TECHNICAL SPECIFICATION

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CLC/TS 60034-24

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English version

Rotating electrical machines -
Part 24: Online detection and diagnosis of potential failures at the active parts of rotating electrical machines and of bearing currents - Application guide
(IEC/TS 60034-24:2009)

Machines électriques tournantes -
Partie 24: Détection et diagnostic en ligne
de défaillances potentielles des parties
actives de machines électriques
tournantes et de courants de palier -
Guide d'application
(CEI/TS 60034-24:2009)

Drehende elektrische Maschinen -
Teil 24: Erkennung und Diagnose von
möglichen Schäden an den Aktivteilen
drehender elektrischer Maschinen und
von Lagerströmen -
Anwendungsleitfaden
(IEC/TS 60034-24:2009)

This Technical Specification was approved by CENELEC on 2011-01-25.

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CENELEC

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

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Foreword

The text of the Technical Specification IEC/TS 60034-24:2009, prepared by IEC TC 2, Rotating machinery, was submitted to the formal vote and was approved by CENELEC as CLC/TS 60034-24 on 2011-01-25.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following date was fixed:

– latest date by which the existence of the CLC/TS
  has to be announced at national level   (doa)   2011-07-25

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Endorsement notice

The text of the Technical Specification IEC/TS 60034-24:2009 was approved by CENELEC as a Technical Specification without any modification.

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INTRODUCTION

Progress in design and technology has resulted in an increasing reliability of rotating electrical machines, but failures could not be eliminated completely. Since the demand for a high availability is permanently increasing, it is essential to detect deficiencies at an early stage and to recognize the origin and identify the severity of the fault in order to estimate the risk of a continuation of operation.

It would be advantageous, if the signals which are obtained by the detection methods presented in this guide, were suitable to distinguish the different failures from each other. By this means, the signal analysis can be used as input data of a complete monitoring system.

The aim of this guide is to present possible tools which are available for the intended purpose and to explain their advantages and disadvantages. The minimum requirements which shall be met by the various sensors will be discussed, whereas the detailed design rules are outside the scope of this technical specification.

This guide deals with the detection of failures at the active parts of multi-phase rotating machines (all kinds of winding faults in stator and rotor, cage deficiencies, eccentricities) and of bearing currents.

ROTATING ELECTRICAL MACHINES –

**Part 24: Online detection and diagnosis of potential failures
at the active parts of rotating electrical machines
and of bearing currents –
Application guide**

1 Scope

This part of IEC 60034 is applicable to the on-line detection and diagnosis of failures at the active parts of multi-phase rotating electrical machines (induction and synchronous machines) and of bearing currents. The failure analysis includes:

– interturn faults;

– phase-to-phase short-circuits;

– double earth faults and single earth faults of motors with earth connection of the star-point;

– static and dynamic eccentricities;

– cage imperfection or defects (e.g. broken bars or end-rings);

– bearing currents.

This can be achieved by tools like search coils or other magnetic sensors or partly by the analysis of the terminal voltages and currents.

The detection of the following effects is excluded from the scope:

– vibration (covered by ISO standards, e.g. ISO 10816 and ISO 7919);

– partial discharge (covered by IEC 60034-27);

– single earth-faults of motors without earth connection of the star-point;

– core imperfection.

Also excluded are special methods applicable for specific applications only (e.g. turbo generators).

2 Normative references

There are no normative references in this technical specification.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

**3.1
distribution factor**
the factor, related to a distributed winding, which takes into account the reduction in the generated voltage due to the phase difference between the voltages generated in the coils in different slots

[IEV 411-38-37]