Pow-R-Way III low-voltage busway

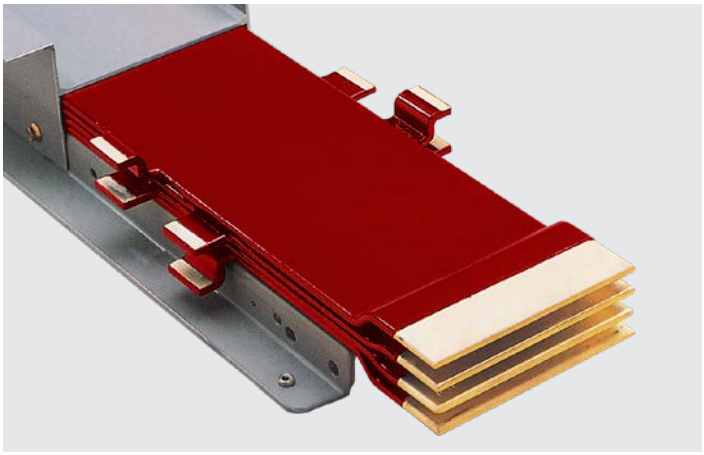
Meeting your most complex power distribution needs

Powering Business Worldwide

Pow-R-Way III low-voltage busway

Eaton has combined the requirements of NEMA®, UL®, CSA® and IEC into one design—the Pow-R-Way III busway system.

It can be used over a broad spectrum of industrial, commercial and institutional applications worldwide. Standard features include a two-piece all-aluminum housing, finger-safe plug-in outlets, an integral ground path and the highest 6-cycle short-circuit withstand ratings available in the industry today.



Plug-in outlet
The plug-in contact surfaces of Pow-R-Way III extend into the outlet, allowing for a continuous sandwich design to be maintained through the plug-in and feeder busway.

Housing process
The extruded aluminum housing channels are cut to size by an automated process.

Welding process
Full-sized conductor tabs are welded to the side edges of plug-in busbars by a state-of-the-art welding process.

Product offerings

Plug-in busway

- 225 A to 5000 A copper
- 225 A to 4000 A aluminum
- Straight sections of plug-in busway are available in 24.00-inch (609.6 mm) incremental lengths from a 2-foot (0.6 m) minimum to a 10-foot (3.0 m) maximum
- Sprinkler-proof plug-in busway is an available option

Feeder busway

- 225 A to 5000 A copper
- 225 A to 4000 A aluminum
- Straight sections of indoor and outdoor feeder busway are available in any length in 0.125-inch (3.2 mm) increments from a 16.00-inch (406.4 mm) minimum to a 10-foot (3.0 m) maximum
- A wide range of fittings are available for indoor and outdoor feeder busway

Plug-in units

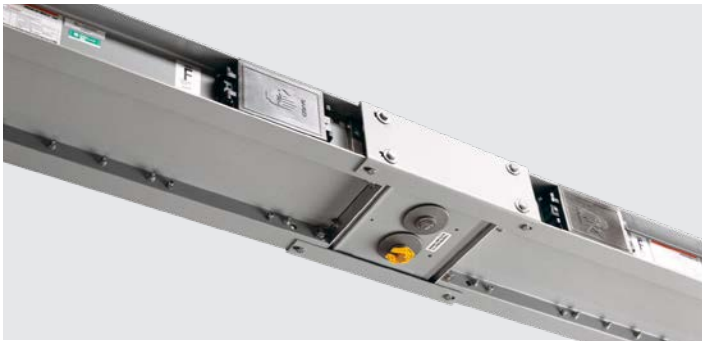
- A full family of busway plug-in units is available
- Standard plug-in units include fusible or circuit breaker protection
- Advanced plug-in units include SPD surge suppression, Power Defense™ circuit breakers, and Advantage™ combination contactors and starters

EV charging

- Now offering Level 2 AC 19.2 kW EV charger in bus plug-in units
- Chargers are rated 80 A; bus plug is Energy Star Certified and has 200 kA interrupting current rating
- Units come equipped with software for dynamic load management charging

