



The Next Generation of Flexible Power Distribution

# PowerWave 2™ Bus System

## Flexible. Robust. Efficient.

Specifically designed for the mission critical power market, the PowerWave 2™ Bus System is a rugged yet flexible, easy to install, highly efficient, modular busway for the safe and reliable distribution of power. The PowerWave 2™ Bus System incorporates several patent pending design features including integrated communications capability, new and improved Coupler featuring CouplerTek™ Technology and robust Busrails featuring Toughrail Technology®.

With over 35 years serving data and processing centers as well as banking and industrial markets, PDI has gained an unmatched level of expertise in developing reliable products for critical power facilities. From preliminary concept to final installation, PDI critical application solutions simplify system installation, improve flexibility and increase operational efficiencies.

### Flexibility

Server loads can be plugged in almost anywhere along the busway. Through Tap-Off Boxes, the exact circuit breaker capacity and cable or receptacle type can be specified at any location along the Busrail, simply by plugging the correct Tap-Off Box into the Busrail. Tap-Off Boxes are highly configurable to meet load demands and specific requirements including PDI's patented Branch Circuit Monitoring System (BCMS). PowerWave 2™ Bus System leads the industry with a keep-out area ranging from zero to a maximum 3.75 inches (9.53cm) for 250A and 400A and 4 inches (10.16cm) to 9 inches (22.86cm) for 800A at each joint along the Busrail.

### Configurability

The continuous rail design allows circuits to be added and changed as needed without extensive electrical work. CouplerTek™ Technology enables PowerWave 2 Busrails to be assembled and then dis-assembled to support easy reconfiguration options.

### Traceability

Overhead power distribution effectively maximizes the use of space and increases traceability of circuits.

### Disruption-Free Upgrades and Additions

The PowerWave 2™ Bus System allows for equipment upgrades and additions on live systems.

### Energy Efficiency

The open channel bus design eliminates energy-wasting hot spots commonly found in electrical cable congestion points. It reduces resistance and minimizes voltage drops as well as power losses, which in turn decrease heat generation.

### Electrical Robustness

In order to run and manage ultra efficient data centers you need busway engineered with mission critical facilities in mind. That's why PowerWave 2™ Bus System is the first overhead busway tested and qualified for 60 degree C ambient environments (250A & 400A, excludes Monitoring, breakers require derating).

### Structural Robustness

Designed with PDI's unique Coupler with CouplerTek™ Technology as well as the robust Busrails featuring Toughrail Technology®, the PowerWave 2™ Bus System consistently passes load capacity tests of up to 200 percent of its maximum rating.

### Environmental Friendliness

The PowerWave 2™ Bus System is made of 99 percent recyclable components.

### Safety

The components of the PowerWave 2™ Bus System are flame-retardant and comply with all industry standards to eliminate toxicity in case of a fire.

### Integrated Communications Capabilities

Optional Branch Circuit Monitoring System (BCMS) integration enables advanced power monitoring without additional footprint. Multiple local display options include PDI's BCMS Hub and PowerWave 7-inch Local Display. BCMS can also integrate into Building Management Systems (BMS) or Data Center Infrastructure Management (DCIM) systems through MODBUS®

