SLOVENSKI STANDARD

SIST-TS CLC/TS 60034-25:2006

januar 2006

Rotacijski električni stroji – 25. del: Smernice za konstrukcijo in karakteristike asinhronskih motorjev s kratkostično kletko, posebej narejenih za napajanje s pretvornikom

(istoveten CLC/TS 60034-25:2005)

Rotating electrical machines – Part 25: Guide for the design and performance of cage induction motors specifically designed for converter supply

ICS 29.160.30

Referenčna številka
SIST-TS CLC/TS 60034-25:2006(en)

TECHNICAL SPECIFICATION

SPECIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CLC/TS 60034-25

October 2005

ICS 29.160

English version

Rotating electrical machines
Part 25: Guide for the design and performance of cage induction motors specifically designed for converter supply

Drehende elektrische Maschinen
Teil 25: Leitfaden für den Entwurf und das Betriebsverhalten von Induktionsmotoren mit Käfigläufer, die speziell für Umrichterbetrieb bemessen sind

This Technical Specification was approved by CENELEC on 2005-06-04.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. CLC/TS 60034-25:2005 E

Foreword

The text of the Technical Specification IEC/TS 60034-25:2004, prepared by IEC TC 2, Rotating machinery, was submitted to the formal vote and was approved by CENELEC as CLC/TS 60034-25 on 2005-06-04.

The following date was fixed:

– latest date by which the existence of the CLC/TS has to be announced at national level (doa) 2005-12-04

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the Technical Specification IEC/TS 60034-25:2004 was approved by CENELEC as a Technical Specification without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60034-1	- [1)]	Rotating electrical machines Part 1: Rating and performance	EN 60034-1	2004 [2)]
IEC 60034-2 + IEC 60034-2A	1972 1974	Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)	EN 60034-2	1996
A1	1995		A1	1996
A2	1996		A2	1996
IEC 60034-6	- [1)]	Part 6: Methods of cooling (IC Code)	EN 60034-6	1993 [2)]
IEC 60034-9 (mod)	- [1)]	Part 9: Noise limits	EN 60034-9	2005 [2)]
IEC 60034-14	- [1)]	Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity	EN 60034-14	2004 [2)]
IEC/TS 60034-17	- [1)]	Part 17: Cage induction motors when fed from converters - Application guide	CLC/TS 60034-17	2004 [2)]
IEC 61800-2	- [1)]	Adjustable speed electrical power drive systems Part 2: General requirements - Rating specifications for low voltage adjustable frequency a.c. power drive systems	EN 61800-2	1998 [2)]
IEC 61800-3	- [1)]	Part 3: EMC requirements and specific test methods	EN 61800-3	2004 [2)]
IEC 61800-5-1	- [1)]	Part 5-1: Safety requirements - Electrical, thermal and energy	EN 61800-5-1	2003 [2)]

[1)] Undated reference.

[2)] Valid edition at date of issue.

TECHNICAL SPECIFICATION

IEC TS 60034-25

First edition
2004-04

Rotating electrical machines –

Part 25: Guide for the design and performance of cage induction motors specifically designed for converter supply

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International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

Part 25: Guide for the design and performance of cage induction motors specifically designed for converter supply

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- The subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 60034-25, which is a technical specification, has been prepared by IEC technical committee 2: Rotating machinery.

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

Enquiry draft	Report on voting
2/1271/DTR	2/1288/RVC

Full information on the voting for the approval of this technical specification 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 2007. At this date, the publication will be

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

A bilingual edition of this Technical Specification may be issued at a later date.

INTRODUCTION

This introduction is intended to explain the aim of this part of IEC 60034.

Motor categories

There are 2 categories of cage induction motors, which can be applied in variable speed electric drive systems.

- Standard cage induction motors, designed for general purpose application. The design and performance of these motors are optimized for operation on a fixed-frequency sinusoidal supply. Nevertheless they are generally also appropriate for use in variable speed drive systems.

  Guidance on this field of application is given in IEC 60034-17.

- Cage induction motors specifically designed for converter operation. The design and construction of such motors may be based on standard motors with standardized frame sizes and dimensions, but with modifications for converter operation.

  This category is covered by this part of IEC 60034, and it is recommended that the motor be marked with a reference to this part of IEC 60034.

Motors for converter supplies greater than 1 000 V, or for converters other than voltage source, will be considered in later editions of this part of IEC 60034.

Incorporation of the motor into the power drive system

Figure 1 illustrates the Power Drive System (PDS). A PDS consists of a motor and a Complete Drive Module (CDM). It does not include the equipment driven by the motor. The CDM consists of a Basic Drive Module (BDM) and its possible extensions such as the feeding section or some auxiliaries (for example ventilation). The BDM contains converter, control and self-protection functions. The rating and performance of the complete PDS is covered in general by IEC 61800-2.

NOTE Figure 1 of IEC 61800-2 provides further details of the structure of a PDS.

The motor itself and additional specific requirements for its proper incorporation into the PDS are covered by the IEC 60034 series.