Product features and benefits

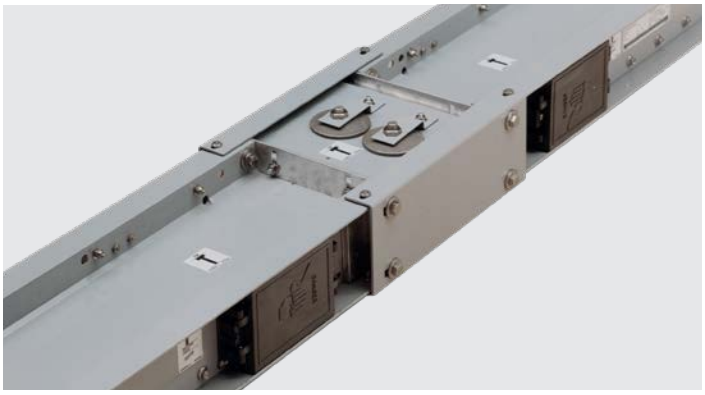
- The aluminum two-piece housing provides durability and product integrity
- The lightweight and compact design provides for easy installation
- The housing is combined with a true sandwich design in both plug-in and feeder busway, contributing to improved coordination and high short-circuit ratings
- An epoxy insulation process ensures optimum conductor and system protection
- Silver-plated joint and contact surfaces provide high-quality connections
- Highly automated manufacturing processes result in a superior product with reduced cycle times
- Pow-R-Bridge joint package and torque-indicating bolt give a rugged, yet flexible and easy-to-install connection
- Corner joint elbows contribute to successful layouts and minimize space limitations
- High 6-cycle short-circuit ratings optimize coordination between busway and power equipment
- World-class product design and manufacturing meets requirements of NEMA, UL, CSA and ISO®
- Flexible ground and neutral options provide solutions for any application problem
- A full family of plug-in units is available for every power need
- Advanced bus plugs provide protection, communication and coordination capabilities



Pow-R-Way III installation
Pow-R-Way III provides a busway system that can be used over a broad spectrum of industrial, commercial and institutional applications worldwide. A typical example is this installed run of 1600 A aluminum plug-in busway.

Busway capabilities

- Plug-in units are available for immediate shipment in select ampere ratings and system configurations
- Customer approval drawings can be available in two weeks or less to meet your project requirements
- Eaton's Final Field Fit program ensures accurate layout and allows for minor last-minute modifications during installation
- Advanced system tools, including Bid Manager,™ ProDesign™ and AutoCAD drawings, provide quick and accurate information



Housing features
Potential points of entry for moisture and dust are eliminated from the Pow-R-Way III design. There are no seams, spot welds or penetrations through the housing top or bottom.

Comprehensive support

Busway product and application support is available from a professional team of Eaton employees that includes field sales engineers, application engineers, engineering services and systems, and the Hodges busway product engineers.

For additional product information, refer to:

- Technical Data TD01701001E
- Volume 2—Commercial Distribution, CA08100003E

Superior housing design

Pow-R-Way III is constructed with a lightweight and rugged two-piece, all-aluminum extruded housing. There are no seams or welds across the top or bottom of the housing. There are no fastening bolts or screws that penetrate the housing to enter the busbars. The two-piece housing is bolted together along the bottom sides only, below the busbars with high-tensile strength, zinc-plated hardware.

This design forms a tight, secure housing with a high degree of rigidity and bracing. The nonmagnetic aluminum housing provides for excellent heat dissipation and a significant reduction in reactance and magnetic flux leakage as compared to a steel or a steel and aluminum combination housing.

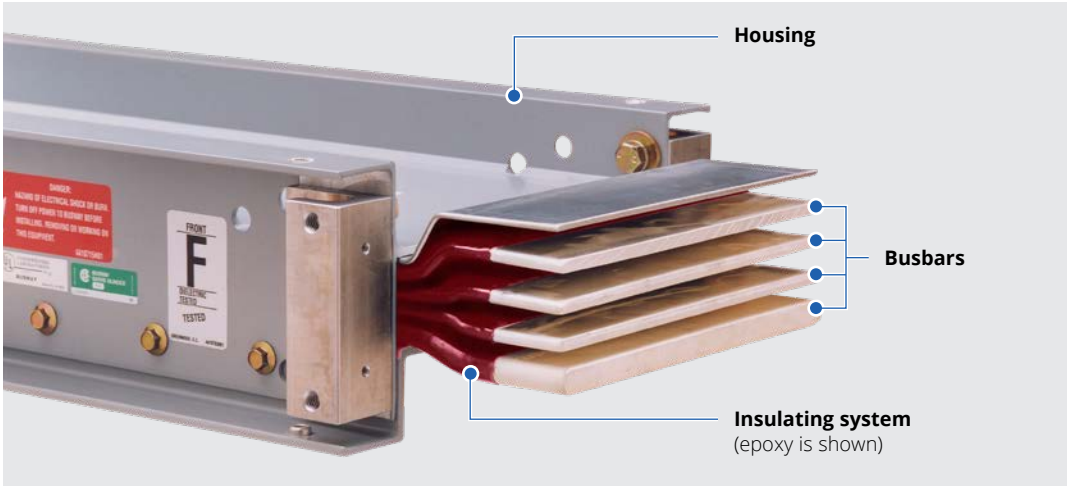
With this housing design, Pow-R-Way III achieves a minimum 6-cycle short-circuit rating of 85 kA for 225 A to 600 A busway, and a maximum of 200 kA for 3000 A to 5000 A busway (plug-in or feeder).

True sandwich design

Busbars for plug-in applications have full-sized conductor tabs welded to their side edges to form the plug-in contact surfaces. The tabs are of the same exact thickness as the conductor bars and are welded in place by a fully automated, state-of-the-art welding process. This process also mills and cleans the welded surface to ensure a smooth and uniform contact surface.

