

# GUIDE FORM SPECIFICATION

EAE KD-III-UL Busway

The logo for EAE, consisting of the letters 'EAE' in white on a red rectangular background.

## 1. SUMMARY

1.1 This specification covers the electrical characteristics and general requirements for busways for use in electrical systems rated 600 V and below. The busway system allows users to distribute electrical energy safer and more efficiently within a smaller footprint.

Where designated, low-impedance busway systems of the indicated ratings shall be offered with all necessary fittings, power takeoffs, hanging devices and accessories.

1.2 Specification includes:

1.2.1 Three-phase busway system with the following features:

Section 4.1 – Housing

Section 4.2 – Conductor

Section 4.3 – Insulation

Section 4.4 – Joint Structure

Section 4.5 – Accessories & Components

## 2. STANDARDS AND CERTIFICATIONS

2.1 The busway shall be designed and manufactured to the following standards:

2.1.1 Electrical Testing Laboratories (ETL) (US/Canada) Classified to UL 857. Each busway rating has been tested individually and complies for all type tests and certified by an independent authorized UL testing laboratory.

2.1.2 Compliant – CUL Listing

2.1.3 Compliant – National Electric Code (NEC) Article 364 – Busways 19

2.1.4 Compliant – NEMA AB1, Molded Case Circuit Breakers and Molded Case Switches

2.1.5 NFPA 70 – National Fire Protection Agency

2.1.6 EAE has ISO 9001, ISO 14001, OSHA 18001, ISO 27001 and ISO 17025 certifications.

2.1.7 All the required type tests for each rating shall be available according to IEC 61439-6 and certified with a 3rd party.

2.1.8 Compliant – IEC 60364-1 Low-voltage electrical installations

2.1.9 Each product shall have a “Type Label” including coding system, which identifies the brand, type of the unit, number of conductors and electrical details. The same coding shall be on the related certificate and catalogue.

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## 3. SYSTEM DESCRIPTION

### 3.1 Electrical Requirements

3.1.1 System voltage: Up to 600V

3.1.2 Operating frequency: 50/60 Hz

3.1.3 Ampacity and 3 cycle Symmetrical Short Circuit Rating shall be:

*Aluminum conductors*

*Copper conductors*

250A: 65kA

250A: 65kA

400A: 65kA

400A: 65kA

600A: 65kA

600A: 65kA

800A: 65kA

3.1.4 Conductor: 4-conductor (L1/L2/L3/N1/PE housing)

5-conductors (L1/L2/L3/N1/CPE/PE housing)

6-conductors (L1/L2/L3/N1/N2/CPE/PE housing)

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3.1.5 The Voltage drop of the busway shall follow the table below for the designated voltage and conductor type:

Amperage Rating (A)	Al Busway (V)	Amperage Rating (A)	Copper Busway (V)
250	3.50	250	3.23
400	4.16	400	3.98
600	4.64	600	4.61
		800	4.57

**Note:** Voltage drop calculated with power factor = 0.8, Frequency = 60Hz

**Note:** Voltage drop is per 100 ft. (3048 cm.)

**Table 1:** Voltage Drop by Amperage, Aluminum and Copper Busway

## 4. COMPONENTS

4.1 **Housing** – The busway system shall have an isolation layer around each conductor.

- 4.1.1 The housing shall have a minimum Ingress Protection (IP) of 23D, offering protection from touch with fingers or similar objects (greater than 0.49 inches (12.5 millimeters)). There shall be protection against a wire touching hazardous parts. The housing shall offer protection from contact with enclosed equipment. The housing shall have no harmful effect protecting from water falling as a spray at any angle up to 60 degrees from the vertical.
- 4.1.2 Conductors shall be packed and placed into the housing.
- 4.1.3 Housing shall be made of thermal processed, extruded aluminum, RAL7012-Electrostatic painted.
- 4.1.4 The busway housing shall be 100% aluminum construction to reduce hysteresis and eddy current losses.
- 4.1.5 When installed flatwise, 3.94 inches (100 millimeters) of clearance shall be allowed vertically, 5.91 (150 millimeters) horizontally and 11.81 inches (300 millimeters) between two parallel busways (horizontally).
- 4.1.6 A minimum of 3.94 inches (100 millimeters) shall be allowed when a busway crosses under a beam in the flatwise position.
- 4.1.7 The minimum distance between busway runs shall be 11.80 inches (300 millimeters).

