DIVISION 26 – ELECTRICAL (SECTION 26xx0)

MANUFACTURED WIRING SYSTEM

ACCESS FLOOR

PART 1 - GENERAL

1.01 SUMMARY

* + 1. This section includes the following:

The modular convenience power system ensures the electrification and delivery of power from the distribution panels to required convenience power equipment. The modular wiring system shall be the Global IFS modular power system manufactured by America Cable Systems, New Bedford, MA, or approved equal.

* + - 1. Main Distribution Boxes
			2. Secondary Distribution Boxes
			3. Multi-Conductor Home Run Cables
			4. Extender Cables & Whip End Extender Cables
			5. Access Floor Modules
			6. Cable Accessories
		1. Related Sections include the following
			1. Distribution panels,
			2. Boxes,
			3. Fixtures,
			4. Supporting hardware, and
			5. Devices

1.02 ENVIRONMENTAL CONDITIONS FOR STORAGE AND INSTALLATION

* + 1. The General Contractor and/or Owner shall provide a clean, level, dry subfloor, temperature controlled, and protected from the weather.
		2. Access flooring storage and installation areas shall be maintained at a temperature between 40°F to 120°F and be less than 70% relative humidity for 24 hours a day before, during and after installation.
		3. Overhead construction work must be completed before installing access floor to avoid damage to panels and finishes. Any damage to panels or finishes resulting from construction work done after floor is installed shall be the responsibility of the general contractor.

1.03 DESIGN PERFORMANCE AND CERTIFICATION OF PRODUCT

A. Design components to provide for quick-connect field assembly in a manner conducive to visual site inspection. Full wiring configuration shall be maintained throughout system to allow for future reconfigurations.

B. Products are designed to comply with NFPA 70, NEC Article 604 Manufactured Wiring Systems. System shall meet installation requirements for other air handling spaces in accordance with NEC 300.22 C. Products are designed to comply with Canadian Electrical Code, CEC.

C. Products shall be tested and listed per Underwriter’s Laboratories Manufactured Wiring Systems (UL183) Standard for Safety.

1.04 COUNTRY OF ORIGIN

A. Access floor materials shall comply with the provisions outlined in FAR Subpart 25.2–Buy American Act–Construction Materials.

1.05 SUBMITTALS

* + 1. Submit a sample of each major component.
		2. Specifications and catalog numbers for each cable and accessory type shall be available upon request.
		3. Maintenance Data - A complete replacement parts list shall be provided with the as-built package.
		4. Warranty shall be provided, as applicable.

1.06 QUALITY ASSURANCE

* + 1. Manufacutrer Qualifications:
			1. Electrical component manufacture shall be ISO9001:2015 certified demonstrating it has a robust and well documented quality management system with continual improvement goals and strategies.
			2. Electrical component manufacture shall be ISO14001:2015 certified demonstrating they maintanin an environmental management system.
		2. Installer Qualifications: Engage an experienced installer with minimum of 5 years’ experience in installation of access floor systems of comparable size and complexity.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

* + 1. Deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance.
		2. Store materials in secure and dry facility and in original packaging in a manner to prevent soiling, physical damage, wetting or corrosion prior to installation.
		3. Materials shall be delivered in the manufacturer’s original unopened, protective packages.

1.08 REGULATORY REQUIREMENTS

A. National Fire Protection Association (NFPA)

* + - 1. 70, National Electrical Code (NEC)
			2. 101, Life Safety Code

B. National Electrical Code (NEC)

C. Underwriters Laboratories (UL) Standards

* + - 1. UL 183, Modular Wiring Systems
			2. UL 50, Enclosures for Electrical Equipment
			3. UL 1863, Communications Circuit Association
			4. UL 94, Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances testing
			5. UL 486A, Wire Connectors and Soldering Lugs for Use with Copper Conductors

1.09 WARRANTY

1. Provide manufacturer’s standard 1-year warranty on defects in materials or workmanship.

PART 2 – PRODUCTS

2.01 MANUFACTURER

* + 1. Basis-of-Design Product: Subject to compliance with requirements, provide Global IFS; [Modular Power System], located in Grand Rapids, MI 49512.
			1. Substitutions will be considered, providing the alternative products meet or exceed the feature requirements as indicated herein and the performance requirements as outlined in section 1.3 and receive prior written approval by the Architect. The manufacturer shall certify that all panels meet or exceed the stated design criteriA.
			2. The modular power system shall be based on zone wiring architecture. Power system cable management shall be achieved through the use of multi-conductor cables, run from the distribution panel to pre-wired Main Distribution Boxes. This method shall eliminate individual home run cabling. The Main Distribution Boxes shall branch out to feed Secondary Distribution Boxes in a hierarchy. From zone locations, factory-sized prefabricated multi-conductor extender cables shall send power to any point where convenience power is required. Typically, this will be at an Access Floor Module.
			3. The modular power system shall be in accordance with NEC Article 604 and all applicable UL standards. All components shall be labeled with both voltage ratings and installation information. The system shall be designed and keyed to prevent mismatching of different voltages. All devices and wiring shall be rated for 20 amperes.
			4. The connector-grounding pin on each modular assembly shall be so designed that the grounding connection is made prior to the contact made within the current carrying conductors per NEC Article 604.

