PROCUREMENT SPECIFICATION

Low Voltage IEC Motor Control Centers

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PART 1 GENERAL

1.01 SCOPE OF SPECIFICATION

A. This specification defines the minimum requirements for the design, materials, fabrication, assembly, inspection, test, paint, preparation for shipment, and supply of an IEC Motor Control Center.
B. The equipment must be installed indoors and designed for continuous operation.
C. The equipment can include, but not be limited to, the package as identified in the accompanying specifications and all accessories that are required for a complete assembly.

1.02 REFERENCES

A. Definitions

Terms that are used in this specification are defined as follows:

Term	Definition
BUYER	The respective client.
COMPANY	The respective client or Engineering Firm/OEM.
CONTRACTOR	The person or company that agrees to install an IEC motor control center or to provide or install specialized portions of the installation.
INSPECTOR	Those individuals who act for the COMPANY on all matters that relate to quality control, any tests, examination, validation, and acceptance of work that is done by any VENDOR.
MANUFACTURER	The person or company that manufactures the IEC motor control center.
VENDOR	The equipment supplier and their subcontractors or suppliers.

B. Codes, Standards, Regulations, or Specifications
1. Interpret the following codes as the minimum requirements applicable to the subject work, and no statement that is contained in this specification can be construed as limiting the work to such minimum requirements. The latest editions of codes that are listed must govern the work.
   a) IEC 61439-1: 2011, Low-voltage switchgear and control gear assemblies – Part 1: General rules
   b) IEC 61439-2: 2011, Low-voltage switchgear and control gear assemblies – Part 2: Power Switchgear and control gear assemblies
   c) IEC 60204-1:1997, Safety of machinery - Electrical equipment of machines – Part 1: General requirements
   d) More Electrical Safety

2. Arc fault tests per IEC/TR 61641:2008 Criteria 1-7 must be conducted and evaluated to be in compliance to help protect against internal arcing faults for durations up to 300 ms.
   a) MCC must provide arc-containment latches on all doors (vertical wireway and unit).
   b) MCC must provide a top exhaust-vent system to direct heat and energy in the event of an internal arc without the need of more plenums or ducts.

1.03 PRE-MANUFACTURE SUBMITTALS

A. MANUFACTURER Drawings
   1. MCC elevations that show dimensional information including details such as, but not limited to, the following:
      a) MCC height (less any removable lifting angles or eyes)
      b) MCC width
      c) MCC depth
      d) Location of shipping splits
   2. Structure descriptions that show the following:
      a) Bus ratings
      b) Enclosure ratings
      c) Short circuit withstand ratings

      Other information as required for approval
   3. Conduit and cable locations
   4. Required bus splices
   5. Unit descriptions including, but not limited to, starter sizes, circuit breaker frame sizes, circuit breaker continuous ampere ratings, and pilot devices
   6. Nameplate information
   7. Schematic wiring diagrams
   8. MANUFACTURER drawings must be provided in DWG format
   9. MANUFACTURER drawings do not need to be stamped if a drawing schedule is provided that lists the drawing numbers, revision levels, and status of drawings (such as Preliminary, Approval, and Final)

B. Product Data
   1. Data sheets and publications on all major components, including, but not limited to, the following:
      a) Motor starters
      b) Overload relays
      c) Circuit breaker and fuse information, including time current characteristics
      d) Control power transformers
      e) Pilot devices
      f) Relays

C. Specification Response
   1. All clarifications and exceptions must be clearly identified.

D. Installation Instructions
   1. Provide a copy of the installation instructions from the MANUFACTURER, which includes the following:
      a) Receiving, handling, and storage instructions
      b) General description for reading nameplate data, serial numbers, and short circuit ratings
      c) Installation procedures including splicing procedures
      d) Conduit and cable installation
      e) Installing and removing plug-in units
      f) Operation of operator handles and unit interlocks
      g) Checklist before energizing
      h) Procedure for energizing equipment
      i) Maintenance procedures

