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Railway applications - Fixed installations - Stationary energy storage system for DC traction systems

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 08/17

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62924

April 2017

ICS 45.060.01

English Version

**Railway applications - Fixed installations - Stationary energy
storage system for DC traction systems
(IEC 62924:2017)**

Applications ferroviaires - Installations fixes - Système fixe
de stockage de l'énergie pour les systèmes de traction en
courant continu
(IEC 62924:2017)

Bahnanwendungen - Ortsfeste Anlagen - Ortsfeste
Energiespeichersysteme für Gleichstrombahnen
(IEC 62924:2017)

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

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

European foreword

The text of document 9/2221/FDIS, future edition 1 of IEC 62924, 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 62924:2017.

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) 2017-12-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-03-03

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

IEC 60146-2:1999	NOTE	Harmonized as EN 60146-2:2000.
IEC 61881-3	NOTE	Harmonized as EN 61881-3.
IEC 62620	NOTE	Harmonized as EN 62620.
IEC 62864-1:2016	NOTE	Harmonized as EN 62864-1:2016.
IEC 62928 ¹	NOTE	Harmonized as FprEN 62928.

1) To be published.

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 60146-1	series	Semiconductor converters - General requirements and line commutated converters	EN 60146-1	series
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)		-
IEC 60850	-	Railway applications - Supply voltages of traction systems		-
IEC 61936-1	-	Power installations exceeding 1 kV a.c. -- Part 1: Common rules	EN 61936-1	-
IEC 61992-7-1	-	Railway applications - Fixed installations -- DC switchgear - Part 7-1: Measurement, control and protection devices for specific use in d.c. traction systems - Application guide		-
IEC 62236	series	Railway applications - Electromagnetic-compatibility		series
IEC 62236-1	-	Railway applications - Electromagnetic-compatibility -- Part 1: General		-
IEC 62236-5	-	Railway applications - Electromagnetic-compatibility -- Part 5: Emission and immunity of fixed power supply installations and apparatus		-
IEC 62590	2010	Railway applications - Fixed installations -- Electronic power converters for substations		-



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Edition 1.0 2017-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Railway applications – Fixed installations – Stationary energy storage system for DC traction systems

Applications ferroviaires – Installations fixes – Système stationnaire de stockage d'énergie pour les systèmes de traction en courant continu



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IEC 62924

Edition 1.0 2017-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Railway applications – Fixed installations – Stationary energy storage system for
DC traction systems**

**Applications ferroviaires – Installations fixes – Système stationnaire de stockage
d'énergie pour les systèmes de traction en courant continu**

INTERNATIONAL
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CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms, definitions and abbreviations	9
3.1 Terms and definitions.....	9
3.2 Abbreviations	13
4 Configuration of stationary energy storage systems	13
4.1 General.....	13
4.2 Example system configuration using an electronic power converter	14
4.3 Example system configuration without an electronic power converter.....	14
4.4 Accessory and auxiliary components.....	15
5 Service conditions	15
5.1 Environmental conditions	15
5.2 Electrical service conditions	15
6 Investigation before the installation of stationary ESS	15
6.1 General.....	15
6.2 Decision on the installation location and capacity of the stationary ESS.....	16
6.3 Evaluation of the positive effects of introducing a stationary ESS.....	16
6.4 Coordination with other systems	16
7 Performance requirements.....	16
7.1 General requirements	16
7.1.1 Rating.....	16
7.1.2 System capability to conform with the specified duty cycle.....	18
7.1.3 Short-time withstand current capability	18
7.1.4 Calculation of charge-discharge efficiency	18
7.1.5 Temperature rise	19
7.1.6 Lifetime requirements	19
7.2 Control and protection functions.....	19
7.2.1 Charge/discharge control functions.....	19
7.2.2 Short circuit protection function	20
7.2.3 Earth-fault protection function.....	20
7.2.4 Overload protection function	20
7.2.5 Disconnection functions.....	20
7.3 Electromagnetic compatibility (EMC).....	20
7.4 Failure conditions for the stationary ESS	20
7.5 Mechanical characteristics	21
7.5.1 General	21
7.5.2 Earthing.....	21
7.5.3 Degree of protection	21
7.6 Rating plate	22
7.7 Terminals of the main circuit	22
8 Tests	22
8.1 Types of test.....	22
8.1.1 General	22
8.1.2 Type test	23