2.02 GENERAL SYSTEM REQUIREMENT

A. The system shall provide a modular wiring system which provides quick connection of components to provide a zone distribution of multiple circuits to raised access floor boxes, systems furniture feeds and or movable wall receptacles. Component’s wiring shall not be de-populated to impede future reconfigurations. System shall fit within a 1.75 inch tall cavity under a raised floor.

B. System Ratings: The system shall be UL 183 listed and certified to CSA 22.2 No. 203-M.

C. Connectors will be polarity keyed and shaped to prevent interconnection of electrically incompatible components.

2.03 COMPONENTS

* + 1. Home Run Cable: The cable shall be metal clad cable (type “MC”) consisting of multiple #10 AWG, THHN 90°C insulation. The cable type shall be UL listed and recognized as outlined in Article #334 of the latest edition of National Electrical Code.
		2. Main Distribution Box: A Main Distribution Box (MDB) with multiple ports (per project requirements) shall provide general-purpose and isolated-ground 3-phase, 120/208 volts power.
			1. The MDB shall include a home run as specified below. Ground conductors shall be added as required by National Electrical Code (NEC). An insulated green with yellow stripe grounding conductor shall be installed in the cable when an isolated-ground system is required.
			2. The MDB shall be constructed of cold-rolled steel conforming to ASTM A596. Minimum thickness shall be 16 gauge or 0.060+/-0.005, with powder-coated finish, tamper proof screwed covers, and four leg mounting supports. The 5- or 10-pin bulkhead connectors shall be secured by rivets. Output ports can be single or double port configurations.
			3. Each MDB shall be equipped with a mechanical type grounding lug for attachment of the equipment grounding conductor. The equipment grounding conductor shall be extended to each connector housing and connected to each ground pin position.
			4. The MDB shall be UL-listed and identified as such on each cover. The MDB shall be suitable for use in environmental air-handling spaces (plenums) in accordance with NEC 300.22(c). Compliance with this requirement shall be marked on the cover.
			5. Each cover of the MDB shall have a label indicating the circuit number at each bulkhead connector.
		3. Secondary Distribution Box
			1. Secondary Distribution Box (SDB) with multiple ports (per project requirements) shall provide general-purpose and isolated-ground 3-phase, 120/208 volts power. Ground conductors shall be added as required by National Electrical Code (NEC).
			2. The SDB shall be constructed of cold-rolled steel conforming to ASTM A596. Minimum thickness shall be 16 gauge or 0.060+/-0.005, with powder-coated finish, tamper proof screwed covers, and four leg mounting supports. The 5- or 10-pin bulkhead connectors shall be secured by rivets. Output ports can be single or double port configurations.
			3. Each SDB shall be equipped with a mechanical type grounding lug for attachment of the equipment grounding conductor. The equipment grounding conductor shall be extended to each connector housing and connected to each ground pin position.
			4. The SDB shall be UL listed and identified as such on each cover. The SDB shall be acceptable for use in air-handling spaces other than ducts or plenums in accordance with NEC 300.22(c). Compliance with this requirement shall be marked on the cover.
			5. Each cover of the SDB shall have a label indicating the circuit number at each bulkhead connector.

D. Extender Cables

* + - 1. Extender cables, as required, shall interface with the Main Distribution Box and feed to the Secondary Distribution Boxes.
			2. Extender cables shall be type “MC” consisting of 90° C insulated, #12 AWG solid copper conductors, accompanied by a #12 AWG solid copper ground conductor.
			3. The extender cable shall have line side (power out) and load side (power in) connectors. The connectors shall be capable of having 5 pins for the distribution of 3-phase, 4 wire, 120/208 volt general-purpose power or 10 pins for the distribution of both 3-phase, 4 wire, 120/208 volt general-purpose and isolated-ground power.
			4. The contacts shall be male pin and female receptacle type with minimum conductivity of .60. The contacts shall be manufactured of .016 tinned copper alloy #194. Contacts of pin connectors shall conform to MIL-STD-202, 204 Condition A, and 213 Condition A to ensure durability and UL 486A for crimp retention force.
			5. The plastic that encases the contacts shall be #241, manufactured by Sabic with a UL standard rating of 94V2. The plastic shall be keyed differently to prevent mismatching of system voltages and uses.
			6. The plastic shall be color coded to identify voltage and use.