| Specifications                            | PowerWave Bus System<br>Item Description  | System Ratings         |                        |                         |
|---|---|------------------------|------------------------|-------------------------|
| Ampacity System                           | Three specific design options with the most common ampacity.  | 250                    | 400                    | 800                     |
| Protection                                | Finger-safe indoor rated systems.   | IP2X                   |                        |                         |
| Rated Voltage                             | Operating voltages.   | 120 - 600V             |                        |                         |
| Rated Short Circuit<br>Withstand Capacity | Tested and rated up to 600V and 42 kAIC depending on amperage.  | 42 kAIC up to 208VAC   | 42 kAIC up to 208VAC   | 42kAIC up to 600VAC     |
|   |   | 35 kAIC up to 480VAC   | 35 kAIC up to 480VAC   |                         |
|   |   | 22 kAIC up to 600VAC   | 22 kAIC up to 600VAC   |                         |
| Conductor Type                            | All conductors and contact points are plated copper.  | CU                     |                        |                         |
| Frequency Rating                          | International / North America   | 50/60 Hz               |                        |                         |
| Testing Criteria                          | ETL certified to UL rating for busway systems.  | UL 857                 |                        |                         |
| IEC Rated                                 | ETL certified to IEC rating for busway systems.   | 60439.2                |                        |                         |
| CAN/CSA Rated                             | ETL certified to CAN/CSA rating for busway systems.   | C22.2 No. 27           |                        |                         |
| Thermal Rating                            | Ambient ETL Certification.<br>Monitoring Rated to 40 degree C, Breakers require derating at 60 degree C | 60 degree C            | 60 degree C            | 40 degree C             |
| Keep Out Area - Min/Max                   | Width of unusable busrail at Coupler joint.   | 0" / 3.75"             | 0" / 3.75"             | 4" / 9"                 |
| System Weight                             | Straight sections only.   | 6.8lbs/ft.<br>10.1kg/m | 9.6lbs/ft.<br>14.3kg/m | 19.4lbs/ft.<br>28.9kg/m |

| Component Library         | PowerWave Bus System<br>Item Description  | System Ratings  |                     |                                   |
|---------------------------|---|---|---------------------|-----------------------------------|
|                           |   | 250   | 400                 | 800                               |
| Straight Lengths          | Overall length of rail section.   | max. 12' / 3.66m  |                     |                                   |
| Elbows                    | Elbows come standard with consistently aligned neutral phasing, cross neutral phasing is available on request.  | Neutral Inside<br>Neutral Outside<br>Neutral Cross          |                     | Neutral Inside<br>Neutral Outside |
| End Feed                  | End Feeds are used to bring power to the bus system and available in Compact, Modular, Standard.  | Compact<br>Standard<br>Modular                              | Standard<br>Modular | Modular                           |
| Hangers                   | Hangers are for universal mounting with various support hardware, including Unistrut® Channel Nuts.   | Top Rail Mount<br>Side Rail Mount                           |                     |                                   |
| Tap-Off Boxes             | Tap-Off Boxes can be mounted at any position along the busrail. Tap-Off Boxes are configurable with many variations of breakers, receptacles, and corded connections available. | Up to 12 Poles<br>128 Amp<br>Six-Pole Monitoring Capability |                     |                                   |
| Monitoring Communications | A dedicated communication channel for BCMS within the busway enclosure enables monitoring for each Tap-Off Box.   | Yes (optional)<br>Maximum 30 Tap-Off Boxes per End Feed     |                     |                                   |

| Monitoring    | PowerWave Bus System<br>Notations              | System Capabilities   |                   |
|---------------|--|-----------------------|-------------------|
|               |  | 7-Inch Local Display  | BCMS Hub          |
| End Feeds     | Number of End Feeds that can be addressed.     | Up to 6               | Variable          |
| Tap-Off Boxes | Number of Tap-Off Boxes that can be addressed. | Up to 15 per End Feed | Variable          |
| Total Devices | Total number of addressable devices.           | 96                    | 240               |
| Display Size  | Diagonal measurement of display.               | 7" Touchscreen        | 10.4" Touchscreen |



# PowerWave 2™ ToughRail Technology®

## Toughrail Technology® and Construction

PowerWave 2™ Toughrail Technology® has a unique, inherently safe, yet open and accessible design that meets the IP2X - finger-safe safety standards. Tap Off Boxes can be located anywhere on the run, reducing cabling and conduit runs, improving functionality and aesthetics of the system as well as maximizing the server installation area. Oversized bus bars provide superior voltage drop characteristics. The extruded aluminum housing comes as a solid, one-piece design without welds and bolts to reduce weight, improve the ground path and enhance stability and strength while minimizing electromagnetic interferences.

