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## Elektriska energilagringssystem (EES) – Del 5-2: Säkerhetsfordringar på elektriska energilagringssystem i elnätet – Elektrokemiska system

*Electrical energy storage (EES) systems –  
Part 5-2: Safety requirements for grid-integrated EES systems –  
Electrochemical-based systems*

Som svensk standard gäller europastandarden EN IEC 62933-5-2:2020. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 62933-5-2:2020.

### Nationellt förord

Europastandarden EN IEC 62933-5-2:2020

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- **IEC 62933-5-2, First edition, 2020 - Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems**

utarbetad inom International Electrotechnical Commission, IEC.

Standarden ska användas tillsammans med SEK TS 62933-5-1, utgåva 1, 2018.

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English Version

Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems  
(IEC 62933-5-2:2020)

Systèmes de stockage de l'énergie électrique (EES) - Partie 5-2: Exigences de sécurité pour les systèmes EES intégrés dans un réseau - Systèmes électrochimiques  
(IEC 62933-5-2:2020)

Elektrische Energiespeichersysteme (EES-Systeme) - Teil 5-2: Sicherheitsanforderungen an netzintegrierte EES-Systeme elektrochemische Systeme  
(IEC 62933-5-2:2020)

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
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## **European foreword**

The text of document 120/173/FDIS, future edition 1 of IEC 62933-5-2, prepared by IEC/TC 120 "Electrical Energy Storage (EES) Systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62933-5-2:2020.

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) 2021-02-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-05-21

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The text of the International Standard IEC 62933-5-2:2020 was approved by CENELEC as a European Standard without any modification.

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

IEC 60364-4-41	NOTE	Harmonized as HD 60364-4-41
IEC 60364-4-42	NOTE	Harmonized as HD 60364-4-42
IEC 60364-4-43	NOTE	Harmonized as HD 60364-4-43
IEC 60721 (series)	NOTE	Harmonized as EN 60721 (series)
IEC 60896-21	NOTE	Harmonized as EN 60896-21
IEC 60896-22	NOTE	Harmonized as EN 60896-22
IEC 61140	NOTE	Harmonized as EN 61140
IEC 61427-1	NOTE	Harmonized as EN 61427-1
IEC 61427-2	NOTE	Harmonized as EN 61427-2
IEC 61508 (series)	NOTE	Harmonized as EN 61508 (series)
IEC 61511-1:2016	NOTE	Harmonized as EN 61511-1:2017 (not modified)
IEC 62040-1	NOTE	Harmonized as EN IEC 62040-1
IEC 62040-2	NOTE	Harmonized as EN IEC 62040-2
IEC 62116:2014	NOTE	Harmonized as EN 62116:2014 (not modified)
IEC 62351 (series)	NOTE	Harmonized as EN 62351 (series)
IEC 62381:2012	NOTE	Harmonized as EN 62381:2012 (not modified)
IEC 62443-2-4	NOTE	Harmonized as EN IEC 62443-2-4
IEC 62485-1	NOTE	Harmonized as EN IEC 62485-1
IEC 62909-1	NOTE	Harmonized as EN IEC 62909-1
IEC 62932-1:2020	NOTE	Harmonized as EN IEC 62932-1:2020 (not modified)
ISO 1182	NOTE	Harmonized as EN ISO 1182
ISO 9241 (series)	NOTE	Harmonized as EN ISO 9241 (series)
ISO 13732-1:2006	NOTE	Harmonized as EN ISO 13732-1:2008 (not modified)
ISO 13850:2015	NOTE	Harmonized as EN ISO 13850:2015 (not modified)

## 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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-52	-	Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN IEC 60068-2-52	-
IEC 60079-7	2015	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"	EN 60079-7	2015
+ A1	2017		+ A1	2018
IEC 60079-13	-	Explosive atmospheres - Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"	EN 60079-13	-
IEC 60079-29	series	Explosive atmospheres - Gas detectors	EN 60079-29	series
IEC 60364	series	Low-voltage electrical installations	-	-
IEC 60364-4-44	-	Low-voltage electrical installations - Part 4-44: Protection for safety - Protection against voltage disturbances and electromagnetic disturbances	HD 60364-4-442	-
IEC 60364-6	2016	Low voltage electrical installations - Part 6: Verification	HD 60364-6	2016
			+ A11	2017
			+ A12	2017
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60812	-	Failure modes and effects analysis (FMEA and FMECA)	EN IEC 60812	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-1-2	-	Electromagnetic compatibility (EMC) - Part 1-2: General - Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena	EN 61000-1-2	-
IEC 61000-6-7	-	Electromagnetic compatibility (EMC) - Part 6-7: Generic standards - Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations	EN 61000-6-7	-
IEC 61025	-	Fault tree analysis (FTA)	-	-
IEC 61660-1	-	Short-circuit currents in d.c. auxiliary installations in power plants and substations - Part 1: Calculation of short-circuit currents	EN 61660-1	-
IEC 61660-2	-	Short-circuit currents in d.c. auxiliary installations in power plants and substations - Part 2: Calculation of effects	EN 61660-2	-
IEC 61882	-	Hazard and operability studies (HAZOP studies) - Application guide	EN 61882	-
IEC 61936-1 (mod)	2010	Power installations exceeding 1 kV a.c. - Part 1: Common rules	EN 61936-1	2010
			+ AC	2013
+ A1	2014		+ A1	2014
IEC 62305-2	-	Protection against lightning - Part 2: Risk management	-	-
IEC 62368-1	-	Audio/video, information and communication technology equipment - Part 1: Safety requirements	EN IEC 62368-1	-
IEC 62477-1	2012	Safety requirements for power electronic converter systems and equipment - Part 1: General	EN 62477-1	2012
			+ A11	2014
+ A1	2016		+ A1	2017
IEC 62485-2	-	Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries	EN IEC 62485-2	-
IEC 62619	2017	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications	EN 62619	2017

