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Standards

Irish Standard
I.S. EN 61287-1:2014&AC:2014

Railway applications - Power converters installed on board rolling stock - Part 1: Characteristics and test methods

I.S. EN 61287-1:2014&AC:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

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Add "d'essais" at the end of the French title.

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EUROPEAN STANDARD

EN 61287-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2014

ICS 45.060

Supersedes EN 61287-1:2006

English Version

**Railway applications - Power converters installed on board
rolling stock - Part 1: Characteristics and test methods
(IEC 61287-1:2014)**

Applications ferroviaires - Convertisseurs de puissance
embarqués sur le matériel roulant - Partie 1:
Caractéristiques et méthodes
(CEI 61287-1:2014)

Bahnanwendungen - Stromrichter auf Bahnfahrzeugen -
Teil 1: Eigenschaften und Prüfverfahren
(IEC 61287-1:2014)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of document 9/1918/FDIS, future edition 3 of IEC 61287-1, 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 61287-1:2014.

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) 2015-05-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-08-14

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60112	NOTE	Harmonized as EN 60112.
IEC 60146-1-1	NOTE	Harmonized as EN 60146-1-1.
IEC 60216	NOTE	Harmonized in EN 60216 series (not modified).
IEC 60384-1	NOTE	Harmonized as EN 60384-1.
IEC 60587	NOTE	Harmonized as EN 60587.
IEC 60664-1:2007	NOTE	Harmonized as EN 60664-1:2007 (not modified).
IEC 60747-15	NOTE	Harmonized as EN 60747-15.
IEC 61377-1	NOTE	Harmonized as EN 61377-1.
IEC 61377-2	NOTE	Harmonized as EN 61377-2.
IEC 61377-3	NOTE	Harmonized as EN 61377-3.
IEC 62520	NOTE	Harmonized as EN 62520.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When 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 60050-551	1998	International Electrotechnical Vocabulary (IEV) - Part 551: Power electronics	-	-
IEC 60050-811	1991	International electrotechnical vocabulary (IEV) - Chapter 811: Electric traction	-	-
IEC 60076-10	2001	Power transformers - Part 10: Determination of sound levels	EN 60076-10	2001
IEC 60077-1 (mod)	1999	Railway applications - Electric equipment for rolling stock - Part 1: General service conditions and general rules	EN 60077-1	2002
IEC 60270	-	High-voltage test techniques - Partial discharge measurements	EN 60270	-
IEC 60310	-	Railway applications - Traction transformers and inductors on board rolling stock	EN 60310	-
IEC 60322	-	Railway applications - Electric equipment for rolling stock - Rules for power resistors of open construction	EN 60322	-
IEC 60349-1	-	Electric traction - Rotating electrical machines for rail and road vehicles - Part 1: Machines other than electronic converter-fed alternating current motors	EN 60349-1	-
IEC 60349-2	-	Electric traction - Rotating electrical machines for rail and road vehicles - Part 2: Electronic converter-fed alternating current motors	EN 60349-2	-
IEC 60349-4	-	Electric traction - Rotating electrical machines for rail and road vehicles - Part 4: Permanent magnet synchronous electrical machines connected to an electronic converter	EN 60349-4	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60384-4	-	Fixed capacitors for use in electronic equipment - Part 4: Sectional specification - Aluminium electrolytic capacitors with solid (MnO ₂) and non-solid electrolyte	EN 60384-4	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	-
IEC 60571	-	Railway applications - Electronic equipment used on rolling stock	-	-
IEC 60721-3-5	-	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 5: Ground vehicle installations	EN 60721-3-5	-
IEC 60747	series	Semiconductor devices	EN 60747	series
IEC 60850	-	Railway applications - Supply voltages of traction systems	-	-
IEC 61148	-	Terminal markings for valve device stacks and assemblies and for power conversion equipment	EN 61148	-
IEC 61373	-	Railway applications - Rolling stock equipment - Shock and vibration tests	EN 61373	-
IEC 61881	series	Railway applications - Rolling stock equipment - Capacitors for power electronics	EN 61881	series
IEC 61991	-	Railway applications - Rolling stock - Protective provisions against electrical hazards	-	-
IEC 62236-3-1	-	Railway applications - Electromagnetic compatibility - Part 3-1: Rolling stock - Train and complete vehicle	-	-
IEC 62236-3-2	-	Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus	-	-
IEC 62278	-	Railway applications - Specification and demonstration of reliability, availability, maintainability and safety (RAMS)	-	-
IEC 62497-1 + A1	2010 2013	Railway applications - Insulation coordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment	-	-
IEC 62498-1	2010	Railway applications - Environmental conditions for equipment - Part 1: Equipment on board rolling stock	-	-



