



NSAI
Standards

Irish Standard
I.S. EN IEC 60947-9-1:2019

Low-voltage switchgear and controlgear - Part 9-1: Active arc-fault mitigation systems - Arc quenching devices

I.S. EN IEC 60947-9-1:2019

Incorporating amendments/corrigenda/National Annexes issued since publication:

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National Foreword

I.S. EN IEC 60947-9-1:2019 is the adopted Irish version of the European Document EN IEC 60947-9-1:2019, Low-voltage switchgear and controlgear - Part 9-1: Active arc-fault mitigation systems - Arc quenching devices

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EUROPEAN STANDARD

EN IEC 60947-9-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2019

ICS 29.120.40; 29.130.20

English Version

**Low-voltage switchgear and controlgear - Part 9-1: Active arc-fault mitigation systems - Arc quenching devices
(IEC 60947-9-1:2019)**

Appareillage à basse tension - Partie 9-1: Systèmes actifs de limitation des défauts d'arc - Dispositifs d'extinction d'arc
(IEC 60947-9-1:2019)

Niederspannungsschaltgeräte - Aktive Systeme zur Verringerung von Lichtbogenfehlern - Teil 9-1: Lichtbogenlöschgeräte
(IEC 60947-9-1:2019)

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Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 60947-9-1:2019 (E)

European foreword

The text of document 121A/254/FDIS, future edition 1 of IEC 60947-9-1, prepared by SC 121A "Low-voltage switchgear and controlgear" of IEC/TC 121 "Switchgear and controlgear and their assemblies for low voltage" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60947-9-1:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-11-24
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-05-24

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For the relationship with EU Directives and the standardization requests see informative Annex ZZA and Annex ZZB, which are integral parts of this document.

Endorsement notice

The text of the International Standard IEC 60947-9-1:2019 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-30	2005	Environmental testing -- Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
IEC 60417	Data-base	Graphical symbols for use on equipment	-	-
IEC 60947-1	2007	Low-voltage switchgear and controlgear -- Part 1: General rules	EN 60947-1	2007
+ A1	2010		+ A1	2011
+ A2	2014		+ A2	2014
IEC 61439	series	Low-voltage switchgear and controlgear assemblies	EN 61439	series
CISPR 11 (mod)	2015	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	2016
+ A1	2016		+ A1	2017

EN IEC 60947-9-1:2019 (E)

Annex ZZA (informative)

Relationship between this European standard and the essential requirements of Directive 2014/30/EU [2014 OJ L96] aimed to be covered

This European standard has been prepared under the European Commission standardisation request C(2016) 7641 final of 30.11.2016¹, ('M/552'), as regards harmonised standards in support of Directive 2014/30/EU relating to electromagnetic compatibility, to provide one voluntary means of conforming to essential requirements of Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

Table ZZA.1 – Correspondence between this European standard and Annex I of Directive 2014/30/EU [2014 OJ L96]

Essential requirements of Directive 2014/30/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
Annex I. 1(a) (electromagnetic disturbances)	8.3, 9.3.2.2	
Annex I. 1(b) (electromagnetic immunity)	8.3, 9.3.2.1	

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¹ COMMISSION IMPLEMENTING DECISION C(2016) 7641 final of 30.11.2016 on a standardisation request to the European Committee for Standardisation, to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards harmonised standards in support of Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

Annex ZZB (informative)

Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European standard has been prepared under a Commission's standardisation request relating to harmonised standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

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Table ZZB.1 – Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks/Notes
1 a)	6	
1 b)	6	
1 c)	1, 3, 4, 5, and 6.3	
2 a)	8.1, 8.2, 9.3	
2 b)	8.1, 9.3	
2 c)	6.2, 6.3, 8.1, 9.3, 9.4	
2 d)	8.1, 8.2, 9.3	
3 a)	6.3, 8.1, 9.3, 9.4	
3 b)	8.1, 9.3	
3 c)	-	No hazard identified for products falling under the scope of this standard.

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IEC 60947-9-1

Edition 1.0 2019-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Low-voltage switchgear and controlgear –
Part 9-1: Active arc-fault mitigation systems – Arc quenching devices**

**Appareillage à basse tension –
Partie 9-1: Systèmes actifs de limitation des défauts d'arc – Dispositifs
d'extinction d'arc**





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IEC 60947-9-1

Edition 1.0 2019-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Low-voltage switchgear and controlgear –
Part 9-1: Active arc-fault mitigation systems – Arc quenching devices**

**Appareillage à basse tension –
Partie 9-1: Systèmes actifs de limitation des défauts d'arc – Dispositifs
d'extinction d'arc**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 9-1: Active arc-fault mitigation systems –
Arc quenching devices

FOREWORD

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International Standard IEC 60947-9-1 has been prepared by subcommittee SC121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

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

FDIS	Report on voting
121A/254/FDIS	121A/266/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 60947 series, published under the general title *Low-voltage switchgear and controlgear*, 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

The effects of arc-faults inside an enclosure are more and more taken into consideration, both from user safety and time-to-repair points of view. Protection against the effects of internal arc-faults can be achieved through passive components (containment) or through active components, also known as "active arc-fault mitigation systems".

Active arc-fault mitigation systems generally use internal arc-fault control devices (IACDs), based on the effects of the arc (light, pressure, current or voltage harmonics, etc.), and an actuator to eliminate the arc-fault.

This actuator can be an upstream circuit-breaker, which is tripped to interrupt the fault current, or an arc quenching device that will transfer the fault to a dedicated low-impedance circuit, before the short-circuit current is interrupted by the upstream short-circuit protective device (SCPD).

The purpose of this document is to set the requirements for arc quenching devices, so that the necessary safety is ensured and their performance can be fairly assessed.

Special requirements for environmental withstand (e.g. ambient temperature, damp heat, shock, vibrations) are included, considering the high impact of a malfunction, either unwanted operation (creation of a short-circuit) or failure to operate.

Requirements for internal arc-fault control devices are under development and will be published as IEC 60947-9-2¹.

Requirements for integration of internal arc-fault mitigation systems in power switchgear and controlgear assemblies are under development and will be published as IEC TS 63107².

¹ Under preparation. Stage at the time of publication: IEC/ACD 60947-9-2:2018.

² Under preparation. Stage at the time of publication: IEC/PCC 63107:2018.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 9-1: Active arc-fault mitigation systems – Arc quenching devices

1 Scope

This part of IEC 60947 covers low-voltage arc quenching devices, hereinafter referred to as AQDs, which are intended to eliminate arc-faults in low-voltage assemblies (typically low-voltage switchgear and controlgear assemblies in accordance with the IEC 61439 series), by creating a lower impedance current path, to cause the arcing current to transfer to the new current path. This new current path is maintained until a short-circuit protection device (SCPD) interrupts the short-circuit current.

AQDs are installed in low-voltage assemblies, connected to the main circuit, preferably as close as possible to all primary power sources.

Their rated voltage does not exceed 1 000 V AC or 1 500 V DC.

This document does not cover:

- sensors intended to detect arc-faults;
- devices intended to trigger the functioning of the arc quenching device;
- devices intended to interrupt arc-fault current;
- special requirements for AQDs for use in explosive atmospheres (e.g. ATEX).

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 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-1:2007/AMD1:2010

IEC 60947-1:2007/AMD2:2014

IEC 61439 (all parts), *Low-voltage switchgear and controlgear assemblies*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

CISPR 11:2015/AMD1:2016

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