1.04 FINAL SUBMITTALS

A. The CONTRACTOR must provide certification that:
   1. The MCC has been installed in accordance with the installation instructions from the MANUFACTURER, and with local codes and standards that govern MCC installations.
B. Final Drawings
   1. The MANUFACTURER must provide final drawings that reflect the “As-Shipped” state of the MCC documents previously sent.
   2. MANUFACTURER drawings must be provided in DWG format.
   3. MANUFACTURER drawings do not need to be stamped if a drawing schedule is provided that lists the drawing numbers, revision levels, and status of drawings (such as Preliminary, Approval, and Final).
   4. The CONTRACTOR is responsible for any changes to the “As-Shipped” drawings from the MANUFACTURER to reflect any field modifications.
C. Test reports that indicate standard testing are performed by the MANUFACTURER.
D. Maintenance Data
   1. MCC installation instructions.
   2. Installation/operation instructions for major components such as the automatic transfer switch and circuit breakers.
   3. MCC spare parts list and prices.
   4. Name and phone number for a local distributor who can provide spare parts.

1.05 QUALITY ASSURANCE

A. The MCC must be designed, manufactured, and tested in facilities that are registered to ISO 9001 quality standards.
B. Type testing must be verified by a recognized testing authority such as KEMA or DEKRA, and must be available upon request.
C. The VENDOR must be fully aware of this specification, plus any referenced document.

1.06 CLEANING

A. At time of shipment, the equipment must be clean inside and outside.
B. All waste (such as metal chips or filings, weld stubs, dirt, rags, debris, and any other foreign material) must be removed from the interior of each component. All mill scale, rust, oil, grease, chalk, crayon, or paint marks and other deleterious material must be removed from all interior and exterior surfaces.

1.07 DELIVERY, STORAGE, AND HANDLING

A. All openings must be provided with protection to prevent damage, corrosion, and entrance of foreign matter during storage and shipment.

B. Each MCC assembly must be divided into a shipping section, if necessary, as designated on the single-line drawings. Each shipping section must be assembled on continuous mounting sills, and must be protected during shipment by a plastic wrapping for moisture protection and rigidly braced framework that is constructed of not less than 2 x 4 in. (45 x 90 mm) lumber around the structure for mechanical protection. All loose parts must be crated or boxed for shipment and appropriately identified.
C. Equipment-standard 600 mm wide stacks must be shipped in sections from the factory that are fully assembled, prewired, and with all components in place, as far as practicable. The 800 mm wide sections and larger must be shipped as individual sections that are equipped with suitable bus connectors.

1.08 DOCUMENTATION

A. VENDOR must provide handling and installation instructions to BUYER. One set of these instructions must be fastened securely to the outside of the shipping unit.

1.09 WARRANTY

A. Defective components must be replaced by VENDOR under terms of the Vendor Warranty for one year.

PART 2 MOTOR CONTROL CENTER SPECIFICATIONS

2.01 IEC MCC STRUCTURE

A. The IEC MCC must consist of one or more columns that are bolted together to form a rigid, free-standing assembly that is designed so future columns can be added without significant fabrication or interruption of service.
B. The MCC must be designed with full isolation of electrical components from the front side of the enclosure.
C. Columns must be fabricated of formed sheet steel to provide an enclosed, dead-front construction, joined to form one, rigid, free-standing assembly. Separation must be only as required for shipping. Continuous floor sills and removable continuous steel lifting angles must be furnished on all shipping blocks. Two lifting angles must be furnished for dual-front columns.
D. Units within each vertical column must be based on module spacing approximately 80 mm high to allow the installation of 24 modules of varying unit combination.
    1. Any given column can house a combination of fixed and withdrawable units.

