Installation Procedures

1. Ensure the area is well ventilated and free from explosive or corrosive gas or vapors.
2. Check the transformer nameplate and verify that it is the correct kVA, frequency, line and load voltage for the application
3. Mount the transformer securely
4. Shut off primary voltage using approved lock-out/tag-out procedures
5. Remove the cover over the wiring compartment.

Note: On ventilated transformers the bottom screws should be loosened and not removed for easier replacement of the cover. See Figure 1

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6. Adjust primary taps if necessary and insulate any unused taps individually
7. Route wires into enclosure using the predefined access holes or by creating holes as needed. On ventilated units the wires should enter the unit below the terminals and in front of the coil. See Figure 2
8. Connect the transformer primary according to the wiring diagram on the nameplate.
9. Ground the enclosure in accordance with NEC and local electrical codes.
10. Energize the unit and check the secondary voltage to ensure it is proper for the load.
11. Shut off the primary voltage using approved lock-out/tag-out procedures.
12. Connect the load to the secondary terminals according to the wiring diagram on the nameplate

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Note: After installation of cables and connectors, a minimum of 1" clearance should be maintained between the enclosure and any energized parts.

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13. Replace the cover over the wiring compartment
14. Energize the unit.

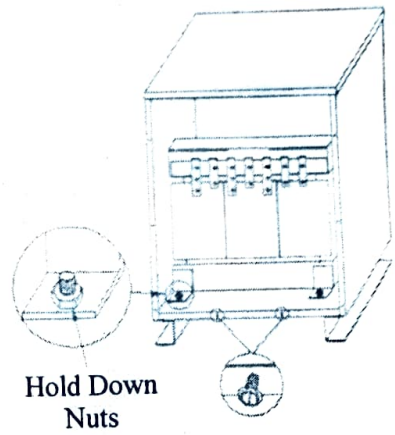

Figure 1 - Front view of Ventilated unit

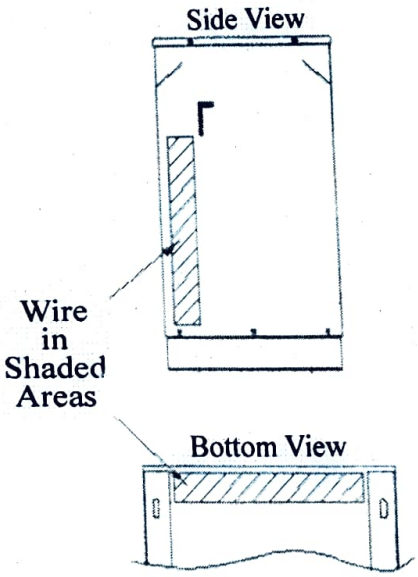

Figure 2 - Side & Bottom View of Ventilated unit

Installing Outdoors

- Select appropriate location to meet applicable codes, cable installation and mounting hardware.
- Use weather shield on ventilated units.
- Use water tight couplings on all electrical connections

Torque Values for Screws and Bolts

When re-attaching the cover to the wiring compartment be within 5% of 66 in-lbs. Tightening the screws more than this may strip the threads.

When attaching the wires to the terminals use of recommended bolts for the wiring lugs. It is recommended to use two wrenches when tightening or loosening bolted connections to prevent damage. The chart below shows recommended torque values for standard size bolts.

Torque Values for Screws and Bolts	
Screw/bolt Size (SAE Grade 2)	Torque Value (+/- 5%)
6-32	10 in-lbs
6-40	12 in-lbs
8-32	19 in-lbs
8-36	20 in-lbs
10-24	27 in-lbs
10-32	31 in-lbs
¼-20	66 in-lbs
¼-28	76 in-lbs
5/16-18	11 ft-lbs
5/16-24	12 ft-lbs
3/8-16	20 ft-lbs
3/8-24	23 ft-lbs
7/16-14	30 ft-lbs
7/16-20	35 ft-lbs
½-13	50 ft-lbs
½-20	55 ft-lbs
9/16-12	70 ft-lbs
9/16-18	80 ft-lbs
5/8-11	100 ft-lbs
5/8-18	110 ft-lbs

Transformer Sound

Transformers, like other electromagnetic devices, produce sound whose primary cause is the magnetic energy in the transformer core. The relative loudness of the sound depends upon the construction of the transformer, the manner of installation, the ambient sound level of the installation and the sensitivity of the individual listener.

