
Three-phase oil-immersed distribution transformers 50 Hz, from 50 to 2500 kVA with highest voltage for equipment not exceeding 36 kV – Part 2: Distribution transformers with cable boxes on the high-voltage and/or low-voltage side – Section 3: Cable boxes type 2 for use on distribution transformers meeting the requirements of HD 428.2.1

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST HD 428.2.3 S1:1999](https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-62b8d1ed6325/sist-hd-428-2-3-s1-1999)

[https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-](https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-62b8d1ed6325/sist-hd-428-2-3-s1-1999)

[62b8d1ed6325/sist-hd-428-2-3-s1-1999](https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-62b8d1ed6325/sist-hd-428-2-3-s1-1999)

ICS 29.180

Referenčna številka
SIST HD 428.2.3 S1:1999(en)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST HD 428.2.3 S1:1999

<https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-63b8d1cd6325/sist-hd-428-2-3-s1-1999>

English version

**Three-phase oil-immersed distribution transformers 50 Hz,
from 50 to 2500 kVA with highest voltage for equipment
not exceeding 36 kV**

**Part 2: Distribution transformers with cable boxes on the
high-voltage and/or low-voltage side**

**Section 3: Cable boxes type 2 for use on distribution transformers
meeting the requirements of HD 428.2.1**

Transformateurs triphasés de
distribution immergés dans l'huile
50 Hz, de 50 à 2500 kVA de tension
la plus élevée pour le matériel
ne dépassant pas 36 kV
Partie 2: Transformateurs de distribution
raccordés par boîtes à câble côté haute
tension et/ou côté basse tension
Section 3: Boîtes à câbles de type 2
pour utilisation sur transformateurs de
distribution conformes aux exigences du
HD 428.2.1

Drehstrom-Öl-Verteilungstrans-
formatoren, 50 Hz, 50 bis 2500 kVA
mit einer höchsten Spannung für
Betriebsmittel bis 36 kV
Teil 2: Verteilungstransformatoren mit
Kabelanschlußkästen auf der Ober-
und/oder Unterspannungsseite
Hauptabschnitt 3: Kabelanschlußkästen
Typ 2 für Verteilungstransformatoren
nach HD 428.2.1

This Harmonization Document was approved by CENELEC on 1997-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

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

This Harmonization Document exists in three official versions (English, French, German).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-63b8d1cd6325/sist-hd-428-2-3-s1-1998>

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This Harmonization Document was prepared by the Technical Committee CENELEC TC 14, Power transformers.

The text of the draft was submitted to the formal vote and was approved by CENELEC as HD 428.2.3 S1 on 1997-10-01.

The HD 428 series consists of the following parts, under the general title "Three-phase oil-immersed distribution transformers 50 Hz, from 50 to 2500 kVA with highest voltage for equipment not exceeding 36 kV":

| | |
|--------------------|---|
| HD 428.1 S1:1992 | Part 1: General requirements and requirements for transformers with highest voltage for equipment not exceeding 24 kV |
| HD 428.2.1 S1:1994 | Part 2: Distribution transformers with cable boxes on the high-voltage and/or low-voltage side Section 1: General requirements |
| HD 428.2.2 S1:1997 | Section 2: Cable boxes type 1 for use on distribution transformers meeting the requirements of HD 428.2.1 S1 |
| HD 428.2.3 S1:1997 | Section 3: Cable boxes type 2 for use on distribution transformers meeting the requirements of HD 428.2.1 S1 |
| HD 428.3 S1:1994 | Part 3: Supplementary requirements for transformers with highest voltage for equipment equal to 36 kV |
| HD 428.4 S1:1994 | Part 4: Determination of the power rating of a transformer loaded with non-sinusoidal currents |

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 1998-03-01
- latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 1998-09-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 1998-09-01

The following documents are referred to in this HD:

| | |
|----------|--|
| EN 50180 | Bushings above 1 kV up to 36 kV and from 250 A to 3,15 kA for liquid filled transformers |
| EN 60529 | Degrees of protection provided by enclosures (IP Code) (IEC 60529) |
| HD 596 | Bushings up to 1 kV and from 250 A to 5 kA, for liquid filled transformers |



Contents

| | | |
|---|--------------------------------|---|
| 1 | Scope..... | 4 |
| | 1.1 High-voltage side..... | 4 |
| | 1.2 Low-voltage side | 4 |
| 2 | High-voltage connections | 4 |
| 3 | Low-voltage connections..... | 6 |
| 4 | Design..... | 7 |
| 5 | Test..... | 8 |

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST HD 428.2.3 S1:1999

<https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-63b8d1cd6325/sist-hd-428-2-3-s1-1999>

1 Scope

Cable boxes described in this document correspond to cable boxes Type 2 in HD 428.2.1 and are suitable for assembly on the cover of oil-immersed distribution transformers meeting the requirements of HD 428.2.1.