E. Each vertical column of the motor control center must be provided with a top- and bottom-mounted horizontal wiring trough that extends the full depth of the column, with front, removable-access cover. In addition, each structure must be provided with an adequately sized (350 mm deep) vertical wiring trough. All wiring troughs must be isolated from all buses and units. Vertical troughs must have a separate access door for the full height of the vertical section.
F. Painting must be according to standards by the MANUFACTURER.
   1. Before painting, all rough edges must be ground smooth.
   2. The external structure is given a rust resistant primer and two finish coats.
   The paint must be applied with an electro-deposition process to help ensure a uniform paint coat with high adhesion.
G. Cable entrances into the motor control center must be from either the top or bottom. All cabling knockouts are provided in the field.
H. When doors are open, a person on the operating side of the equipment must not be exposed to live parts. There must be an IP2X minimum protection maintained.
I. Side sheets must be 2.0 mm thickness minimum.
J. Back plates must be of 2.5 mm thickness minimum.
K. For flexibility of layout, standard columns must be available in widths of 600 mm to 1000 mm.
L. MCC columns must be 600 mm or 800 mm deep, depending on bus size.
   1. 800 mm deep columns do not increase the volume of the units that are contained in the column. An extra 200 mm is added to the back of the structure. Horizontal bus and front of columns remain flush.

2.02 FORM OF SEPARATION

A. Internal isolation and separation must exist between the following:
   1. Individual units
   2. Units and wireways
   3. Units and the bus system
   4. Wireways and the bus system
   5. Vertical wireway for unit load connections and the vertical wireway for control/network connections (Form 3b)
   6. Each terminal’s group for external conductors must be shrouded by insulating barriers within the vertical wireway with separate segregated-cable areas for top or bottom direct-cable connections (Form 4b option)
   7. Each terminal’s group for external conductors that is housed in a dedicated metal box within the vertical wireway must be separated from the terminal box in another unit with separate segregated-cable areas for top or bottom direct-cable connections (Form 4b Type 7 option)

2.03 MOUNTING CONFIGURATIONS

A. The MCC must be available in front-only or dual-front configurations.
B. Front-only columns must be joined and installed side-by-side.
C. Dual-front columns must be comprised of two separate columns joined at the rear. The two columns must have separate, power bus systems that provide the same phasing on units, both front and rear. Full usage of unit space must be available for front and rear columns. The horizontal power bus must be linked, front to rear, with a factory installed U-shaped bus splice assembly.

2.04 WIREWAYS

A. Horizontal wireways must be at the top and bottom of each MCC column.
   1. The top horizontal wireway must be no less than 170 mm high.
   2. The bottom horizontal wireway must no less than 115 mm high.
   3. Horizontal wireways must extend the full width and depth of the MCC.
   4. Horizontal wireways must have removable front covers that are held in place by captive screws.
B. Openings must be provided in each side plate of the column in the top and bottom horizontal wireways to allow access between joined columns.
   1. Closing plates must be provided for these openings for columns that are at the end of an MCC lineup.
C. Horizontal wireways must be isolated from the power bus. Horizontal wireways for incoming line sections must maintain isolation from the incoming line area.
D. The vertical wireway must be on the right side of each column and must extend from the top horizontal wireway to the bottom horizontal wireway.
   1. Hinge location of the door permits unobstructed access to units and wireway alike.
E. The vertical wireway must be isolated from the power bus and must be independent of unit space.
F. Vertical wireways must not be present in fixed, frame-mounted, full-column units.
G. Vertical wireways must be covered with steel doors and must be held in place by five door latches.
H. Optional cable supports for use in vertical wireways must be available.
I. Vertical wireways must be 200...500 mm wide, and 350 mm deep.

2.05 POWER BUS

A. Incoming Power
   1. MCC incoming line voltage must be between 380V and 690V, 3-phase, and 50/60 Hz.
   2. 3-wire and 4-wire systems are available. If the system is a 4-wire solution, TN-S grounding is required; TN-C is not sufficient.
B. Short Circuit Withstand
   1. The power bus system must be supported, braced, and isolated by a continuous bus support. This bus support must be fabricated of a non-tracking glass-polyester blend.
   2. Bus bracing must be 50 kA minimum.
C. Horizontal Power Bus
   3. Standard, horizontal power-bus material must be tin-plated copper per the MANUFACTURER with a capacity up to 4000 A.
   4. The power bus must be continuous in each column or shipping block.
   5. Horizontal power-bus splicing must be accomplished with a splice kit of the same ampere rating as the horizontal power bus.
   6. To help ensure the reliability of the splice connections, both ends of the horizontal bus splices must have at least two bolts. Bolts must be machined torqued and require no periodic maintenance.
   7. The splice connections must be front accessible through the vertical wireway for installation and service.
   8. The vertical spacing of the horizontal busbars must be 165 mm or larger.

