

PART 1 - GENERAL

- 1.1 General .1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1.
- 1.2 Codes and Standards .1 Do complete installation in accordance with CSA C22.1-09 except where specified otherwise.
- .2 Abbreviations for electrical terms: to CSA Z85-1983.
- .3 Comply with CSA Certification Standards and Electrical Bulletins in force at time of Tender submission.
- .4 Where requirements of this specification exceed those of the above mentioned standards, this specification shall govern.
- 1.3 Care, Operation and Start-up .1 Instruct Engineer and operating personnel in the operation, care and maintenance of equipment.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, and adjust.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.
- 1.4 Voltage Ratings .1 Operating voltages: to CAN3-C235-83.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- 1.5 Permits, Fees and Inspection .1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay associated fees.
- .3 Engineer will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
- .4 Notify Engineer of changes required by Electrical Inspection Department prior to making changes.

1.6 Materials and
Equipment

- .1 Provide materials and equipment in accordance with Section 01 00 10 - General Instructions.
- .2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department.
- .3 Factory assemble control panels and component assemblies.

1.7 Electric Motors,
Equipment and
Controls

- .1 Supplier and installer responsibility is indicated in Motor, Control and Equipment on Annex 3. Related mechanical responsibility is indicated in Division 23.
- .2 Control wiring and conduit is specified in Division 26 except for conduit, wiring and connections below 50 V which are related to control systems specified in Division 23 and shown on mechanical drawings.

1.8 Finishes

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

1.9 Equipment
Identification

- .1 Identify electrical equipment with nameplates and labels as follows:
- .2 Nameplates:
 - .1 Lamicaid 3 mm thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .3 Labels:
 - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
- .4 Wording on nameplates and labels to be approved by Engineer prior to manufacture.

1.9 Equipment
Identification
(Cont'd)

- .5 Allow for average of twenty-five (25) letters per nameplate and label.
- .6 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Transformers indicate capacity, primary and secondary voltages.

1.10 Wiring
Identification

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1-09.
- .4 Use colour coded wires in communication cables, matched throughout system.

1.11 Conduit and
Cable
Identification

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	<u>Prime</u>	<u>Auxiliary</u>
up to 250 V	yellow	
up to 600 V	yellow	green
up to 500 V	yellow	blue
Telephone		green
Other communication systems	green	blue
Fire alarm		red
Emergency voice	red	blue
Other security systems	red	yellow

1.12 Wiring
Terminations

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

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| <u>1.13 Manufacturers and CSA Labels</u> | .1 | Visible and legible after equipment is installed. |
| <u>1.14 Warning Signs</u> | .1 | As specified and to meet requirements of Electrical Inspection Department and Engineer. |
| <u>1.15 Single Line Electrical Diagrams</u> | .1 | Provide single line electrical diagrams in glazed frames as follows: <ul style="list-style-type: none">.1 Electrical distribution systems located in main electrical room..2 Provide fire alarm riser diagram, plan and zoning of building in glazed frame locate in main electrical room..3 Drawings: 750 x 750 mm minimum size. |
| <u>1.16 Conduit and Cable Installation</u> | .1 | Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum. |
| | .2 | Holes for conduits passing through exterior wall and roof shall be properly flashed and made watertight. |
| <u>1.17 Field Quality Control</u> | .1 | Conduct and pay for following tests: <ul style="list-style-type: none">.1 Power distribution system including phasing, voltage, grounding and load balancing..2 Circuits originating from branch distribution panels..3 Lighting and its control..4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable..5 Systems: fire alarm system, voice and data signal systems, paging system, CCTV system, panic alarm system, cable TV system and emergency lighting system. |
| | .2 | Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions. |
| | .3 | Insulation resistance testing. <ul style="list-style-type: none">.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument..2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument..3 Check resistance to ground before energizing. |
| | .4 | Carry out tests in presence of Engineer. |
| | .5 | Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project. |
| | .6 | Submit test results for Engineer's review. |
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1.18 Scope of Work .1 Provide a complete system for the following as shown on drawings and as described in these specifications:
.1 Provide electrical mechanical equipment. power and control connection to mechanical equipment.

1.19 As Built Record .1 Consultants representative will provide two (2)sets of drawings at the start of construction to allow the contractor to keep and maintain accurate as built drawings. Co-ordinate requirements with Section 01 78 00.
.2 One set shall be keep on site to record the information reflecting changes and installation on a daily basis during construction. At the end of the project all information from the construction set shall be transferred onto the clean set and sent to the consultant for the final review.

PART 2 - PRODUCTS

2.1 Not Used .1 Not used.

PART 3 - EXECUTION Not used.

3.1 Not Used .1 Not used.

PART 1 - GENERAL

1.1 References .1 CSA C22.2-No.65-2003(R2008) Wire Connectors.

PART 2 - PRODUCTS

2.1 Materials .1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors: with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Clamps or connectors for flexible conduit as required.

