SECTION 16466000
225 to 5000 AMPERE PLUG-IN AND FEEDER
BUSWAYS - SPECTRA™

PART 1 GENERAL

A. The requirements of the Contract, Division 1, and Division 16 apply to work in this Section.

1.01 SECTION INCLUDES

A. Low-Voltage Plug-in Busway - 225 to 5000 ampere, 600 VAC

1.02 RELATED SECTIONS

1.03 REFERENCES

The low-voltage plug-in busway and protection devices in this specification are designed and manufactured according to latest revision of the following standards (unless otherwise noted).

A. ANSI/IEEE C37.23, Metal-Enclosed Bus and Calculating Losses in Isolated-Bus, Guide for

B. ANSI/NEMA BU 1, Busways

C. ANSI/NEMA KS 1, Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts)

D. ANSI/NFPA 70, National Electrical Code

E. CSA C22.2 No. 27, Busways

F. NEMA AB 1, Molded Case Circuit Breakers and Molded Case Switches

G. NEMA BU1.1, General Instructions for Proper Handling , Installation, Operation, and Maintenance of Busway Rated 600 Volts or Less

H. NEMA ICS 2, Industrial Control and Systems: Controllers, Contactors and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC

1.04 DEFINITIONS

1.05 SYSTEM DESCRIPTION

A. Busway shall be a totally enclosed, [{indoor}{outdoor}] low-impedance system.

B. Material and installation shall comply with all applicable codes, recommended practices, and standards of ANSI, IEEE, NEMA, UL, CSA, and ASTA. All busway components shall be UL listed. Arrangements, details, and location shall be as indicated in drawings. Busway shall be tested and conform to Seismic Zone 4 requirements.

C. Short circuit rating of fittings with protective devices shall be equal to the lower short circuit rating of the protective device or the busway. Short circuit rating of busway plugs equals the rating of the fuses or circuit breaker used in the plug.

1.06 SUBMITTALS

A. Manufacturer shall provide copies of following documents to owner for review and evaluation in accordance with general requirements of Division 1 and Division 16:

1. Product Data on specified product;

2. Shop Drawings on specified product;

3. Design Data, detailed component data on specified product, such as CT ratios, ratings;

4. Certified trip curves for each specified product;

5. Certified copies of all Type (Design) and Verification Test Reports.

1.07 PROJECT RECORD DOCUMENTS

A. Maintain an up-to-date set of Contract documents. Note any and all revisions and deviations that are made during the course of the project.

1.08 OPERATION AND MAINTENANCE DATA

A. Manufacturer shall provide copies of installation, operation and maintenance procedures to owner in accordance with general requirements of Division 1 and Division 16.

B. Submit operation and maintenance data based on factory and field testing, operation and maintenance of specified product.

1.09 QUALITY ASSURANCE (QUALIFICATIONS)

A. Manufacturer shall have specialized in the manufacture and assembly of low-voltage plug-in busway for [50] years.

B. Low-voltage plug-in busway shall be listed and/or classified by Underwriters Laboratories in accordance with standards listed in Article 1.03 of this specification.

C. Manufacturer's Certificate of ISO 9000 Compliance.

D. Installer's Certificate of ISO 9000 Compliance.

E. Installer has specialized in installing low voltage plug-in busways with [minimum _ years documented experience].

1.10 REGULATORY REQUIREMENTS

1.11 MOCK-UPS (FIELD SAMPLES)

1.12 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products in accordance with recommended practices listed in manufacturer's Installation and Maintenance Manuals.

B. Deliver each low-voltage plug-in busway in individual shipping cartons for ease of handling. Each busway shall be wrapped for protection.

C. Inspect and report concealed damage to carrier within specified time.

D. Store in a clean, dry space. Maintain factory protection or cover with heavy canvas or plastic to keep out dirt, water, construction debris, and traffic. (Heat enclosures to prevent condensation.)

E. Handle in accordance with NEMA [___] and manufacturer's written instructions to avoid

damaging equipment, installed devices, and finish. <Lift only by installed lifting eyes.>

1.13 PROJECT CONDITIONS (SITE ENVIRONMENTAL CONDITIONS)

A. Follow (standards) service conditions before, during and after busway installation.

B. Low-voltage plug-in busways shall be located in well-ventilated areas, free from excess humidity, dust and dirt and away from hazardous materials. Ambient temperature of area will be between minus [30] and plus [40] degrees C. Indoor locations shall be protected to prevent moisture from entering enclosure.

1.14 SEQUENCING AND SCHEDULING

1.15 WARRANTY

A. Manufacturer warrants equipment to be free from defects in materials and workmanship for 1 year from date of installation or 18 months from date of purchase, whichever occurs first.

1.16 MAINTENANCE SERVICE

A. Furnish complete service and maintenance of low voltage, plug in busways for [{1 year}{5 years}] <specify other service contract time period> from date of substantial completion.

1.17 EXTRA MATERIALS

A. Provide [{parts}{spares}] as indicated in drawings.

B. Provide sizes and ratings of spare fuses as indicated in drawings.

C. Provide fuse cabinet.

1.18 FIELD MEASUREMENTS

A. Make all necessary field measurements to verify that equipment shall fit in allocated space in full compliance with minimum required clearances specified in National Electrical Code.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. General Electric Company products have been used as the basis for design. Other manufacturers' products of equivalent quality, dimensions and operating features may be acceptable, at the Engineer's discretion, if they comply with all requirements specified or indicated in these Contract documents.

2.02 SYSTEMS

A. Furnish GE Spectra Series™ 225 - 5000 ampere feeder or plug-in low-voltage busways (or equal) as indicated in drawings.

