# PART 1 – GENERAL

## 1.1 SECTION INCLUDES

A. Low-voltage, 3-phase, integral horsepower electronically commutated motor systems with integrated variable frequency drives

## 1.2 REFERENCES

A. Division 01 for requirements for references and standards.

B. NFPA 70 – National Electrical Code.

## 1.3 REGULATORY REQUIREMENTS

A. Conform to UL 1004-7 Standard for Electronically Protected Motors.

B. Conform to UL 1004-1 Rotating Electrical Machines – General Requirements.

C. Conform to CSA C22.2 No.77 Motors with Inherent Overheating Protection.

D. Conform to UL 61800-5-1 Standard for Adjustable Speed Electrical Power Drive Systems,

Part 5-1: Safety Requirements & Electrical, Thermal and Energy.

E. Installation shall conform to NFPA 70 and local energy code.

F. Confirm to IEEE 519-2022

## 1.4 DELIVERY, STORAGE, AND PROTECTION

A. Division 01 for transport, handling, storage, and protection of products.

B. Protect motor systems stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motor systems from equipment and store separately.

# PART 2 – PRODUCTS

## 2.1 MOTOR SYSTEMS

A. Acceptable Manufacturers:

1. Infinitum.

## 2.2 GENERAL CONSTRUCTION AND REQUIREMENTS

A. Description: Axial flux air-core permanent magnet synchronous motor system with an integrated variable frequency drive capable of Active Front End AFE and non-AFE drives.

1. Motor systems with AFE shall be IEEE519 compliant

2. It shall be possible to turn ON and OFF the AFE function using MODBUS commands

3. Motor system with AFE shall support internal cooling fans for enhanced protection

B. Furnish motor systems either separately or as an integral part of mechanical system. Horsepower, speed, and torque characteristics shall be coordinated with the manufacturer of the driven piece of equipment.

1. Motor systems shall be selected such that the brake horsepower (BHP), including drive losses of the driven equipment, does not exceed the motor nameplate at design conditions.

C. Efficiency: Motor system efficiency meets or exceeds AMCA 207 efficiency requirements.

D. Temperature Rise: Match insulation rating.

E. Insulation: Class B, capable of withstanding maximum operating temperature of 150 deg C.

F. Bearings: Hybrid ceramic bearings.

G. Stator: Printed circuit board (PCB) stator, FR4 material, with etched copper traces.

H. Rotor: Two (2) disc-shaped rotors containing permanent magnets.

I. IP rating: Default IP rating shall be IP65

J. Enclosure: Motors shall be Totally Enclosed Fan Cooled (TEFC).

K. Enclosure Material: Cast aluminum housing.

L. Mounting Types: C-face and peripheral mount.

M. Motor systems shall have threaded holes for eyebolts used for lifting.

N. Integrated VFD shall be generally field replaceable and serviceable.

O. Motor system shall support Modbus RTU, 0-10 VDC analog signal, 4-20 mA analog signal for speed control.

1. Option: BACnet MSTP.

P. Motor system shall support Modbus TCP (via RJ45), Modbus RTU, and USB connection for communication with motor control software.

Q. Motor system shall support Grounded Y, Corner Grounded Delta and High Resistance Ground infrastructure without the need for external equipment or wiring changes.

**2.3 MOTOR SYSTEM CHARACTERISTICS**

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3,300 feet above sea level.

1. A 9% power derate shall be applied per 1,000 m up to 4,000 m of altitude above sea level.
2. A 2% power derate shall be applied per 1 deg C up to 50 deg C ambient temperature.

B. Capacity and Torque Characteristics: Motor systems shall be selected such that the motor system is sufficient to start, accelerate, and operate connected loads at designated speeds,

at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

C. The service factor shall be 1.0.

### 2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors driven by a VFD shall not continuously operate at speeds that exceed nameplate RPM rating.

B. Motors driven by a VFD shall be provided with internal shaft grounding to protect bearings from shaft currents.

C. Motor system shall support at least two (2) Digital Inputs and four (4) Digital Outputs in addition to a relay for faults.

## PART 3 – EXECUTION

A. Install in accordance with manufacturer's recommendations.

B. Store motor systems and components in clean, dry place. Protect from weather, dirt, water, construction debris, and physical damage in accordance with manufacturer's instructions.