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Järnvägsanläggningar – Elutrustning för rälsfordon – Del 4: Effektbrytare för växelström

*Railway applications –
Electric equipment for rolling stock –
Part 4: Electrotechnical components –
Rules for AC circuit-breakers*

Som svensk standard gäller europastandarden EN IEC 60077-4:2019. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60077-4:2019.

Nationellt förord

Europastandarden EN IEC 60077-4:2019

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60077-4, Second edition, 2019 - Railway applications - Electric equipment for rolling stock - Part 4: Electrotechnical components - Rules for AC circuit-breakers**

utarbetad inom International Electrotechnical Commission, IEC.

Standarden ska användas tillsammans med SS-EN 60077-1 och SS-EN 60077-2.

Tidigare fastställd svensk standard SS-EN 60077-4, utgåva 1, 2003, gäller ej fr o m 2022-11-29.

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English Version

**Railway applications - Electric equipment for rolling stock - Part
4: Electrotechnical components - Rules for AC circuit-breakers
(IEC 60077-4:2019)**

Applications ferroviaires - Équipements électriques du
matériel roulant - Partie 4: Composants électrotechniques -
Règles pour disjoncteurs à courant monophasé
(IEC 60077-4:2019)

Bahnanwendungen - Elektrische Betriebsmittel auf
Fahrzeugen - Teil 4: Elektrotechnische Bauteile - Regeln für
AC-Leistungsschalter
(IEC 60077-4:2019)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

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

European foreword

The text of document 9/2538/FDIS, future edition 2 of IEC 60077-4, prepared by IEC/TC 9 "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60077-4:2019.

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) 2020-08-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-11-29

This document supersedes EN 60077-4:2003 and all of its amendments and corrigenda (if any).

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

Endorsement notice

The text of the International Standard IEC 60077-4:2019 was approved by CENELEC as a European Standard without any modification.

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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.

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 60060-1	2010	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	2010
IEC 60077-1	2017	Railway applications - Electric equipment for rolling stock - Part 1: General service conditions and general rules	EN 60077-1	2017
IEC 60077-2	2017	Railway applications - Electric equipment for rolling stock - Part 2: Electrotechnical components - General rules	EN 60077-2	2017
IEC 60529	-	Degrees of protection provided by - enclosures (IP Code)	-	-
IEC 61373	-	Railway applications - Rolling stock equipment - Shock and vibration tests	EN 61373	-
IEC 62271-1	2017	High-voltage switchgear and controlgear - Part 1: Common specifications for alternating current switchgear and controlgear	EN 62271-1	2017
IEC 62271-100	2008	High-voltage switchgear and controlgear - Part 100: Alternating current circuit-breakers	EN 62271-100	2009
+ A1	2012		+ A1	2012
+ A2	2017		+ A2	2017
IEC 62271-102	-	High-voltage switchgear and controlgear - Part 102: Alternating current disconnectors and earthing switches	-	-

CONTENTS

FOREWORD	4
1 Scope	6
2 Normative references	7
3 Terms, definitions and abbreviated terms	7
3.1 Components	7
3.2 Component parts	8
3.3 Operational features	9
3.4 Making and breaking characteristics	10
3.5 Abbreviated terms	12
4 Classification	12
5 Characteristics	13
5.1 Summary of characteristics	13
5.2 Type of circuit-breaker	13
5.3 Rated values and limiting values for the main circuit	13
5.3.1 General	13
5.3.2 Rated voltages	13
5.3.3 Rated currents	13
5.3.4 Rated operational frequency	14
5.3.5 Rated power factors	14
5.3.6 Short-circuit characteristics	14
5.4 Operational frequencies	16
5.5 Electric and pneumatic control circuits	16
5.6 Electric and pneumatic auxiliary circuits	17
5.7 Overcurrent release	17
5.8 Recovery voltages	17
6 Product information	17
6.1 Component documentation	17
6.2 Marking	17
7 Normal service conditions	17
8 Constructional and performance requirements	17
8.1 Constructional requirements	17
8.2 Performance requirements	18
8.2.1 Operating conditions	18
8.2.2 Temperature limits	18
8.2.3 Operation following inactivity	18
8.2.4 Electromagnetic compatibility (EMC)	18
8.2.5 Acoustic noise emission	18
8.2.6 Clearances	18
8.2.7 Creepage distances	18
8.2.8 Switching overvoltages	18
8.2.9 Operational performance capability	18
8.2.10 Ability to withstand vibration and shock	19
8.2.11 Ability to make and break under short-circuit conditions	19
9 Tests	19
9.1 Kind of tests	19