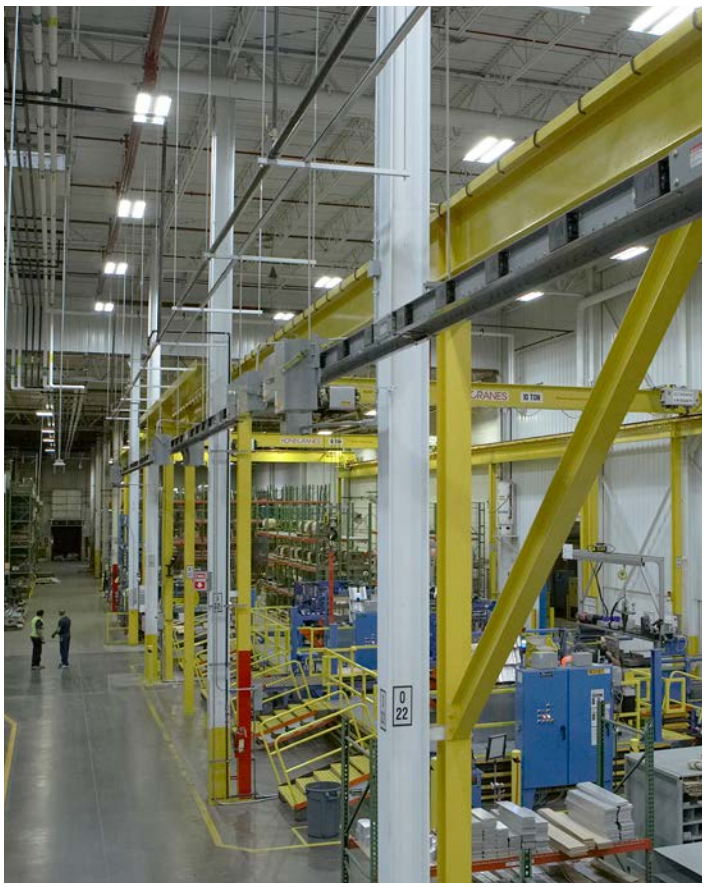
The design extends the contact surfaces outside of the busway housing and into the plug-in outlet, eliminating the need to separate or flare the bars in order to create contact points for the stab assemblies of plug-in devices. This enables Pow-R-Way III plug-in busway to be built with the same seamless housing as feeder busway. The benefits of maintaining the sandwich design through plug-in and feeder are improved heat dissipation and bracing. The high short-circuit withstand ratings of feeder bus can now be equaled by plug-in busway. This results in complete coordination on bus runs that use a mix of plug-in and feeder busway.

Maintaining a true sandwich design also eliminates potential pathways for the propagation of flame, smoke or gas through the busway housing, which is more commonly referred to as the "chimney effect."



Highly durable silver-plating

Silver-plating is applied to all joint and contact surfaces. Aluminum bars are silver-plated by the ALSTAN 88C process. Copper bars are silver-plated by a flashing process. Silver-plating provides an extremely durable contact surface for the spring-loaded connections of plug-in device stab assemblies.



Busway is an excellent alternative to cable and conduit for distributing power
The above image shows plug-in type busway distributing power throughout an industrial facility with bus plugs installed to feed downstream loads.

Epoxy insulation provides exceptional performance

Busbars are fabricated from high-strength, 98% conductivity copper or 55% conductivity aluminum. The phase and neutral bars are insulated with Class B, 130 °C, epoxy insulation applied by an automated fluidized bed process. This application insulates the conductors in a precisely defined and controlled manner to ensure a smooth, continuous and uniform thickness.

The busbars undergo a series of pretreatment processes to clean them, which enhances the bonding of the epoxy powder. The pretreatment stage also helps to prevent any contamination of the powder. After pretreatment, the bars are submerged in a two-station water bath to remove the chemicals used in the pretreatment process. After the cleaning is complete, the busbars are preheated uniformly in an air-circulating oven to enable the epoxy powder to melt and fuse to the busbar.

The epoxy powder is applied over the full length of the preheated bar except for the joint and contact surfaces. After the epoxy is allowed to gel and fuse to the busbars, they enter a cure oven. This ensures that all the epoxy cross links and hardens to the bars.

The consistent thickness and smooth surface of the epoxy provides a high-quality insulation with a 50-year life cycle. The fluidized bed process also provides excellent edge coverage to the bars. Epoxy provides optimum resistance to water absorption and chemical erosion. It has excellent dielectric strength, is flame retardant, and resists impacts that other Class B insulating material cannot withstand. Epoxy has outstanding heat transfer characteristics and is ideally suited for sandwich bus applications.

The Pow-R-Bridge package

Pow-R-Way III joint connections are made with the rugged Pow-R-Bridge joint package. A Pow-R-Bridge is installed on each section of busway prior to shipment. Torque-indicating bolts of a double-headed design are provided as standard to ensure that proper installation torque is achieved. A standard wrench or a socket with a 14.00-inch (355.6 mm) minimum handle should be used to complete the joint connection between two sections. Fall-away instruction tags are also furnished on the torque-indicating bolts to allow for visual inspection from a distance.

