PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary
   Conditions, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Feeder-bus assemblies.
   2. Plug-in bus assemblies.

1.3 DEFINITIONS

A. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

A. Shop Drawings: For each type of bus assembly and plug-in device.
   1. Show fabrication and installation details for enclosed bus assemblies. Include
      plans, elevations, and sections of components. Designate components and accessories, including clamps, brackets, hanger rods, connectors, straight lengths, and fittings.
   2. Show fittings, materials, fabrication, and installation methods for listed fire-stop barriers and weather barriers.
   3. Indicate required clearances, method of field assembly, and location and size of each field connection.
   4. Detail connections to switchgear, switchboards, transformers, and panelboards.

B. Coordination Drawings: Floor plans and sections, drawn to scale. Include scaled bus-assembly layouts and relationships between components and adjacent structural, mechanical, and electrical elements. Show the following:
   1. Vertical and horizontal enclosed bus-assembly runs, offsets, and transitions.
   2. Clearances for access above and to the side of enclosed bus assemblies.
   3. Vertical elevation of enclosed bus assemblies above the floor or bottom of structure.
   4. Support locations, type of support, and weight on each support.

C. Location of adjacent construction elements including light fixtures, HVAC and plumbing
equipment, fire sprinklers and piping, signal and control devices, and other equipment.

D. Product Certificates: For each type of enclosed bus assembly, signed by product manufacturer.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For enclosed bus assemblies to include in emergency, operation, and maintenance manuals.

1.5 QUALITY CONTROL

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency’s Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Source Limitations: Obtain enclosed bus assemblies and plug-in devices through one source from a single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NEMA BU 1, "Busways."

E. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle enclosed bus assemblies according to NEMA BU 1.1, "General Instructions for Proper Handling, Installation, Operation and Maintenance of Busway Rated 600 Volts or Less."

1.7 PROJECT CONDITIONS

A. Derate enclosed bus assemblies for continuous operation at indicated ampere ratings for ambient temperature not exceeding 140 deg F (60 deg C).

1.8 COORDINATION

A. Coordinate layout and installation of enclosed bus assemblies and suspension system with other construction that penetrates ceilings or floors or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1. Coordinate size and location of concrete curbs around openings for vertical bus. Concrete, reinforcement, and formwork requirements are specified in Division 3.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. General Electric Company; Electrical Distribution & Control Division.
4. Square D; Schneider Electric.

2.2 ENCLOSED BUS ASSEMBLIES

A. Feeder-Bus Assemblies: NEMA BU 1, low-impedance bus assemblies in nonventilated housing; single-bolt joints; ratings as indicated.

1. Voltage: As indicated on the drawings.
2. Temperature Rise: 55 deg C above 40 deg C ambient maximum for continuous rated current.
3. Bus Materials: Current-carrying copper conductors, fully insulated with Class 130C insulation except at joints; plated surface at joints.
4. Ground:
   a. 50 percent capacity integral with housing.
   b. 50 percent capacity internal bus bars of material matching bus material.
   c. 50 percent capacity isolated, internal bus bar of material matching bus material.
5. Enclosure: Steel with manufacturer's standard finish
6. Fittings and Accessories: Manufacturer's standard.
7. Mounting: Arranged flat, edgewise, or vertically without derating.

B. Plug-in Bus Assemblies: NEMA BU 1, low-impedance bus assemblies in nonventilated housing; single-bolt joints; ratings as indicated.

1. Voltage: As indicated on the drawings; 3 phase.
2. Temperature Rise: 55 deg C above 40 deg C ambient maximum for continuous rated current.
3. Bus Materials: Current-carrying copper conductors, fully insulated with Class 130C insulation except at stabs and joints; plated surface at stabs and joints.
4. Ground:
   a. 50 percent capacity integral with housing.
   b. 50 percent capacity internal bus bar of material matching bus material.
   c. 50 percent capacity isolated, internal bus bar of material matching bus material.

5. Enclosure: Steel, with manufacturer's standard finish, plug-in openings 24 inches (610 mm) o.c., and hinged covers over unused openings

6. Fittings and Accessories: Manufacturer's standard.

7. Mounting: Arranged flat, edgewise, or vertically without derating.

2.3 PLUG-IN DEVICES

A. Fusible Switches: NEMA KS 1, heavy duty; with fuse clips to accommodate specified fuses; hookstick-operated handle, lockable with two padlocks, and interlocked with cover in closed position. See Division 16 Section "Fuses" for fuses and fuse installation requirements.

B. Molded-Case Circuit Breakers: NEMA AB 1; hookstick-operated handle, lockable with two padlocks, and interlocked with cover in closed position.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Support bus assemblies independent of supports for other elements such as equipment enclosures at connections to panelboards and switchboards, pipes, conduits, ceilings, and ducts.

1. Design each fastener and support to carry 200 lb (90 kg) or 4 times the weight of bus assembly, whichever is greater.

2. Support bus assembly to prevent twisting from eccentric loading.

3. Support bus assembly with not less than 3/8-inch (10-mm) steel rods. Install side bracing to prevent swaying or movement of bus assembly. Modify supports after completion to eliminate strains and stresses on bus bars and housings.

4. Fasten supports securely to building structure according to Division 16 Section "Hangers and Supports for Electrical Equipment".

B. Install expansion fittings at locations where bus assemblies cross building expansion joints. Install at other locations so distance between expansion fittings does not exceed manufacturer's recommended distance between fittings.

C. Construct rated fire-stop assemblies where bus assemblies penetrate fire-rated elements such as walls, floors, and ceilings. Seal around penetrations according to Division 7.
D. Install weatherseal fittings and flanges where bus assemblies penetrate exterior elements such as walls or roofs. Seal around openings to make weathertight. See Division 7.

E. Install a concrete curb at least 3 inches (75 mm) high around bus-assembly floor penetrations.

F. Coordinate bus-assembly terminations to equipment enclosures to ensure proper phasing, connection, and closure.

G. Tighten bus-assembly joints with torque wrench or similar tool recommended by bus-assembly manufacturer. Tighten joints again after bus assemblies have been energized for 30 days.

H. Install bus-assembly, plug-in units. Support connecting conduit independent of plug-in unit.

3.2 CONNECTIONS

A. Ground equipment according to Division 16 Section "Grounding and Bonding."

B. Connect wiring according to Division 16 Section "Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Remove and replace units that do not pass tests and inspections and retest as specified above.

D. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of bus assembly including joints and plug-in units.

1. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.

2. Perform 2 follow-up infrared scans of bus assembly, one at 4 months and the other at 11 months after Substantial Completion.

3. Prepare a certified report identifying bus assembly checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.

3.4 ADJUSTING

A. Set field-adjustable, circuit-breaker trip ranges as indicated in the coordination study.
3.5 CLEANING
   A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

3.6 PROTECTION
   A. Provide final protection to ensure that moisture does not enter bus assembly.

END OF SECTION