D. Vertical Power Bus
   1. The vertical power-bus material must be tin-plated copper.
   2. Vertical power busbars must be cylindrical, providing optimum contact with the unit plug-in stabs.
   3. The vertical bus rating must be a minimum 300 A above and below the main horizontal bus for a total rating of 600 A (an option for 600 A above and below for a total rating of 1200 A is effective).
   4. Horizontal spacing between the vertical power busbars must be 100 mm.
   5. The vertical bus must be contained in a continuous, recessed bus support. No point-bracing is allowed.

E. Neutral Bus
   1. The horizontal neutral bus, when specified for 4-wire systems, must be provided across the full width of the MCC and must be located above or below the horizontal power bus.
   2. The neutral bus must match the material and specifications of the vertical power bus.
   3. The vertical neutral bus must be mechanically joined to the horizontal neutral bus and must provide a neutral contact for plug-in unit stabs throughout the length of the column.
   4. The space between the horizontal power busbars and horizontal neutral busbar must be 165 mm.
   5. The space between the vertical power busbar and vertical neutral busbar must be 75 mm.
   6. The neutral bus must be braced the same way as the horizontal and vertical power bus.

F. Automatic Shutters
   1. Automatic shutters that must open as withdrawable units are inserted and must close by using non-gravitational mechanisms when the unit is removed.

2.06 PROTECTIVE EARTH CONDUCTOR

A. Horizontal Protective Earth (PE) Conductor
   1. The horizontal PE conductor must be:
      a) Made from standard copper (minimum 6 x 50 mm^2) or optional tin-plated copper.
      b) Continuous for the width of the column and must be located in the bottom horizontal wireway.
      c) Comprised of one, two, or three (minimum 6 x 50 mm^2) conductors.
   2. Each column is pre-punched and predrilled with 12 evenly spaced, 8 mm holes along the length of the conductor to receive ground connections.
   3. A pressure-type mechanical lug must be mounted on the horizontal PE conductor in the incoming line section.

B. Vertical Plug-in Protective Earth (PE) Conductor
   1. A 6 mm x 32 mm^2 copper (or optional tin-plated copper) vertical plug-in PE conductor must be provided in each standard column.
   2. The vertical plug-in PE conductor must be mechanically connected to the horizontal PE conductor, which forms a complete internal-protective earth circuit.
   3. For power connections, the vertical plug-in PE conductor, in combination with the unit PE contact, must establish a first make, last break operation of the PE connection.

2.07 MAIN INCOMING SECTION

A. Air Circuit Breaker or Molded Case Circuit Breaker
   1. All main incoming units must be front accessible.
   2. Main ACB incoming units must be withdrawable.
   3. All main incoming units must be 3-pole or 4-pole.
   4. All main incoming units must be easily integrated into Auto Transfer Schemes.
   5. The main incoming section must contain removable protective barriers on the line side to help reduce the possibility of accidental contact with line terminals.
   6. The main incoming section must contain power metering with communication capabilities.

2.08 UNITS

A. Unit Design
   1. For flexibility of design and use, a column must accept units of different types, such as VFD, DOL, FD, MCB, and SMC, and fixed and withdrawable units in the same column.
   2. In fixed units, line, load, PE, network, and control connections must be made directly within the unit to dedicated terminals.
   3. Withdrawable units must have withdrawable line, load, control, network, and protective earth (PE) connections. Outgoing load and control connections from these units must be made in the vertical wireway.
   4. Units must be of modular dimensions so units of the same size can be interchanged without modification in the structure. After insertion, each plug-in unit must be held in place by a latch at the front of the unit.

