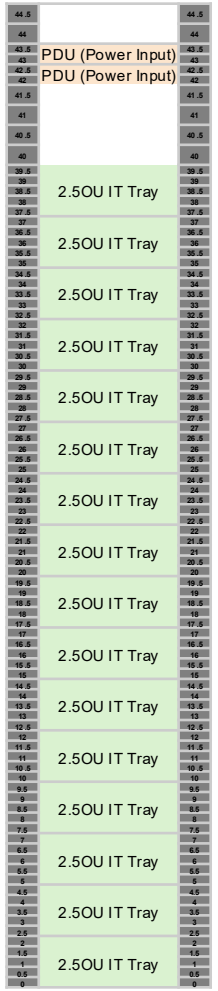




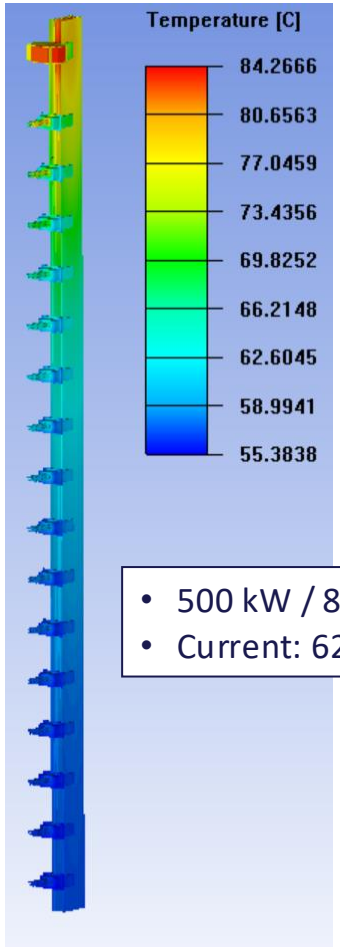


Note: The TE products shown and discussed in this presentation are shown for reference only and are not currently licensed Contributions to any OCP specification.

800V DC IT Rack Busbar - Simulation Data

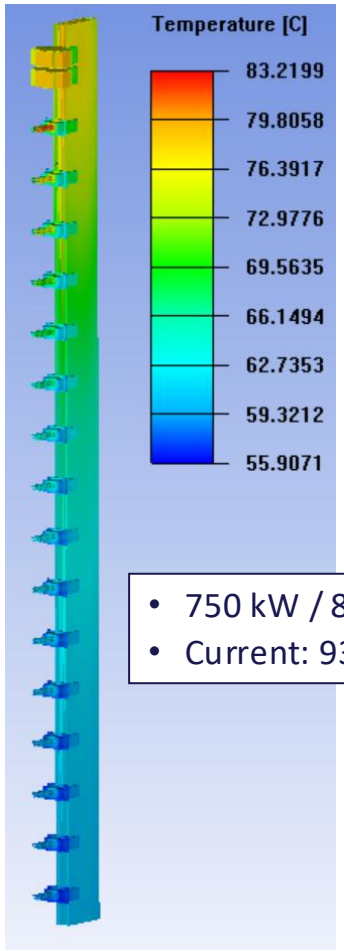


Generic Rack Layout



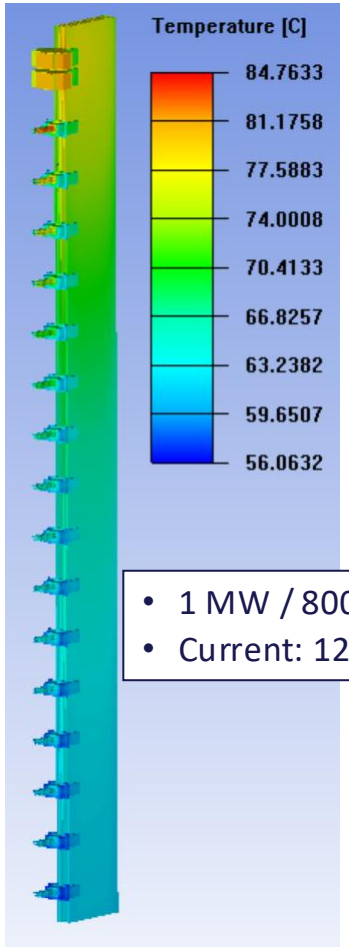
- 500 kW / 800V
- Current: 625A

- T-rise is 29.27° C Max.