Torque should be applied to the outer bolt head only. As the proper value is achieved, that bolt head will shear off and allow the instruction tag to fall to the floor. Any Pow-R-Bridge that is improperly torqued will retain the highly visible caution yellow tag and should be retightened. The inner bolt head remains intact for future work and a label with the proper torque information is provided on the Pow-R-Bridge.

With the release of a retainer screw, the Pow-R-Bridge can provide an adjustment in section length of up to ±0.50 inch (12.7 mm) at each joint.

Overadjustment is prevented by the joint covers, which will only allow the ±0.50 inch (12.7 mm) maximum adjustment, and by stopping lances on the conductor bars of the Pow-R-Bridge.

Due to a single bolt nonrotating design, the Pow-R-Bridge maintains its configuration integrity when it is removed from a section of busway. The conductor plates and insulators do not displace or swivel, making reinstallation quick and easy.

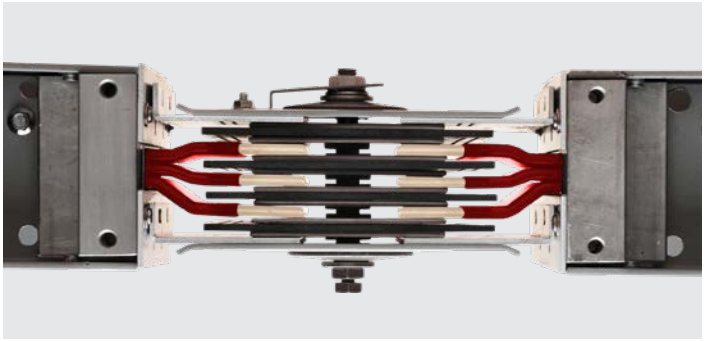
The insulators of the Pow-R-Bridge are made of high strength, molded glass polyester and rated as Class B, 130 °C, insulating material.

Joint connections for outdoor feeder busway are made with a weatherized version of the Pow-R-Bridge. Aluminum water barriers are provided across the top and bottom sides of both joint ends on each section of outdoor busway. Closed cell, neoprene gaskets are applied to the top of each water barrier and to the inside of the aluminum side-access joint covers. The gaskets are manufactured as a single-piece design.

The aluminum top and bottom access covers bolt directly to the water barriers and are overlapped by the side-access joint covers.

The outdoor Pow-R-Bridge has the same 0.50 inch (12.7 mm) adjustability and features as the indoor unit and is UL listed.

Joint installation
3000 A copper Pow-R-Bridge connecting two short sections of feeder busway. (Shown with the top-, bottom- and side-access covers removed.)



Joint orientation
1200 A copper Pow-R-Bridge with joint covers removed, showing the proper orientation of the double-headed, torque-indicating bolt (bottom) and the heavy-duty captive nut retainer (top). The fall-away tag has been removed in this picture.

Pow-R-Bridge
The robust Pow-R-Bridge joint package provides a solid and safe connection along with 1.00-inch (25.4 mm) adjustability in section length at each joint. The photo shows the Pow-R-Bridge in 2000 A (foreground), 2500 A (center) and 5000 A copper configurations.

Corner joints
The exclusive Pow-R-Way III corner joint elbow can solve any difficult pathway problem with leg lengths as small as 4.71 inches (119.6 mm) for an upward or 4.35 inches (110.5 mm) for a downward elbow. The corner joint is provided with torque-indicating bolts, fall-away instruction tags and heavy-duty captive nut retainer. The photograph depicts a 1000 A (front foreground), two 2500 A (foreground), a 5000 A upward (center background) and two 5000 A forward.

Corner joint elbow leg lengths

Ampere rating		Forward (X)		Backward (Y)		Upward (X)		Downward (Y)	
Cu	Al	Inches	mm	Inches	mm	Inches	mm	Inches	mm
225	225	0.94	23.9	5.38	136.7	4.71	119.6	4.35	110.5
400	400	0.94	23.9	5.38	136.7	4.71	119.6	4.35	110.5
600	—	0.94	23.9	5.38	136.7	4.71	119.6	4.35	110.5
800	600	0.94	23.9	5.38	136.7	4.71	119.6	4.35	110.5
1000	—	1.25	31.8	5.69	144.5	4.71	119.6	4.35	110.5
1200	800	1.50	38.1	5.94	150.9	4.71	119.6	4.35	110.5
1350	1000	1.75	44.5	6.19	157.2	4.71	119.6	4.35	110.5
1600	1200	2.25	57.2	6.69	169.9	4.71	119.6	4.35	110.5
2000	1350	2.88	73.2	7.31	185.7	4.71	119.6	4.35	110.5
—	1600	3.25	82.6	7.70	195.6	4.71	119.6	4.35	110.5
2500	2000	4.12	104.6	8.57	217.7	4.71	119.6	4.35	110.5
3200	—	6.64	168.7	11.07	281.2	4.71	119.6	4.35	110.5
4000	2500	7.89	200.4	12.32	312.9	4.71	119.6	4.35	110.5
—	3200	8.65	219.7	13.08	332.2	4.71	119.6	4.35	110.5
5000	4000	10.42	264.7	14.85	377.2	4.71	119.6	4.35	110.5

High 6-cycle and 1-second short-circuit withstand ratings

Pow-R-Way III offers the highest 6-cycle short-circuit ratings in the industry. Six-cycle ratings exceed NEMA and UL 3-cycle requirements and ensure maximum withstand capability.