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## 4.2 Conductors

- 4.2.1 Straight sections of feeder busway shall be supplied in any length, from a 13.78 inch (350 millimeters) minimum to a 10 feet (3,048 millimeters) maximum.
- 4.2.2 Bus bars shall be suitably plated at all joints and contact surfaces.
- 4.2.3 4 Conductors shall have: (4 full-size conductors + housing).
- 4.2.4 5 Conductors shall have: (5 full-size conductors CPE (100% earth conductor + housing)).
- 4.2.5 6 Conductors shall have: (6 full-size conductors CPE (100% earth conductor + housing)).
- 4.2.6 The neutral conductors shall have the same cross-section and insulation properties as the phase conductors.
- 4.2.7 Aluminum conductors shall be EC grade aluminum.
- 4.2.8 The conductors shall be ordered in copper (98% conductivity), Aluminum (58% conductivity).
- 4.2.9 The Aluminum conductors shall be EC grade aluminum. Minimum conductivity shall be  $34 \Omega \cdot \text{m}/\text{mm}^2$ .
- 4.2.10 The Copper conductors shall be composed of 99.95% electrolytic copper at a minimum. The minimum conductivity shall be  $56 \Omega \cdot \text{m}/\text{mm}^2$ .
- 4.2.11 The conductors shall be whisker free to ensure better heat dissipation, higher short circuit values and longer operation life.

## 4.3 Insulation

- 4.3.1 Insulation system shall be suitable for 1.000V continuous operation. Conductor size shall be designed so that temperature rise on the conductors shall not exceed 100°C degree at nominal current, which helps to global heating problem. With this reason, insulation class shall be selected as B-class.
- 4.3.2 All insulators shall be recognized by UL.

## 4.4 Joint Structure

- 4.4.1 The Joint Pack shall be designed in such a way that both the male and female Joint Packs come pre-installed on the busway sticks, reducing field installation time. The Joint Pack shall be a single assembly that does not require multiple fit ups. The Joint Pack shall be of a bolt design which is able to disassemble the conductors, insulators and other components.
- 4.4.2 A Belleville spring shall be used to ensure contact pressure at the joint.
- 4.4.3 All parts of the joint structure shall be plated with Tin, protecting against contact losses due to corrosion, ensuring safe/reliable earth connections and

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very low resistance values throughout the entire busway run. The plating process shall not involve dipping of the conductor, the plating shall be applied in a powder coat to ensure higher accuracy and consistency of the plated material.

- 4.4.4 It shall be possible to make up a joint from one side in the event the busway is installed against a wall or ceiling. The joint shall be so designed as to allow removal of any length without disturbing adjacent lengths.
- 4.4.5 The fastening mechanism for the Joint Pack shall be designed to have over torque protection. When the torque is exceeded, a failsafe shall be deployed halting further torquing.
- 4.4.6 Installation of the Joint Pack shall be achieved with use of alignment pins, ensuring correct orientation.

## 4.5 Accessories & Components

- 4.5.1 All system components including Tees, Flanges, Reducers, Expansion Joints, Elbows, etc. shall be of the same material from the same manufacturer.
- 4.5.2 End pieces and end caps shall be provided to install at the ends of each line.
- 4.5.3 The busway system shall offer all necessary accessories. Special or custom accessories shall be available upon request to meet design parameters. Special busway shall have a minimum length of 13.78 inches (350 millimeters) and a maximum length of 10 feet (3048 millimeter).
- 4.5.4 Tap-off-box (TOB) – The TOB shall be designed so that all cable runs/connections do not exude excessive force to the contacts, reducing mechanical stress. The TOB shall have a simple installation design, plug-and-play, not requiring any special tools or processes.
  - 4.5.4.1 The cable TOB shall be designed to have a small profile and direct connection to the busway, eliminating the need for transition or other modules.
  - 4.5.4.2 The TOB shall be plug-n-play type.
  - 4.5.4.3 Plug-n-play TOB shall be suitable to install or remove from busbars without switching off the power on the busbar.
  - 4.5.4.4 Plug-n-play TOB shall be suitable to install or remove anywhere alongside the busbar.
  - 4.5.4.5 The TOB contacts shall be protected with a cover.
  - 4.5.4.6 The TOB contacts shall be heat cycle tested.
  - 4.5.4.7 Contacts of plug-in TOB shall be silver plated. The contacts shall have constant contact pressure achieved with double sided spring system.

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- 4.5.4.8 The special locking mechanism of the TOB shall ensure the weight of the plug-in box and cables can be maintained by the busbar housing.
- 4.5.4.9 While inserting the contacts of plug-in TOB, earth contact shall make the first touch. While removing, it shall be disconnected last.
- 4.5.4.10 TOB shall be manufactured of epoxy painted aluminum.
- 4.5.4.11 The TOB shall be equipped with a safe alignment mechanism to ensure correct installation and operation.
- 4.5.4.12 The TOB shall have a snap-in suspension mechanism allowing for easy and fast structural mounting.
- 4.5.4.13 When mounting the bus, a clip shall be available which allows for simple toolset installation.