

PRE-RELEASE VERSION (FDIS)

Rotating electrical machines – Part 11: Thermal protection

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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Attention IEC-CENELEC parallel voting

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The CENELEC members are invited to vote through the CENELEC online voting system.

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In addition to their evaluation as being acceptable for industrial, technological, commercial and user purposes, Final Draft International Standards may on occasion have to be considered in the light of their potential to become standards to which reference may be made in national regulations.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Rotating electrical machines – Part 11: Thermal protection

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NOTE FROM TC/SC OFFICERS:

I enclose the corrected version for submission.

CONTENTS

FOREWORD	3
INTRODUCTION	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Thermal protection limits	7
5 Protection against thermal overloads with slow variation	8
6 Protection against thermal overloads with rapid variation	9
7 Restart after tripping	11
8 Type tests	12
8.1 General	12
8.2 Verification of temperature due to the thermal overloads with slow variation	12
8.3 Verification of temperature due to thermal overloads with rapid variation	12
9 Routine tests	12
Figure 1 – Example of thermal overload with slow variation and direct thermal protection	8
Figure 2 – Example of thermal overload with slow variation in the case of too intensive intermittent periodic duty with starting (duty S4) and direct thermal protection	9
Figure 3 – Example of thermal overload with rapid variation where the thermally critical part has direct thermal protection	10
Figure 4 – Example of thermal overload with rapid variation where the thermally critical part has indirect thermal protection	11
Table 1 – Maximum winding temperatures for overloads with slow variation	8
Table 2 – Maximum winding temperatures for overloads with rapid variation	9

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

Part 11: Thermal protection

FOREWORD

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International Standard IEC 60034-11 has been prepared by IEC technical committee 2: Rotating machinery.

This third edition cancels and replaces the second edition, published in 2004. This edition constitutes a technical revision.

The main changes with respect to the previous edition are

- the additional specification of winding temperature limits for temperature class 200 (N),
- the increased limits of maximum winding temperatures for overloads with rapid variation,
- the clarification that the motor winding may be permanently damaged after it has been exposed to temperatures according to Table 2,
- a clarification of scope,
- a clarification of the definition of indirect thermal protection,
- a clarifying note in Clause 6,
- the conversion of note 3 in Clause 6 into normal text including changes in wording,

- the incorporation of note 3 in Clause 5 into Clause 2,
- a clarification on the test methods for larger motors in 8.3.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
2/XX/FDIS	2/XX/RVD

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

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

A list of all parts in the IEC 60034 series, published under the general title *Rotating electrical machines*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

Thermal protection systems are based on the principle of protecting or monitoring the vulnerable machine parts against excessive temperatures. This requires the selection of the appropriate thermal protection device to suit both the type of protection required and the machine component to be protected. This document does not detail the protection methods available or specify the protection method to be used for particular applications, but instead it specifies the temperature of the protected parts that should not be exceeded if a fault or machine abuse occurs.

The requirements are not intended to guarantee a "normal" machine life for all conditions of use, but rather to avoid both failure and accelerated premature thermal ageing of the winding insulation. The requirements result from a compromise, since the level of protection should neither be set so low that it causes nuisance tripping nor so high that it allows continuous working at temperatures that will seriously affect the life of the winding insulation.

Normal insulation life can only be ensured by correct motor application and maintenance. Frequent operation at above the normal temperature limits, see IEC 60034-1, which cannot be prevented by built-in thermal protection without risking nuisance tripping may lead to a noticeable reduction in machine life. The life of the winding insulation is approximately halved for every 8 K to 10 K increase in the continuous operating temperature.

The requirement to incorporate thermal protection in a machine is a matter for agreement. The application of this document is a matter of agreement between the user and the machine manufacturer.

ROTATING ELECTRICAL MACHINES –

Part 11: Thermal protection

1 Scope

This part of IEC 60034 specifies requirements relating to the use of thermal protectors and thermal detectors incorporated into the stator windings or placed in other suitable positions in induction machines in order to protect them against serious damage due to thermal overloads. It applies to single-speed three-phase 50 Hz or 60 Hz cage induction motors in accordance with IEC 60034-1 and IEC 60034-12 that:

- have a rated voltage up to 1 000 V;
- are intended for direct-on-line or star-delta starting.

Not included are:

- direct protection of the rotor winding; the methods of protection only protect rotor windings indirectly; for large motors (particularly 2 pole motors) and for motors starting large inertia loads, special attention is given to rotor heating both when starting and especially after a "trip" has occurred;
- the protection of bearings and other mechanical parts;
- the protection methods to be used for particular applications.

NOTE 1 Although temperature values given in this document are higher than those specified in IEC 60034-1, they are not in conflict.

NOTE 2 Additional requirements may apply to particular motor types, such as those used in household appliances, or for motors used in explosive atmospheres.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60034-1:2017, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-12:2016, *Rotating electrical machines – Part 12: Starting performance of single-speed three-phase cage induction motors*