SVENSK STANDARD SS-EN 61936-1

Fastställd	Utgåva	Sida	Ansvarig kommitté
2011-03-09	1	1 (1+115)	SEK TK 99

Starkströmsanläggningar med nominell spänning överstigande 1 kV AC – Del 1: Allmänna fodringar

Power installations exceeding 1 kV a.c. –
Part 1: Common rules

Som svensk standard gäller europastandarden EN 61936-1:2010. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61936-1:2010.

Nationellt förord

Europastandarden EN 61936-1:2010

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61936-1, Second edition, 2010 - Power installations exceeding 1 kV a.c. - Part 1: Common rules**

utarbetad inom International Electrotechnical Commission, IEC.

I bilaga ZA och ZB redovisas svenska avvikelser, vilka av CENELEC accepterats till följd av speciella nationella förhållanden.

SS-EN 61936-1, utgåva 1, 2011 ersätter alla avsnitt utom avsnitt 9 i tidigare fastställd svensk standard SS 421 01 01, utgåva 2, 2004, som ej gäller fr o m 2013-11-01. Avsnitt 9 i SS 421 01 01 ersätts av SS-EN 50522, utgåva 1, 2011.

ICS 29.020; 29.080.01

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61936-1

November 2010

ICS 29.020. 29.080.01

Supersedes HD 637 S1:1999 (partially)

English version

Power installations exceeding 1 kV a.c. - Part 1: Common rules

(IEC 61936-1:2010, modified)

Installations électriques en courant alternatif de puissance supérieure à 1 kV - Partie 1: Règles communes
(CEI 61936-1:2010, modifiée)

Starkstromanlagen mit Nennwechselspannungen über 1 kV - Teil 1: Allgemeine Bestimmungen
(IEC 61936-1:2010, modifiziert)

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61936-1:2010 E

SEK Svensk Elstandard

Foreword

The text of document 99/95/FDIS, future edition 2 of IEC 61936-1, prepared by IEC TC 99, System engineering and erection of electrical power installations in systems with nominal voltages above 1 kV a.c. and 1,5 kV d.c., particularly concerning safety aspects, was submitted to the IEC-CENELEC parallel vote.

A draft amendment was prepared by the Technical Committee CENELEC TC 99X, Power installations exceeding 1 kV a.c. (1,5 kV d.c.) and was submitted to formal vote.

The combined texts were approved by CENELEC as EN 61936-1 on 2010-11-01.

This European Standard partially supersedes HD 637 S1:1999.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-11-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-11-01

Annexes ZA, ZB and ZC have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61936-1:2010 was approved by CENELEC as a European Standard without with agreed common modifications as given below.

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

[5] IEC 60044-6	NOTE	Harmonized as EN 60044-6.
[16] IEC 60068 series	NOTE	Harmonized in EN 60068 series (not modified).
[17] IEC 60364-4-41	NOTE	Harmonized as EN 60364-4-41.
[18] IEC 60480	NOTE	Harmonized as EN 60480.
[19] IEC 60664-1	NOTE	Harmonized as EN 60664-1.
[23] IEC 62271-100	NOTE	Harmonized as EN 62271-100.
[24] IEC 62271-102	NOTE	Harmonized as EN 62271-102.
[25] IEC 62271-103	NOTE	Harmonized as EN 62271-103.
[26] IEC 62271-104	NOTE	Harmonized as EN 62271-104.
[27] IEC 62271-105	NOTE	Harmonized as EN 62271-105.

Annex ZC
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60034-1 (mod)	-	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1	-
IEC 60034-3	-	Rotating electrical machines - Part 3: Specific requirements for synchronous generators driven by steam turbines or combustion gas turbines	EN 60034-3	-
IEC 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60071-1	-	Insulation co-ordination - Part 1: Definitions, principles and rules	EN 60071-1	-
IEC 60071-2	1996	Insulation co-ordination - Part 2: Application guide	EN 60071-2	1997
IEC 60076-2 (mod)	1993	Power transformers - Part 2: Temperature rise	EN 60076-2	1997
IEC 60076-11	-	Power transformers - Part 11: Dry-type transformers	EN 60076-11	-
IEC 60079-0	-	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	-
IEC 60079-10-1	-	Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres	EN 60079-10-1	-
IEC 60255	Series	Measuring relays and protection equipment	EN 60255	Series
IEC 60331-21	-	Tests for electric cables under fire conditions - Circuit integrity - Part 21: Procedures and requirements - Cables of rated voltage up to an dincluding 0,6/1,0 kV	-	-
IEC 60331-1	-	Tests for electric cables under fire conditions - Circuit integrity - Part 1: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding 20 mm	-	-
IEC 60332	Series	Tests on electric and optical fibre cables under fire conditions	-	-

