Specifications and dimensions of bushings for primary distribution boxes



Overview

Standard Requirements for Bushings in Primary Distribution BoxesThis standard applies to power apparatus bushings that have basic impulse insulation levels.

Key Takeaways

Primary distribution box bushings are designed to insulate conductors from the transformer tank, with dimensions and specifications standardized according to IEC 60137 and IEEE C57. 19, and are available in various voltage and current ratings.

Voltage and Current Ratings

Primary distribution bushings typically cover voltage ratings from 600 V up to 35 kV or higher, depending on the application, with current ratings commonly ranging from 200 A to 600 A for medium-voltage distribution transformers and apparatus. For example, Eaton's 600 A, 35 kV deadbreak bushings comply with IEEE Std 386-2006 and are suitable for sidewall mounting in transformers or switches.

Insulation and Materials

Bushings are constructed with oil-impregnated paper (OIP), epoxy, or high-temperature nylon (HTN) resin, providing electrical insulation between the conductor and the transformer tank. High-voltage bushings often use conical porcelain shells for transformer-end insulation, while low-voltage bushings may use polyester or glass-reinforced nylon resin. The insulation design ensures low partial discharge levels and reliable operation under heavy pollution or wet conditions.

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Creepage Distance and Pollution Class

The creepage distance is critical for outdoor bushings and is defined according to IEC 60815-3. Typical values are 25 mm per kV for air-end porcelain in heavily polluted atmospheres.

AB

B specifies very heavy pollution class with 54 mm/kV for high-voltage bushings. Polymeric insulators may allow reduced creepage distances compared to ceramic types.

Mounting and Mechanical Specifications

Bushings are designed for vertical or inclined mounting up to 30° from vertical. They include robust sealing systems to prevent moisture ingress and ensure a reliable ground connection throughout the service life. Cantilever load ratings are specified in IEC 60137, with Level 1 for normal applications and Level 2 for severe mechanical loads.

Termination and Compatibility

Primary bushings provide termination points for both air-side conductors and transformer leads. Low-voltage bushings often include spade terminals for internal connections to fuse holders such as Type KTM or DO-III, while high-voltage bushings are compatible with separable connectors like BOL-T or T-OP II systems. Bushings are designed to mate with inserts conforming to IEEE 386-2006 standards.

Thermal and Electrical Performance

Bushings are rated for continuous AC voltage and maximum current at specified ambient and oil temperatures, with hot spot limits typically 105°C for standard bushings and 120°C for RIP types. They undergo routine and type tests for lightning impulse, switching impulse, and power factor to ensure compliance with IEC and ANSI standards.

Summary

Primary distribution box bushings are engineered to provide electrical insulation, mechanical support, and reliable termination for medium-voltage distribution transformers. Key specifications include voltage/current ratings, insulation type, creepage distance, mounting angle, and compliance with IEC 60137 and IEEE C57. 19 standards.

Material choices, sealing systems, and compatibility with fuse holders or separable connectors ensure safe and durable operation in various environmental conditions.

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Article Content

Standard Requirements for Bushings in Primary Distribution Boxes

This standard applies to power apparatus bushings that have basic impulse insulation levels of 110 kV and above for use as components of oil-filled transformers and oil-filled reactors.

LV Transformer Bushing Specifications

This document provides information on porcelain bushings for distribution transformers, including their electrical and mechanical characteristics. It specifies insulation and impulse withstand voltage levels

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For all applications, GE'' s bushings represent a cost-effective solution to facilitate the electric stress control of your equipment. GE offers a large portfolio of condenser bushings for AC or DC operation.

PORCELAIN BUSHINGS LV Series

1.3 Overload conditions (IEC 354): Bushing selected with Ir not less than 120% of the rated current of the transformers are considered to be able to withstand the overload conditions according to IEC 354.

Transformer OEM equipment | bushings | switches | Eaton

The 200 A 35 kV three-phase rated integral loadbreak bushing meets all the requirements of IEEE Std 386 standard (separable insulated connector systems) and combines the advantages of a reliable

Transformer Bushing Specifications Guide | PDF | Washer (Hardware ...

It provides technical details like electrical and mechanical characteristics, component lists, and descriptions of outdoor transformer bushings for different voltage and current ratings. Diagrams and

600 A 15 and 25 kV class deadbreak apparatus bushing catalog

Eaton''s Cooper PowerTM series 600 A 25 kV Class deadbreak apparatus bushing meets the full requirements of IEEE Std 386TM-2016 standard separable insulated connector systems.

Distribution transformer components Product guide

Distribution transformer components Product guide Bushings for use in pad or surface mounted transformers. The bushings insulate the current carrying conductor from the tank, allowing for

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TPH-4N | Transformer bushings | Homac | Medium Voltage Utility ...

Tin Plated Bronze Transformer Bushing Pad, Four 9/16 inch Diameter Mounting Holes on 1-3/4 inch Centers, Pad Length 3 inch, Width 4-1/2 inch, Pad Thickness 3/8 inch.

Bushings for power transformers

Bushings must be designed for full thermal stability at their highest voltage while considering both the ohmic and dielectric losses throughout the bushings'' service life. For a properly designed bushing, a

Electrical Bushings – Understanding Their Purpose,

Electrical bushings are essential components in transformers, serving the critical function of enabling electricity to pass safely through ground barriers

Substation transformers-unit and open types

Substation transformers are available with cover-mounted bushings or sidewall-mounted bushings for connections to primary and/or secondary switchgear. Substation transformers are made with a wide

D5000 General Electrical Requirements

The distribution system in developed technical areas is typically underground and configured as one or more primary loop systems5. Each loop circuit is fed from two utility substation circuit breakers; some

Understanding the Types of Transformer Bushing 2025

The primary function of transformer bushings revolves around insulation; they prevent electrical arcing while allowing safe passage for current-carrying conductors. Additionally, these components provide

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Functional specification for three-phase pad-mounted distribution ...

This specification covers the electrical and mechanical characteristics of Eaton''s Cooper Power series 45-10,000 kVA Three-Phase Step-Down Pad-Mounted Distribution Transformers.

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TECHNICAL SPECIFICATION OF 100 kVA to 2500 kVA, 11/0.433 kV

Scope: The specification covers design manufacture, testing packing and delivery of 3 phase 50 Hz, Dry Type (VPI) distribution transformer of ratings 100, 200,315,630,1000,1250, 1600 And 2500 kVA,

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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