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Railway applications – Electronic power converters for fixed installations – Part 1: General requirements

Applications ferroviaires – Convertisseurs électroniques de puissance pour installations fixes – Partie 1: Exigences générales

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IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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FOREWORD

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

This document, in conjunction with the other parts of IEC 62590, cancels and replaces IEC 62589:2010 and the former IEC 62590:2019.

This document includes the following significant technical changes with respect to IEC 62589:2010 and the former IEC 62590:2019:

a) Split into common requirements and special requirements for different converters;
b) Interface Model for the different systems connected;
c) Split into circuits with their requirements like insulation coordination;
d) Energy efficiency addressed.

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

Draft	Report on voting
9/3160/FDIS	9/3206/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62590 series, published under the general title *Railway applications – Electronic power converters for fixed installations*, can be found on the IEC website.

Future documents in this series will carry the new general title as cited above. Titles of existing documents in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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 the IEC 60146 series does not fully cover the requirements of railway applications and the decision was taken to have a specific series of standards for this use.

Specific requirements for the design of converter transformers for fixed installations of railway applications are specified in IEC 62695.

This document defines common vocabulary and requirements. Other parts will cover different applications. The whole series is listed below. Requirements in the specific parts have priority over this document.

IEC 62590-1, *Railway applications – Electronic Power Converters for fixed installations – Part 1: General requirements*

IEC 62590-2-1, *Railway applications – Electronic Power Converters for fixed installations – Part 2-1: DC traction applications – Uncontrolled rectifiers*

IEC 62590-2-2, *Railway applications – Electronic Power Converters for fixed installations – Part 2-2: DC traction applications – Controlled converters*

IEC 62590-3-1, *Railway applications – Fixed installations – Electronic power converters – Part 3-1: AC traction applications – Electronic power compensators*

IEC 62590-3-2, *Railway applications – Electronic Power Converters for fixed installations – Part 3-2: AC traction applications – Static frequency converters*

RAILWAY APPLICATIONS – ELECTRONIC POWER CONVERTERS FOR FIXED INSTALLATIONS –

Part 1: General requirements

1 Scope

This part of IEC 62590 specifies the common requirements and definitions for all power converter applications in fixed installations for power supply of railway systems.

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

- railway networks,
- metropolitan transport networks including metros, tramways, trolleybuses and fully automated transport systems, magnetic levitated transport systems, electric road systems.

This document applies to AC/DC converters, DC converters and AC converters. Converters for improvement of power quality and for energy saving are also included.

Converters connected to electric traction systems feeding 3AC, 1AC or DC systems for auxiliary purpose are not in the scope of this document but some aspects such as insulation coordination and railway specific conditions can be referred to.

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 60071-1, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60364-1, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions*

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

IEC 60664-1, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

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

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

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

IEC 61936-1, *Power installations exceeding 1 kV AC and 1,5 kV DC – Part 1: AC*