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IEC 61439-5

Edition 3.0 2023-05  
REDLINE VERSION

# INTERNATIONAL STANDARD



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**Low-voltage switchgear and controlgear assemblies –  
Part 5: Assemblies for power distribution in public networks**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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ICS 29.130.20

ISBN 978-2-8322-6987-9

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES –

#### Part 5: Assemblies for power distribution in public networks

#### FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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**This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61439-5:2014. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.**

IEC 61439-5 has been prepared by subcommittee 121B: Low-voltage switchgear and controlgear assemblies, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage. It is an International Standard.

This third edition cancels and replaces the second edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) omission of the requirement to conduct mechanical tests at  $-25\text{ °C}$  when enclosures are made of a metallic material;
- b) addition of assumed loading factors generation supplies and electric vehicle charging applications;
- c) additional dielectric tests when a PENDA is used in a distribution substation with separate HV and LV earths;
- d) further clarification of representative samples for design verification.

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

Draft	Report on voting
121B/173/FDIS	121B/178/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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Tables and figures in IEC 61439-5:2023 that are new are numbered starting with 101.

New annexes in IEC 61439-5:2023 are lettered AA, BB, etc.

The reader's attention is drawn to the fact that Annex DD lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

A list of all parts of the IEC 61439 series, under the general title *Low-voltage switchgear and controlgear assemblies* 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,
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- amended.

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## LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES –

### Part 5: Assemblies for power distribution in public networks

#### 1 Scope

This document defines the specific requirements for public electricity network distribution assemblies (PENDAs).

PENDAs have the following criteria:

- used for the distribution of electrical energy in three phase systems for which the rated voltage does not exceed 1 000 V AC (see Figure 101 for a typical distribution network) and DC systems not exceeding 1 500 V DC;
- stationary;
- open type assemblies are not covered by this document;
- suitable for installation in places where only skilled persons have access for their use, however, outdoor types ~~may~~ can be installed in situations that are accessible to ordinary persons
  - intended for use in energy distribution in public power grids;
  - indoor use: assemblies for installation inside of electric power substations;
  - outdoor use: assemblies containing an enclosure suitable for open air installation.

The object of this document is to state the definitions and to specify the service conditions, construction requirements, technical characteristics and tests for PENDAs. ~~Network parameters may require~~ Tests at higher performance level can be applicable with some network parameters.

PENDAs ~~may~~ can also include control and or signalling devices associated with the distribution of electrical energy.

NOTE 1 Control and monitoring devices can be used in smart grid applications or the transmission of smart grid data.

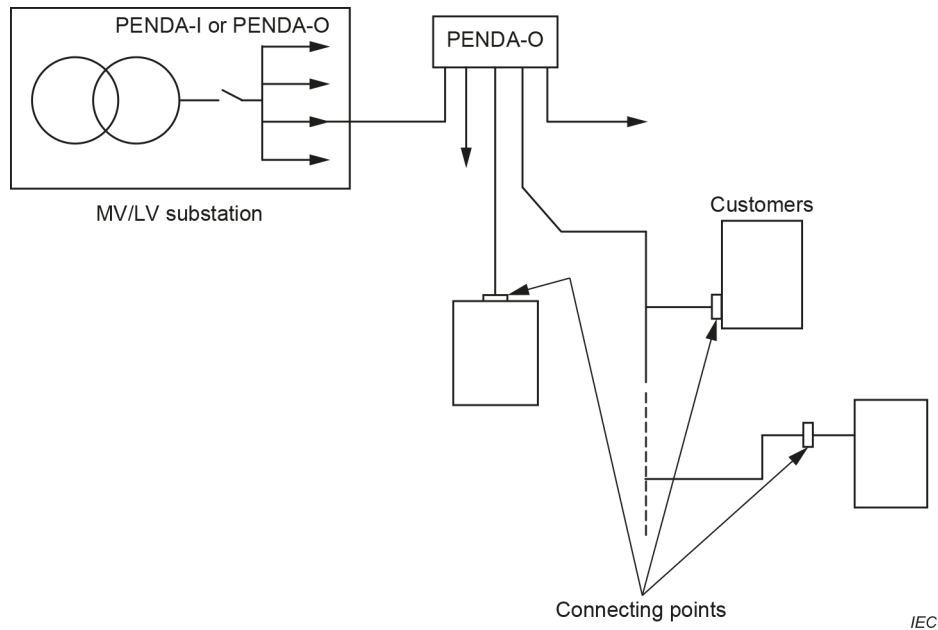
This document applies to all PENDAs whether they are designed, manufactured on a one-off basis or fully standardised and manufactured in quantity.