9.1.1	General	19
9.1.2	Type tests.....	20
9.1.3	Routine tests	20
9.1.4	Investigation tests.....	20
9.2	Verification of constructional requirements.....	20
9.2.1	General	20
9.2.2	Type tests.....	20
9.2.3	Routine tests	20
9.3	Type tests for verification of performance requirements	20
9.3.1	Test sequences	20
9.3.2	General test conditions	21
9.3.3	Test sequence I: General performance characteristics.....	22
9.3.4	Test sequence II: Rated short-circuit making and breaking capacities.....	23
9.3.5	Test sequence III: Ability to withstand vibration and shock.....	25
9.3.6	Test sequence IV: Climatic conditions	26
9.3.7	Test sequence V: Other tests.....	26
9.4	Routine tests for verification of performance requirements	26
9.4.1	General	26
9.4.2	Functional test.....	26
9.4.3	Calibration of releases.....	27
9.4.4	Air-tightness (for pneumatic circuit-breaker)	27
9.4.5	Dielectric withstand	27
Annex A (informative)	Test circuit to verify the making and breaking capacities	28
Annex B (informative)	Determination of short-circuit making and breaking currents, and of percentage DC component.....	29
Bibliography.....		30
Figure A.1 – Diagram of the test circuit		28
Figure B.1 – Determination of short-circuit making and breaking currents, and of percentage DC components.....		29
Table 1 – Standard values of transient recovery voltage – Representation by two parameters		16
Table 2 – Operational performance capability		19
Table 3 – List of type test sequences for performance requirements		21
Table 4 – Tolerances on test values.....		22
Table 5 – Standard values of prospective transient recovery voltage – Representation by two parameters		24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RAILWAY APPLICATIONS –
ELECTRIC EQUIPMENT FOR ROLLING STOCK –****Part 4: Electrotechnical components –
Rules for AC circuit-breakers****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60077-4 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This second edition cancels and replaces the first edition, issued in 2003. It constitutes a technical revision.

This edition includes the following main technical changes with regard to the previous edition:

- a) standard values of transient recovery voltages and test procedure are reviewed;
- b) procedure of verification of temperature rise is changed;
- c) air-tightness test as type test, insulation resistance measurement are added.

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

FDIS	Report on voting
9/2538/FDIS	9/2554/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.

This document should be read in conjunction with IEC 60077-1 and IEC 60077-2.

A list of all parts in the IEC 60077 series, published under the general title *Railway applications – Electric equipment for rolling stock*, 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.

RAILWAY APPLICATIONS – ELECTRIC EQUIPMENT FOR ROLLING STOCK –

Part 4: Electrotechnical components – Rules for AC circuit-breakers

1 Scope

In addition to the general requirements of IEC 60077-2, this part of IEC 60077 gives rules for AC circuit-breakers, the main contacts of which are connected to AC overhead contact lines; the nominal voltage of these circuits being in accordance with IEC 60850.

This document, together with IEC 60077-2, states specifically:

- a) the characteristics of the circuit-breakers;
- b) the service conditions with which circuit-breakers comply with reference to:
 - operation and behaviour in normal service;
 - operation and behaviour in short-circuit;
 - dielectric properties;
- c) the tests for confirming the compliance of the components with the characteristics under the service conditions and the methods to be adopted for these tests;
- d) the information to be marked on, or given with the circuit-breaker.

NOTE 1 Circuit-breakers which are dealt with in this document can be provided with devices for automatic opening under pre-determined conditions other than those of overcurrent, for example, undervoltage and reversal of power flow direction. This document does not deal with the verification of operation under such predetermined conditions.

NOTE 2 The incorporation of electronic components or electronic sub-assemblies into electrotechnical components is now common practice.

Although this document is not applicable to electronic equipment, the presence of electronic components does not provide a reason to exclude such electrotechnical components from the scope.

Electronic sub-assemblies included in the circuit-breakers comply with the relevant standard for electronics (IEC 60571).

NOTE 3 Certain of these rules, after agreement between the user and the manufacturer, are used for electrotechnical components installed on vehicles other than rail rolling stock such as mine locomotives, trolleybuses, etc. In this case, particular additional requirements can be necessary.

This document does not cover industrial circuit-breakers which comply with IEC 62271-100. For these, in order to ensure satisfactory operation, this document is used to specify only the particular requirements for rolling stock. In such cases, a specific document states the additional requirements with which the industrial circuit-breakers comply, for example:

- either to be adapted (e.g. for control voltage, environmental conditions, etc.);
- or to be installed and used so that they do not have to endure specific rolling stock conditions;
- or to be additionally tested to prove that these components can withstand satisfactorily the rolling stock conditions.

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 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60077-1:2017, *Railway applications – Electric equipment for rolling stock. – Part 1: General service conditions and general rules*

IEC 60077-2:2017, *Railway applications – Electric equipment for rolling stock. – Part 2: Electrotechnical components – General rules*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61373, *Railway applications – Rolling stock equipment – Shock and Vibration tests*

IEC 62271-1:2017, *High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear*

IEC 62271-100:2008, *High-voltage switchgear and controlgear – Part 100: Alternating current circuit-breakers*

IEC 62271-100:2008/AMD1:2012

IEC 62271-100:2008/AMD2:2017

IEC 62271-102, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*