NEMA Standards Publication

NEMA ICS 7.1-2014

Standard for Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems

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National Electrical Manufacturers Association

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Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems

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Foreword

In the preparation of this standards publication, input of users and other interested parties has been sought and evaluated.

It is general knowledge that the misuse of electricity is potentially hazardous and may create risks to personnel and property. In addition to shocks or burns from direct contact with live parts, the risks may also include: 1) fire resulting from over loads, faulty wiring, or faulty equipment and 2) injuries resulting from erratic machine operation. The degree of hazard can be greatly reduced by proper design, construction, selection, installation, and use, but hazards cannot be completely eliminated. The reduction of hazard should be the joint responsibility of the user and the manufacturers of: 1) the driven equipment 2) the motor or motors and 3) the electrical equipment for supplying and controlling the power for the motor or motors.

Since any electrical equipment can be installed or operated in such a manner that hazardous condition can occur, compliance with this publication does not by itself assure a safe installation. However, when equipment complying with this publication is properly selected with respect to the driven load and environment and is installed in accordance with the *National Electric Code*®, the potential hazards to persons and property will be reduced.

The importance of communication between manufacturer and user cannot be overemphasized. The chances for preventing hazardous incidents and limiting their consequences are greatly improved when both user and manufacturer are correctly and fully informed with respect to the intended use and all environmental and operating conditions.

The purpose and scope of this Standards Publication are given on page 1. The book consists of the following clauses:

- Clause 1—Defines the scope of the standard, lists the referenced standards, and defines terms.
- Clause 2—Defines construction details which contribute to safety. It is intended to assist the electrical manufacturer to design and build equipment with features which will reduce hazards and also to assist the user and the manufacturer of the driven equipment in the selection of electrical equipment which has been designed and built to include features that contribute to safety.
- Clause 3—Sets forth test requirements.
- Clause 4—Intended to guide the user and the manufacturer of the driven equipment in the proper selection, installation, and operation of adjustable-speed drive systems. Since the reduction of hazards depends greatly on how equipment is selected, installed and used, this section points out possible hazards and suggests ways and means to reduce them.

ICS 7.1-2014 supplements NEMA ICS 7-2014 *Industrial Control and Systems: Adjustable Speed Drives*.

The purpose of this standards publication is to define the construction and test requirements for adjustable-speed drive systems and to provide recommendations for their selection, installation, and operation in such a manner as to provide for the practical safeguarding of persons.

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NEMA standards publications are subject to periodic review. They are revised frequently to reflect user input and to meet changing conditions and technical progress. Users should secure the latest editions.

Comments will be welcomed. Proposed revisions to this standards publication should be submitted to:

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This standards publication was approved by the NEMA Industrial Automation Control Products and Systems Section. Section approval of this standard, however, does not necessarily imply that all section members voted for its approval or participated in its development. At the time this standard was approved, the Industrial Automation Control Products and Systems Section consisted of the following members:

ABB Inc.—Raleigh, NC
Bluffton Motor Works-Bluffton, IN
CARLO GAVAZZI, INC.—Buffalo Grove, IL
Cummins, Inc.—Minneapolis, MN
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Delta Products Corporation-Research Triangle Park, NC
Eaton—Milwaukee, WI
Electro Switch Corporation—Weymouth, MA
Elliott Control Company, Ltd.-Willis, TX
Emerson Electric Co.—Saint Louis, MO
GE—Fairfield, CT
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Omron Electronics LLC—Hoffman Estates, IL
Phoenix Contact, Inc.—Middletown, PA
Post Glover Resistors, Inc.—Erlanger, KY
Reliance Controls Corporation—Racine, WI
Rockwell Automation—Milwaukee, WI
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Schneider Electric—Palatine, IL
SEW-Eurodrive, Inc.—Lyman, SC
Siemens Industry, Inc.—Norcross, GA
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Section 1
GENERAL

1.1 SCOPE

These standards apply to all industrial equipment electrical components and wiring which are parts of the electrical drive system, commencing at the point of connection of input power to these components. They apply to open or enclosed electrical equipment for use on circuits which operate from an alternating-current supply voltage of 600 volts or less.

These standards are intended for industrial equipment which will be installed in accordance with the *National Electrical Code*® and the manufacturer's instructions. They are not considered adequate for industrial equipment intended for use in locations which are designated as hazardous in the *National Electrical Code*®.

These standards are generally applicable, but there may be situations where a conflict with other safety measures or operational requirements will necessitate that these standards be modified.

Excluded from this publication are:

a. Portions, subassemblies, or parts of motors or controllers to be used in the manufacture of more complete controllers or drive systems

b. Main propulsion equipment for railroad and transit locomotive cars

c. Automotive equipment

d. Equipment for airborne or aerospace craft

e. Equipment for household use

f. Equipment built to military specifications which conflict with or override the provisions of this publication

g. Additional specific features required for use under unusual service conditions, in locations involving hazardous atmospheres and hazardous projects

h. Systems for processes using electricity for purposes other than supplying and controlling electric motors

i. Drive systems rated less than 1/4 horsepower

j. Drive systems for portable tools

k. Industrial electric trucks

l. Passenger elevators or moveable walkways or lifts

m. Marine equipment

1.2 DEFINITIONS

Refer to ICS 7, Part 1 for equipment definitions.

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