PART 3 - EXECUTION

3.1 Installation .1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2-No.65-2003(R2008)

.2 Install fixture type connectors and tighten. Replace insulating cap.

.3 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

.4 Install box connectors to CSA E222.2 No. 18.

PART 1 - GENERAL

1.1 References .1 CSA C22.2-No.0.3-2009, Test Methods for Electrical Wires and Cables.

1.2 Product Data .1 Submit product data in accordance with Section 01 33 00: Submittal Procedures.

PART 2 - PRODUCTS

2.1 Service Entrance Below Ground .1 Conductors: stranded copper, size as indicated with 1000 volt insulation cross-linked polyethylene XLPE - 40°C. Neutral conductor with similar insulation - ground conductor copper insulated or bare to match Hydro Ottawa Standards.

2.2 Building Wires .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
.2 Phase neutral and ground conductors: Copper size as indicated, with 1000 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90.

2.3 Control Wiring .1 600 V type: copper stranded annealed copper conductors, sizes as indicated with , polyethylene insulation RW90 (x-link).

2.4 Mineral Insulated Cable .1 Conductors: solid bare soft-annealed copper, size as indicated. 600V, 90 degree Centigrade.
.2 Insulation: compressed powdered magnesium oxide to form compact homogeneous mass throughout entire length of cable.
.3 Two hour fire rating.
.4 Connectors: Manufacturer approved connectors.
.5 Termination kits:Manufacturer approved cable termination.

PART 3 - EXECUTION

- 3.1 Installation of Building Wires .1 Install wiring as follows:
.1 In conduit systems in accordance with Division 26, Section 26 05 34.
- 3.2 Installation of Control Wiring .1 Install control wiring in conduit.
- 3.3 Installation of Mineral - Insulated Cables .1 Run cable exposed or concealed, securely supported by straps.
.2 Support 2 h fire rated cables at 1 m intervals.
.3 Make cable terminations by using factory-made kits.
.4 At cable terminations use thermoplastic sleeving over bare conductors.
.5 Where cables are buried in cast concrete or masonry, sleeve for entry of cables.

PART 1 - GENERAL

- 1.1 References .1 ANSI/IEEE 837-2002, Qualifying Permanent Connections Used in Substation Grounding.

PART 2 - PRODUCTS

- 2.1 Equipment .1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.
- .2 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, tinned, soft annealed, size as indicated.
- .3 Rod electrodes: galvanized steel 19 mm dia by 3 m long.
- .4 Plate electrodes: copper, surface area 0.2 m², 1.6 mm thick.
- .5 Grounding conductors: bare stranded copper, , soft annealed, size as indicated.
- .6 Insulated grounding conductors: green, type. XLPE.
- .7 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.
- .8 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
- .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermit welded type conductor connectors.
 - .5 Bonding jumpers, straps.
 - .6 Pressure wire connectors.

PART 3 - EXECUTION

- 3.1 Installation .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.
- General .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to conductive water main, electrodes, using permanent mechanical connectors or inspectable wrought copper compression connectors to ANSI/IEEE 837-2002.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.

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| 3.1 Installation
General
<u>(Cont'd)</u> | .6 | Soldered joints not permitted. |
| | .7 | Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit. |
| | .8 | Install separate ground conductor to outdoor lighting standards. |
| | .9 | Make grounding connections in radial configuration only, with connections terminating at street side of water pipe. Avoid loop connections. |
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| 3.2 System and
Circuit Grounding | .1 | Install system and circuit grounding connections to neutral of, secondary 208 V system. |
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| 3.3 Equipment
Grounding | .1 | Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, frames of motors, starters, control panels, elevators and escalators, distribution panels, outdoor lighting. |
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| 3.4 Grounding Bus | .1 | Install copper grounding bus mounted on insulated supports on wall of electrical rooms. |
| | .2 | Ground items of electrical equipment in electrical room to ground bus with individual bare stranded copper connections size 3/0 AWG. |
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| 3.5 Communication
Systems | .1 | Install grounding connections for voice/image/data, fire alarm, intercommunication systems as required by the standards. |
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| 3.6 Field Quality
Control | .1 | Perform tests in accordance with Section 26 05 00 - Common Work results - Electrical. |
| | .2 | Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Engineer and local authority having jurisdiction over installation. |
| | .3 | Perform tests before energizing electrical system. |

PART 1 - GENERAL

1.1 Related Work .1 Fastenings and supports:Section 01 01 00

1.2 General .1 Fastenings and supports: No electrical equipment to be fastened directly to drywall only drywall supports.