## EN IEC 62933-5-2:2020 (E)

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62933-1	-	Electrical energy storage (EES) systems - Part 1: Vocabulary	EN IEC 62933-1	-
IEC/TS 62933-5-1	2017	Electrical energy storage (EES) systems - Part 5-1: Safety considerations for grid integrated EES systems - General specification	-	-
ISO/IEC Guide 51	2014	Safety aspects - Guidelines for their inclusion in standards	-	-



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL ENERGY STORAGE (EES) SYSTEMS –****Part 5-2: Safety requirements for grid-integrated EES systems –  
Electrochemical-based systems**

## FOREWORD

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International Standard IEC 62933-5-2 has been prepared by IEC technical committee 120: Electrical Energy Storage (EES) Systems.

This International Standard is to be used in conjunction with IEC TS 62933-5-1:2017.

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

FDIS	Report on voting
120/173/FDIS	120/182/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.

A list of all parts in the IEC 62933 series, published under the general title *Electrical energy storage (EES) systems*, 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.

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## INTRODUCTION

All the electrical energy storage systems (EESS) follow the general safety requirements as described in IEC TS 62933-5-1, which is based on a systems approach. IEC 62933-5-2 follows the same structure as IEC TS 62933-5-1 and provides additional requirements for battery energy storage systems (BESS). The additional requirements are provided for the following reasons:

- a) BESS can be integrated into a significant range of electrical grids.
- b) The level of safety requirements awareness can vary between utilities, system integrators, operators and end-users.
- c) Although the safety of individual subsystems is generally covered by international standards at ISO and IEC levels, the safety matters that arise due to the combination of electrochemical accumulation subsystems and any electrical subsystems are not always considered. BESS are complex at the systems level due to the variety of potential battery options and configurations, including the combination of subsystems (e.g. control systems for electrochemical accumulation subsystems, electrochemical accumulation subsystems, power conversion subsystems and auxiliary subsystems). Compliance with standards and related material produced specifically for the safety of subsystems cannot be sufficient to reach an acceptable level of safety for the overall system.
- d) BESS can have additional safety hazards, due, for example, to the presence of chemicals, the emission of toxic gases, chemicals spilt around the electrochemical accumulation subsystems and to events critical for safety from electrochemical accumulation subsystems that cause safety issues for the entire BESS. They can cause loss of power at any part of the systems and buildings that can result in additional threats to safety. From a systems perspective, these individual hazards can have a system wide impact.

## ELECTRICAL ENERGY STORAGE (EES) SYSTEMS –

### Part 5-2: Safety requirements for grid-integrated EES systems – Electrochemical-based systems

#### 1 Scope

This part of IEC 62933 primarily describes safety aspects for people and, where appropriate, safety matters related to the surroundings and living beings for grid-connected energy storage systems where an electrochemical storage subsystem is used.

This safety standard is applicable to the entire life cycle of BESS (from design to end of service life management).

This document provides further safety provisions that arise due to the use of an electrochemical storage subsystem (e.g. battery system) in energy storage systems that are beyond the general safety considerations described in IEC TS 62933-5-1.

This document specifies the safety requirements of an “electrochemical” energy storage system as a “system” to reduce the risk of harm or damage caused by the hazards of an electrochemical energy storage system due to interactions between the subsystems as presently understood.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitute 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 60068-2-52, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60079-7:2015, *Explosive atmospheres – Part 7: Equipment protection by increased safety “e”*  
IEC 60079-7:2015/AMD1:2017

IEC 60079-13, *Explosive atmospheres – Part 13: Equipment protection by pressurized room “p” and artificially ventilated room “v”*

IEC 60079-29 (all parts), *Explosive atmospheres – Gas detectors*

IEC 60364 (all parts), *Low-voltage electrical installations*

IEC 60364-4-44, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60364-6:2016, *Low voltage electrical installations – Part 6: Verification*

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

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60812, *Failure modes and effects analysis (FMEA and FMECA)*

IEC 61000-1-2, *Electromagnetic compatibility (EMC) – Part 1-2: General – Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena*

IEC 61000-6-7, *Electromagnetic compatibility (EMC) – Part 6-7: Generic standards – Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations*

IEC 61025, *Fault tree analysis (FTA)*

IEC 61660-1, *Short-circuit currents in d.c. auxiliary installations in power plants and substations – Part 1: Calculation of short-circuit currents*

IEC 61660-2, *Short-circuit currents in d.c. auxiliary installations in power plants and substations – Part 2: Calculation of effects*

IEC 61882, *Hazard and operability studies (HAZOP studies) – Application guide*

IEC 61936-1:2010, *Power installations exceeding 1 kV a.c. – Part 1: Common rules*  
IEC 61936-1:2010/AMD1:2014

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