The 6-cycle ratings allow for safer coordination with switchgear having a 4-cycle rated bus system. All ampere ratings of Pow-R-Way III have been tested to 6-cycle standards and have achieved a minimum rating of 85 kA rms symmetrical and a maximum rating of 200 kA rms symmetrical (see short-circuit rating table).

Pow-R-Way III provides optimum coordination in a distribution system as the short-circuit ratings of plug-in are equal to the ratings of indoor and outdoor feeder busway. The integrity and strength of the two-piece extruded aluminum housing design ensures specifiers and users of a safe and durable installation for industrial, commercial and institutional applications.

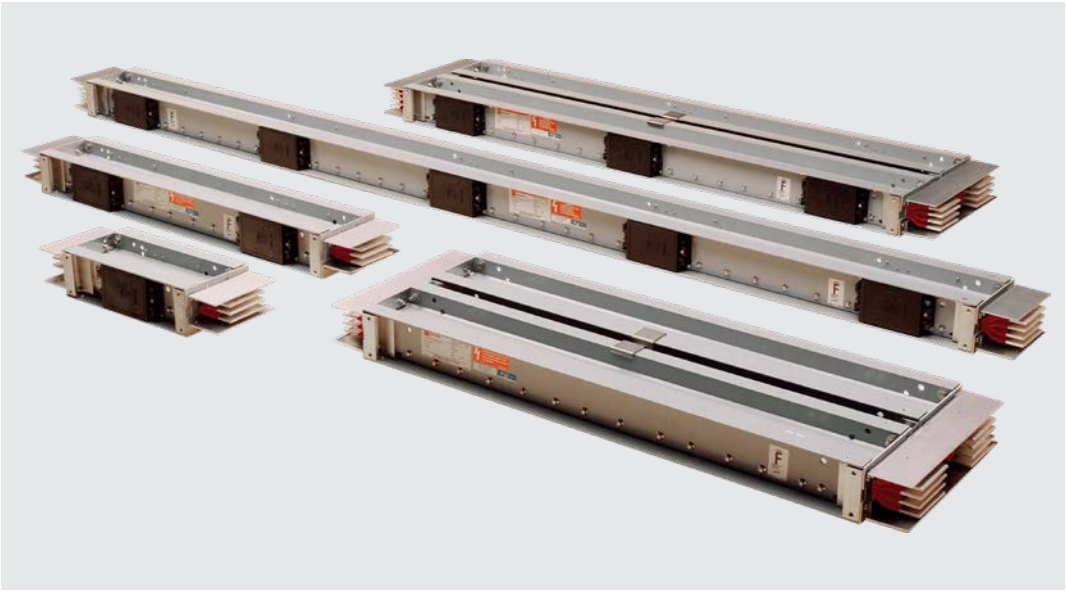
Pow-R-Way III meets the requirements of NEMA, UL 857, CSA C22.2 No. 27-94 and ANSI. The design is also available as an outdoor feeder, indoor feeder (for use with indoor sprinkler-proof applications), indoor plug-in, and in an indoor sprinkler-proof configuration for both plug-in and feeder.

All four types of busway can be used interchangeably without the use of adapters or special splice plates, provided they are of the same current and system rating. Pow-R-Way III is also certified for seismic withstand capability in accordance with the earthquake requirements as specified in both the IBC and the CBC. The seismic capability of Pow-R-Way III exceeds the Zone 4 requirements.

Pow-R-Way III is available in ratings from 225 A to 4000 A aluminum and from 225 A to 5000 A copper in both plug-in and feeder designs.

Torque-indicating bolts
The Pow-R-Bridge and corner joint elbows are provided with torque-indicating bolts as standard. The only tool that is required to complete a connection properly is a standard wrench or a socket with a 14.00-inch (355.6 mm) minimum handle.

Fall-away tags
Fall-away instruction tags are furnished on the torque-indicating bolts to allow for visual inspection from a distance. Any Pow-R-Bridge or corner joint that is improperly torqued will retain the highly visible tag.



Pow-R-Way III busway
Pow-R-Way III offers high 6-cycle short-circuit withstand ratings. It is available in outdoor and indoor feeder configurations, indoor plug-in and indoor sprinkler-proof designs for both feeder and plug-in.

