MARATHON ELECTRIC

SUGGESTED SPECIFICATION

MAGNAMAX GENERATORS

140 – 2370 KW

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Marathon Electric

1. General

The generator shall be manufactured by Marathon Electric Manufacturing Corporation and of the MagnaMAX DVR design. It shall meet all requirements of NEMA MG-1, Parts 16 and 22, in design, performance and factory test procedures. The generator and regulator will be C.S.A. listed. The regulator shall be factory wired and tested with the generator.

2. Capacity

The generator shall be rated _____kW, _____ kVA, _____ Hertz, _____ RPM, ____ phase, and _____ lagging power factor. The voltage output shall be _____ volts, _____ wire.

3. Construction and Bearings

Cast iron end brackets and fabricated steel frames shall be used. The unit shall be fully guarded per NEMA MG-1-1.25.4.

Bearings shall be pre-lubricated, double shielded, ball type with provisions for adding and/or changing grease through extended supply and relief tubes. Minimum B-10 bearing life shall be 40,000 hours for single bearing units.

4. PMG Excitation System

The generator shall be equipped with a 300/250 Hz permanent magnet generator excitation system. Both the PMG and the rotating brushless exciter shall be mounted outboard of the bearing. The system shall supply a minimum short circuit support current of 300% of the rating (250% for 50 hertz operation) for 10 seconds. The rotating exciter shall use a three phase full wave rectifier assembly with hermetically sealed silicon diodes protected against abnormal transient conditions by a multi-plate selenium surge protector. The diodes shall be designed for safety factors of 5 times voltage and 3 times current.

5. Insulation System

The insulation system of both the rotor and stator shall be of NEMA Class H materials or better and shall be synthetic and non-hygroscopic. The stator winding shall be given multiple dips and bakes of varnish, plus a final coating if epoxy for extra moisture and abrasion resistance. The rotor shall be layer wound with thermosetting 100% solids epoxy between each layer, plus a final coating of epoxy for moisture and abrasion resistance.

6. Main Rotor

The main rotating field shall be of Unirotor® construction, consisting of one piece, four pole laminations. Dovetails, cross bolts and other pole to shaft connection means are not acceptable. In addition, the amortisseur winding and field pole coil supports shall be integrally die cast with the rotor laminations to form a unitized rotor core. Fabricated and welded or brazed amortisseur windings and coil supports are not acceptable. The rotor core shall be shrunk fit and keyed to the shaft.

The rotating assembly shall be dynamically balanced to less than 2 mils – peak to peak – displacement, and shall be designed to have an overspeed withstand of 125% of rated speed for 15 minutes when operating at stable rated operating temperature.

7. Stator Winding

The stator winding shall be of 2/3 pitch design to eliminate the third harmonic and shall incorporate a one slot skew to minimize slot harmonics. Windings shall be random wound and lashed at the endturns to provide superior mechanical strength.

8. Temperature Rise

The temperature rise of both the rotor and stator shall be measured by the resistance method and shall be in accordance with the applicable sections of NEMA MG-1, Parts 16 and 22, BS-5000, or C.S.A. C22.2 for the type of service intended.

9. Voltage Regulator

The DVR2000 voltage regulator shall be a digital, microprocessor design with solid state voltage build-up. No voltage build-up relay or other relays are acceptable. The unit shall be encapsulated for humidity and abrasion protection. The regulator shall include ¼% regulation, true volts per hertz operation with adjustable cut in, loss of sensing continuity shutdown, overexcitation shutdown, three phase RMS sensing, overvoltage protection, and provisions for parallel operation.

10. Performance

The voltage regulation shall be ¼% from no load to full load and 5% frequency variation. Regulator drift shall be less than ½% per 72°F (40°C) ambient temperature changes. The voltage regulator shall be a static-type using non-aging silicon controlled rectifiers, with electromagnetic interference suppression to MIL-STD-461C, part 9, when mounted in the generator conduit box.

Voltage dip shall not exceed ____% upon application of full continuous rated load with recovery to steady state band conditions within ____ seconds as measured on a light beam recorder.

The waveform harmonic distortion shall not exceed 5% total RMS measured line to line at full rated load. The TIF factor shall not exceed 50.

11. Ventilation

The generator shall be self-ventilated and have a one-piece, cast aluminum alloy, unidirectional internal fan for high volume, low noise air delivery.

12. Conduit Box

Load connections shall be made in the front end mounted conduit box. The generator construction will allow connection to the load through the top, bottom or either side of the conduit box.

The conduit box shall be constructed of heavy gauge sheet steel, capable of supporting up to 240 pounds of accessory control equipment. The conduit box shall contain two compartments; one housing the rotating rectifier and PMG; and the other the connection area and regulator. This is to separate the rotating elements from the load connection and voltage regulator adjustments.

The regulator shall be mounted on the inside of the conduit box panel allowing access to adjust the regulator through a swinging dust cover from the outside of the conduit box, therefore avoiding the high voltage generator terminals on the inside of the conduit box.

13. Verification of Performance

All certified performance and temperature rise test data submitted by the generator manufacturer shall be the result of the actual test of the same or duplicate generators. Temperature rise data shall be the result of loaded, rated power factor heat runs at the rated voltage and hertz. All performance testing shall be done in accordance with MIL-STD-705 and/or IEEE Standard-115.