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Railway applications – Fixed installations – Electronic power converters for substations

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CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
3.1 Semiconductor devices and combinations	9
3.2 Arms and connections	10
3.3 Controllability of converter arms	11
3.4 Commutation, quenching and commutation circuitry	11
3.5 Commutation characteristics	12
3.6 Rated values	15
3.7 Load capabilities	16
3.8 Specific voltages, currents and factors	17
3.9 Definitions related to virtual junction temperature	18
3.10 Cooling	18
3.11 Electromagnetic compatibility and harmonic distortion	19
4 Symbols	19
5 Operation of semiconductor power equipment and valve devices	21
5.1 Classification of traction supply power converters and valves	21
5.1.1 Types of traction supply power converters	21
5.1.2 Purpose of conversion	21
5.1.3 Classification of semiconductor valve devices	21
5.2 Basic calculation factors for line commutated converters	22
5.2.1 Voltage	22
5.2.2 Voltage characteristics and transition current	22
6 Service conditions	23
6.1 Code of identification of cooling method	23
6.1.1 Letter symbols to be used	23
6.1.2 Arrangement of letter symbols	24
6.2 Environmental conditions	24
6.2.1 Ambient air circulation	24
6.2.2 Normal service conditions	25
6.2.3 Special service conditions	26
6.3 Electrical service conditions	26
6.3.1 General	26
6.3.2 Limiting values as basis of rating	26
6.3.3 DC traction supply voltage	28
7 Converter equipment and assemblies	28
7.1 Losses and efficiency	28
7.1.1 General	28
7.1.2 Included losses	28
7.2 Power factor	28
7.3 Electromagnetic compatibility (EMC)	29
7.4 Rated values for converters	29
7.4.1 General	29

7.4.2	Current values	29
7.4.3	Capability for unsymmetrical load of a 12-pulse converter in parallel connection	31
7.4.4	Semiconductor device failure conditions	32
7.5	Mechanical characteristics	32
7.5.1	General	32
7.5.2	Earthing	32
7.5.3	Degree of protection	33
7.6	Insulation coordination	33
7.7	Specifics of line commutated rectifiers	33
7.7.1	Electrical connections	33
7.7.2	Calculation factors	35
7.7.3	Direct voltage harmonic content	35
8	Tests	35
8.1	General	35
8.1.1	Overview	35
8.1.2	Performance of tests	36
8.1.3	Test schedule	36
8.2	Test specifications	36
8.2.1	Insulation tests	36
8.2.2	Light load functional test	38
8.2.3	Load test	38
8.2.4	Power loss determination	39
8.2.5	Temperature-rise test	39
8.2.6	Checking of auxiliary devices	40
8.2.7	Checking of the properties of the control equipment	40
8.2.8	Checking of the protective devices	41
8.2.9	Short-time withstand current test	41
8.2.10	EMC test	41
8.2.11	Additional tests	41
9	Marking	41
9.1	Rating plate	41
9.2	Main circuit terminals	42
Annex A (informative)	Information required	43
A.1	General	43
A.2	Diode rectifiers	43
A.2.1	Procurement specification	43
A.2.2	Supplier's tender specification	44
A.2.3	Information and data to be given by the supplier during the delivery stage	44
A.3	Controlled converters and inverters	45
A.3.1	Procurement specification	45
A.3.2	Supplier's tender specification	46
A.4	Frequency converters (direct and DC link converters)	46
A.4.1	Procurement specification	46
A.4.2	Supplier's tender specification	47
A.5	DC converters	48
A.5.1	Procurement specification	48
A.5.2	Supplier's tender specification	49

