PART 1 GENERAL

The requirements of the contract contained in either, Division 01, or Division 26 shall also apply to the work/requirements of this section.

1. SECTION INCLUDES
    A. This specification covers low voltage grouped meter centers with circuit breaker, fusible switch or lugs as the main device and circuit breakers as the feeder devices as detailed below and as shown on the contract drawings.

2. RELATED SECTIONS
    A. Not Applicable – No related sections

3. REFERENCES
    A. As applicable to the specifics of the project drawings and the specifics of the design for this project, the low voltage grouped meter centers, installed protective devices and other factory installed components in this specification shall be designed and manufactured according to latest revision of the following standards (unless otherwise noted on the project drawings or annotated in any sections below).
        1. UL 50 & UL 50E, Standard for Enclosures for Electrical equipment
        2. UL 67, Standard for Panelboards
        3. UL 98, Standard for Enclosed and Dead-Front Switches
        4. UL414, Standard for Meter Sockets
        5. UL869A, Reference Standard for Service Equipment
        6. NFPA 70, National Electric Code
        7. NEC 408, National Electric Code (Article for Switchboards,Switchgear and Panel Boards)
        8. C22.2 No. 29-11, Panelboards and enclosed panelboards
        9. CSA C22.2 No. 5, Standard for Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
        10. NEMA PB 1, Standard for Panelboards
        11. UL 489, Standard for Molded-Case Circuit Breakers, Molded- Case Switches and Circuit Breaker Enclosures
        12. UL1066, Standard for Low Voltage AC and DC Power Circuit Breakers Used in Enclosures
        13. NEMA AB 1,Standard for Molded-Case Circuit Breakers and Molded Case Switches and Circuit Breaker Enclosures
        14. CSA 22.2, Canadian Electrical Code
        15. UL 486A-486B, Standard for Wire Connectors

4. DEFINITIONS
    A. Overcurrent Protective Device = a circuit breaker pole. Example: a 2-pole device is considered 2 protective devices.
    B. Short Circuit Rating = shall be the interrupting rating of lowest rated device in the meter stack or applicable UL series rating for proper main and tenant device combinations.
    C. Fully Rated System = The short-circuit ratings of all protective devices are equal to or exceed the available short-circuit current of the system.

D. Series-Connected System = The short-circuit rating of the upstream device is fully rated at its location, but the downstream devices are not fully rated. The downstream device has lower interruption rating than the available fault current at its location.
E. Series-Connected Rating = UL permits assigning a short-circuit rating to a combination of devices (molded-case circuit breakers and/or fuses) connected in series that is higher than the lowest rated protective device in the combination. Note:
    1. Series ratings are applicable only when the end-use equipment is so marked.
    2. The combination rating cannot exceed the rating of the protective device furthest upstream.
    3. Upstream device can be a molded-case circuit breaker or fuse.

5. SUBMITTALS
    A. The contractor/installer shall provide electronic copies of the following documents in PDF format as SUBMITTAL drawings to the engineer/owner for review and evaluation. It is preferred that the drawing format be provided in letter/size "A" (8.5" x 11") or tabloid/ size "B" (11" x 17") format to facilitate easy copying. Manufacturing of the equipment will not begin until the submitted documents are stamped/noted "approved" or "approved as noted" by the engineer/owner and officially released for manufacturer by the contractor/ installer/distributor/owner.
    B. APPROVAL documents for the specified product shall include:
        1. Front View of Each Grouped Meter Center Assembly, showing overall height and width dimensions – by the equipment manufacturer
        2. Plan View of Each Grouped Meter Center Assembly, showing overall width and depth dimensions – by the equipment manufacturer
        3. Grouped Meter Center Assembly Bussing or One Line Diagrams – by the equipment manufacturer
        4. Component Level Bill of Material – by the equipment manufacturer
        5. Product Data Sheets on the meter stacks, and associated components – by the equipment manufacturer

    C. The contractor/installer shall provide electronic copies of the following documents in PDF format as AS BUILT drawings to the engineer/owner for review and evaluation. It is preferred that the drawing format be provided in letter/size "A" (8.5" x 11") or tabloid/ size "B" (11" x 17") format to facilitate easy copying. Manufacturing of the equipment will not begin until the submitted documents are stamped/noted "approved" or "approved as noted" by the engineer/owner and officially released for manufacturer by the contractor/ installer/distributor/owner.
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        3. Grouped Meter Center Assembly Bussing or One Line Diagrams – by the equipment manufacturer
        4. Component Level Bill of Material – by the equipment manufacturer
        5. Product Data Sheets on the meter stacks, and associated components – by the equipment manufacturer

6. Installation Instructions / Operation and Maintenance Manual – by the equipment manufacturer

6. QUALITY ASSURANCE (QUALIFICATIONS)
   A. The manufacturer shall have produced similar equipment for a minimum of 15 years.
   B. The low voltage grouped meter centers shall be listed and/or classified by Underwriters Laboratories in accordance with standards listed in the "REFERENCES" section of this specification above.