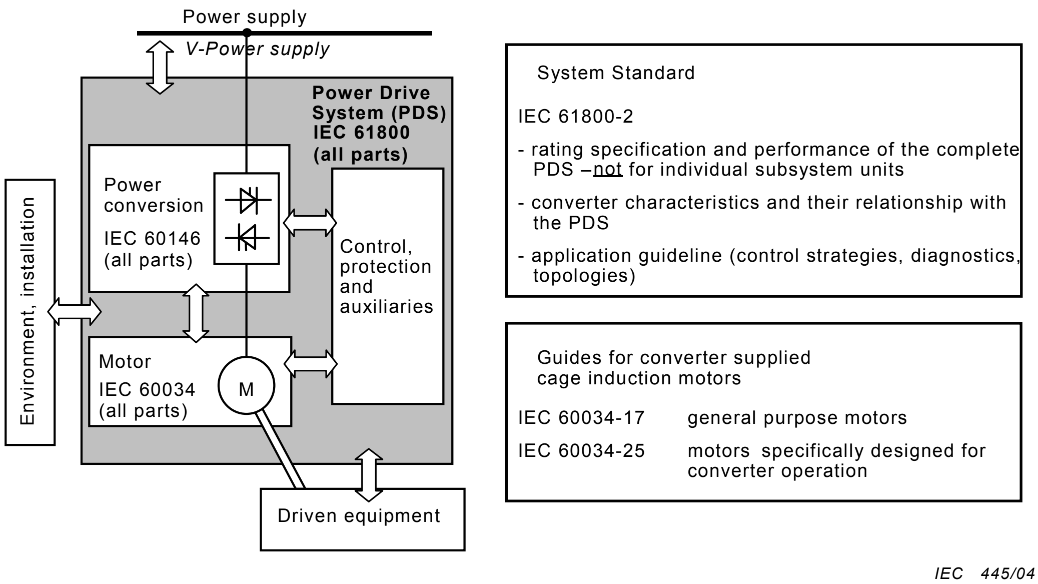

Figure 1 – Component parts of a PDS

ROTATING ELECTRICAL MACHINES –

Part 25: Guide for the design and performance of cage induction motors specifically designed for converter supply

1 Scope

This part of IEC 60034 describes the design features and performance characteristics of polyphase cage induction motors specifically designed for use on voltage source converter supplies up to 1 000 V. It also specifies the interface parameters and interactions between the motor and the converter including installation guidance as part of a power drive system.

NOTE 1 For motors operating in potentially explosive atmospheres, additional requirements as described in the IEC 60079 series apply.

NOTE 2 This technical report is not primarily concerned with safety. However, some of its recommendations may have implications for safety, which should be considered as necessary.

NOTE 3 Where a converter manufacturer provides specific installation recommendations, they should take precedence over the recommendations of this technical report.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-2:1972, *Rotating electrical machines – Part 2: Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)*
Amendment 1 (1995)
Amendment 2 (1996)

IEC 60034-6, *Rotating electrical machines – Part 6: Methods of cooling (IC Code)*

IEC 60034-9, *Rotating electrical machines – Part 9: Noise limits*

IEC 60034-14, *Rotating electrical machines – Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity*

IEC 60034-17, *Rotating electrical machines – Part 17: Cage induction motors when fed from converters – Application guide*

IEC 61800-2, *Adjustable speed electrical power drive systems – Part 2: General requirements – Rating specifications for low voltage adjustable frequency a.c. power drive systems*

IEC 61800-3, *Adjustable speed electrical power drive systems – Part 3: EMC product standard including specific test methods*

IEC 61800-5-1, *Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy*

3 Terms and definitions

For the purposes of this part of IEC 60034, the following terms and definitions apply.

3.1
bonding
electrical connection of metallic parts of an installation together and to ground (earth)

NOTE For the purposes of this part of IEC 60034, this definition combines elements of IEV 195-01-10 (equipotential bonding) and IEV 195-01-16 (functional equipotential bonding).

3.2
converter
operating unit for electronic power conversion, changing one or more electrical characteristics and comprising one or more electronic switching devices and associated components, such as transformers, filters, commutation aids, controls, protections and auxiliaries, if any

[IEC 61800-2, 2.2.1]

NOTE This definition is taken from IEC 61800-2, and for the purposes of this part of IEC 60034 embraces the terms Complete Drive Module (CDM) and Basic Drive Module (BDM) as used in the IEC 61800 series.

3.3
EMC (electromagnetic compatibility)
ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

[IEV 161-01-07]

3.4
field weakening
motor operating mode where motor flux is less than the flux corresponding to the motor rating

3.5
peak rise time
time interval between the 10 % and 90 % points of the zero to peak voltage (see Figure 14)

3.6
Power Drive System
PDS
system consisting of power equipment (composed of converter section, AC motor and other equipment such as, but not limited to, the feeding section), and control equipment (composed of switching control – on/off for example –, voltage, frequency, or current control, firing system, protection, status monitoring, communication, tests, diagnostics, process interface/ port, etc.)

3.7
protective earthing
PE
earthing a point or points in a system or in an installation or in equipment for the purposes of electrical safety

[IEV 195-01-11]

3.8
skip band
small band of operating frequencies where steady-state operation of the PDS is inhibited