B. Unit Design Features
   1. Withdrawable units must consist of the unit, unit support pan, and unit door.
   2. Withdrawable units must be held securely in the column when inserted.
   3. Withdrawable units must be designed with an interlock to help ensure that units cannot be inserted or withdrawn when the disconnect means is in the ON/I position.
   4. Tools are not required to fully remove or insert withdrawable units.
   5. The withdraw lever must feature a locking mechanism that can be disengaged to change positions.
   6. Detents must be present to help confirm that the unit is secured in one of the operating positions.
   7. Withdrawable units must have four operating positions: connected, test, disconnected, and withdrawn.
      a) **Connected** - In the connected position, the line, load, control, network, and PE connections must be engaged. The unit door must be closed to help ensure that the withdraw lever is in the connected position. To engage the interlock or to turn the disconnect means to the ON/I position, the unit door must be fully closed.
      b) **Test** - In the test position, the control, network, and PE connections must be engaged. Line and load connections must be isolated for the control and network wiring of the units to be verified. Units can be locked in this position.
      c) **Disconnected** - In the disconnected position, the unit remains housed in the column, but power/control connections are not present. It must be an isolated position with PE maintained. Units can be locked in the disconnected position.
      d) **Withdrawn** - Withdrawable units must be fully removed from the columns. When units are withdrawn from the MCC, they must be isolated from connections. Withdrawn units must be locked to prevent insertion.

C. Operating Handle Mechanism
   1. An industrial, heavy duty, rotary operating-handle mechanism must be supplied for control of the disconnecting means in each unit.
   2. When the unit door is closed, the handle can be engaged with the disconnect means.
   3. The operating handle can be locked in the OFF/O position with up to three 8 mm diameter shackle padlocks.
   4. The operating handle can be modified to enable locking in the ON/I position.
   5. The unit operating handle must be interlocked with the unit door to help prevent opening the unit door unless the disconnect means is in the OFF/O position.
   6. An externally operated defeater must be provided for access to the unit without interrupting service.
   7. The operating handle must be interlocked with the unit so the unit cannot be inserted or withdrawn with the operating handle in the ON/I position.

D. Unit Disconnect Means
   1. The unit main switch must be available as a circuit breaker or disconnect. Withstand ratings for combination starter units must be based on what short-circuit protective devices and components are selected.

E. Circuit Breakers
   1. Circuit breakers must be provided as the disconnecting means for units that are specified with a main switch for the circuit breaker unit.
   2. Motor circuit protectors must be used for combination motor-control units.
   3. Motor protection circuit breakers or molded case circuit breakers must be used for feeder units.

F. Power Stab Assembly
   1. The power cable connection at the plug-in stab must be made with lower maintenance cost, crimp-style connection. There must be no exposed wiring at the back of the unit between the disconnecting means and the plug-in stabs. Unit plug-in power stabs must be free-floating and self-aligning. The stabs must be made of tin-plated copper for a low-resistance connection and must be designed to tighten during heavy current surges. Use stainless-steel spring clips to back unit plug-in power stabs for a high pressure, 4-point connection to the vertical power bus.

G. Neutral Stab Assembly
   1. The neutral stab assembly must have the ability be supplied on withdrawable units when a 4-wire TNS system is required. The neutral stab assembly must have the same design and features as the power stab assembly.

H. Protective Earth Contact
   1. An unplated copper PE contact must be provided on withdrawable units. This contact must establish a connection with the PE circuit before other connections are made and must be the last withdrawable connection to be disconnected.

I. Pilot Devices
   1. Pilot devices must be housed in door-mounted control stations. Each control station must accommodate up to four devices. Multiple control stations must be mounted on a unit door if more than four pilot devices are required. Control stations must be equipped with a quick connect plug to easily connect and disconnect control wiring. The control station must be easily removed by using captive screws. If a control station is removed, closing plates must be available to cover the opening in the unit door and provide isolation.

J. Unit Doors and Door Latches
   1. Each unit must be provided with a removable unit door mounted on removable pin-type hinges.
   2. The unit door must be fastened to the stationary structure (not the unit itself), so it can be closed to maintain external IP rating and arc flash protection with the unit removed.
   3. The door must be hinged on the left side so that it opens away from the vertical wireway.
   4. The unit door can be removed from any location on the MCC without other unit doors being disturbed.
   5. Control stations for pilot devices and low-profile, external reset buttons for overload relays must often be mounted to the unit door.
   6. Door latches must be provided on unit and vertical wireway doors to hold the door closed and isolate the column.
   7. Door latches can be locked or released by rotating the latch ¼ turn. An arrow on the door latch head must indicate the position of the latch.
   8. Optional arc-containment latches must be available for doors. Arc-containment latches can be locked or released by rotating the latch ¼ turn.

