

# TECHNICAL SPECIFICATION

**Power installations exceeding 1 kV AC and 1,5 kV DC –  
Part 0: Principles to be observed in the design and erection of high voltage  
installations – Safety of high voltage installations**

IEC TS 61936-0:2023

<https://standards.iteh.ai/catalog/standards/sist/244e704a-597d-4988-8e09-eaadccdbe8fb/iec-ts-61936-0-2023>



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INTERNATIONAL  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**POWER INSTALLATIONS EXCEEDING 1 kV AC AND 1,5 kV DC –****Part 0: Principles to be observed in the design and erection of high voltage installations – Safety of high voltage installations**

## FOREWORD

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IEC TS 61936-0 has been prepared by technical committee 99: Insulation co-ordination and system engineering of high voltage electrical power installations above 1,0 kV AC and 1,5 kV DC. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
99/375/DTS	99/404/RVDTS

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 Technical Specification 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 [https://www.iec.ch/members\\_experts/refdocs](https://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at <https://www.iec.ch/standardsdev/publications>.

A list of all parts in the IEC 61936 series, published under the general title *Power installations exceeding 1 kV AC and 1,5 kV DC*, 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 [webstore.iec.ch](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- withdrawn,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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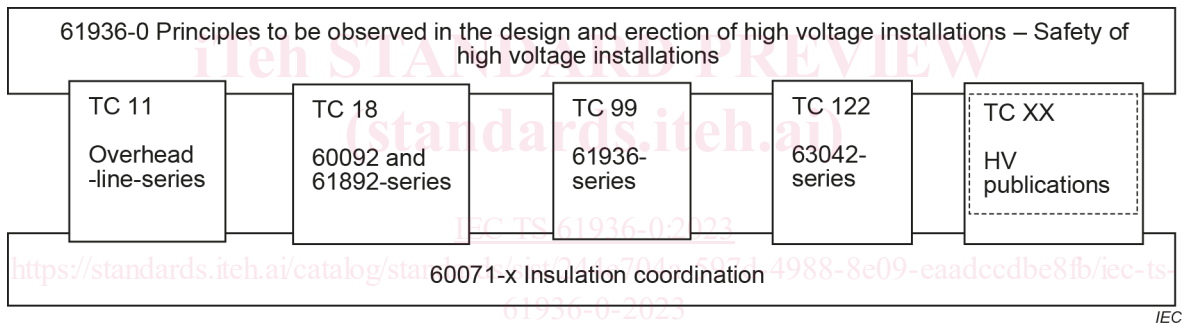
## INTRODUCTION

The scope of TC 99 is the standardisation of insulation co-ordination for high voltage systems and common rules and particular requirements for system engineering and erection of high voltage electrical power installations for power generation, transmission, distribution, and consumer premises, in both indoor and outdoor situations, with particular consideration of safety aspects.

With the increasing development of electric power systems and renewable energy devices, there is an increasing demand for Technical Committees to define installations, systems and equipment at voltages above 1,0 kV AC and 1,5 kV DC. This requirement became evident during the activities of TC 99 AhG6's discussions with TC 18 and TC 88 where a review of documents prepared by these TCs showed that there was a need for a document which defines principles to be observed in design and the erection of HV installations.

The objective of this document is to give the principles for TCs in how to define requirements with respect to HV installations to ensure that safety of such systems is maintained and that a consistent approach is taken by all TCs involved with HV installations with respect to design, operation and maintenance of installation at voltages above 1,0 kV AC and 1,5 kV DC.

Figure 1 below describes the relationship of this document to other IEC standards:



**Figure 1 – Relationship of IEC 61936-0 to other IEC standards**



## POWER INSTALLATIONS EXCEEDING 1 kV AC AND 1,5 kV DC –

### Part 0: Principles to be observed in the design and erection of high voltage installations – Safety of high voltage installations

#### 1 Scope

This part of IEC 61936 provides principles to ensure the coherence amongst HV publications to be observed necessary for the coordination of the design, selection of equipment, operation, and maintenance activities for erection of electrical HV installations to ensure the safety of such systems.

In the context of this document, "safety" relates to the safety of persons, domestic animals, livestock and property.

This Technical Specification is intended for use by technical committees in the preparation of standards with safety aspects which can be a part of an electrical high voltage installation.

#### 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 TS 61936-0:2023  
<https://standards.iec.ch/catalog/standards/sist/244e704a-597d-4988-8e09-eaadccdb8fb/iec-ts-61936-0-2023>  
ISO/IEC Guide 51:2014, *Safety aspects – Guidelines for their inclusion in standards*

IEC 60068 (all parts), *Environmental testing*

IEC 60071 (all parts), *Insulation co-ordination*

IEC 60445, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC TR 60479-5, *Effects of current on human beings and livestock – Part 5: Touch voltage threshold values for physiological effects*

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

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

#### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

**3.1  
arc  
arcing**

luminous discharge of electricity across an insulating medium, usually accompanied by the partial volatilization of the electrodes

Note 1 to entry: A complete sinusoidal current half-cycle is not considered to be an arcing half-cycle.