PART 2 - PRODUCT

2.1 Support Channels .1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted suspended and ceilings.

2.2 Manufacturer .1 Acceptable manufacturers: Cantruss, Electrovert or equivalent.

PART 3 - EXECUTION

- 3.1 Installation .1 Secure equipment to masonry, tile and plaster surfaces with lead anchors.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .4 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .5 Fasten exposed conduit or cables to building construction or support system using straps.
- .1 One-hole malleable iron straps to secure surface conduits and cables 50 mm and smaller.
- .2 Two-hole steel straps for conduits and cables larger than 50 mm.
- .3 Beam clamps to secure conduit to exposed steel work.
- .6 Suspended support systems.
- .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
- .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

3.1 Installation
(Cont'd)

- .7 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .8 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .9 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .10 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Engineer.
- .11 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.
- .12 Electrical panels, switches or other electrical equipment shall be complete with suitable bases or mounting brackets. Install angle or channel iron supports to bear the equipment where it is shown in or on structural tile walls, or walls that are inadequate to bear the equipment.
- .13 Provide channel iron or other metal supports where necessary to adequately support lighting fixtures. Do not use wood. Lighting fixtures shall be supported totally independent of ceiling and supported from structure above.
- .14 Support hangers, in general, from inserts in concrete construction or from building structural steel beams, using beam clamps. Provide Additional angle or channel steel members required between beams for supporting conduits.

PART 1 - GENERAL

- 1.1 Shop Drawings and Product Data .1 Submit shop drawings and product data for cabinets in accordance with Section 01 33 00 - Submittal Procedures.
- 1.2 Reference .1 CAN/CSA C22.2 NO. 76-M92 (R2007) Splitters.
.2 CSA C22.2 NO. 40-M1989 (R2004) Cutout, Junction and Pull Boxes.

PART 2 - PRODUCTS

- 2.1 Junction and Pull Boxes .1 Welded steel construction with screw-on flat covers for surface mounting.
.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.
- 2.2 Cabinets .1 Type E: sheet steel, hinged door and return flange overlapping sides, handle, lock and catch, for surface mounting.
- 2.3 Splitters .1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.
.2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.
.3 At least three spare terminals on each set of lugs in splitters less than 400 A.

PART 3 - EXECUTION

- 3.1 Junction, Pull Boxes and Cabinets Installation .1 Install pull boxes in inconspicuous but accessible locations.
.2 Install terminal block as indicated in Type T cabinets.
.3 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.2 Splitter
Installation

- .1 Install splitters as indicated and mount plumb, true and square to the building lines.
- .2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.3 Identification

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Install size 2 identification labels indicating system name voltage and phase.

PART 1 - GENERAL

- 1.1 References .1 CSA C22.1-09 Canadian Electrical Code, Part 1.
.2 CAN/CSA C22.2 NO. 18.1-04 (R2009) Outlet boxes, Conduit boxes and Fittings.

PART 2 - PRODUCTS

- 2.1 Outlet and Conduit Boxes General .1 Size boxes in accordance with CSA C22.1-09.
.2 102 mm square or larger outlet boxes as required for special devices.
.3 Gang boxes where wiring devices are grouped.
.4 Blank cover plates for boxes without wiring devices.
.5 Combination boxes with barriers where outlets for more than one system are grouped.
.6 347 V outlet boxes for 347 V switching devices.
- 2.2 Sheet Steel Outlet Boxes .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
.2 102 mm square or octagonal outlet boxes for lighting fixture outlets.
.3 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster or tile walls.
- 2.3 Masonry Boxes .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.
- 2.4 Concrete Boxes .1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.
- 2.5 Conduit Boxes .1 Cast FS boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.6 Fittings-
General

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 - EXECUTION3.1 Installation

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit. Reducing washers are not allowed.
- .5 Provide a suitable outlet box for each light switch, receptacle or other outlet, approved for the particular area in which it is to be installed.
- .6 Locate outlet boxes, mounted in hung ceiling space, so they do not obstruct or interfere with the removal of lay-in ceiling tiles.
- .7 Offset outlet boxes, shown back to back in partitions, horizontally to minimize noise transmission between adjacent rooms.
- .8 Use gang boxes at locations where more than one device is to be mounted. Use combination boxes with suitable barriers where outlets for more than one system are shown.

PART 1 - GENERAL

- 1.1 Location of Conduit .1 Drawings do not indicate all conduit runs. Those indicated are in diagrammatic form only.