7. DELIVERY, STORAGE, AND HANDLING
   A. The contractor /installer shall receive, store, protect and handle the low voltage grouped meter centers in accordance with recommended practices listed in manufacturer's Installation Instructions and/or Maintenance Manuals.
   B. Units shall be shipped with packing that is adequate to protect the meter stack enclosure from common dents and scratches.
   C. The contractor/installer shall inspect and if necessary, report any concealed damage to carrier within 48 hours of the meter stacks being delivered. The contractor/installer shall be responsible for all claims with the shipper.
   D. The contractor/installer shall store the meter stacks in a clean, dry space and shall maintain factory protection and/or cover them with heavy canvas or plastic to keep out dirt, water, construction debris, and traffic. The contractor/installer shall refer to the manufacturer's Installation Instructions and/or Maintenance Manuals for any and all requirements to keep the equipment in compliance with the warranty.
   E. The contractor/installer shall handle the equipment in accordance with all appropriate NEMA and manufacturer's written instructions to avoid damaging the equipment, installed devices and finish.

8. PROJECT CONDITIONS (SITE ENVIRONMENTAL CONDITIONS)
   A. The contractor/installer shall follow all appropriate standards and service conditions before, during and after the meter stack installation.
   B. The low voltage grouped meter centers shall be located in well ventilated areas, free from excess humidity, dust and dirt and away from hazardous materials.
   C. Indoor locations shall be protected to prevent moisture from entering enclosure.

9. WARRANTY
   A. The Manufacturer warrants the low voltage grouped meter centers to be free from defects in materials and workmanship for 1 year from date of installation or 18 months from date of shipment, whichever occurs first. The equipment must be received, stored and installed in accordance with the manufacturer's Installation Instructions and/or Maintenance Manuals to avoid nullifying this warranty.
   B. In the event of that any warranty work needs to be performed, a representative of the manufacturer shall be notified in writing of the problem. The factory will then issue instructions and any materials to correct the problem. All warranty work must be performed by the manufacturer at the manufacturer's discretion in order to maintain the manufacturer's warranty.

10. FIELD MEASUREMENTS

A. The contractor/installer shall make all necessary field measurements to verify that the low voltage grouped meter centers shall fit in the allocated space in full compliance with the minimum required clearances recommended by the manufacturer, specified in National Electrical Code and required by any applicable local/facility constraints.

PART 2 PRODUCTS

1. MANUFACTURER & DESIGN
    A. **General Electric products by ABB** have been used as the basis for design and is the preferred provider for the equipment. Other possible acceptable manufactures are listed below. The listing of specific manufacturers does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed are not relieved from meeting these specifications in their entirety.
        1. **GE by ABB** – Modular Metering (basis of design)
        2. Cutler Hammer – Modular Metering
        3. Siemens – Modular Metering
        4. Square D – Modular Metering

    B. Request for acceptance as an approved equal manufacturer must be submitted to the engineer in writing (letter, fax or e-mail) at least 10 business days prior to the bid date. A written (letter, fax or email) response from the engineer/owner will then be issued determining the acceptance or rejection of the request.
    C. Any and all exceptions to the requirements detailed in this specification shall be included in the manufacturer's proposal so that the engineer/owner can easily make a comparison to this base specification document.
    D. If no exceptions or qualification are contained in the manufacturer's proposal, the manufacturer shall provide exactly what is detailed in this section of the specification. Failure to meet the requirements of the specification or to note any exceptions or qualifications will result in the technical rejection of the proposal.
    E. The first source of general information shall be these general specifications; however, detailed and specific information contained in the drawings will take prescient over these general specifications as the drawings contain project specific information. In the event of a conflict the owner/engineer will determine which is correct.