## Installation Ease

System installations can be completed quickly and easily. The rugged, yet lightweight Toughrail Technology® system design allows for easy handling and installation with up to 60 percent savings in time and labor over competitive cable and conduit solutions. Visual indicators effectively support the secure installation of the busway system and the hangers are engineered to work with standard Unistrut® Channel Nuts.

## Configuration Options

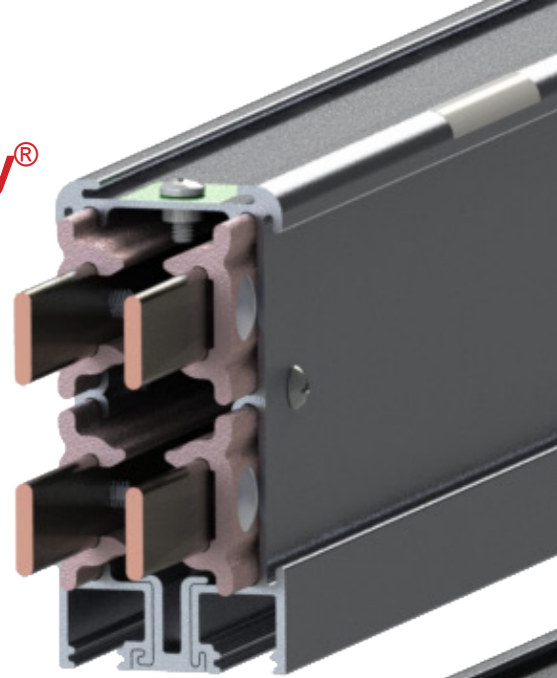
The continuous plug-in style rail is rated at 250–800 Amp with plated copper conductors and contacts. The patented PowerWave 2™ Toughrail Technology® system is available in the following configurations:

- Three-pole and four-pole.
- Optional 150% fully rated neutral.
- Optional 100% rated isolated ground.
- Black and silver anodized finish.
- Optional custom finish colors available.

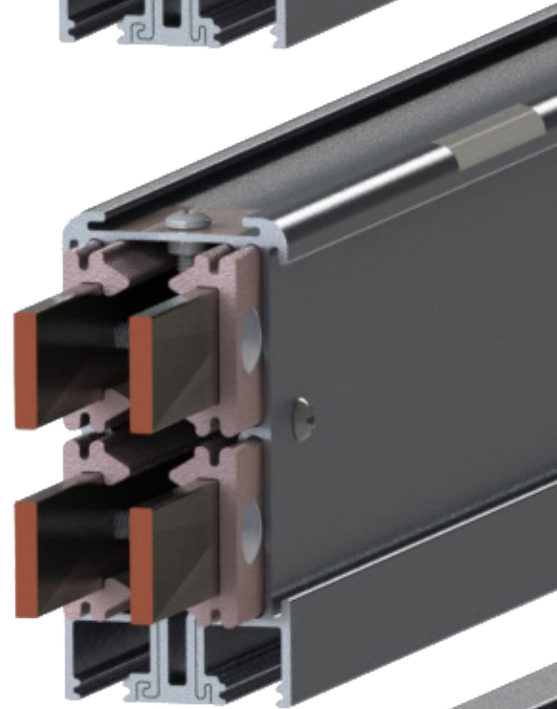
## Integrated Communications

PowerWave 2™ Bus System integrates power and communications in a single run simplifying installation. Optional Branch Circuit Monitoring System (BCMS) integration enables advanced power monitoring without additional footprint.

