Distribution Transformers
Reference Data
TD202004EN

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COOPER POWER SERIES

When to use a substation transformer

At issue

Substation-type single- and three-phase transformers may be specified instead of pad-mounted transformers when certain job site conditions apply.

Recommendation

Substation transformers may be the logical choice when:

- Public access to the transformer is not a concern or a separate enclosure is acceptable
- Incoming cables are overhead, transformers is connected to separate switchgear, or primary and secondary feeds are underground
- Additional flexibility to handle overload conditions is required

Rationale

Three key considerations apply when determining whether a substation transformer should be specified: the location of the transformers, the location of the incoming and outgoing cables, and the required immediate and future load of the transformer.

Location of the transformer

A key question to be asked is, "Is there going to be public access to the transformer?" If public access to the transformer is not a concern, a reliable choice may be the substation transformer. In lieu of a tamper-resistant enclosure design used on pad-mounted transformers, the substation transformer is placed inside a fence or other suitably secured area.

Location of the incoming and outgoing cables

If either the primary or secondary cables will connect to the transformer from over head, one option is the open substation transformer with cover-mounted bushings. If the unit will be close-coupled to switchgear, the unit substation transformer is an option.

Required current/future/emergency capacity of the transformer

Substation transformers may be designed to hold additional capacity for future needs or periodic overloads. The design of the transformer allows for additional capacity with upgraded conductor material, lead assembly, and components. External fans may be included.

Depending on the size of the transformer, unit capacity can be increased by 15%, 25%, or 33%.

The connection

Eaton offers its Cooper Power™ series three-phase and single-phase substation transformers in the following ratings:

Three-phase

- kVA range: 300 kVA through 12,000 kVA (with temperature rise and fans, capacity up to 18000 kVA is possible)
- Primary voltage: 2400 - 46000, with or without taps; dual voltages available
- Secondary voltage: 208Y/120 (through 1500 kVA only) through 14,400 Volts
- Temperature Rise: 55°, 55/65°, 65°, 55/75°, 66/75°, 75°
- Basic Insulation Level: 30 kV BIL through 250 kV BIL
- SUSS - Secondary unit substation
- PUSS - Primary unit substation
- SOSS - Secondary open substation
- POSS - Primary open substation

Single-phase

- kVA Range: 250 kVA through 5,000 kVA
- Primary Voltage: 2400 - 46000, with or without taps; dual voltages available
- Secondary Voltage: 208Y/120 (through 1500 kVA only) through 14,400 Volts
- SOSS
- POSS

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Units meet all applicable ANSI®, NEMA®, and IEEE® standards. The primary IEEE® standard that governs Eaton's Cooper Power series substation distribution transformers is IEEE Std C57.12.36™-2007 standard. Several other IEEE® standards that govern the construction, loading and testing of pad-mounted and substation transformers are: IEEE Std C57.12.00™-2010, IEEE Std C57.12.10™-2010, IEEE Std C57.12.70™-2011, IEEE Std C57.12.80™-2010, IEEE Std C57.12.90™-2010, and ANSI/IEEE Std C57.105™-1978 standards.

See publications

- CA202001EN Substation Transformers-Unit and Open Types
- 210-90 PEAK Substation Transformers

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