Short-circuit withstand and ratings rms symmetrical amperes for plug-in and feeder busway

Ampere rating	kA 6-Cycle	
	Cu	Al
225	85	85
400	85	85
600	85	85
800	85	100
1000	100	100
1200	100	125
1350	100	150
1600	125	150
2000	150	150
2500	150	200
3200	200	200
4000	200	200
5000	200	—

Pow-R-Way III offers grounding options to meet every customer preference and need

The two-piece extruded aluminum housing is UL listed as a 50% integral ground path (integral earth) and is fully fault rated. The system ground continuity is maintained through each joint by ground path collector blocks, ground path pressure plates (both are furnished at each end of a section) and the aluminum joint covers. The joint covers are provided with ground path contact surfaces on the inside of each end. When the covers are installed, the contact surfaces are bolted directly to the ground path collector blocks with four 3/8-inch hex bolts per cover.

The ground path pressure plates contribute to system ground continuity by making positive contact with the Pow-R-Bridge. This contact is maximized and maintained when the torque-indicating bolt heads of the Pow-R-Bridge are sheared off during installation. A highly visible label will be furnished on each joint cover to alert the installer that the covers must be properly installed in order to maintain the ground path. The result is a 50% ground path that ensures ground continuity with very low resistance characteristics. If the customer prefers a traditional 50% internal ground bus, it can be provided as an option with the Pow-R-Way III design.

Resistance values for plug-in or feeder busway with integral housing ground (milliohms per 100 ft or 30.5 m)

	Phase bars	
Ampere rating	Al	Cu
225	4.38	2.30
400	4.38	2.30
600	4.38	2.30
800	2.67	2.30
1000	2.29	1.67
1200	1.76	1.39
1350	1.39	1.20
1600	1.25	0.94
2000	1.01	0.76
2500	0.71	0.55
3200	0.62	0.47
4000	0.50	0.38
5000	—	0.27

Pow-R-Way III provides solutions to specific problems that are inherent in today's electrical distribution systems

100% ground option

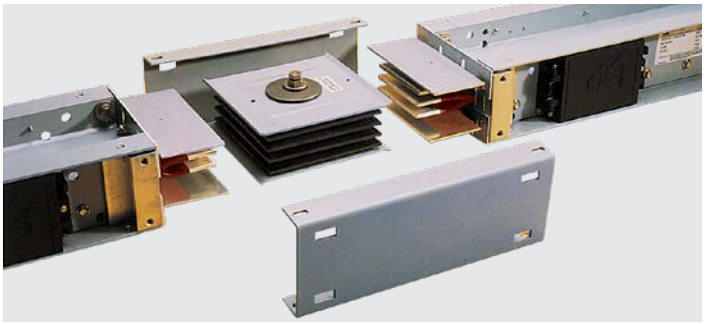
In certain industrial applications, a ground path greater than 50% may be required. In the past, a specifier would have to overrate the busway in order to obtain a 75% or 100% ground path. In many applications, this proves to be cost-prohibitive as the ampere rating of the busway would have to be doubled in order to achieve a 100% ground path. Pow-R-Way III can solve this problem in a cost-efficient manner by providing a fully rated 100% ground path by combining the 50% integral housing ground with a 50% internal ground bus option. The two ground paths are mechanically and electrically tied together at the termination points and at the plug-in outlet to deliver a 100% grounded system without the need for costly overrating.

Isolated ground option

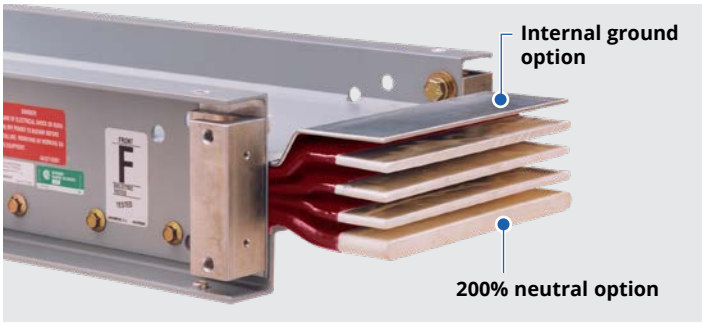
To meet the growing demand for grounding isolation, Pow-R-Way III offers a 50% isolated ground bus. The ground bus is insulated with the same Class B, 130 °C, epoxy as the phase and neutral bars. This option is available for facilities with large amounts of microprocessor-based loads. The isolated ground option is also beneficial when the busway is used to feed a portion of a facility that houses large banks of personal computers.

200% neutral option

Power system harmonics are generated by various types of nonlinear loads. Examples of nonlinear loads are personal computers, UPS systems, variable frequency motor controllers, electronic lighting ballasts, medical test equipment, and many other microprocessor-based apparatuses. On 208 V wye systems, certain nonlinear loads cause odd triplen harmonics that are additive and will not cancel each other in the neutral. The neutral current can be as high as 1.73 times the phase current. This can lead to a deterioration of equipment performance and a shortened life cycle. Pow-R-Way III offers a solution to this problem with a fully rated 200% neutral bus option. The additional neutral capacity prevents the overheating caused by high harmonic neutral currents.