The manufacture and/or assembly ~~may~~ can be carried out other than by the original manufacturer (see 3.10.1 of IEC 61439-1:2014/2020).

This document does not apply to individual devices and self-contained components, such as motor starters, fuse switches, electronic equipment, etc. which comply with the relevant product standards.

If the substation is owned or operated by a public distribution system operator (DSO), PENDA's which are used as LV distribution panels in transformer substations are within the scope of this document,

This document does not apply to specific types of assemblies covered by other parts of IEC 61439 series.



**Figure 101 – Typical distribution network**

NOTE 2 If a PENDA is equipped with additional equipment (for example meters), in such a way that the main function is changed considerably, then other standards can also apply as agreed between user and manufacturer (see 8.5 of IEC 61439-1:2014/2020).

NOTE 3 Where local regulations and practices permit, a PENDA according to this document can be used in other than public networks.

NOTE 4 DSO's can define additional requirements for their PENDA's.

## 2 Normative references

This clause of IEC 61439-1:2020 applies except as follows.

*Addition:*

IEC 60695-11-10:2013, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 61439-1:2014/2020, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*

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ISO 6506-1:2014, *Metallic materials – Brinell hardness test – Part 1: Test method*

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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**Low-voltage switchgear and controlgear assemblies –  
Part 5: Assemblies for power distribution in public networks**

**Ensembles d'appareillage à basse tension –  
Partie 5: Ensembles pour réseaux de distribution publique**





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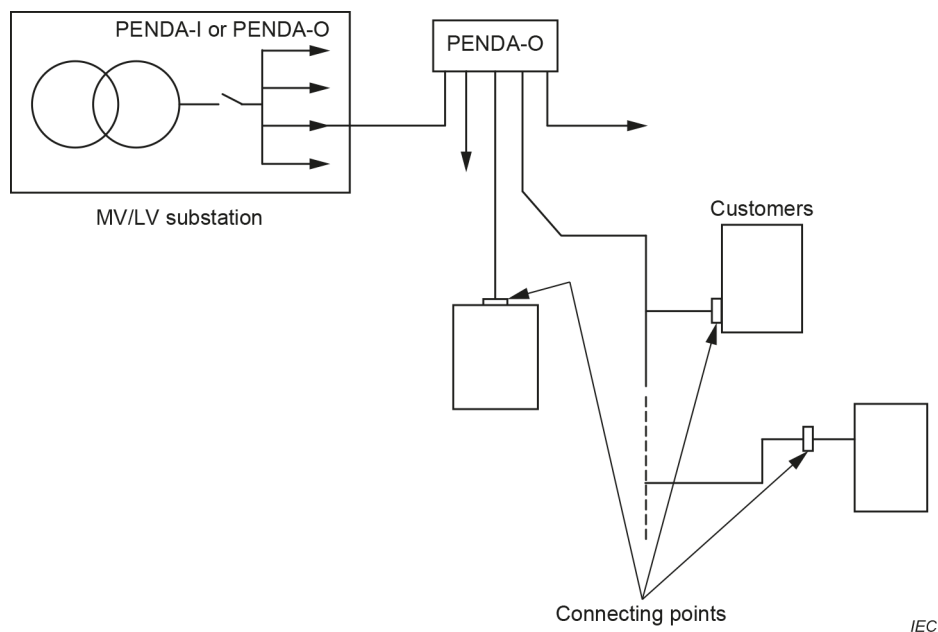
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## COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

### ENSEMBLES D'APPAREILLAGE À BASSE TENSION –

#### Partie 5: Ensembles pour réseaux de distribution publique

#### AVANT-PROPOS

- 1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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L'IEC 61439-5 a été établie par le sous-comité 121B: Ensembles d'appareillages à basse tension, du comité d'études 121 de l'IEC: Appareillages et ensembles d'appareillages basse tension. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2014. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) omission de l'exigence de réalisation d'essais mécaniques à -25 °C lorsque les enveloppes sont en matériau métallique;
- b) ajout d'application de charge de véhicules électriques et de production d'énergie avec des facteurs de charge présumés;

- c) ajout d'essais diélectriques lorsqu'un ERD est utilisé dans un poste avec terres HT et BT séparées;
- d) description plus détaillée des échantillons représentatifs pour la vérification de la conception.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
121B/173/FDIS	121B/178/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). Les principaux types de documents développés par l'IEC sont décrits plus en détail sous [www.iec.ch/publications](http://www.iec.ch/publications).

Le présent document doit être lu conjointement avec l'IEC 61439-1. Les dispositions des règles générales traitées dans l'IEC 61439-1 s'appliquent uniquement au présent document lorsqu'elles sont spécifiquement citées. Lorsque le présent document mentionne "addition", "modification" ou "remplacement", le texte correspondant de l'IEC 61439-1:2020 doit être adapté en conséquence. Les paragraphes qui sont numérotés avec un suffixe 101 (102, 103, etc.) sont ajoutés au même paragraphe de l'IEC 61439-1:2020.

Les nouveaux tableaux et nouvelles figures de l'IEC 61439-5:2023 sont numérotés à partir de 101.

Les nouvelles annexes de l'IEC 61439-5:2023 sont désignées AA, BB, etc.

L'attention du lecteur est attirée sur le fait que l'Annexe DD énumère tous les articles qui traitent des différences à caractère moins permanent inhérentes à certains pays, concernant le sujet du présent document.

Une liste de toutes les parties de la série IEC 61439, publiées sous le titre général *Ensembles d'appareillage à basse tension*, se trouve sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous [webstore.iec.ch](http://webstore.iec.ch) dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.



## ENSEMBLES D'APPAREILLAGE À BASSE TENSION –

### Partie 5: Ensembles pour réseaux de distribution publique

#### 1 Domaine d'application

Le présent document définit les exigences spécifiques aux ensembles pour réseaux de distribution publique d'électricité (ERD).

Les ERD remplissent les critères suivants:

- ils sont utilisés pour la distribution de l'énergie électrique dans des systèmes triphasés pour lesquels la tension assignée ne dépasse pas 1 000 V en courant alternatif (se reporter à la Figure 101 qui représente un réseau de distribution classique) et des systèmes à courant continu qui ne dépassent pas 1 500 V en courant continu;
- ils sont fixes;
- les ensembles ouverts ne sont pas couverts par le présent document;
- ils sont adaptés à une installation dans des emplacements où seules des personnes qualifiées ont accès pour leur utilisation; cependant, les types pour l'extérieur peuvent être installés dans des endroits accessibles à des personnes ordinaires;
  - ils sont destinés à être utilisés dans les réseaux de distribution publique;
  - à l'intérieur: ensembles installés à l'intérieur de postes d'alimentation électrique;
  - à l'extérieur: ensembles avec une enveloppe adaptée à une installation en plein air.

L'objet du présent document est de fournir les définitions et de spécifier les conditions d'emploi, les exigences de construction, les caractéristiques techniques et les essais pour les ERD. Des essais à des niveaux de performance supérieurs peuvent s'appliquer pour certains paramètres de réseau.

Les ERD peuvent également inclure des dispositifs de commande et de signalisation associés à la distribution de l'énergie électrique.

NOTE 1 Des dispositifs de commande et de surveillance peuvent être utilisés dans les applications de réseau intelligent ou pour la transmission de données de réseau intelligent.

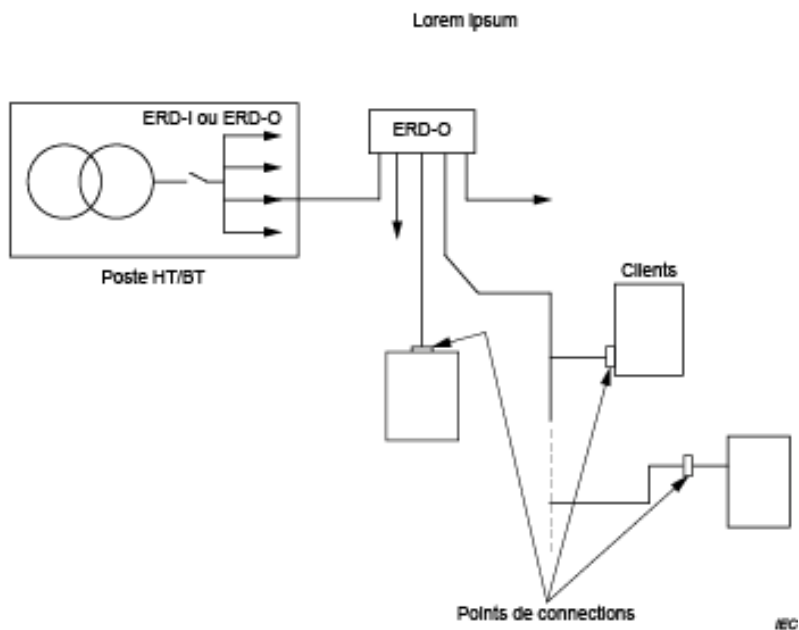
Le présent document s'applique à tous les ERD qu'ils soient conçus, fabriqués et vérifiés à l'unité ou qu'ils soient complètement normalisés et fabriqués en quantité.

La fabrication et/ou l'assemblage peuvent être réalisés par un tiers qui n'est pas le fabricant d'origine (voir 3.10.1 de l'IEC 61439-1:2020).

Le présent document ne s'applique pas aux appareils individuels et aux composants indépendants, tels que démarreurs de moteurs, fusibles-interrupteurs, matériels électroniques, etc. qui sont conformes aux normes de produit applicables.

Si le poste appartient à (ou est exploité par) un opérateur de réseau de distribution public, les ERD utilisés comme tableaux de distribution basse tension dans les postes de transformation sont inclus dans le domaine d'application du présent document.

Le présent document ne s'applique pas aux types d'ensembles spécifiques qui sont couverts par d'autres parties de la série IEC 61439.



**Figure 101 – Réseau de distribution classique**

NOTE 2 Si un ERD comporte des matériels complémentaires (par exemple des compteurs), de telle sorte que sa fonction principale est considérablement modifiée, d'autres normes peuvent alors également s'appliquer selon accord entre utilisateur et fabricant (voir 8.5 de l'IEC 61439-1:2020).

NOTE 3 Si les pratiques et règlements locaux le permettent, un ERD conforme au présent document peut être utilisé sur des réseaux autres que publics.

NOTE 4 Les opérateurs de réseau de distribution peuvent définir des exigences supplémentaires pour leurs ERD.

## 2 Références normatives

L'article de l'IEC 61439-1:2020 s'applique, avec les exceptions suivantes.

*Addition:*

IEC 60695-11-10:2013, *Essais relatifs aux risques du feu – Partie 11-10: Flammes d'essai – Méthodes d'essai horizontal et vertical à la flamme de 50 W*

IEC 61439-1:2020, *Ensembles d'appareillage à basse tension – Partie 1: Règles générales*

IEC 62262, *Degrés de protection procurés par les enveloppes de matériels électriques contre les impacts mécaniques externes (code IK)*

ISO 9223:2012, *Corrosion des métaux et alliages – Corrosivité des atmosphères – Classification, détermination et estimation*

ISO 6506-1:2014, *Matériaux métalliques – Essai de dureté Brinell – Partie 1: Méthode d'essai*