NEMA Standards Publication ICS 61800-6 TR-2015

Adjustable Speed Electrical Power Drive Systems Part 6: Guide for Determination of Types of Load Duty and Corresponding Current Ratings

Published by:

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

www.nema.org

© 2015 National Electrical Manufacturers Association. All rights, including translation into other languages, reserved under the Universal Copyright Convention, the Berne Convention for the Protection of Literary and Artistic Works, and the International and Pan American copyright conventions.

NOTICE AND DISCLAIMER

The information in this publication was considered technically sound by the consensus of persons engaged in the development and approval of the document at the time it was developed. Consensus does not necessarily mean that there is unanimous agreement among every person participating in the development of this document.

NEMA standards and guideline publications, of which the document contained herein is one, are developed through a voluntary consensus standards development process. This process brings together volunteers and/or seeks out the views of persons who have an interest in the topic covered by this publication. While NEMA administers the process and establishes rules to promote fairness in the development of consensus, it does not write the document and it does not independently test, evaluate, or verify the accuracy or completeness of any information or the soundness of any judgments contained in its standards and guideline publications.

NEMA disclaims liability for any personal injury, property, or other damages of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, application, or reliance on this document. NEMA disclaims and makes no guaranty or warranty, expressed or implied, as to the accuracy or completeness of any information published herein, and disclaims and makes no warranty that the information in this document will fulfil any of your particular purposes or needs. NEMA does not undertake to guarantee the performance of any individual manufacturer or seller's products or services by virtue of this standard or guide.

In publishing and making this document available, NEMA is not undertaking to render professional or other services for or on behalf of any person or entity, nor is NEMA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. Information and other standards on the topic covered by this publication may be available from other sources, which the user may wish to consult for additional views or information not covered by this publication.

NEMA has no power, nor does it undertake to police or enforce compliance with the contents of this document. NEMA does not certify, test, or inspect products, designs, or installations for safety or health purposes. Any certification or other statement of compliance with any health- or safety-related information in this document shall not be attributable to NEMA and is solely the responsibility of the certifier or maker of the statement.

Foreword

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this technical report may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 61800-6, which is a technical report, has been prepared by subcommittee 22G: Semiconductor power converters for adjustable speed electric drive systems, of IEC technical committee 22: Power electronics systems and equipment.

This first edition cancels and replaces IEC 61136-1, issued in 1992, and constitutes a technical revision.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
22G/85/DTR	22G/100/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

Contents

For	eword			i	
1	Scope	Scope and Object1			
	1.1	.1 DV (US DEVIATION)			
	1.2	NORM	ATIVE REFERENCES	1	
	1.3	DV		. 1	
2	Term	rms, Definitions, and Symbols			
	2.1	TERMS AND DEFINITIONS			
	2.2	SYMBO	DLS	5	
3	Ratec	l Values		6	
	3.1	GENEF	RAL	6	
3.2 SYSTEM OF ESTABLISHING RATED CURRENT-TIME VALUES FOR SEMICONDUCTOR ASSEMBLIES AND EQUIPMENTS			M OF ESTABLISHING RATED CURRENT-TIME VALUES FOR ONDUCTOR ASSEMBLIES AND EQUIPMENTS	.7	
		3.2.1	General	7	
		3.2.2	Rated Current of a Common Converter Transformer	7	
		3.2.3	Rated Values of a Double Converter	.7	
		3.2.4	Determination of Type of Load Duty	7	
	3.3	RATED	CURRENTS FOR EQUIPMENTS AND SECTIONS	7	
		3.3.1	General	7	
		3.3.2	Rated Currents for Uniform Load Duty	8	
		3.3.3	Rated Currents for Intermittent Peak Load Duty	8	
		3.3.4	Rated Currents for Intermittent Load Duty	8	
		3.3.5	Rated Currents for Intermittent Load Duty with No-Load Intervals	8	
		3.3.6	Rated Currents for Repetitive Load Duty	8	
		3.3.7	Rated Currents for Non-Repetitive Load Duty	9	
	3.4	OVERLOAD AND SURGE CURRENT CAPABILITY11			
4	Duty (Classes for Non-Repetitive Load Duty11			
Figures					
Figure 1 Typical Current-Time Chart for Uniform Load Duty2					
Figure 2 Typical Current-Time Chart for Intermittent Peak Load Duty2					
Figure 3 Typical Current-Time Chart for Intermittent Load Duty					
Figure 4 Typical Time Chart for Intermittent Load Duty with No-Load Intervals					
Figure 5 Example of Current-Time Chart for Repetitive Load Duty					
Figure 6 Typical Current-Time Chart for Non-Repetitive Load Duty 4					
Figure 7 Equivalent Repetitive Load Duty Load-Time Chart					
Figure 8 Typical Rating Curves for Non-Repetitive Load Duty					
Tah		st of Svr	nhols	5	
Table 2 Duty Cleases for Non Depotitive Industrial Applications					
1.90	Table 2 Duty Classes for Non-Repetitive industrial Applications				

1 Scope and Object

This technical report provides alternative methods for specifying ratings for adjustable speed electrical power drive systems (PDS) and, in particular, their basic drive modules (BDM).

It is not intended to cover adjustable speed drives for traction purposes.

General rules for rating specification for low voltage adjustable speed d.c. power drive systems are contained in IEC 61800-1, and for low voltage adjustable frequency a.c. power drive systems in IEC 61800-2.