Integral ground
The two-piece extruded aluminum housing of Pow-R-Way III is UL listed for use as a 50% integral ground path (integral earth). The system ground continuity is maintained through each joint by the ground path collector blocks, the ground path pressure plates and the aluminum joint covers. This provides a ground path that ensures continuity and has very low resistance characteristics.



Neutral options
The Pow-R-Way III 200% neutral option is unique in that Eaton is the only manufacturer that provides this option with a fully rated 0.50-inch (12.7 mm) thick neutral bar. The additional neutral capacity prevents the overheating caused by high harmonic neutral currents. The figure above also shows an internal aluminum ground bus option (shown with ground path pressure plates removed).

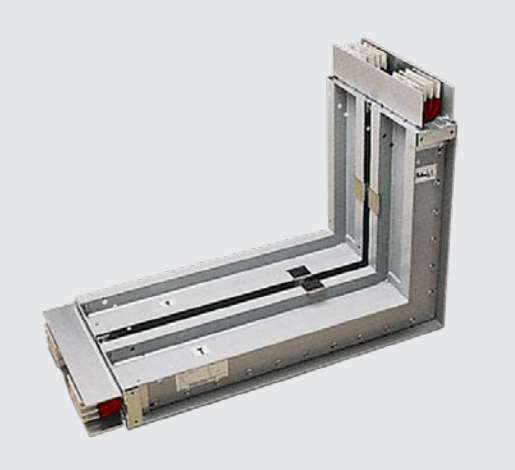
A complete line of fittings for indoor and outdoor applications

Pow-R-Way III offers an extensive range of fittings to meet every application need. Flanges, elbows, end cable tap boxes and end closures are some of the basic fittings that are included in the Pow-R-Way III design.

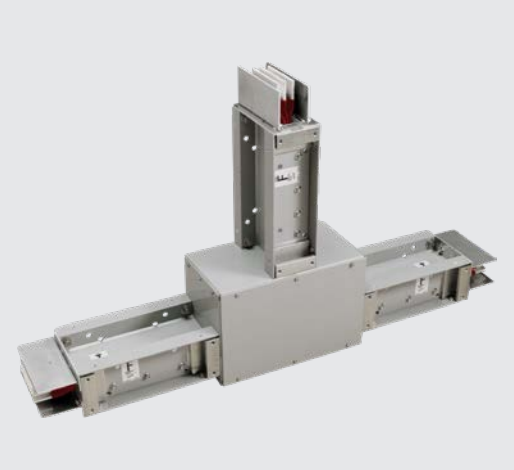
For more complex layouts, combination elbows and offsets can be used along with transformer throats, weather-heads, power takeoff sections, reducers, expansion joints, vault flanges, flush switchboard flanges, crosses and tees.

For more detailed information on Pow-R-Way III, consult Technical Data TD01701001E. This publication includes all minimum dimensions, weights, application tables, protective device selection charts, a typical Pow-R-Way III specification, and all the technical data required for accurate and successful layout design.

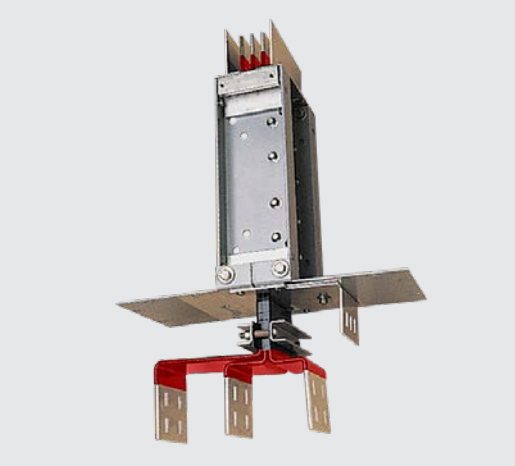
Contact your local Eaton sales office to make arrangements for a Pow-R-Way III capabilities presentation at your facility or for assistance with any application questions you might have.



Elbow
A traditional elbow is available for outdoor applications and for situations that require longer leg lengths than the corner joint.



Tee
Upward tee busway fitting suitable for connection in three directions.



Flange
3000 A, three-wire switchboard flange.

Tap box
1200 A end cable tap box.

A “safety-first” plug-in busway design

All Pow-R-Way III plug-in busway and plug-in devices are designed with the safety of the installer and the user as a key criteria. Plug-in outlets protect against accidental contact with live parts by an operator by not allowing a 0.47-inch (12.0 mm) or larger probe to enter the plug-in outlet.

The bus plug ground stab makes a positive connection with the busway ground (integral or internal) before the phase or neutral stabs contact the busbars.