Transformers are designed to have an average sound level below industry sound level limits when tested in accordance with NEMA ST 20 (IEEE C57.12.91 sec 13).

The NEMA maximum allowable averages of the readings in decibels are as follows:

Transformer kVA Rating	NEMA Maximum dB* Ratings
0-9	40
10-50	45
51-150	50
151-300	55
301-500	60
501-700	62
701-1000	64

*Decibels-Unit for measuring the loudness of sound.

Guides for Minimizing Transformer Noise

Proper installation of the transformer is required since a quiet transformer can develop objectionable sound levels unless certain basic rules are followed.

For a Quiet Installation:

- Consider the installation and location of the transformer before the building is built. Building modifications to correct sound can be expensive.
- Place sound dampening pads between the transformer and its mounting surface.
- Use flexibe conduit coupling between the transformer and the wiring system.
- Install transformer as far away as possible from any area where sound is objectionable.

TRANSFORMER DESIGN FEATURES

Ventilated enclosure Style

Ventilated style power transformers are 600 Volt Class units with ventilated enclosures for natural draft cooling. They are designed for indoor and, with the appropriate weather shields, outdoor installations.

On smaller kVA sizes a wiring compartment, located below the core and coil, provides cool operation and accessibility of connections. Primary and secondary terminals share the same board. Larger units are top terminated, front and/or rear, permiting the use of raceway bus or conduit connections. All units are shipped connected for nominal line voltage.

These units can be floor or platform mounted but must always be in a vertical position with the mounting feet down.

The ventilating openings of this transformer must not be blocked or restricted in any way that will reduce the flow of air through the transformer.

Encapsulated enclosure Style

Encapsulated style power transformers are 600 Volt Class units with the transformer sealed with a mix of sand and resin. They are designed for indoor or outdoor installations.

The wiring compartment, typical located below the core and coil, provides coll operation and accessibility of connections.

Encapsulated units should be wall mounted with the wiring compartment at the bottom. Some larger units are floor mounted with the wiring compartment on the top.

Insulation System

Ventilated transformers are designed and manufactured with UL Recognized Class 220°C insulation systems. These systems are rated for operation in an environment with a maximum ambient temperature of 40°C.

Average winding temperature rises are rated at 80°C, 115°C and 150°C above ambient temperature, See transformer nameplate for product specific information.

The insulation rating is guaranteed for altitudes of less than 3300 feet (1005m) above sea level.

Encapsulated transformers are designed and manufactured with UL Recognized Class 105°C, 130°C, or 180°C insulation systems. These systems are rated for operation in an environment with a maximum ambient temperature of 25°C

Average winding temperature rises are rated at 70°C, 95°C and 115°C above ambient temperature. See transformer nameplate for product specific information.

The insulation rating is guaranteed for altitudes of less than 3000 feet (1005 m) above sea level.

System Loading

Overloading, operating in ambient temperatures greater than 40°C and/or elevation greater than 3300 feet will result in reduction of transformer life unless de-rating of the unit is calculated using IEEE Loading Guide in IEEE C57.96

Fully loaded transformers may appear excessively warm to the touch, particularly on the top cover of the unit Standards permit the cover temperature to reach 65°C over ambient temperatur. The represents normal heating and should not cause concern.

Overloads can be tolerated without exceeding the maximum allowable insulation temperature provided the overload is of short time duration and is preceded and followed by a period of operation at less than rated kVA. The actual conditions and characteristics of the loading cycle must be known in order to calculate the proper kVA rating of the transformer. Refer to Guide for Loading of Dry Type TransformerIEEE C.57.96

Ambient temperatures above 30°C average with a 40°C maximum require either larger kVA ratings or special low temperature rise transformers.

Altitude correction for application of a standard transformer in altitudes above 3300 feet can be made by reducing the load. Refer to Altitude Correction Factor in IEEE C57.96