2. EQUIPMENT INFORMATION - **Item #10**
    A. Refer to the project drawings for low voltage grouped meter center layouts and locations. The drawings also include information about the current and voltage ratings of meter centers, internal bussing, main and tenant devices, as well as any other assemblies.
    B. Equipment Requirements
        1. The entire low voltage meter stack assembly shall be designed for front-accessible connections. Main devices shall be circuit breaker or fusible switches or main lug only. Tenant devices shall be circuit breaker type only.
        2. Each meter stack shall be **UL** listed and shall bear the UL label.
        3. Each meter stack section shall be suitable for both NEMA 3R and NEMA 1 applications. All units shall ship from the factory with a rain cover to provide the necessary NEMA 3R rating. Units with this rating are intended for outdoor use primarily to provide a degree of protection against falling rain, sleet, and external ice formation. Removal of the rain cover shall make the units suitable for NEMA 1 rating. Units with this rating are intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment.
        4. The general meter center orientation (main section / feeder sections layout) as standard or central or reversed shall be based on the project floor plan drawings and meter stack front elevation drawings.

5. All boxes and trims shall be primed and finished with the manufacturers standard light gray enamel paint.

C. Voltage
   1. The supply voltage to the grouped meter centers shall be as shown on the project drawings and the meter center schedules.

D. Phase and Wire
   1. The associated phase and wire configuration for the grouped meter centers is **three-phase / four-wire** for the incoming main and single-phase / three-wire and/or three phase / four wire for the tenant breakers. This configuration may require phase balancing the load and the final layout and installation should take this requirement into consideration.

E. AIC Rating
   1. The grouped meter center assemblies shall have a minimum short circuit rating of **10k RMS** symmetrical amperes at the voltage noted above. This value shall be equal to or greater than the short-circuit available from all sources. All main breakers, all tenant breakers and the bus bar bracing shall be rated to this minimum value.

F. Bussing Requirements
   1. All bus bars shall be tin-plated aluminum. The main horizontal bus bars shall be mounted with all phases arranged in the same vertical plane. Bus sizing shall be based on UL standard temperature rise criteria for multi-metering equipment.
   2. A full capacity neutral bus shall also be provided and the neutral shall be arranged in the same vertical plane as the phase bus.

G. The meter stacks shall consist of 1 - 6 commonly bussed meter sockets with branch circuit protection. The meter socket secures and provides the electrical connection for the meter.
H. All stacks shall be manufactured to accommodate top or bottom feeds.
I. The meter stacks shall be mechanically and electrically built to bolt-up with a main device and other meter stacks.

3. MAIN PROTECTIVE DEVICES
   A. When greater than six branch circuits are required, the NEC requires a main disconnect and overcurrent protection device ahead of the meters. A Main Breaker Module or a main fusible switch module shall serve as this single point of disconnect and overcurrent protection.
   B. The main breaker module consists of a pull section to house the lugs for connecting to the utility feed and the main device. Both left and right horizontal bus covers shall also be included
   C. Provide a Circuit Breaker for the low voltage meter center main device. This main breaker shall be mechanically operated. Refer to the project drawings and meter center schedules for the ampere rating of the main breakers.
   D. All main breakers shall be connected to the bus by bolted connections to a main

horizontal bus. A neutral lug attached to the neutral horizontal bus with the same wire capacity as the main breaker shall also be included

E. Breakers shall have ON and OFF position clearly marked on escutcheon. Breakers shall include a trip-to-test means on the escutcheon for manually tripping the breaker and exercising the mechanism and trip latch.
F. Factory installed CU/AL mechanical lugs are to be provided with the main breaker. The lugs shall be UL listed and rated 75 or 60/75 degrees C as appropriate.
G. If required by NEC 240.87 an arc energy reduction switch shall be provided with the main breaker.

4. FEEDER / TENANT PROTECTIVE DEVICES
   A. The tenant disconnects shall be wired for hot sequence, as required by the serving utility, and shall be molded case circuit breakers. If this is a Canadian application, the tenant disconnects shall be wired for cold sequence. Refer to the project drawings and meter center schedules for the ampere rating of each tenant breaker.
   B. All circuit breakers shall be UL listed for standard duty, to be applied at 80% of their current rating. The breaker handle or faceplate shall indicate the rated ampacity of each tenant breaker.
   C. The circuit breaker frames shall be constructed of a high-strength, molded, glass-reinforced polyester material. Breakers shall have an overcenter, toggle handle-operated, trip free mechanism with quick make, quick break action independent of the speed of the toggle handle operation.
   D. An ON and OFF position shall be clearly marked on all breakers. Also a means to show handle trip indication when the breaker activates during a fault shall be provided.
   E. Factory installed CU/AL mechanical lugs are to be provided with the breakers. The lugs shall be UL listed and rated 75 or 60/75 degrees C as appropriate.