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Edition 3.0 2014-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Railway applications – Power converters installed on board rolling stock –
Part 1: Characteristics and test methods**

**Applications ferroviaires – Convertisseurs de puissance embarqués sur
le matériel roulant –
Partie 1: Caractéristiques et méthodes d'essais**





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IEC 61287-1

Edition 3.0 2014-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Railway applications – Power converters installed on board rolling stock –
Part 1: Characteristics and test methods**

**Applications ferroviaires – Convertisseurs de puissance embarqués sur
le matériel roulant –
Partie 1: Caractéristiques et méthodes d'essais**

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CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions	9
3.1 General.....	9
3.2 Terms and definitions related to equipment	9
3.3 Terms and definitions related to electrical parameters	11
4 Common clauses	12
4.1 General.....	12
4.1.1 Design	12
4.1.2 Marking	12
4.1.3 Technical documentation	12
4.1.4 Reliability, availability, maintainability and safety	13
4.1.5 Useful lifetime.....	14
4.2 Service conditions	14
4.2.1 General	14
4.2.2 Altitude	14
4.2.3 Temperature	14
4.2.4 Other environmental conditions	15
4.2.5 Mechanical stress	15
4.2.6 Load profile.....	15
4.2.7 Supply-system characteristics	16
4.2.8 Interference	17
4.2.9 Input current limitations.....	18
4.2.10 Influence on the environment	18
4.3 Characteristics	19
4.3.1 Characteristics of components	19
4.3.2 Characteristics of semiconductor devices.....	19
4.3.3 Characteristics of transformers, reactors and capacitors	19
4.3.4 Characteristics of converters.....	20
4.4 Technical requirements	22
4.4.1 Insulation co-ordination.....	22
4.4.2 EMC requirements for converters	22
4.4.3 Fault effects.....	23
4.5 Tests	23
4.5.1 General	23
4.5.2 Converter tests	24
4.5.3 Description of tests	27
4.5.4 Failure of components during type tests	36
5 Direct traction converters	36
5.1 Line-commutated converters for DC motors	36
5.1.1 General	36
5.1.2 Characteristics.....	36
5.1.3 Tests	37
5.2 Choppers for DC motors.....	40
5.2.1 Characteristics.....	40