PART 2 - PRODUCTS

- 2.1 Conduits .1 Rigid galvanized steel threaded conduit.
.2 Electrical metallic tubing (EMT): with couplings.
.3 Flexible steel conduit and liquid-tight flexible metal conduit.
- 2.2 Conduit Fastenings .1 One hole malleable iron straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.
.2 Beam clamps to secure conduits to exposed steel work.
.3 Channel type supports for two or more conduits at 2 m oc.
.4 Six mm dia threaded rods to support suspended channels.
- 2.3 Conduit Fittings .1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.
.2 Factory "ells" where 90° bends are required for 25 mm and larger conduits.
.3 Raintight connectors and couplings for EMT. Set-screws are not acceptable.
- 2.4 Expansion Fittings for Rigid Conduit .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.
.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.
.3 Weatherproof expansion fittings for linear expansion at entry to panel.
- 2.5 Fish Cord .1 Polypropylene.
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PART 3 - EXECUTION

- 3.1 Installation
- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
 - .2 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.
 - .3 Use electrical metallic tubing (EMT) for runs exposed, concealed in walls or suspended ceiling.
 - .4 Use flexible metal conduit for connection to recessed incandescent fixtures without a prewired outlet box and connection to recessed fluorescent fixtures.
 - .5 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment.
 - .6 Minimum conduit size for lighting and power circuits: 19 mm.
 - .7 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
 - .8 Mechanically bend steel conduit over 19 mm dia.
 - .9 Install fish cord in empty conduits.
 - .10 Run 2- 25 mm spare conduits up to ceiling space from each flush panel. Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space.
 - .11 Where conduits become blocked, remove and replace blocked section. Do not use liquids to clean out conduits.
 - .12 Dry conduits out before installing wire.
- 3.2 Surface Conduits
- .1 Run parallel or perpendicular to building lines.
 - .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
 - .3 Run conduits in flanged portion of structural steel.
 - .4 Group conduits wherever possible on channels.
 - .5 Do not pass conduits through structural members except as indicated.
 - .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.3 Concealed
Conduits

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

PART 1 - GENERAL

- 1.1 Related Work .1 Refer to Division 23 for equipment specification and ratings.
- 1.2 References .1 CAN/CSA-Q9000-92, Quality Management and Quality Assurance Standards - Guidelines for Selection and Use.
.2 CSA C22.1 No. 14 for Control Equipment and Enclosure.
- 1.3 Shop Drawings and Product Data .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
.2 Indicate:
.1 Outline dimensions
.2 Configuration of identified compartments.
.3 Schematic and wiring diagrams.
- 1.4 Operation and Maintenance Data .1 Provide operation and maintenance data for motor control centre for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
.2 Include data for each type and style of starter.
- 1.5 Source Quality Control .1 Provide manufacturer's type test certificates including short circuit fault damage certification up to short circuit values specified under bus bracing.
.2 Consultant to witness standard factory testing of complete motor control centre including operation of switches, circuit breakers, starters and controls.
.3 Manufacturer to provide proof of quality control program in accordance with CAN/CSA-Q9000.
- 1.6 Manufacturer .1 Acceptable manufacturer: Existing Cutler Hammer Model F-500, 600A, 600V/3/60. to be modified.
.2 Provide KA rating suitable to existing MCC.
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PART 2 - PRODUCTS

- 2.1 General Characteristics
- .1 Existing Motor Control Center 600 V, 60 Hz 3 phase, 3 wire with ampere rating as noted on plans will be reused in this renovation.
 - .2 Modify and Brace buswork to suit the new starter. Provide support and accessories as required for complete installation.
 - .3 Bus supports: with high dielectric strength, low moisture absorption, high impact material and long creepage surface designed to discourage collection of dust.
- 2.2 Ground Bus
- .1 Copper ground bus extending entire width of motor control centre.
 - .2 Vertical ground bus strap, full height of section, tied to horizontal ground bus, engaged by plug-in unit ground stab.
- 2.3 Starter Unit Compartments
- .1 Existing starter Units shall be removed. Install two 60A circuit breaker units, Plug-in type with self-disconnect. Guide rail supports for units to ensure that stabs make positive contact with vertical bus. Provision for units to be installed or removed, off load, while buses energized.
 - .2 Unit mounting:
 - .1 Engaged position - unit stabbed into vertical bus.
 - .2 Withdrawn position - unit isolated from vertical bus but supported by structure. Terminal block accessible for electrical testing of starter.
 - .3 Provision for positive latching in either engaged or withdrawn position and padlocking in withdrawn position.
 - .4 Stab-on connectors free floating tin plated clips, self-aligning, backed up with steel springs.
 - .3 Provide blank plate as required to match the unit.
- 2.4 Wiring Identification
- .1 Provide wiring identification in accordance with Section 26 05 00 - Common Work Results - Electrical.
- 2.5 Equipment Identification
- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.
 - .1 Motor control centre main nameplate: existing to remain.
 - .2 Individual compartment name plates: size to match existing.

PART 3 - EXECUTION

3.1 Installation .1 Make field power and control connections as indicated.

3.2 Testing and Commissioning .1 Carry out testing and Commissioning in accordance with manufacturer's recommendations.