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AMENDMENT 1
2006-09

Amendment 1

Low-voltage switchgear and controlgear –

Part 8: Control units for built-in thermal protection (PTC) for rotating electrical machines

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

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FOREWORD

This amendment has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

The text of this amendment is based on the following documents:

FDIS	Report on voting
17B/1477/FDIS	17B/1504/RVD

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be:

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- withdrawn,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

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CONTENTS

Modify the title of Clause 3 to read:

3 Terms, definitions, symbols and abbreviations

Insert the following:

3.1 Terms and definitions

3.2 Symbols and abbreviations

Delete the following:

Annex C (informative) Verification requirements in circumstances requiring short-circuit detection in the sensor circuit

2 Normative references

Replace the reference to IEC 60034-11:1978 by the following:

IEC 60034-11:2004, *Rotating electrical machines – Part 11: Thermal protection*

Insert the following references:

IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27:1987, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*

Replace the reference to IEC 60417-DB:2000 by the following:

IEC 60417:2002, *Graphical symbols for use on equipment*

Replace, on page 13, the reference to IEC 60947-1:1999 by the following:

IEC 60947-1:2004, *Low-voltage switchgear and controlgear – Part 1: General rules*

Replace, on page 13, the reference to IEC 60947-5-1:1997 by the following:

IEC 60947-5-1:2003, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

Replace, on page 13, the reference to IEC 61000-4-3:2002 by the following:

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*

Replace, on page 13, the reference to IEC 61000-4-6:1996 by the following:

IEC 61000-4-6:2003, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*
Amendment 1 (2004)
Amendment 2 (2006)

Replace, on page 13, the reference to CISPR 11:1997 by the following:

CISPR 11:2003, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*
Amendment 1 (2004)

Replace, on page 13, the reference to CISPR 22:1997 by the following:

CISPR 22:2005, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*
Amendment 1 (2005)
Amendment 2 (2006)

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3 Terms and definitions

Replace the existing title by the following:

3 Terms, definitions, symbols and abbreviations

Insert, after the first paragraph, the following new title and the new alphabetical index:

3.1 Terms and definitions

Renumber definitions 3.1 to 3.25 as 3.1.1 to 3.1.25.

Add, on page 17, the following note to definition 3.1.15 "control unit":

NOTE The control unit may be part of other devices or systems.

3.1.17

Replace the term "**detector operating temperature TNF (nominal function temperature)**" *by* "**detector operating temperature (TNF)**"

3.1.18

Replace the term "**system operating temperature TFS (system function temperature)**" *by* "**system operating temperature (TFS)**"

Add, after definition 3.1.25, the following new subclause:

3.2 Symbols and abbreviations

EMC	Electromagnetic compatibility
I_e	Rated operational current (5.3.3)
I_{th}	Conventional free air thermal current (5.3.3)
PTC	Positive temperature coefficient
Q	Amplification factor (9.3.3.13.3)
TFS	System operating temperature (3.1.18)
TNF	Detector operating temperature (3.1.17)
U_e	Rated operational voltage (5.3.2)
U_i	Rated insulation voltage (5.3.2)
U_{imp}	Rated impulse withstand voltage (6.1)
U_r	Rated voltage of the detector circuit (6.1)
U_s	Rated control supply voltage (6.1)

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Add, on page 25, after the subclause 5.2.6, the following new subclause 5.2.7:

5.2.7 Short-circuit detection within the sensor circuit

Thermal detectors have a low resistance and therefore a special measure is necessary to recognize a reduction of the resistance to nearly zero by a short-circuit. For safety applications, or to increase the lifetime of a rotating electrical machine, it is useful to establish a short-circuit detection system within the sensor circuit. The safety of the thermal protection, in particular, is increased by such a short-circuit detection.

Such a short-circuit detection only identifies a short-circuit but it does not automatically cover a defined action. All following actions depend on the configuration of the control unit and the manufacturers application.

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8.2.10 Shock and vibration

Replace the existing text of this subclause by the following:

8.2.10.1 Shock

The control unit shall be tested in accordance with IEC 60068-2-27 with the following parameters.

Three positive and negative shocks shall be applied in each direction along three mutually perpendicular axes, with the device energized and de-energized.

Pulse shape: half-sine

Peak acceleration: 100 m/s^2

Duration of the pulse: 11 ms

8.2.10.2 Vibration

The control unit shall be tested in accordance with IEC 60068-2-6 with the parameters of Table 2, with the device energized and de-energized.

Table 2 – Vibration test parameters

Frequency range	Displacement	Acceleration
2^{+3}_{-0} to 13,2 Hz	±1mm	
13,2 Hz to 100 Hz		±0,7 *g*

8.2.11 Verification requirements in circumstances requiring short-circuit detection in the sensor circuit

Replace the existing title and text of this subclause by the following:

8.2.11 Requirements for short-circuit detection within the sensor circuit

When the control unit operates under normal conditions of service and the detector circuit is connected to the terminals of the control unit, the following conditions shall be met. Compliance shall be verified by tests specified in 9.3.3.12.

a) The control unit shall be switched on, or be able to be reset, when the resistance of the detector circuit is between X Ω and 750 Ω.

b) The control unit shall switch off as the resistance falls, before it reaches 10 Ω.

c) The control unit shall switch on, or be able to be reset, when the resistance of the detector circuit is increased, before it reaches X Ω.

d) There shall be no significant modification in the operation of the control unit when the capacitance of the detector circuit is not greater than 0,2 µF.

The value X shall be provided by the manufacturer of the control unit.

NOTE The resistance value of the PTC may be as low as 20 Ω.