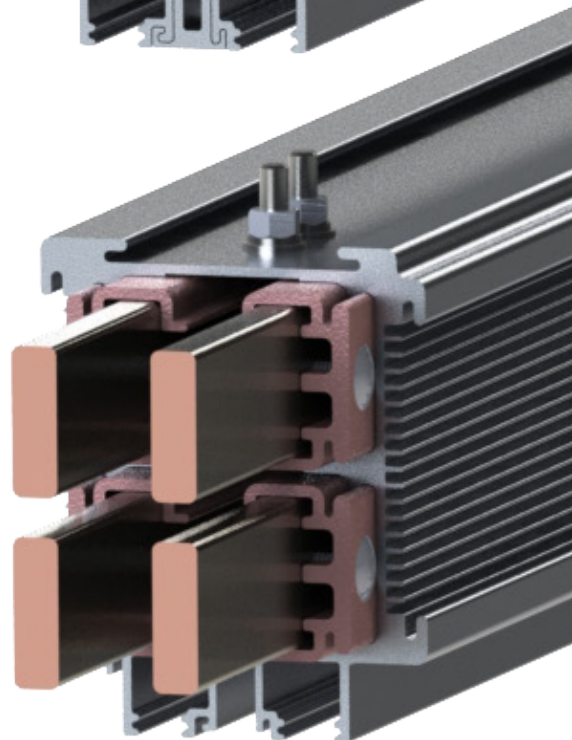
250A



400A



800A





# PowerWave 2™ ToughRail Technology®



## Thermal Performance

The insulation used in the busway system is rated to 150°C and certified to UL 94VO – flammability rating. The insulation wraps around each bus bar giving perfect separation from phase-to-phase and phase-to-ground while enhancing the short circuit rating. These high performance materials enabled PowerWave 2™ Bus System to be tested and qualified for 60 degree C ambient environments (250A & 400A)\*.

## Plating

To improve system conductivity the PowerWave 2™ Bus System features highly-conductive, corrosion-resistant, nickel-plated copper bus bars. The resulting improvement in overall surface contact reduces resistance and decreases corrosion in high humidity environments.

## Integral Ground Path

PowerWave 2™ Toughrail Technology® incorporates an integral ground system, a feature of its extruded, one-piece aluminum housing. By utilizing the housing design for the grounding system, we ensure a path to ground, improve the capacity, and encase the complete system.

## Short Circuit Strength

The unique design for low voltage distribution from 250–800 Amp of the PowerWave 2™ Toughrail Technology® system achieves an AIC rating for unprotected bus at up to 42,000 RMS symmetrical.

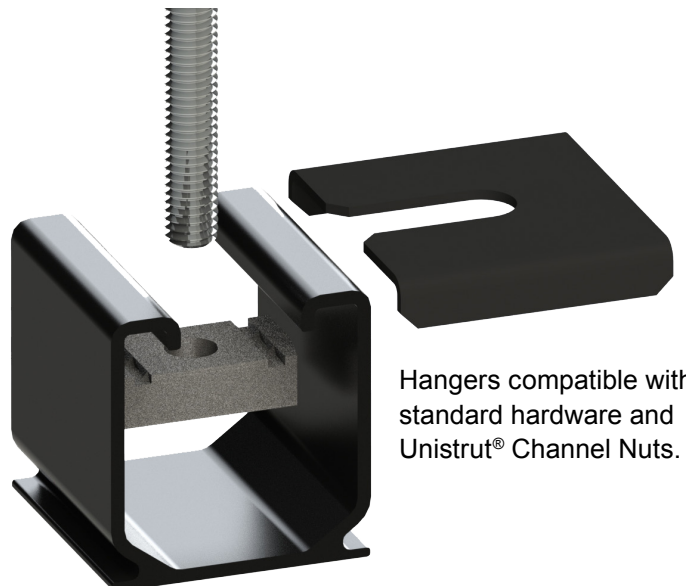
## Voltage Drop

PowerWave 2™ Toughrail Technology® features one of the lowest voltage drop ratings in the industry. Low resistance is a key design criterion for power quality equipment in critical power and data markets.

# 60°C

## ETL TESTED & QUALIFIED\*

\* 250 & 400A Systems  
Monitoring qualified to 40° C  
Circuit Breakers require derating



Hangers compatible with standard hardware and Unistrut® Channel Nuts.