5. TENANT UTILITY METERING
   A. The meter sockets shall be either ring or ringless type, as required by the serving utility, rated as 125 ampere, 200 ampere, 225 ampere or 400 ampere as shown on the plans. A meter bypass mechanism shall be provided as required by the serving utility. The meter sockets and associated branch protective device positions shall be completely pre-wired and shipped ready for installation of the meters and tenant breakers.
   B. Meter sockets shall include covers with sealing provisions. Single-phase ringless meter sockets shall be supplied with a 5-jaw. Ring-type meter sockets shall be supplied with a 5th jaw kit when required by the utility.
   C. Provide the following for non-EUSERC serviced areas
      1. Meter centers shall incorporate metering sections with tenant feeder circuits using either ring or ringless type meter sockets as required by local utility or customer requirements. Provide meter sockets with individual covers having sealing provisions. Meter sockets shall have current ratings as indicated on drawings.
      2. Meter sockets shall have manual bypass and optional internal barriers.

6. ACCESSORIES
   A. Not Applicable – no other accessories are required.

7. TESTING

A. Normal factory quality, function and production testing shall be provided.

PART 3 EXECUTION

1. EXAMINATION
    A. The following examinations shall be performed by the contractor/installer.
        1. Verify that the field measurements of the assembly are the same as shown on factory drawings.
        2. Inspect the **GE by ABB** Meter Mod III meter stack units and confirm that they are ready to be installed.
        3. Check walls or the mounting structure for uniformity and a level plumb surface.
        4. Examine the installation area to assure there is enough clearance to install the low voltage grouped meter centers such that when fully assembled, it will fit in the allocated space in full compliance with the minimum required clearances recommended by the manufacturer, specified in National Electrical Code and required by any applicable local/facility constraints. The final clearances shall be based on the dimensions with the utility company under-glass meters are installed.
        5. Confirm that required utilities are available, in proper location and ready for use.

    B. Beginning of installation means that the contractor/installer accepts these conditions.

2. LOCATION
    A. Refer to the projects site layout drawings for details regarding the proper area to place the equipment.

3. INSTALLATION
    A. The contractor/installer shall furnish and completely install the low voltage grouped meter centers as shown on the factory drawings and per manufacturer's installation instructions. All necessary hardware to secure the equipment in place shall be provided by the contractor/installer.
    B. The contractor/installer shall provide and install any required safety labels.
    C. The contractor/installer shall mount the panelboard in full compliance with NEC 404.8(A). The center handle shall not be more than 6'7" above the floor or working platform. The contractor/installer shall also verify any minimum ground clearance that is required.

4. FIELD QUALITY CONTROL
    A. The following quality control checks shall be performed by the contractor/installer.
        1. Inspect the installed meter stack assemblies for proper anchoring, alignment and grounding as well as inspecting for any internal and external physical damage.
        2. Confirm that all shipping material and packing material has been removed.
        3. Check the tightness of all accessible mechanical and electrical connections with a calibrated torque wrench. The minimum acceptable values are specified in the manufacturer's instructions.
        4. Refer to manufacturer's instruction books for any other requirements applicable to the meter stack assemblies.
        5. Check each electrical bus for proper phasing as well as phase balancing and identification of all phases.
        6. Attach a phase rotation meter to the meter stack main bus and observe proper

phase sequences both at the main bus and the tenant meter sockets.

7. Check and test each breaker for proper mechanical and electrical operation.

5. ADJUSTING
   A. The contractor/installer shall adjust all covers and operating handles for free mechanical and electrical operation as described in the manufacturer's instructions.
   B. The contractor/installer shall refer to the manufacturer's instruction book to make adjustments to covers, handles, sockets, etceteras, as required.
   C. The contractor/installer shall set all adjustable protective devices to the values recommend in the coordination study for this project - refer to the separate "Short Circuit and Coordination Study" specification contained in this project specification document for additional information. Examples of adjustable protective devices are listed below:
      1. The instantaneous pickup knob shall be set on molded case circuit breakers containing an adjustable magnetic trip unit.
      2. Main breakers requiring Arc Reduction shall be set to their proper values.

6. CLEANING
   A. The contractor/installer shall clean the interior and exterior of the each meter stack to remove construction debris, dirt, and shipping materials.
   B. The contractor/installer shall repaint scratched or marred exterior surfaces to match original finish.

7. TRAINING
   A. Not Applicable – no training on the modular metering is required.