Publication	Year	Title	EN/HD	Year
IEC 60364	Series	Low-voltage electrical installations	HD 60364	Series
IEC/TS 60479-1	2005	Effects of current on human beings and livestock - Part 1: General aspects	-	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60617	-	Graphical symbols for diagrams	-	-
IEC 60721-2-6	-	Classification of environmental conditions - Part 2-6: Environmental conditions appearing in nature - Earthquake vibration and shock	HD 478.2.6 S1	-
IEC 60721-2-7	-	Classification of environmental conditions - Part 2-7: Environmental conditions appearing in nature - Fauna and flora	HD 478.2.7 S1	-
IEC 60754-1	-	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the amount of halogen acid gas	-	-
IEC 60754-2 (mod)	-	Test on gases evolved during combustion of electric cables - Part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	HD 602 S1[1)]	-
IEC/TS 60815-1	-	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles	-	-
IEC 60826	-	Design criteria of overhead transmission lines	-	-
IEC 60865-1	-	Short-circuit currents - Calculation of effects - Part 1: Definitions and calculation methods	EN 60865-1	-
IEC 60909	Series	Short-circuit currents in three-phase a.c. systems	EN 60909	Series
IEC 60949	-	Calculation of thermally permissible short-circuit currents, taking into account non-adiabatic heating effects	-	-
IEC/TR 61000-5-2	-	Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 2: Earthing and cabling	-	-
IEC 61034-1	-	Measurement of smoke density of cables burning under defined conditions - Part 1: Test apparatus	EN 61034-1	-
IEC 61082-1	-	Preparation of documents used in electrotechnology - Part 1: Rules	EN 61082-1	-
IEC 61100	-	Classification of insulating liquids according to fire point and net calorific value	EN 61100	-
IEC 61140	-	Protection against electric shock - Common aspects for installation and equipment	EN 61140	-

[1)] HD 602 S1 is superseded by EN 50267-2-3:1998.

Publication	Year	Title	EN/HD	Year
IEC 61219	-	Live working - Earthing or earthing and short-circuiting equipment using lances as short-circuiting device - Lance earthing	EN 61219	-
IEC 61230	-	Live working - Portable equipment for earthing or earthing and short-circuiting	EN 61230	-
IEC 60079-10-2	-	Explosive atmospheres - Part 10-2: Classification of areas - Combustible dust atmospheres	EN 60079-10-2	-
IEC 61243	Series	Live working - Voltage detectors	EN 61243	Series
IEC 62271-1	2007	High-voltage switchgear and controlgear - Part 1: Common specifications	EN 62271-1	2008
IEC 62271-200	-	High-voltage switchgear and controlgear - Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	EN 62271-200	-
IEC 62271-201	-	High-voltage switchgear and controlgear - Part 201: AC insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	EN 62271-201	-
IEC 62271-202	-	High-voltage switchgear and controlgear - Part 202: High voltage/low voltage prefabricated substation	EN 62271-202	-
IEC 62271-203	-	High-voltage switchgear and controlgear - Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV	EN 62271-203	-
IEC/TR 62271-303	-	High-voltage switchgear and controlgear - Part 303: Use and handling of sulphur hexafluoride (SF6)	CLC/TR 62271-303	-
IEC 62305	Series	Protection against lightning	EN 62305	Series
IEC 62305-4	-	Protection against lightning - Part 4: Electrical and electronic systems within structures	EN 62305-4	-
IEC Guide 107	-	Electromagnetic compatibility - Guide to the drafting of electromagnetic compatibility publications	-	-
ISO/IEC Guide 51	-	Safety aspects - Guidelines for their inclusion in standards	-	-
ISO 1996-1	-	Acoustics - Description, measurement and assessment of environmental noise - Part 1: Basic quantities and assessment procedures	-	-
IEEE 80	-	Guide for safety in AC substation grounding	-	-
IEEE 980	-	Guide for containment and control of oil spills in substations	-	-

CONTENTS

INTRODUCTION

There are many national laws, standards and internal rules dealing with the matter coming within the scope of this standard and these practices have been taken as a basis for this work.

This part of IEC 61936 contains the minimum requirements valid for IEC countries and some additional information which ensures an acceptable reliability of an installation and its safe operation.

The publication of this standard is believed to be a decisive step towards the gradual alignment all over the world of the practices concerning the design and erection of high voltage power installations.

Particular requirements for transmission and distribution installations as well as particular requirements for power generation and industrial installations are included in this standard.

The relevant laws or regulations of an authority having jurisdiction takes precedence.

POWER INSTALLATIONS EXCEEDING 1 kV AC –

Part 1: Common rules

1 Scope

This part of IEC 61936 provides common rules for the design and the erection of electrical power installations in systems with nominal voltages above 1 kV a.c. and nominal frequency up to and including 60 Hz, so as to provide safety and proper functioning for the use intended.