# PowerWave 2™ Coupler

## CouplerTek™ Technology and Construction

PowerWave 2™ incorporates a unique coupler joint concept featuring CouplerTek™ Technology. The patent-pending modular connection has been reduced in size by 50% while doubling contact points when compared to our original splice design. This method assures a secure, thermally efficient maintenance-free connection that is tested and qualified for 60 degree C ambient environments (250A & 400A). This new Coupler with CouplerTek™ Technology also minimizes resistance and voltage drops across each connection.

## Compact Design

PowerWave 2™ Bus System can be mounted horizontally or vertically allowing for installation into very tight areas. CouplerTek™ Technology enables industry leading Tap-Off Box density by minimizing keep-out area at Busrail joints.

## No Special Tools Required

CouplerTek™ Technology simplifies installation. With the use of standard tools you are able to connect the two halves of the Coupler together, install the grounding bar, and secure the covers. The new installation procedure allows the installing contractor to reduce the installation time of the busway by up to 60%.

## Efficient Configurability

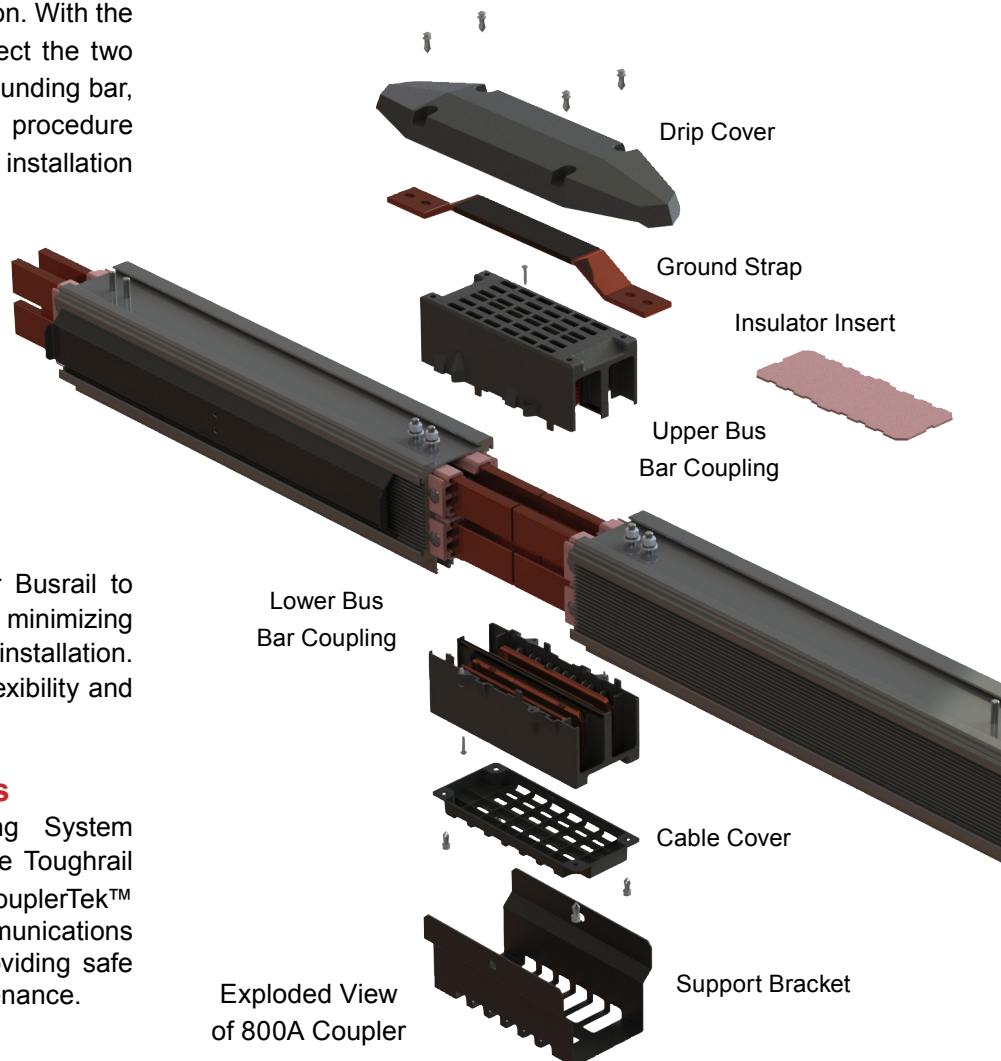
CouplerTek™ Technology is engineered for Busrail to Busrail and Busrail to End Feed connections minimizing the number of components needed during installation. This simple and efficient design allows for flexibility and configuration in the field.