8.1.3	Routine test	23
8.1.4	Commissioning test	23
8.1.5	Test categories	23
8.2	Tests	24
8.2.1	Visual inspection	24
8.2.2	Degree of protection test	24
8.2.3	Test of accessory and auxiliary components	24
8.2.4	Insulation test	24
8.2.5	Start and stop sequence test	25
8.2.6	Checking of the protective devices	25
8.2.7	Charge/discharge control functions test	25
8.2.8	Light load functional test	25
8.2.9	Temperature rise test	25
8.2.10	Measurement of charge-discharge efficiency	26
8.2.11	Noise measurement	26
8.2.12	EMC test	26
8.2.13	Harmonic measurement	27
Annex A (normative)	Methods of simulation and measurement on site	28
A.1	General	28
A.2	System design to use simulation software	28
A.2.1	General	28
A.2.2	Simulation software	28
A.2.3	Input parameters for simulation	28
A.2.4	Evaluation of simulation results	30
A.3	Validation of the effect of installing an actual ESS	30
A.3.1	General	30
A.3.2	Before installation	30
A.3.3	After installation	31
Annex B (informative)	State of charge (SOC) and state of energy (SOE) for batteries and capacitors	32
B.1	Content of capacity and energy	32
B.1.1	General	32
B.1.2	Theoretical energy	33
B.1.3	Rated energy	33
B.1.4	Usable energy	33
B.1.5	Theoretical, rated and usable capacity	34
B.2	Content of SOC and SOE	34
B.2.1	General	34
B.2.2	Theoretical purpose	35
B.2.3	Common purpose	35
B.2.4	Effective or practical purpose	35
B.2.5	Coefficient of usage	36
Annex C (informative)	Duty cycle examples	37
Bibliography		40
Figure 1	Common system configuration of stationary ESS	13
Figure 2	Example system configuration using an electronic power converter	14
Figure 3	Example system configuration without an electronic power converter	15

Figure B.1 – Difference of capacity and energy content	32
Figure C.1 – Duty cycle for class I to class III	38
Figure C.2 – Duty cycle for class IV to class VI	38
Figure C.3 – Duty cycle for class VII and class VIII	38
Figure C.4 – Duty cycle for class IX	39
Table 1 – Immunity level	21
Table 2 – List of tests	24
Table A.1 – Operational data	29
Table A.2 – Rolling stock data	29
Table A.3 – DC power supply network data	30
Table A.4 – Measurement data	31
Table C.1 – Duty cycle	37

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RAILWAY APPLICATIONS – FIXED INSTALLATIONS – STATIONARY
ENERGY STORAGE SYSTEM FOR DC TRACTION SYSTEMS**

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International Standard IEC 62924 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

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

FDIS	Report on voting
9/2221/FDIS	9/2244/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.

INTRODUCTION

To save natural resources and counteract global warming, techniques to save energy and/or to improve environmental characteristics are drawing strong interest. In the railway industry, electric rail vehicles fitted with regenerative braking systems have been introduced, not only to save energy, but also to ease maintenance and to reduce the adverse effects of heat generated during braking (especially in tunnels).

However, in DC electric railways, when a train regenerates power, usually the power has to be consumed within the DC network, because DC power supply substations are usually not reversible. There is no guarantee that adequate load exists for regenerative braking trains; in such a circumstance, regenerative braking becomes ineffective, either in part or in whole. In this situation, the power supply network is unreceptive. Among the emerging technologies to improve receptivity is stationary energy storage systems (ESSs). A stationary ESS charges regenerative energy when the power supply network is unreceptive and stores it for use at a later time.

International Standards for stationary ESSs have not been issued. Before ESSs become widely used, international standardization of the basic system structure and measurement method for efficiency, etc., will serve as a guideline for users and manufacturers who want to introduce ESSs.

RAILWAY APPLICATIONS – FIXED INSTALLATIONS – STATIONARY ENERGY STORAGE SYSTEM FOR DC TRACTION SYSTEMS

1 Scope

This document specifies the requirements and test methods for a stationary energy storage system to be introduced as a trackside installation and used in a power supply network of a DC electrified railway. This system can take electrical energy from the DC power supply network, store the energy, and supply the energy back to the DC power supply network when necessary. This document does not apply to onboard energy storage systems.

This document applies to systems which are installed to achieve one or more of the following objectives.

- Absorption of regenerative energy:
 - effective use of regenerative energy (saving energy);
 - reduction of rolling stock maintenance (reduction of brake shoe/pad wear, etc.);
 - avoidance of adverse effects of heat generated during braking (e.g. in tunnels, etc.).
- Power compensation:
 - compensation of line voltage;
 - reduction of peak power;
 - reduction in the requirement of the rectifier ratings.

If this system is combined with one or more of the following functions, this document may be used as a guideline:

- reverse transmission of regenerated power to the upstream power supply network (e.g. inverting or reversible substations);
- use of the regenerated energy for purposes other than the running of trains, such as for station facilities, etc.;
- resistive consumption of regenerated power.

Although it is assumed that the system uses the following typical energy storage technologies, this document also applies to other existing or future technologies:

- batteries (lithium-ion, nickel metal hydride, etc.);
- capacitors (electric double layer capacitors, lithium-ion capacitors, etc.);
- flywheels.

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 60146 (all parts), *Semiconductor converters*

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

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

IEC 61936-1, *Power installations exceeding 1 kV a.c. – Part 1: Common rules*

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

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

IEC 62236-1, *Railway applications – Electromagnetic compatibility – Part 1: General*

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

IEC 62590:2010, *Railway applications – Electronic power converters for substations*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60146 (all parts) and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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