[SOURCE: IEC 60050-442:1998/AMD3:2019, 442-05-65]

**3.2  
arc fault  
arcing fault**

dangerous unintentional arc

[SOURCE: IEC 60050-442:1998/AMD3:2019, 442-05-66]

**3.3  
arm's reach**

zone of accessibility to touch extending from any point on a surface where persons usually stand or move about to the limits which a person can reach with the hand, in any direction, without assistance

[SOURCE: IEC 60050-195:2021, 195-06-12, modified – The note has been removed.]

**3.4  
automatic disconnection of supply**

interruption of one or more of the line conductors effected by the automatic operation of a protective device in the event of a fault

Note 1 to entry: This does not necessarily mean an interruption in all conductors of the supply system.

[SOURCE: IEC 60050-195:2021, 195-04-10, modified – “in the event of a fault” replaces “in case of a fault” and Note 1 to entry added]

**3.5  
basic insulation**

insulation that provides basic protection

Note 1 to entry: This concept does not apply to insulation used exclusively for functional purposes.

[SOURCE: IEC 60050-195:2021, 195-06-06]

**3.6  
conditions****3.6.1  
normal condition**

<protection against electric shock> condition in which all means of protection are intact

[SOURCE: IEC 60050-903:2013, 903-02-07, modified – “<protection against electric shock> has been added.]

### 3.6.2

#### **single fault condition**

<protection against electric shock> condition in which there is a fault of a single protection (but not a reinforced protection) or of a single component or a device

Note 1 to entry: If a single fault condition results in one or more other fault conditions, all are considered as one single fault condition.

[SOURCE: IEC 60050-903:2013, 903-01-15 modified – “<protection against electric shock>” has been added.]

### 3.6.3

#### **environmental condition**

characteristic of the environment which may affect performance of a component, device or equipment

Note 1 to entry: Examples of environmental conditions are external influences, characteristics of the power supply, duty cycle or duty type.

[SOURCE: IEC 60050-151:2001, 151-16-01 modified – The term “operating conditions” has been replaced by “environmental condition”. It has also been replaced by “environmental conditions” in Note 1 to entry.]

### 3.6.4

#### **normal environmental condition**

characteristic of the environment which may affect performance of a device or system, and which is standardized as normal

Note 1 to entry: Examples of environmental conditions are pressure, temperature, humidity, radiation, vibration.

Note 2 to entry: Conditions which are normal as described in IEC Guide 111.

[SOURCE: IEC 60050-151:2001, 151-16-03, modified – The words “and which is standardized as normal” have been added.]

### 3.6.5

#### **special environmental condition**

characteristic of the environment which may affect performance of a device or system, and which is standardized as special

Note 1 to entry: Examples of environmental conditions are pressure, temperature, humidity, radiation, vibration.

Note 2 to entry: Conditions which is special as described in IEC Guide 111.

Note 3 to entry: See 5.3 of IEC Guide 111:2004 for more information on special environmental conditions.

### 3.6.6

#### **operating condition**

state of a component, device, equipment or system characterized by one or more properties

### 3.6.7

#### **normal operating condition**

operating condition representing the range of intended use

[SOURCE: IEC 60050-903:2013/AMD1:2014, 903-01-21 modified – “as closely as possible” has been removed, as well as “that can reasonably be expected” and “normal use” has been replaced by “intended use”.]

### 3.6.8

#### **abnormal operating condition**

operating condition that is not a normal operating condition and is not a single fault condition of the equipment itself

[SOURCE: IEC 60050-903/AMD1:2014:2013, 903-01-22]

### 3.6.9

#### **intended use**

use of a product, process or service in accordance with the information for use

[SOURCE: IEC 60050-903:2014, 903-01-13, modified – The words “provided by the supplier” have been removed.]

### 3.7

#### **danger zone**

in the case of HV, area limited by the minimum clearance around live-parts without complete protection

Note 1 to entry: Entering the danger zone is considered the same as touching live-parts.

[SOURCE: IEC 61140:2016, 3.35, modified – In Note 1 to entry, “hazardous-live-parts” has been replaced by “live-parts”.]

### 3.8

#### **minimum clearance of danger zone**

*N*

clearance which describes the area of danger zone around live-parts without complete protection

[SOURCE: IEC 61936-1:2021, 3.5.6, modified – “hazardous” and “against direct contact” have been removed, as well as the two notes]

### 3.9

#### **vicinity zone**

limited space outside the live working zone where specific precautions are taken to avoid encroaching into the live working zone

Note 1 to entry: Encroaching into the live working zone will create an electrical hazard.

Note 2 to entry: The outer boundary of the vicinity zone and the specific precautions that apply are generally defined by national or company regulations.

Note 3 to entry: This entry was numbered 651-01-07 in IEC 60050-651:1999. It has been modified as follows: Greater detail is provided regarding the precautions to be taken when in the vicinity zone.

[SOURCE: IEC 60050-651:2014, 651-21-04]

### 3.10

#### **reference earth**

#### **reference ground, US**

part of the Earth considered as conductive, the electric potential of which is conventionally taken as zero, being outside the zone of influence of any earthing arrangement

Note 1 to entry: The concept “Earth” means the planet and all its physical matter.

[SOURCE: IEC 60050-195:2021, 195-01-01]