NEMA MG 10011-2024

Power Index Calculation Procedure—Standard Rating Methodology for Motors, Power Drive Systems, and Complete Drive Modules

Published by

National Electrical Manufacturers Association
1300 North 17th Street, Suite 900
Rosslyn, Virginia 22209

www.nema.org

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Contents

Figures

Tables

Foreword

This standard establishes a calculation procedure for use on fixed speed induction, synchronous, and inverter-only motors in standalone configurations and as part of a power drive system.

This metric provides a means to compare the relative energy savings of motors (both fixed and variable speed) to a standard baseline motor. For polyphase equipment, this is a premium efficient direct on line motor (i.e., IE3 equivalent). This metric provides a rank ordering and a conservative estimate of energy savings relative to a single speed baseline product.

NEMA MG 10011-2024 supersedes and replaces NEMA MG 10011-2022.

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The first edition of this standard was developed jointly by Northwest Energy Efficiency Alliance (NEEA) and the NEMA Motors and Generators Section. The current edition was developed in collaboration with NEEA, Alliance Standards Awareness Project, technical experts representing the California IOUs, CADEO Group, and the NEMA Motors and Generators Section. At the time of publication, this section was composed of the following members:

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1 Scope

1.1 Included Products

This test procedure applies to polyphase and single-phase electric motors that are in scope of 10 CFR Part 431 *Subparts B, X and Z* ("covered electric motor"),[1] where not additionally excluded in Section 1.3.

In addition, the scope includes only electric motors with rated speed at full load as specified in Section 1.2.

This scope of products is split into the two following groups:

1.1.1 Group 1—Synchronous and Inverter Only Electric Motors

Group 1 includes covered electric motor(s) that meet the characteristics in Section 1.1 and meet the definition of inverter-only or synchronous motors in Section 3.

1.1.2 Group 2—Fixed Speed and Inverter Capable Electric Motors

Group 2 includes all covered electric motor(s) meeting these characteristics defined in Section 1.1, other than synchronous and inverter only electric motors in Group 1.

1.2 Electric Motor Rated Speed Limits and Speed Groups

Synchronous electric motors have no scope limitations on pole count and are categorized into baseline groups (see Section 4.2) by the rated speed of the motor compared with the IEC TS 60034-30-2 reference speed ranges, shown below in Table 1. Synchronous motors within scope must be within the lowest and highest allowable rpm in the table, which are 250 and 5400 rpm, respectively.

All other electric motors (e.g., induction motors) within scope must have a rated speed (i.e., nameplate, including slip) less than the maximum rpm provided in Table 1 for that pole count, and rated frequency at rated speed less than or equal to the parenthetical value for that pole count. Pole counts outside of 2 through 8 poles are exempt from scope.

[1] (A)(1) polyphase electric motors, (2) between 0.25 and 750 Horsepower (HP), (3) between 90 Volts and 600 Volts, (4) 2,4,6 or 8 poles, (5) in a standard NEMA or IEC frame, (6) rated for at least one continuous duty or continuous operation rating and, (7) in standard enclosures and IP ratings, or (B)(1) single-phase electric motors, (2) between 0.25 and 5 HP, also meeting criteria (A)(3-7).