## Integrated Communications Access

PDI's patented Branch Circuit Monitoring System (BCMS) is fully integrated into our one-piece Toughrail Technology® Busrail. Our Coupler with CouplerTek™ Technology supports and secures the communications cable connection within a support plate providing safe and secure access for installation and maintenance.



Coupler Section View



Exploded View  
of 800A Coupler

## CouplerTek™ Technology By The Numbers

**↓50%**  
REDUCTION IN WIDTH\*

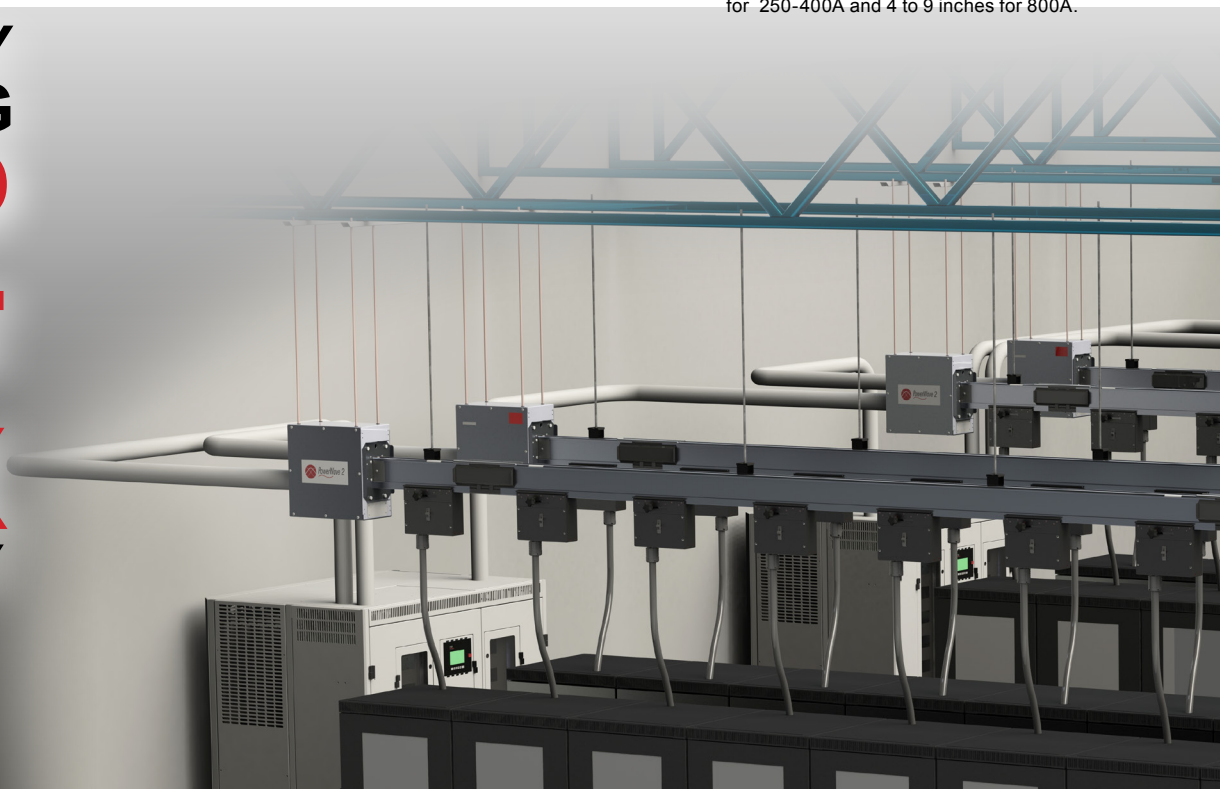
**↑100%**  
INCREASE IN CONTACT POINTS\*



\* When comparing 250A Splice to 250A Coupler.