K. Control Power
   1. Unit control power must be one of the following: 110V AC; 115V AC: 120V AC; 220V AC; 24V DC wired with a minimum size of 1.5 mm^2.

L. Power Wire
   1. Power wire must be copper and rated for 90 °C (194 °F) with a minimum size of 6 mm^2.

M. Communication Networks
   1. Each MCC unit must have network-communication capabilities to retrieve individual unit data and/or provide unit control functionality. Capabilities include DOLs, DOLRs, FCBs, SoftStarts, VFDs, and Mains.
   2. Each unit within the MCC must maintain the tool-less withdrawable feature, including the communication network connections.
   3. The configuration must allow removal of multiple units without disrupting communication to remaining units.
   4. Each MCC must communicate on the preferred EtherNet/IP or DeviceNet network protocol of the BUYER.
   5. Network cabling must be separated from the bus compartments and BUYER wireways.
   6. When a TCP/IP configuration is selected, the managed switches are provided and installed in the MCC columns by the MANUFACTURER before shipment.
   7. The network and node assignments of each MCC lineup are preconfigured and tested by the MANUFACTURER before shipment.
   8. All network configuration data must be available to the customer before the MCC is shipped.
   9. Network Cabling
      a) Network communication cables must be protected with a heavy outer jacket for dielectric strength. No special separation, barriers, or internal conduit must be required.
         i. The DeviceNet cable that is used for trunk lines must be Class 1 flat cable rated 8 A.
         ii. The DeviceNet cable that is used for drop lines to connect DeviceNet units must be Class 1 round cable rated 8 A.
         iii. EtherNet/IP communication must be embedded in each unit of the MCC by using Cable Tray rated 600V Ethernet cable and managed switches in each column.

10. Network Cable Layout
    a) The network cables must be routed through the control and network wireway and top horizontal wireway of the MCC.
    b) For the EtherNet/IP network, each unit with a network connection must have a cable routed in the control and network wireway to a switch located in the top or bottom horizontal wireway.
    c) Cables must be routed behind barriers that isolate the cable from the unit space and wireways to help prevent accidental damage during MCC installation.
    d) Up to 24 DeviceNet ports must be provided in the control and network wireway. Each component in an MCC unit must be connected to a port located in the control and network wireway.
    e) Up to 12 EtherNet/IP ports must be provided in the control and network wireway. Each component in an MCC unit must be connected to a port located in the control and network wireway.
    f) The addition or removal of a unit from the system must not interrupt the operation of other units in the system.
11. Power Supply
    a) The system within the MCC must require a power supply that provides 24V DC rated no less than 8 A.
    b) This power supply must be supplied with a buffer for enhanced ride-through performance.
    c) For the DeviceNet network, this power supply must be ODVA approved.
    d) The DeviceNet system in the MCC must require a DeviceNet scanner.
    e) The EtherNet/IP system in the MCC must require an EtherNet/IP scanner.
    f) The scanner must be located in the MCC or mounted remotely.
12. DeviceNet System Performance
    a) The DeviceNet system in the MCC must be designed to operate at 500 kBd to maximize performance, unless precluded by the cumulative length of the trunk and drop lines.
    b) The DeviceNet system in the MCC must be qualified to communicate and perform under normal and adverse electrical environments, for example, contactor electrical operation, contactor jogging duty, and unit short-circuit fault.
    c) Each unit must be provided with a DeviceNet component. Starter units must be provided with E3™ or E3 Plus™ electronic overload relays or solid-state overload relays with a DeviceNet starter auxiliary. Contactor units must be provided with a DeviceNet starter auxiliary. AC drives must be provided with a DeviceNet communication module. Solid-state controllers must be provided with DeviceNet communication modules and, in some instances, a DeviceNet starter auxiliary. Fusible disconnect and circuit-breaker feeder circuits must be provided with a DeviceNet starter auxiliary.
13. EtherNet/IP System Performance
    a) The EtherNet/IP system in the MCC must be designed to operate at 100 megabaud to maximize performance.
    b) The EtherNet/IP system in the MCC must be qualified to communicate and perform under normal and adverse electrical environments, for example, contactor electrical operation, contactor jogging duty, and unit short-circuit fault.