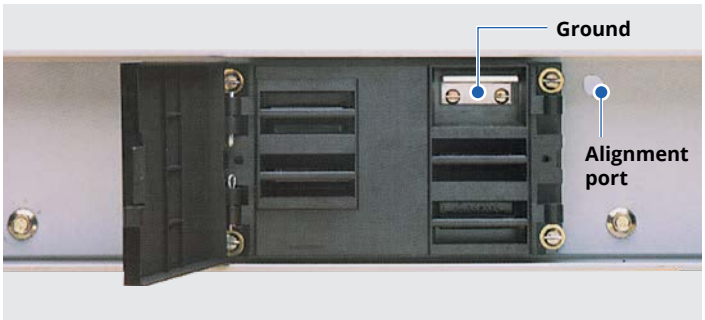
As a countermeasure to the effects of thermal expansion and mechanical vibration, the plug-in outlet is secured to the busway housing with high-tensile strength locking hardware.

A bus plug alignment port is provided in the busway housing to facilitate unit alignment and prevent a bus plug from being installed 180 degrees out of rotation. A polarizing alignment pin is attached to the line side end of each bus plug enclosure. The alignment pin must be inserted into the port for proper installation.

The alignment pin and the port provide polarization and ensure positive positioning of the plug-in stabs onto the busbars.

The plug-in outlet and the cover are made from a durable, high strength, polycarbonate material that is rated as Class B, 130 °C, insulation.

The outlet cover is designed to prevent the entry of dirt, dust and moisture into the busway housing. To limit access by unauthorized personnel, the cover has a standard positive screw close feature that prohibits the opening of the cover without the use of a tool. The cover can also be sealed with a utility “lead lock.” Both the outlet and the cover have an ultraviolet inhibitor in their composition to ensure long life.



Plug-in outlet
Barriers are provided across the openings of the Pow-R-Way III plug-in outlet to protect an operator or an installer against accidental contact with a “live” part. A bus plug alignment port (to the top right of the outlet) is furnished in the busway housing as a positive mechanical guide to facilitate unit alignment and prevent the installation of a bus plug 180 degrees out of rotation. The ground (top right) makes a positive connection before the conductor stabs contact the busbars.

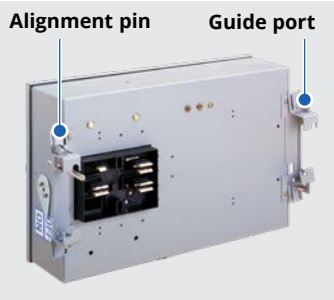
Bus plugs
Bus plug enclosures feature added wiring space, a line side barrier, and extended ground and neutral terminations to increase installation efficiency and safety. Pictured is a 100 A circuit breaker bus plug.

Enhanced bus plug design facilitates installation and improves safety

Pow-R-Way III plug-in protective devices are available from 30 A to 800 A in circuit breaker and fusible switch designs.

The standard features of both types include:

- **Oversized enclosures**
  Ample wiring space is provided in Pow-R-Way III bus plug enclosures, as many sizes exceed the NEMA requirements for wire bending
- **Extended ground and neutral bars**
  Pow-R-Way III bus plugs have extended ground and neutral bars that place the terminals down into the cable entry area, making for a safer, easier connection; installers will have ample space to make these terminations
- **Line side barriers**
  A barrier is provided over the line side connections of the bus plug stab assembly to the protective device to prevent accidental contact with a live part
- **Bus plug alignment pin**
  A bus plug guide port is provided in the busway housing and a polarizing alignment pin is welded to the line side end of each bus plug enclosure. The alignment pin must be inserted into the port for proper installation; this prevents a bus plug from being installed 180 degrees out of rotation
- **Clamp and guides**
  The clamping mechanism will draw the unit tight onto the busway housing as the installer tightens the clamps
- **Busway interlock**
  The plug-in unit and the busway are interlocked to ensure that the device is in the OFF position prior to the installation or removal of the unit
- **Dual-purpose interlock**
  Plug-in units have a dual-purpose interlock that prevents the cover from being opened while the device is in the ON position, and that prevents accidental closing of the device when the cover is open
- **Two-position handle**
  Bus plugs are shipped with the handle mounted on the side as standard; the handle can be quickly relocated to the line side end for horizontal runs in the field
- **Outlet seating ridge**
  The bus plug stab base engages a seating ridge on the plug-in outlet during installation; as the installer tightens the clamp and guide assemblies, the stab base is drawn in to overlap the seating ridge and to form a tight seal against moisture and dust



Alignment pin
The bus plug alignment pin prevents the installation of a plug-in device 180 degrees out of rotation. It also serves as a guide to ease installation. The clamp and guides draw the bus plug tight onto the busway housing as the installer tightens the clamps.

Plug stabs
Rear view of a bus plug showing ground and phase plug-in stabs.

EV plug

- Overhead EV charging with cable management that does not disturb existing parking scheme or conveyor structure
- Load management provides ability to throttle rate of charge, minimizing upgrades to grid infrastructure

For more information, visit
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