a. Clear – 120/208V General-purpose Power

b. Orange - 120/208V Isolated-ground Power

* + - 1. The latching mechanisms shall be of a different design so that engagement of dissimilar voltages is not possible.
			2. Labels shall be permanently attached to both the load (power in) side connector and the line (power out) side connector. The labels shall be color coded to differentiate the general-purpose power and the isolated-ground power.
			3. Whip end extender cables shall extend from the Secondary Distribution Boxes to individual convenience power modules.
			4. Whip end extender cables shall be type “MC” consisting of 90°C insulated, #12 AWG solid copper conductors, accompanied by a #12 AWG solid copper ground conductor.
			5. The whip end extender cable shall have a load side (power in) connector. The connector shall be capable of having 5 pins for the distribution of 3-phase, 4 wire, 120/208 volt general-purpose power or 10 pins for the distribution of both 3-phase, 4 wire, 120/208 volt general-purpose and isolated-ground power.
			6. The line side (power out) conductors extending into the convenience power module for hardwire connection shall be eight inches in length.
			7. The contacts for the load side (power in) shall be male pin type with minimum conductivity of 60% IACS (International Annealed Copper Standard). The contacts shall be manufactured of .016 tinned copper alloy #194. Contacts of pin connectors shall conform to MIL-STD-202, 204 Condition A, and 213 Condition A to ensure durability and UL 486A for crimp retention force.
			8. The plastic that encases the contacts shall be #241, manufactured by Sabic with a UL94 flamability rating of V2. The plastic shall be keyed differently to prevent mismatching of voltages.
			9. The plastic shall be color coded to identify voltage and use.
1. Clear – 120/208V General-purpose Power
2. Orange - 120/208V Isolated-ground Power
	* + 1. The latching mechanism shall be of a different design so that engagement of dissimilar voltages is not possible.
			2. A label shall be permanently attached to the load side (power in) side connector. The label shall be color coded to differentiate the general-purpose power and the isolated-ground power.

E. Access Floor Modules

* + - 1. The Access Floor Module shall be designed for use in the open office environment. It shall provide power and telecom outlets in a raised floor. The Access Floor Module shall have a square shape to allow repositioning to any of four orientations without modification of the module or floor panel. The dual compartment enclosure shall be fitted with a variety of industry standard power receptacles and telecommunications interconnect modules. The basic configuration shall provide device mounting positions for two to five duplex receptacles in the power side of the box. A variety of mounting positions shall be provided on the low voltage telecommunication side of the box. No tools shall be required to install the Access Floor Module in the floor. The box shall be pre-wired with the specified electrical devices at the factory and tested for continuity and highpot before shipping.
			2. The body of the Access Floor module shall be fabricated using welded 0.0625 inch minimum thickness electro-galvanized steel. The 10” x 10” (nominal) AFM unit shall fit into a 10.5” x 10.5” cutout in a raised floor panel. The unit shall be secured in place with two hinged wing lugs that are deployed using thumb screws.
			3. The hinged cover shall be available in two configurations. The standard cover for the 10” x 10” (nominal) AFM units shall be constructed from powder-coated steel and shall feature a recess to accept a carpet insert or a powder-coated steel insert. Two cable exit ports shall be provided in each cover and lock in the open position to provide crush protection for cables.
			4. The standard Access Floor Module shall include a mounting plate for at least one duplex general purpose power receptacle and one isolated ground duplex power receptacle. The mounting plate shall hold up to five duplex power receptacles, depending on the Access Floor Module model.
			5. Power to the Access Floor Module shall be provided via a Global IFS standard Whip End Extender modular wiring cable. The whip extender shall be manufactured from type MC cable, AC cable, or FMC flex and shall be equipped with a listed connector to fit a ½” knockout. The conductors extending into the Access Floor Module for connection to the devices shall be 90°C insulated type THHN #12 AWG solid copper.
			6. All whip extenders shall be rated for use on 20-ampere branch circuits. Each whip extender shall be keyed and color-coded to indicate the operating voltage and voltage system.
			7. The standard Access Floor Module shall be designed to also accommodate termination of fiber optic and copper cable pairs with industry standard connectors. It shall provide wire management for slack storage and routing for optical fibers and jacketed copper cables. Slack storage configuration shall be arranged so that fiber and copper pairs are allowed no less than a 1.5-inch bend radius. The standard configuration shall include a mounting plate with the capability to mount at least four MJ45 modular jacks or fiber couplers used for voice and data.
			8. Alternate mounting configurations shall be available for fiber and copper jack combinations.

F. Custom Products

* + - 1. The Main Distribution Box and Secondary Distribution Box described in the Standard Products section shall also be available as customized products. These units shall be deliverable with a size and port count capacity different from the standard capacities. The associated horizontal cabling shall be provided to support the customized product.

# PART 3 - EXECUTION

3.01 INSPECTION

* + 1. Examine the subfloor which is to receive access flooring for dryness, cleanliness, unevenness, or any irregularities that will affect the quality of the access flooring.
			1. Verify that material storage and installation areas are at recommended temperature and relative humidity before, during and after installation.
			2. Verify that access floor is level to within 1/8” (3mm) in 10 feet (3m).
		2. Do not commence installation of access flooring until subfloor is clean and dry, temperature controlled, and protected from the weather.

3.02 INSTALLATION

A. Install the complete modular wiring system in accordance with manufacturer’s recommendations and system design drawings.

B. Coordinate with the general contractor or owner so as not to interfere with other work in progress.

END