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Low-voltage fuses –
Part 5: Guidance for the application of low-voltage fuses

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Low-voltage fuses –
Part 5: Guidance for the application of low-voltage fuses



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LOW-VOLTAGE FUSES –

Part 5: Guidance for the application of low-voltage fuses

FOREWORD

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IEC 60269-5 edition 2.1 contains the second edition (2014-03) [documents 32B/621A/DTR and 32B/624/RVC] and its amendment 1 (2020-12) [documents 32B/694/DTR and 32B/697A/RVDTR].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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IEC 60269-5, which is a technical report, has been prepared by subcommittee 32B: Low-voltage fuses, of IEC technical committee 32: Fuses.

This second edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) recommendations for fuse operations in high altitudes added

b) more details for operational voltages added

c) recommendations for photovoltaic system protection added

d) numerous details improved

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

A list of all parts of the IEC 60269 series, under the general title: *Low-voltage fuses*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability 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

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IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Fuses protect many types of equipment and switchgear against the effects of over-current which can be dramatic:

– thermal damage of conductors or bus-bars;
– vaporisation of metal;
– ionisation of gases;
– arcing, fire, explosion,
– insulation damage.

Apart from being hazardous to personnel, significant economic losses can result from downtime and the repairs required to restore damaged equipment.

Modern fuses are common overcurrent protective devices in use today, and as such provide an excellent cost effective solution to eliminate or minimize the effects of overcurrent.

LOW-VOLTAGE FUSES –

Part 5: Guidance for the application of low-voltage fuses

1 Scope

This technical report, which serves as an application guide for low-voltage fuses, shows how current-limiting fuses are easy to apply to protect today's complex and sensitive electrical and electronic equipment. This guidance specifically covers low-voltage fuses up to 1 000 V a.c. and 1 500 V d.c. designed and manufactured in accordance with IEC 60269 series. This guidance provides important facts about as well as information on the application of fuses.

2 Normative references

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

IEC 60050 (all parts), *International Electrotechnical Vocabulary*. Available from http://www.electropedia.org/

IEC/TR 60146-6, *Semiconductor convertors – Part 6: Application guide for the protection of semiconductor convertors against overcurrent by fuses*

IEC 60269 (all parts), *Low-voltage fuses*

IEC 60269-1:2006, *Low-voltage fuses - Part 1: General requirements*
IEC 60269-1:2006/AMD1:2009
IEC 60269-1:2006/AMD2:2014

IEC 60269-2, *Low-voltage fuses – Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) – Examples of standardized systems of fuses A to K*

IEC 60269-3, *Low-voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household or similar applications) – Examples of standardized systems of fuses A to F*

IEC 60269-4~~:2009~~, *Low-voltage fuses – Part 4: Supplementary requirements for fuse-links for the protection of semiconductor devices*

IEC 60269-6, *Low-voltage fuses – Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-43:2008, *Low-voltage electrical installations – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-5-52, *Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60947 (all parts), *Low-voltage switchgear and controlgear*

IEC 60947-3:~~2008~~2015, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 60947-4-1:2009, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*

IEC/TR 61912-1:2007, *Low-voltage switchgear and controlgear – Overcurrent protective devices – Part 1: Application of short-circuit ratings*

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Part 5: Guidance for the application of low-voltage fuses



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE FUSES –

Part 5: Guidance for the application of low-voltage fuses

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INTRODUCTION

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– thermal damage of conductors or bus-bars;
– vaporisation of metal;
– ionisation of gases;
– arcing, fire, explosion,
– insulation damage.

Apart from being hazardous to personnel, significant economic losses can result from downtime and the repairs required to restore damaged equipment.

Modern fuses are common overcurrent protective devices in use today, and as such provide an excellent cost effective solution to eliminate or minimize the effects of overcurrent.

LOW-VOLTAGE FUSES –

Part 5: Guidance for the application of low-voltage fuses

1 Scope

This technical report, which serves as an application guide for low-voltage fuses, shows how current-limiting fuses are easy to apply to protect today's complex and sensitive electrical and electronic equipment. This guidance specifically covers low-voltage fuses up to 1 000 V a.c. and 1 500 V d.c. designed and manufactured in accordance with IEC 60269 series. This guidance provides important facts about as well as information on the application of fuses.

2 Normative references

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

IEC 60050 (all parts), *International Electrotechnical Vocabulary*. Available from http://www.electropedia.org/

IEC/TR 60146-6, *Semiconductor convertors – Part 6: Application guide for the protection of semiconductor convertors against overcurrent by fuses*

IEC 60269 (all parts), *Low-voltage fuses*

IEC 60269-1:2006, *Low-voltage fuses - Part 1: General requirements*
IEC 60269-1:2006/AMD1:2009
IEC 60269-1:2006/AMD2:2014

IEC 60269-2, *Low-voltage fuses – Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) – Examples of standardized systems of fuses A to K*

IEC 60269-3, *Low-voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household or similar applications) – Examples of standardized systems of fuses A to F*

IEC 60269-4, *Low-voltage fuses – Part 4: Supplementary requirements for fuse-links for the protection of semiconductor devices*

IEC 60269-6, *Low-voltage fuses – Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-43:2008, *Low-voltage electrical installations – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-5-52, *Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60947 (all parts), *Low-voltage switchgear and controlgear*

IEC 60947-3:2015, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 60947-4-1:2009, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*

IEC/TR 61912-1:2007, *Low-voltage switchgear and controlgear – Overcurrent protective devices – Part 1: Application of short-circuit ratings*