Cable boxes are air-filled, metal- or non-metal enclosed, for high- and/or low-voltage connections in the following variations:

1.1 High-voltage side

- a) Connection directly to bushings;
- b) Connection via busbar system.

1.2 Low-voltage side

- a) Connection directly to bushings (maximum of four connectors per bushing);
- b) Connection via busbar system.

2 High-voltage connections

High-voltage bushings shall preferably be in accordance with EN 50180, pollution class II.

Dimension D, which is the minimum distance between live parts and between live parts and earth, is given in table 1 and indicated in figures 1 and 2. The value of D may be decreased by inserting barriers of insulating material. In this case, the insulation level shall be demonstrated by test.

Busbars in figure 2 shall be dimensioned by reference to rated currents and short-circuit forces. Connection may be by single- or multi-core cables.

Figures 1 and 2 show typical arrangements; the actual design may vary.

Table 1: Minimum distances in the cable box

| U _M (kV) | Rated short duration power frequency withstand voltage (r.m.s) (kV) | Rated lightning impulse withstand voltage (peak) (kV) | | Minimum clearance D (mm) | |
|------------------------|--|---|--------|--------------------------------|--------|
| | | List 1 | List 2 | List 1 | List 2 |
| 3,6 | 10 | 20 | 40 | - | 60 |
| 7,2 | 20 | 40 | 60 | 60 | 90 |
| 12 | 28 | 60 | 75 | 90 | 125 |
| 17,5 | 38 | 75 | 95 | 125 | 170 |
| 24 | 50 | 95 | 125 | 170 | 225 |
| 36 | 70 | 145 | 170 | 275 | 315 |

Values in the table according to IEC 60076-3-1, List 1 and 2.

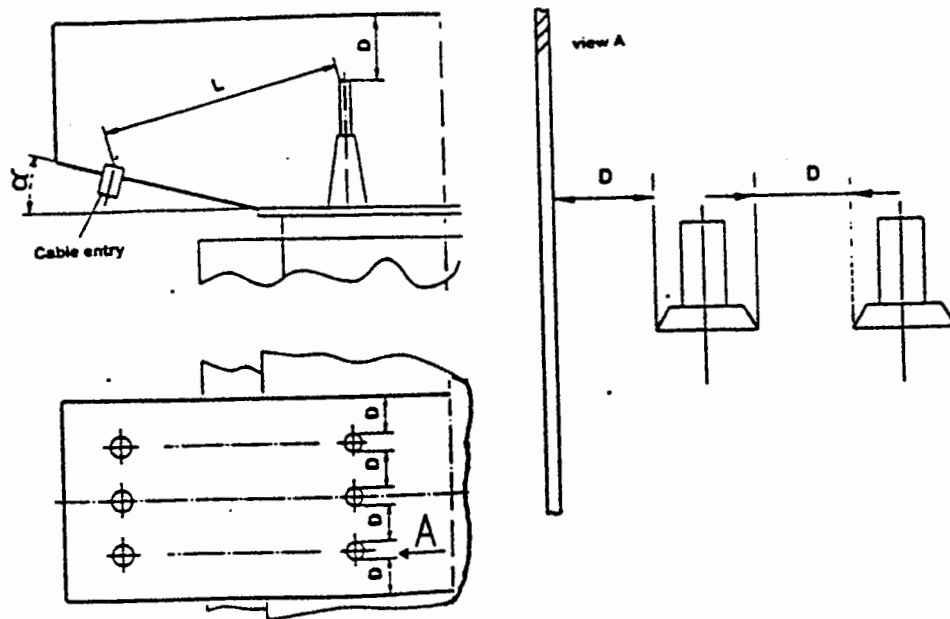
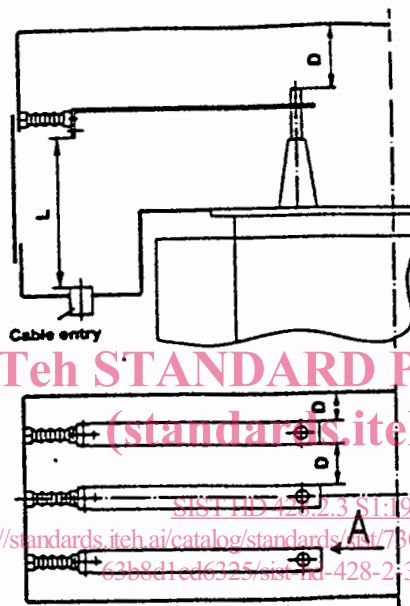