5.2.2	Tests	41
5.3	Multiphase converters for AC motors (inverters)	43
5.3.1	General	43
5.3.2	Characteristics	43
5.3.3	Tests	44
6	Indirect traction converters	44
6.1	General	44
6.2	Line converter	44
6.2.1	General	44
6.2.2	Characteristics	45
6.2.3	Tests	45
6.3	Motor converter	46
6.3.1	Motor converter for DC motors (chopper or rectifier)	46
6.3.2	Motor converter for AC motors (inverter)	46
7	Auxiliary converters	46
7.1	General	46
7.2	Characteristics	46
7.2.1	Auxiliary converter starting conditions	46
7.2.2	Input conditions and characteristics	47
7.2.3	Output characteristics	47
7.3	Short-circuit protection	48
7.4	Choice of rated insulation voltage	48
7.5	Tests	49
7.5.1	General	49
7.5.2	Output characteristics test	49
7.5.3	Starting and restarting test	50
7.5.4	Short-circuit test	50
7.5.5	Voltage and frequency ranges verification	50
7.5.6	Overload capability test	50
7.5.7	Temperature rise test	51
7.5.8	Load break test	51
8	Semiconductor drive units (SDU)	51
8.1	Equivalent expressions	51
8.2	Printed circuit board assemblies	52
8.3	Function of the SDU	52
8.4	Particular requirements for the SDU	52
8.5	Service conditions	52
8.6	Insulation requirements for the SDU	52
8.7	Electromagnetic compatibility requirements	52
8.8	Tests of the SDU	52
Annex A (normative)	Arrangement of basic circuit diagrams	54
Annex B (informative)	Recapitulation of agreements between the manufacturer and the user	55
Annex C (informative)	Guidelines for magnetic field and induced voltage requirements	58
Bibliography	59
Figure 1	– Partial discharge test – Voltage versus time	26
Figure 2	– Configuration of series motors	39

Figure A.1 – Examples of combinations	54
Table 1 – General classes of start-up load characteristics	15
Table 2 – Classes of acoustic noise	19
Table 3 – List of tests	27
Table 4 – Additional tests for direct traction converters	38
Table 5 – Additional tests for choppers for DC motors	41
Table 6 – Additional tests for auxiliary converters	49
Table B.1 – Recapitulation of agreements between the manufacturer and the user	55

INTERNATIONAL ELECTROTECHNICAL COMMISSION

RAILWAY APPLICATIONS – POWER CONVERTERS INSTALLED ON BOARD ROLLING STOCK –

Part 1: Characteristics and test methods

FOREWORD

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International Standard IEC 61287-1 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This third edition cancels and replaces the second edition published in 2005. This edition constitutes a technical revision.

This edition includes the following main technical changes with regard to the previous edition: it includes updates as necessary in order to meet the current technical state of the art and to improve clarity. It also takes into account generic railway standards as relevant parts of IEC 62497 and IEC 62498. Especially the clauses considering temperature rise test and auxiliary converter characteristics have been revised.

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

FDIS	Report on voting
9/1918/FDIS	9/1946/RVD

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

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

A list of all parts of IEC series 61287, under the general title *Railway applications – Power converters installed on board rolling stock*, can be found on the IEC website.

The committee has decided that the contents of this publication 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

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

RAILWAY APPLICATIONS – POWER CONVERTERS INSTALLED ON BOARD ROLLING STOCK –

Part 1: Characteristics and test methods

1 Scope

This part of IEC 61287 defines terminology, service conditions, general characteristics and test methods of electronic power converters onboard of rolling stock.

This International Standard is applicable to power electronic converters mounted on board railway rolling-stock and intended for supplying

- traction circuits;
- auxiliary circuits of power vehicles, coaches and trailers.

The application of this standard extends as far as possible to all other traction vehicles, including trolley-buses, for example.

This standard covers the complete converter assembly together with its mounting arrangements containing

- semiconductor device assemblies;
- integrated cooling systems;
- integrated components like inductors, capacitors, transformers, resistors, contactors, switches;
- semiconductor drive units (SDU) and related sensors;
- incorporated protection circuits.

The following types of power sources are taken into consideration:

- AC contact lines,
- DC contact lines,
- on-board supplies such as generators, batteries and other electric power sources.

This standard excludes converters which provide the electronic control supply for semiconductor drive units (SDU) and other supplies relevant to the converter operation such as sensors.

NOTE 1 Electronic control equipment of converters and those sensors not related to semiconductor drive units and the printed circuit board assemblies of semiconductor drive units (SDU) are covered by IEC 60571.

NOTE 2 Combined tests with the whole traction system or auxiliary supply system are not within the scope of this standard. E.g. rules for combined tests of a motor fed by a converter are given in the IEC 61377 series.

2 Normative references

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