\*\* Keep-Out area ranges from zero to 3.75 inches for 250-400A and 4 to 9 inches for 800A.

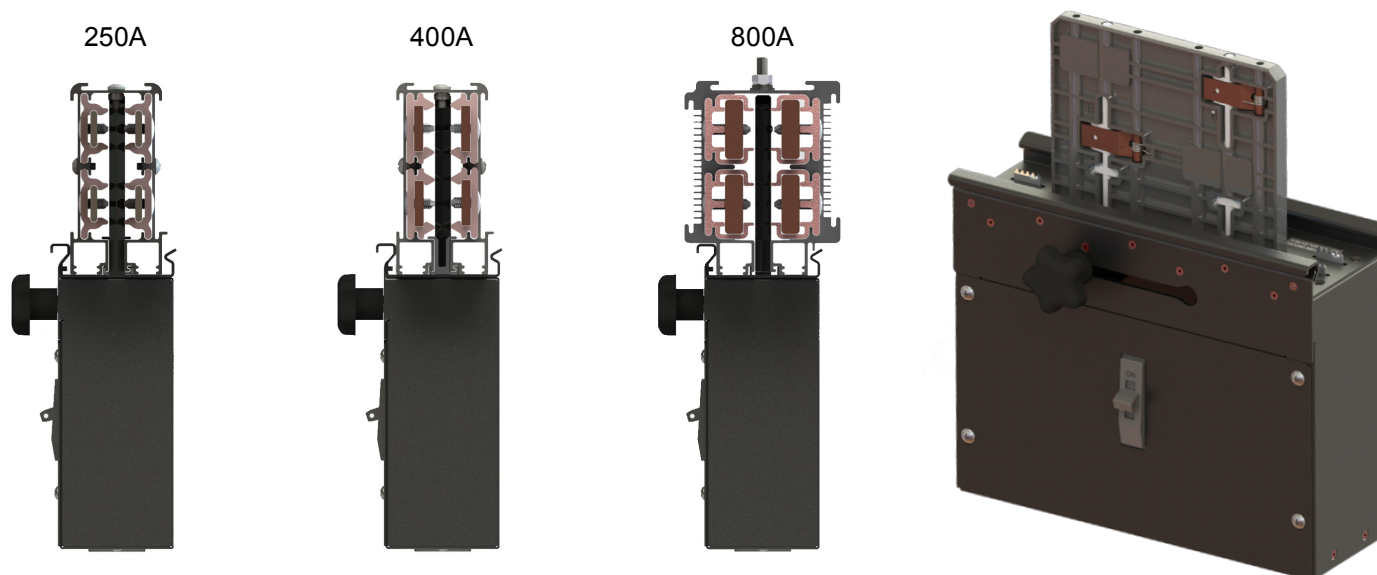
INDUSTRY  
LEADING  
**TAP  
OFF  
BOX**  
DENSITY