Figure 1: High-voltage connection directly to bushings

The details of the cable entry, dimension L (distance between the cable entry and the bushing connection), angle α and other cable entry directions shall be subject to agreement between manufacturer and purchaser.



View A as in figure 1.

Figure 2: High-voltage connection via busbar system

The details of the cable entry, dimension L (distance between the cable entry and the busbar connection) and other cable entry directions shall be subject to agreement between manufacturer and purchaser.

3 Low-voltage connections

Low-voltage bushings shall be in accordance with HD 596.

Dimension D, which is the minimum clearance between live parts and between live parts and earth, is indicated in figures 3 and 4. The minimum value of D shall be 40 mm.

Busbars in figure 3 shall be dimensioned by reference to rated currents and short-circuit forces. Connection may be by single- or multi-core cables.

Figure 3 and 4 show typical arrangements, the actual design may vary.

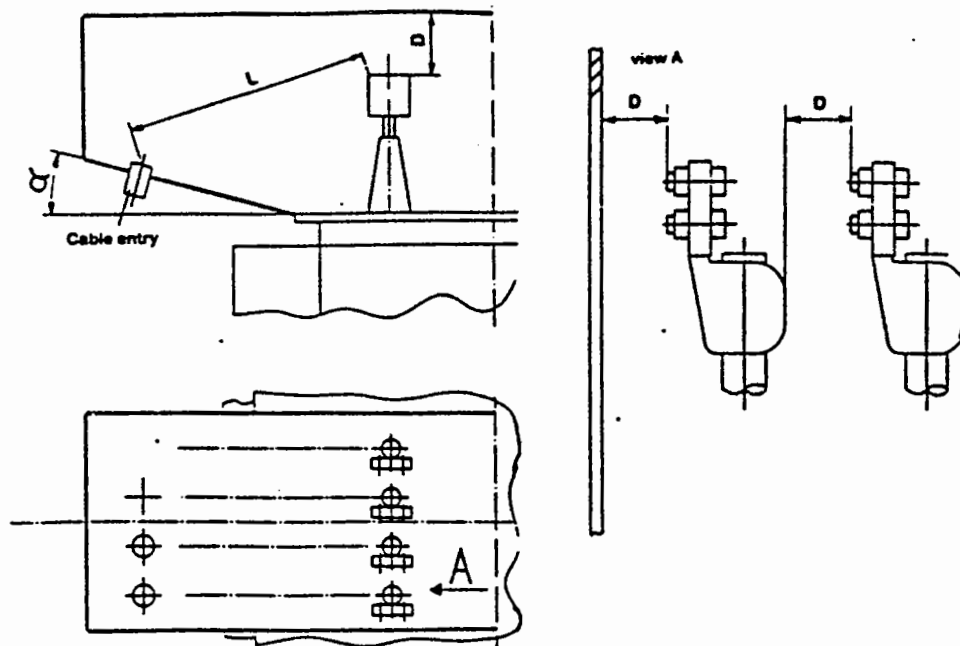
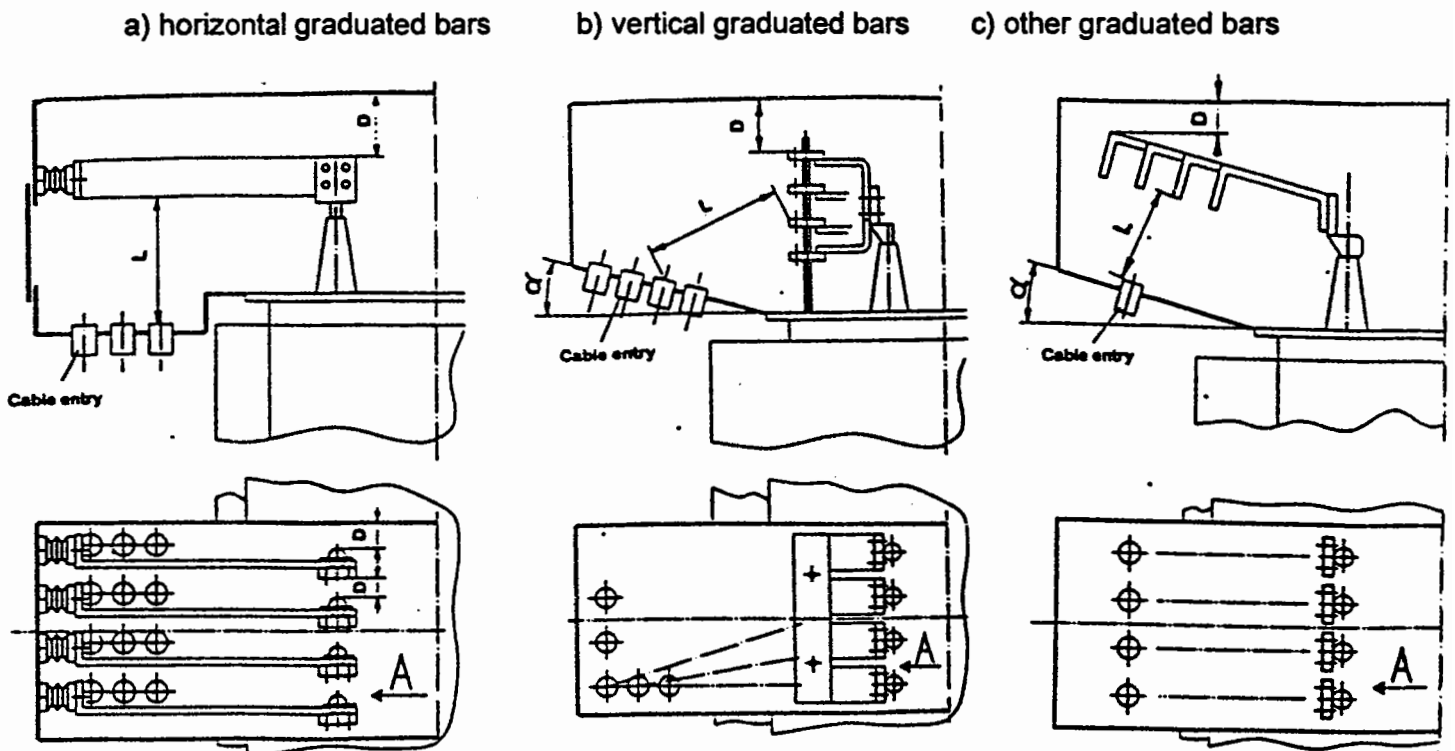