- 750 kW / 800V
- Current: 937A

- T-rise is 28.22° C Max.



- 1 MW / 800V
- Current: 1250A

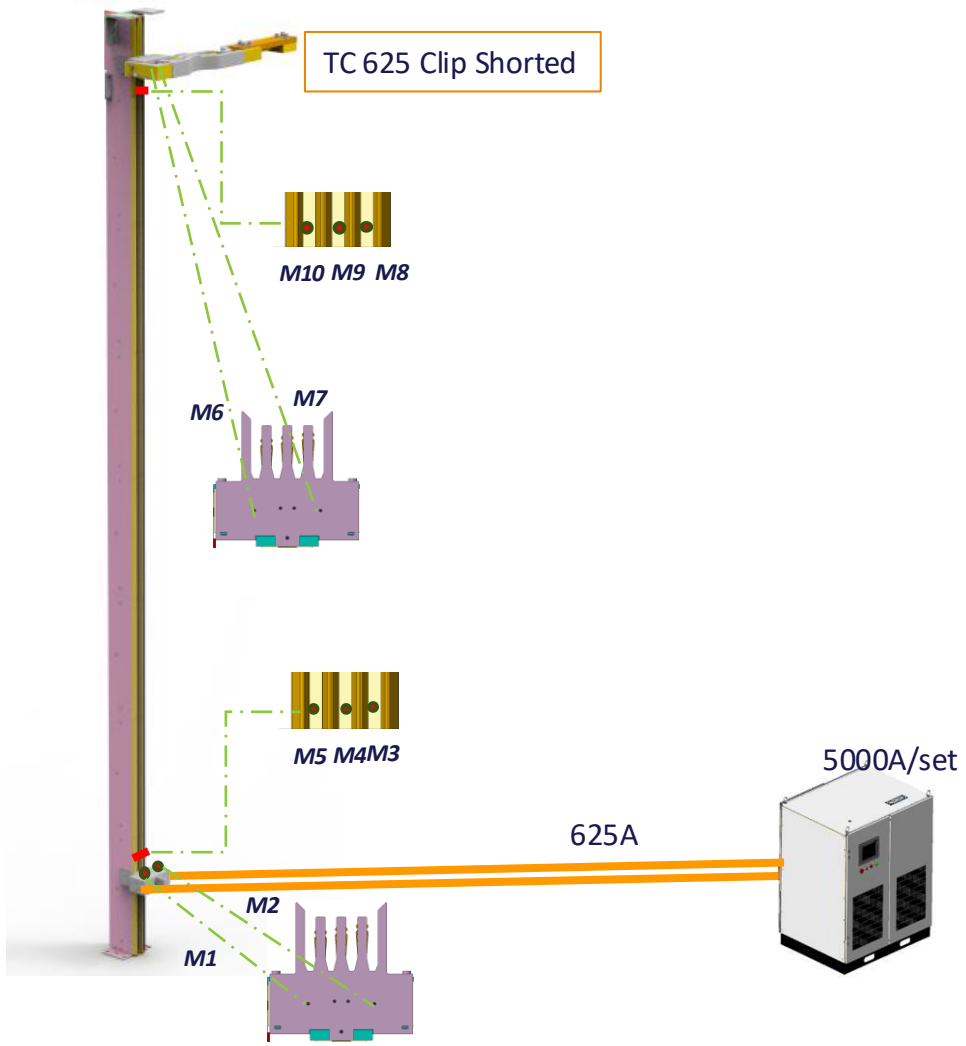
- T-rise is 29.76° C Max.