c) Each unit must be provided with an EtherNet/IP component. Starter units must be provided with E3 or E3 Plus electronic overload relays or E1 Plus™ overload relay with an EtherNet/IP side mount module or E300™. Contactor units must be provided with an EtherNet/IP POINT I/O™ system. AC drives must be provided with an EtherNet/IP communication module. Solid-state controllers must be provided with EtherNet/IP communication modules and, in some instances, an EtherNet/IP POINT I/O system. Fusible disconnect and circuit-breaker feeder circuits must be provided with an EtherNet/IP POINT I/O system.
   i. The Ethernet switches in the MCC architecture must support an optional, switch-level ring topology (such as Resilient Ethernet Protocol) to provide a level of redundancy to MCC lineup.

14. Programming of Parameters
   a) The DeviceNet MAC ID number (node address) must be programmed for each unit as specified by the BUYER. All other parameters are left at the factory default setting.
   b) The DeviceNet components must be configured to operate at the specified communication rate.
   c) The EtherNet/IP address (node address) and subnet address must be programmed for each unit as specified by the BUYER. All other parameters are left at the factory default setting.
   d) The Ethernet switch in the MCC architecture must support a mechanism to automatically set device Ethernet IP addresses when a new device is connected to a switch port.

B. Nameplates
   1. Nameplates must be secured by using two steel self-tapping screws.

2.09 SOFTWARE

A. Preconfigured Software
   1. The software must be preconfigured for the MCC lineups.
   2. The software communication driver must allow the software to be installed and operated on the Ethernet or DeviceNet network.
   3. The software must function as a standalone software package or as an ActiveX control in a Human Machine Interface (HMI).
   4. The software must display the following:
      a) Elevation View
         i. Dynamically displays status information that is based on data read from devices in the MCC lineup
         ii. Sizeable view to easily view multiple MCC lineups
         iii. Unit nameplate information
         iv. Unit status indicators (ready, running, warning, fault, and no communication)
      b) Unit Monitor View
         i. Preconfigured for a specific unit
         ii. Real-time monitoring via analog dials and trends
         iii. Data configurable for customized views
         iv. Modifying device parameters
      c) Spreadsheet View
         i. Configurable for customized monitoring
         ii. Sorting and cascading functions
         iii. Custom user fields

d) Event Log
   i. Track history of MCC unit
   ii. Automatic logging of trips, warnings, and changes
   iii. Manual entry of events
e) Documentation
   i. Front elevation drawings
   ii. Unit wiring diagrams
   iii. User manuals
   iv. Spare parts lists
f) Automatic PLC Integration for EtherNet/IP based MCC lineups
   i. Automatic export of intelligent MCC devices and their configuration (such as name and node settings) into PLC software
g) Integrated Energy Monitoring Functionality
   i. Device-level energy monitoring functionality for intelligent MCC devices via the Elevation View menu
   ii. Energy report options include historical calendar trends, parameter trends, and numerical data tables

PART 3 EXECUTION

3.01 INSTALLATION

A. The BUYER must install the MCC in accordance with instructions from the MANUFACTURER.
B. The BUYER must tighten accessible bus connections and mechanical fasteners to the torque requirements of the MANUFACTURER.
C. The BUYER must select and install fuses in fusible switches that are based on field requirements.
D. The BUYER must adjust circuit breaker settings that are based on field requirements.
E. The BUYER must adjust solid-state overloads to match the installed motor characteristics.

3.02 MANUFACTURER'S SERVICES

A. The MANUFACTURER of the MCC must provide the programming for the programmable logic controller and the operator interface if provided within the MCC.
B. The MANUFACTURER of the MCC must provide start-up services as part of the supply of the MCC.

3.03 TRAINING

A. A course outline must be submitted as part of the MCC submittals.
B. The MANUFACTURER must offer offsite training on the concepts, knowledge and tools necessary to design, specify, install, troubleshoot, and use a DeviceNet MCC.

END OF SECTION

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