Figure 3: Low-voltage connection directly to bushings

The details of the cable entry, dimension L (distance between the cable entry and the bushing connection), angle α and other cable entry directions shall be subject to agreement between manufacturer and purchaser.

[SIST HD 428.2.3 S1:1999](https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-63b8d1cd6325/sist-hd-428-2-3-s1-1999)

<https://standards.iteh.ai/catalog/standards/sist/73072bdb-55c0-4877-aa5f-63b8d1cd6325/sist-hd-428-2-3-s1-1999>



View A as in figure 3.

Figure 4: Low-voltage connection to busbar system

The arrangement of the cable entry, dimension L (distance between the cable entry and the busbar connection), angle α and other cable entry directions shall be subject to agreement between manufacturer and purchaser.

4 Design

Cable boxes shall be fastened on transformer covers by screws or by welding. For convenient cable access, cable boxes shall be provided with covered openings with handles.

The protection class shall be IP33 to IP55 in accordance with EN 60529. Suitable ventilation shall be provided.

(standards.iteh.ai)

The assembly of cable boxes to the transformer covers may be achieved using flanges.

SIST HD 428.2.3 S1:1999

Means of earthing the cable box to the transformer cover shall be provided.

<https://standards.iteh.ai/catalog/standards/sist/73073d45-516b-41877-af56-63b8d1cd6325/sist-hd-428-2-3-s1-1999>

Cable entry surfaces shall be prepared for easy assembly. The type and quantity of cable entries shall be subject to agreement between manufacturer and purchaser. Earthing bosses for cable armour shall be provided.

For single-core cable connections at the appropriate current, cable entry surfaces shall be of non-magnetising material.