# PowerWave 2™ Universal Tap Off Box

## One Size Does Fit All

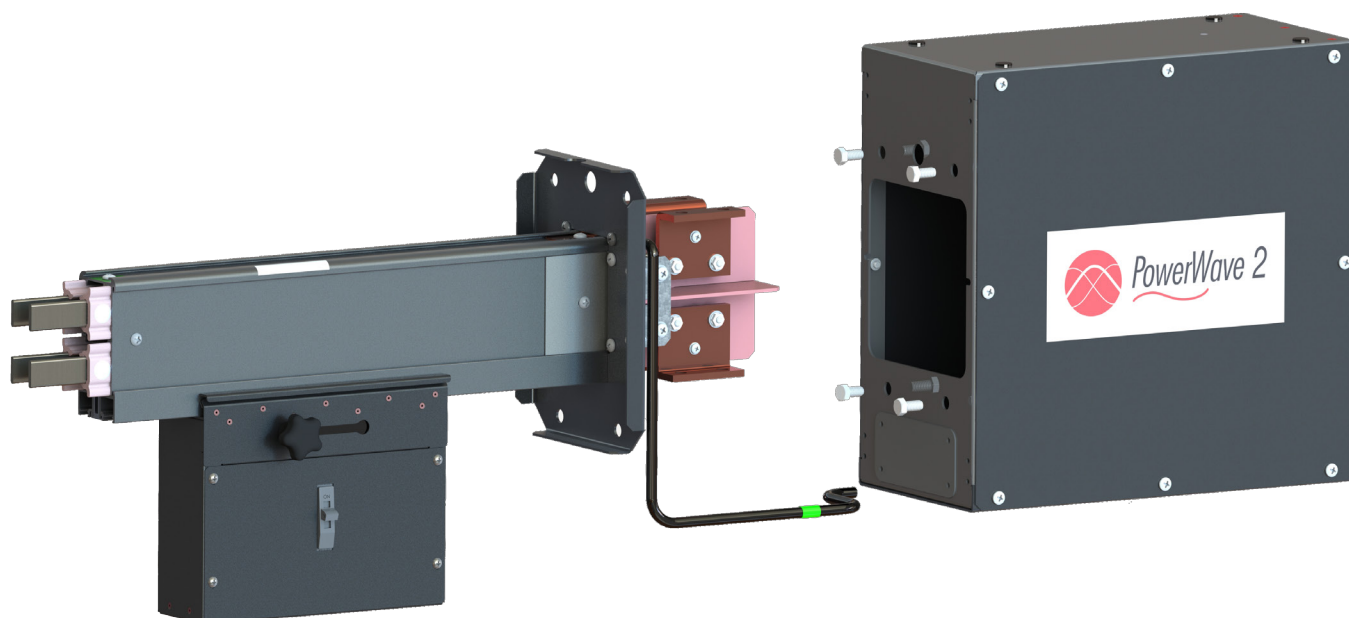
Flexibility is key to managing current and future mission critical facilities. You shouldn't have to buy different sized Tap -Off Boxes for different ampacity rated Busrails. PowerWave 2™ Bus System has standardized Tap-Off Boxes so that they fit all past and future sized systems.



# PowerWave 2™ End Feeds

## Flexibility in Design

End Feeds are available in Compact, Standard and Modular variations. All End Feed designs allows you to hang the Busrail with or without the inclusion of the End Feed. Once your run is positioned, simply slide the End Feed box on the rail, support with threaded rod and run power connections.





# PowerWave 2™ Branch Circuit Monitoring System



● PowerWave 2™ Bus System integrates power and communications in a single run simplifying installation. Optional Branch Circuit Monitoring System (BCMS) integration is available for both power monitoring at the End Feed connections and individual Tap-Off Boxes. This power monitoring data can be viewed through local displays or integrated into Building Management Systems (BMS) or Data Center Infrastructure Management (DCIM) systems through MODBUS® RTU, MODBUS® TCP/IP and SNMP communication protocols.



## PowerWave 7-inch Local Display

End Feed Screen



Tap Off Box Screen



**About Power Distribution, Inc. (PDI)**

Power Distribution, Inc. (PDI) designs, manufactures, and services mission critical power distribution, static switching, and power monitoring equipment for corporate data centers, alternative energy, industrial and commercial customers around the world. For over 35 years, PDI has served the data center and alternative energy markets providing flexible solutions with the widest range of products in the industry.

**Power Distribution, Inc.**

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