2.03 COMPONENTS

Refer to Drawings for: actual layout and location of equipment and components; current ratings of devices, bus bars, and components; voltage ratings of devices, components and assemblies; and other required details.

A. Busway housing shall be extruded aluminum for maximum protection against corrosion from water and other contaminants normally encountered during construction. Housing shall be totally enclosed for protection against mechanical damage and dust accumulation. All hardware shall be plated to prevent corrosion.

B. All bus bar insulation material shall be epoxy NEMA Class B (130 degree C). Insulation shall be UL rated as self-extinguishing and shall be impervious to acids, alkalis, acetones, machine oils and lubricants commonly found in industrial environments. Manufacturer shall provide test data documenting insulation's impact resistance, chemical resistance, and expected life (50 years).

C. Busway shall be rated as indicated in drawings.

D. Bus bars shall be [{copper}{aluminum}].

1. Aluminum bus bars shall be silver-plated in to prevent corrosion in high-arcing loads. Copper bus bars shall be tin-plated.

2. Temperature rise at any point in busway shall not exceed 55 degrees C above ambient when operating at rated load current.

E. If housing ground path is used, system connections shall be silver plated.

F. Hanger System

1. Horizontal busway runs shall be UL listed to hang on 10 foot centers in any position. Vertical busway riser runs shall be supported with spring hangers as shown on plans [{with maximum of 16 foot centers}].

G. Where busway passes through walls or floors, manufacturer shall < at user's request> provide UL-Listed three-hour firestop system [No. 539], GE PENSIL 100 or 500 (or equal).

H. Joints shall have plus or minus 1/2 inch adjustability and be the one-bolt removable type. <{Optional Joint-Guard Protection System may be used.} See paragraph 2.04, Accessories.> Joints shall be able to be made from one side when busway is installed against a wall or ceiling. Plug-in and feeder shall use identical parts. All multi-stacks shall be phase collected.

I. Plug-in busway shall be identical to feeder construction and performance except it shall have 5 dead-front hinged cover type plug outlets per side per 10 foot length. All outlets shall be usable simultaneously.

J. Plug-In Unit Safety Device

1. Busway plugs shall be of the type(s) and rating listed in Contract. Switching device(s) shall be completely enclosed in a sheet steel housing.

2. Shields shall protect stabs and ground plug body before stabs make contact. A grounding terminal shall be inside plug body and shielding to prevent access to live parts when cover is open. A ground stab shall engage ground tab on busway and internal ground bus shall be provided when required.

3. Cover and operating handle shall have provision to padlock in OFF position. Operating handle shall be easily moved from end to side or vice versa.

4. A releasable cover interlock shall prevent opening cover except when switch is OFF.

5. Operating switch type plugs shall have a positive quick-make, quick-break interrupter. Circuit breaker plugs shall have true RMS electronic sensing and an interrupting rating of at least [__] amperes RMS, with interchangeable rating plugs.

K. Short Circuit Ratings

1. The short circuit rating of the busway, including its integral fittings and protective devices, shall be the lowest of the short circuit ratings of the busway, its fittings or protective devices. For example, a fusible power takeoff rated 200,000 amperes with Class J fuses is installed on a 65,000 ampere rated busway. The rating of this system is 65,000 amperes.

2.04 ACCESSORIES

A. Furnish nameplates for each device as indicated in drawings. Color schemes shall be as indicated on drawings.

B. Thermal expansion fittings for:

1. Runs longer than 150 feet when busway is not free to move at ends of run;

2. When busway run crosses building expansion joint.

C. Reducer cubicles and special adapter cubicles, as required in drawings.

<{D. Furnish Joint-Guard Protection System} that uses a "torque sensing bolt". The system shall measure the "elongation of the busway joint bolt". When the bolt looses proper torque, a "red indication shall appear in the bolt head". After re-torquing the bolt, the red indication shall recede and the bolt head shall return to normal color. The system shall be "self renewing" without bolt replacement.>

2.05 TESTING

A. Each busway item shall pass a dielectric withstand test of 5000 VDC for 5 seconds.

2.06 FINISH

A. ANSI-61 gray enamel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that busways are ready to install.

B. Verify field measurements are as [{shown on Drawings}{instructed by manufacturer}].

C. Verify that required utilities are available, in proper location and ready for use.

D. Beginning of installation means installer accepts conditions.

3.02 LOCATION

3.03 INSTALLATION
Additional provisions and editing may be required for this part.

A. Install per manufacturer's instructions.

B. Install required safety labels.

3.04 FIELD QUALITY CONTROL

A. Inspect installed busways for anchoring, alignment, grounding and physical damage.

B. Check tightness of all accessible mechanical and electrical connections< with calibrated torque wrench>. Minimum acceptable values are specified in manufacturer's instructions.

C. Megger busways using [{500}{1000}{2500}] VDC Megger. Check phase to phase, phase to ground. Individual lengths should be at least [3] megohm(s). Entire run should be at least [1] megohm(s). Divide runs over 100 feet long.

3.05 ADJUSTING

A. Adjust all <{circuit breakers}{, }{switches}{, }{access doors}{, }{operating handles}> for free <{mechanical}{ and / or }{electrical}> operation as described in manufacturer's instructions.

B. Adjust circuit breaker trip and time delay settings to values [{specified}{determined}] by Architect Engineer.

3.06 CLEANING

A. Clean interiors of <{switchboards}{, }{panels}{, }{separate enclosures}> to remove construction debris, dirt, shipping materials.

B. Repaint scratched or marred exterior surfaces to match original finish.

END OF SECTION