Annex B (informative) Determination of the current capability through calculation of the virtual junction temperature.....	51
B.1 General.....	51
B.2 Approximation of the shape of power pulses applied to the semiconductor device.....	51
B.3 Superposition method for the calculation of temperature.....	52
B.4 Calculation of virtual junction temperature for continuous load.....	53
B.4.1 General.....	53
B.4.2 Calculation of mean value of virtual junction temperature.....	53
B.4.3 Calculation of maximum instantaneous virtual junction temperature.....	53
B.5 Calculation of virtual junction temperature for cyclic loads.....	54
B.6 Examples for typical applications.....	55
Annex C (informative) Index of definitions.....	57
Bibliography.....	59
Figure 1 – Illustration of angles.....	14
Figure 2 – Voltage regulation.....	23
Figure 3 – AC voltage waveform.....	27
Figure B.1 – Approximation of the shape of power pulses.....	52
Figure B.2 – Calculation of the virtual junction temperature for continuous load.....	53
Figure B.3 – Calculation of the virtual junction temperature for cyclic load.....	54
Table 1 – Letter symbols for cooling mediums and heat transfer agents.....	23
Table 2 – Letter symbols for methods of circulation.....	23
Table 3 – Standardized duty classes.....	30
Table 4 – Semiconductor device failure conditions.....	32
Table 5 – Insulation levels for AC/DC and DC converters.....	33
Table 6 – Connections and calculation factors for line commutated converters.....	34
Table 7 – Summary of tests.....	36
Table 8 – Insulation levels for AC/DC and DC converters.....	38
Table B.1 – Examples for typical applications.....	55

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRONIC POWER CONVERTERS FOR SUBSTATIONS****FOREWORD**

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International Standard IEC 62590 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This standard is based on EN 50328.

This second edition cancels and replaces the first edition published in 2010. This edition constitutes a technical revision.

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

- a) Incorporation of DC converters.
- b) Correction of the clearances and withstand voltages due to erroneous use of PD in former edition.
- c) Adaption to current ISO/IEC directive part 2, adaption of structure, adaption of vocabulary, removal of unused term and abbreviations.

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

FDIS	Report on voting
9/2502/FDIS	9/2516/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.

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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

Semiconductor converters for traction power supply differ from other converters for industrial use due to special electrical service conditions and due to the large range of load variation and the peculiar characteristics of the load.

For these reasons IEC 60146-1-1 does not fully cover the requirements of railway applications and the decision was taken to have a specific standard for this use.

Converter transformers for fixed installations of railway applications are covered by IEC 62695.

Harmonization of the rated values and tests of the whole converter group are covered by IEC 62589.

RAILWAY APPLICATIONS – FIXED INSTALLATIONS – ELECTRONIC POWER CONVERTERS FOR SUBSTATIONS

1 Scope

This document specifies the requirements for the performance of all fixed installations electronic power converters, using controllable and/or non-controllable electronic valves, intended for traction power supply.

The devices can be controlled by means of current, voltage or light. Non-bistable devices are assumed to be operated in the switched mode.

This document applies to fixed installations of the following electric traction systems:

- railways,
- guided mass transport systems such as: tramways, light rail systems, elevated and underground railways, mountain railways, trolleybuses.

This document does not apply to:

- cranes, transportable platforms and similar transportation equipment on rails,
- suspended cable cars,
- funicular railways.

This document applies to diode rectifiers, controlled rectifiers, DC converters, inverters and frequency converters.

The equipment covered in this document is the converter itself.

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 60050-811:2017, *International electrotechnical vocabulary – Part 811: Electric traction*

IEC 60146 (all parts), *Semiconductor convertors*

IEC TR 60146-1-2:2011, *Semiconductor converters – General requirements and line commutated converters – Part 1-2: Application guide*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60721 (all parts), *Classification of environmental conditions*

IEC 60721-3-3:1994, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weatherprotected locations*

AMD1:1995

AMD2:1996

IEC 60721-3-4:1995, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 4: Stationary use at non-weatherprotected locations*
AMD1:1996

IEC 60850:2014, *Railway applications – Supply voltages of traction systems*

IEC 61000-2-4:2002, *Electromagnetic compatibility (EMC) – Part 2-4: Environment – Compatibility levels in industrial plants for low-frequency conducted disturbances*

IEC 61000-2-12:2003, *Electromagnetic compatibility (EMC) – Part 2-12: Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public medium-voltage power supply systems*

IEC 61992-7-1:2006, *Railway applications – Fixed installations – DC switchgear – Part 7-1: Measurement, control and protection devices for specific use in DC traction systems – Application guide*

IEC 62236 (all parts), *Railway applications – Electromagnetic compatibility*

IEC 62236-5:2018, *Railway applications – Electromagnetic compatibility – Part 5: Emission and immunity of fixed power supply installations and apparatus*

IEC 62497-1:2010, *Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment*