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I.S. EN 50532:2010

Compact Equipment Assembly for Distribution Substations (CEADS)

I.S. EN 50532:2010

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English version

Compact Equipment Assembly for Distribution Substations (CEADS)

Ensembles Compacts d'Equipement pour Postes de Distribution (ECEPD)

Kompakte Gerätekombination für Verteilungsstationen (CEADS)

This European Standard was approved by CENELEC on 2010-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 17AC, High-voltage switchgear and controlgear. It was submitted to the formal vote and approved by CENELEC on 2010-04-01.

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)	2011-04-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-04-01

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Introduction

The objective of this standard is to respond to the currently in use compact assemblies that perform the main electrical functions of a distribution substation. Numerous arrangements are possible and this standard provides guidance on basic types of assemblies, which might be envisaged (see Annex C).

As there are potential interactions between devices within such assemblies, it is necessary to consider the standardisation requirements for the assembly in its entirety.

1 General

1.1 Scope

This European Standard specifies the service conditions, rated characteristics, general structural requirements and test methods of the prefabricated assembly of the main electrical functional units of a HV/LV Distribution Substation, duly interconnected, for alternating current of rated operating voltages above 1 kV and up to and including 52 kV on the HV side, service frequency 50 Hz. This assembly is to be cable-connected to the network.

This Compact Equipment Assembly for Distribution Substation (CEADS) as defined in this standard is designed and tested to be a single product with a single serial number and one set of documentation. Such equipment is delivered as single transport unit. For practical reasons manufacturer and user can agree to transport the unit dismantled if transport or installation of the complete CEADS is not possible. In that case suitable verification tests shall be carried out at the installation site.

Note 1: Where the functional units are independent each functional unit will also have its own serial number.

A CEADS is not a Distribution Substation, either prefabricated (covered by EN 62271-202) or not (covered by EN 61936-1). However CEADS is intended to become part of a Distribution Substation assembling the HV equipment, the power transformer and the LV equipment duly interconnected (see Annex C, which also explains the origin and types of CEADS).

The functions of a CEADS are:

- switching and control for the operation of the HV side and protection of the HV/LV transformer functional unit;
- HV/LV transformation;
- switching and control for the operation and protection of the LV feeders.

However relevant provisions of this standard are also applicable to designs where not all of these functions exist (e.g. equipment comprising only HV/LV transformation and switching and control for the operation and protection of the LV feeder functions).

For public distribution networks, CEADS are intended for installation within an indoor or outdoor closed electrical operating area (see Definition 1.3.3) forming part of a Distribution Substation.

For industrial applications, such as factories, installation of CEADS outside a closed electrical operating area may be allowed provided that safety regulations are fulfilled by additional measures adopted at the installation site under the responsibility of the designer of the installation.

This standard considers the potential interaction between the individual functions when closely installed and interconnected to form a type tested assembly and defines ratings, particular design and construction requirements and test procedures for this assembly.

NOTE 2 Interaction is the influence of one functional units of the equipment on another (i.e. electrical mechanical and thermal stresses).

NOTE 3 For the purpose of this standard a self-protected transformer is considered not as a CEADS, but as a functional unit, designed and type tested to its own product standard EN 60076-13.

1.2 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.

EN 50464 series, *Three-phase oil-immersed distribution transformers 50 Hz, from 50 kVA to 2 500 kVA with highest voltage for equipment not exceeding 36 kV*

EN 50464-1:2007, *Three-phase oil-immersed distribution transformers 50 Hz, from 50 kVA to 2 500 kVA with highest voltage for equipment not exceeding 36 kV – Part 1: General requirements*

EN 50464-4:2007, *Three-phase oil-immersed distribution transformers 50 Hz, from 50 kVA to 2 500 kVA with highest voltage for equipment not exceeding 36 kV – Part 4: Requirements and tests concerning pressurised corrugated tanks*

EN 60076 series, *Power transformers* (IEC 60076 series)

EN 60076-1:1997 + A11:1997 + A1:2000 + A12:2002, *Power transformers – Part 1: General* (IEC 60076-1:1993, mod. + A1:1999)

EN 60076-2:1997, *Power transformers – Part 2: Temperature rise* (IEC 60076-2:1993, mod.)

EN 60076-3:2001, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air* (IEC 60076-5:2000 + corr. Dec. 2000)

EN 60076-5: 2006, *Power transformers – Part 5: Ability to withstand short circuit* (IEC 60076-5: 2006)

EN 60076-10, *Power transformers – Part 10: Determination of sound levels* (IEC 60076-10)

EN 60076-11:2004, *Power transformers – Part 11: Dry-type transformers* (IEC 60076-11:2004)

EN 60076-13:2007, *Power transformers - Part 13: Self-protected liquid-filled transformers* (IEC 60076-13:2006)

EN 60243-1, *Electrical strength of insulating materials – Test methods – Part 1: Tests at power frequencies* (IEC 60243-1)

EN 60439 series, *Low-voltage switchgear and controlgear assemblies* (IEC 60439 series)

EN 60439-1:1999, *Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies* (IEC 60439-1:1999)

EN 60529, *Degrees of protection provided by enclosures (IP Code)* (IEC 60529:1989)

EN 60664-1:2003, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests* (IEC 60664-1:1992 + A1:2000 + A2:2002)

EN 60721-1, *Classification of environmental conditions – Part 1: Environmental parameters and their severities* (IEC 60721-1)

EN 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules* (IEC 60947-1)

EN 61439 series [1)], *Low-voltage switchgear and controlgear assemblies* (IEC 61439 series)

EN 61936-1, *Power installations exceeding 1 kV a.c. – Part 1: Common rules* (IEC 61936-1 [2)])

EN 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)* (IEC 62262)

[1)] This series will supersede some parts of EN 60439 series.

EN 62271-1:2008, *High-voltage switchgear and controlgear – Part 1: Common specifications* (IEC 62271-1:2007)

EN 62271-200:2004, *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 62271-200:2003)

EN 62271-201:2006, *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 62271-201:2006)

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

HD 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock* (IEC 60364-4-41)

IEC 60050-441, *International Electrotechnical Vocabulary – Switchgear, controlgear and fuses*

IEC 60721-2-2, *Classification of environmental conditions – Part 2: Environmental conditions appearing in nature. Precipitation and wind*

IEC 60721-2-4, *Classification of environmental conditions – Part 2-4: Environmental conditions appearing in nature – Solar radiation and temperature*

IEC/TS 60815 series, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions*

IEC/TR 62271-300, *High-voltage switchgear and controlgear – Part 300: Seismic qualification of alternating current circuit-breakers*

1.3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-441, EN 62271-1:2008 and in the standards mentioned in 1.2, and the following apply.

1.3.1
Compact Equipment Assembly for Distribution Substation (CEADS)
prefabricated and type-tested assembly comprising functional units, described in 1.1, duly interconnected (see Annex C for details)

1.3.1.1
grouped type CEADS (CEADS-G)
CEADS which functional units are stand alone equipment fully complying with their respective product standards. These equipment is placed close to each other in a specified layout

1.3.1.2
associated type CEADS (CEADS-A)
CEADS which functional units may deviate from existing product standard but not in any aspect that could affect negatively safety and/or operation. They can either be independent units or share part of their frames or enclosures

1.3.1.3
integrated type CEADS (CEADS-I)
CEADS where all or part of HV functional units and the HV/LV transformation functional unit are contained in a single enclosure, sharing the insulating medium