For the purpose of interpreting this standard, an electrical power installation is considered to be one of the following:

a) Substation, including substation for railway power supply

b) Electrical installations on mast, pole and tower

   Switchgear and/or transformers located outside a closed electrical operating area

c) One (or more) power station(s) located on a single site

   The installation includes generators and transformers with all associated switchgear and all electrical auxiliary systems. Connections between generating stations located on different sites are excluded.

d) The electrical system of a factory, industrial plant or other industrial, agricultural, commercial or public premises

The electrical power installation includes, among others, the following equipment:

– rotating electrical machines;
– switchgear;
– transformers and reactors;
– converters;
– cables;
– wiring systems;
– batteries;
– capacitors;
– earthing systems;
– buildings and fences which are part of a closed electrical operating area;
– associated protection, control and auxiliary systems;
– large air core reactor.

NOTE In general, a standard for an item of equipment takes precedence over this standard.

This standard does not apply to the design and erection of any of the following:

– overhead and underground lines between separate installations;
– electric railways;
– mining equipment and installations;
– fluorescent lamp installations;
– installations on ships and off-shore installations;
– electrostatic equipment (e.g. electrostatic precipitators, spray-painting units);

– test sites;
– medical equipment, e.g. medical X-ray equipment.

This standard does not apply to the design of factory-built, type-tested switchgear for which separate IEC standards exist.

This standard does not apply to the requirements for carrying out live working on electrical installations.

If not otherwise required in this standard, for low-voltage electrical installations the standard series IEC 60364 applies.

2 Normative references

The following referenced documents are indispensable for the application 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 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-3, *Rotating electrical machines – Part 3: Specific requirements for synchronous generators driven by steam turbines or combustion gas turbines*

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

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

IEC 60071-2:1996, *Insulation co-ordination – Part 2: Application guide*

IEC 60076-2:1993, *Power transformers – Part 2: Temperature rise*

IEC 60076-11, *Power transformers – Part 11: Dry-type transformers*

IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

IEC 60079-10-1, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*

IEC 60255 (all parts), *Measuring relays and protection equipment*

IEC 60331-21, *Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV*

IEC 60331-1, *Tests for electric cables under fire conditions – Circuit integrity – Part 1: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding 20 mm*

IEC 60332 (all parts), *Tests on electric and optical fibre cables under fire conditions*

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

IEC/TS 60479-1:2005, *Effects of current on human beings and livestock – Part 1: General aspects*

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

IEC 60617, *Graphical symbols for diagrams*

IEC 60721-2-6, *Classification of environmental conditions – Part 2-6: Environmental conditions appearing in nature – Earthquake vibration and shock*

IEC 60721-2-7, *Classification of environmental conditions – Part 2-7: Environmental conditions appearing in nature. Fauna and flora*

IEC 60754-1, *Test on gases evolved during combustion of materials from cables – Part 1: Determination of the amount of halogen acid gas*

IEC 60754-2, *Test on gases evolved during combustion of electric cables – Part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity*

IEC/TS 60815-1, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles*

IEC 60826, *Design criteria of overhead transmission lines*

IEC 60865-1, *Short-circuit currents – Calculation of effects – Part 1: Definitions and calculation methods*

IEC 60909 (all parts), *Short-circuit currents in three-phase a.c. systems*

IEC 60949, *Calculation of thermally permissible short-circuit currents, taking into account non-adiabatic heating effects*

IEC/TR 61000-5-2, *Electromagnetic compatibility (EMC) – Part 5: Installation and mitigation guidelines – Section 2: Earthing and cabling*

IEC 61034-1, *Measurement of smoke density of cables burning under defined conditions – Part 1: Test apparatus*

IEC 61082-1, *Preparation of documents used in electrotechnology – Part 1: Rules*

IEC 61100, *Classification of insulating liquids according of fire-point and net calorific value*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61219, *Live working – Earthing or earthing and short-circuiting equipment using lances as a short-circuiting device – Lance earthing*

IEC 61230, *Live working – Portable equipment for earthing or earthing and short-circuiting*

IEC 60079-10-2, *Explosives atmospheres – Part 10-2: Classification of areas – Combustible dust atmospheres*

IEC 61243 (all parts), *Live working – Voltage detectors*

IEC 62271-1:2007, *High-voltage switchgear and controlgear – Part 1: Common specifications*

IEC 62271-200, *High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-201, *High-voltage switchgear and controlgear – Part 201: AC insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-202, *High-voltage switchgear and controlgear – Part 202: High-voltage/low-voltage prefabricated substation*

IEC 62271-203, *High-voltage switchgear and controlgear – Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*

IEC/TR 62271-303, *High-voltage switchgear and controlgear – Part 303: Use and handling of sulphur hexafluoride (SF_6)*

IEC 62305 (all parts), *Protection against lightning*

IEC 62305-4, *Protection against lightning – Part 4: Electrical and electronic systems within structures*

IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

ISO 1996-1, *Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment-procedures*

IEEE 80, *Guide for safety in AC substation grounding*

IEEE 980, *Guide for containment and control of oil spills in substations*

Official Journal of the European Communities, No. C 62/23 dated 28.2.1994: *Interpretative document, Essential requirements No. 2, "safety in case of fire"*