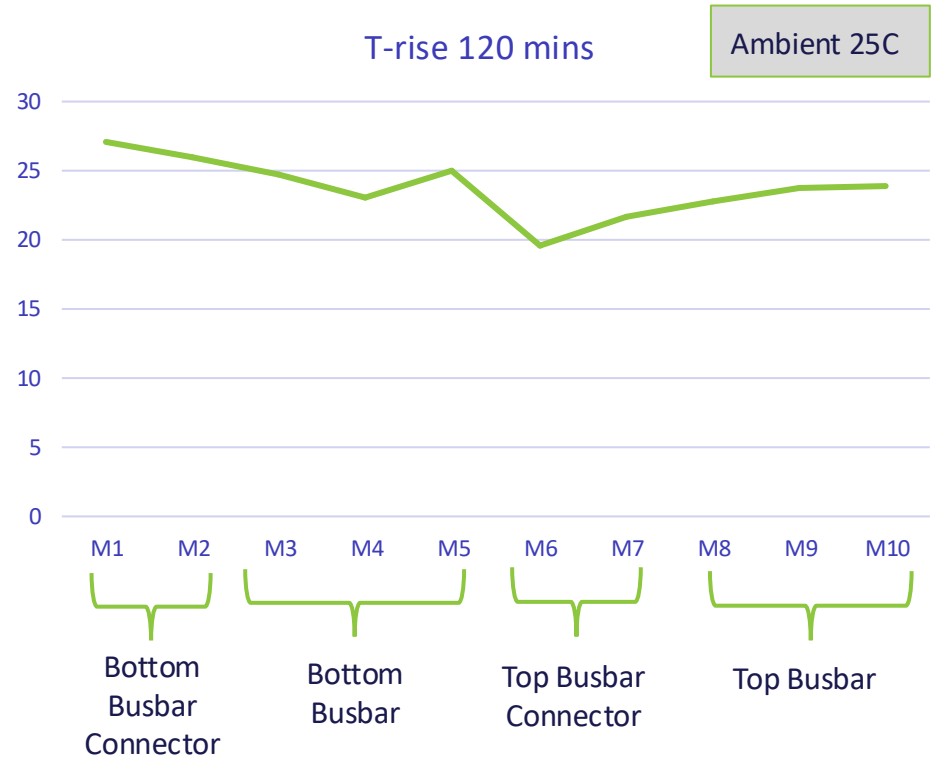
- Current range: 625A – 1250A
- T-rise simulations (<30 °C)
- Ambient temperature: 55°C
- Without airflow

Current (A)	Power	T-rise (°C)
625	500 kW	29.27
937	750 kW	28.22
1250	1 MW	29.76

Note: The TE products shown and discussed in this presentation are shown for reference only and are not currently licensed Contributions to any OCP specification.

T rise results and test setup



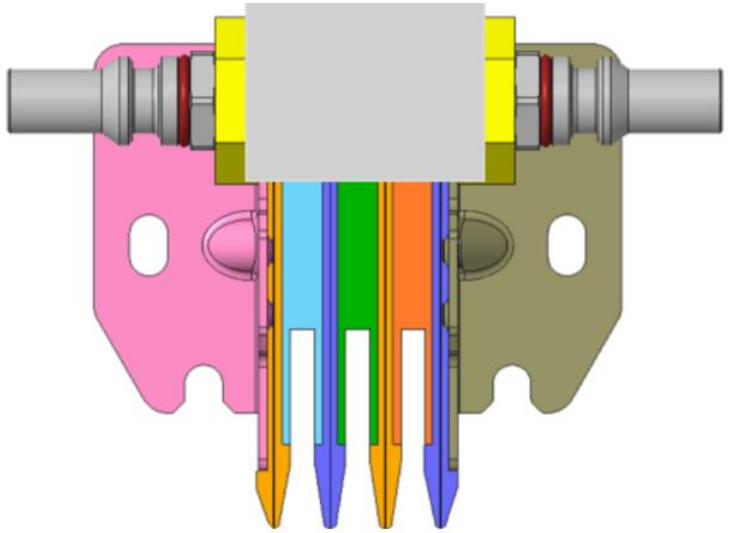


T-rise test summary – 625A | 500 kW

- Max T rise across all measurement points = ~27 °C
- Physical testing within ~6% of simulation data
- All components meet 30 °C T-rise

Future Technology

- ORv3 -> Diablo voltage increase leads to reduced current requirements.
  - Busbar sizing and weights can remain within reasonable limits...to a point
- Liquid cooling provides a pathway for improved current density while limiting conductor size & t-rise



Scaling for Future >> 800V
Liquid Cooled busbar

Note: The TE products shown and discussed in this presentation are shown for reference only and are not currently licensed Contributions to any OCP specification.

Call to Action

- Determine next steps for interface standardization/contribution
- Future study for liquid cooled version to support highest power levels
  - Size & weight optimization
  - Leverage 48V LCBB design efforts
- Where to find additional information:
  - OCP Rack & Power
  - OCP Contributions Database

OCP Rack & Power link

Thank You!

