



Acme Electric®

# INSTRUCTIONS FOR INSTALLATION, OPERATION, AND MAINTENANCE OF DRY TYPE TRANSFORMERS

**WARNING: Due to electrical potential that exists within all dry type transformers, input power must be disconnected before any work is performed.**

**The information contained herein is intended to be general in nature and therefore may not cover all equipment. For specific data, contact your nearest Acme representative.**

## GENERAL INFORMATION

Acme dry type transformers are designed and manufactured for indoor use. Outdoor service requires specific weather proofing and the installation of weather shields. Overheating and resulting damage to the transformer may be caused by restricted air flow, improper voltage and/or frequency, or loading beyond its rating. The maximum ambient temperature should not exceed 104°F (40°C).

## INSPECTION

Upon arrival all units should be inspected for damage during shipment. If damage is found, make suitable notation on all copies of the transportation company's delivery receipt, before signing. Have the transportation company driver also sign and then proceed to file a claim. If damage is discovered after delivery, notify the delivering transportation company immediately and request an inspection. In both cases, also contact your Acme representative. Acme will assist you, where possible, with your claim.

Acme will not assume the responsibility for filing or collections. Returned goods will not be accepted unless permission has been granted by Acme technical service. All returned goods must be properly packed in compliance with shipping regulations and all transportation charges must be paid by the shipper.

## STORAGE

Dry type transformers will stand extended storage with proper precautions. The area must be clean and dry with a minimum of temperature variations. Extreme temperature changes cause condensation and could lead to insulation deterioration upon start-up. This is particularly applicable to medium voltage magnetics. If dampness is suspected, see maintenance section before placing in service.

## LIFTING INSTRUCTIONS

Transformers must always be kept in the upright position. Based on the style of the enclosure they may be handled as follows:

1. Open Base.
  - Utilizing a fork-type lift truck by placing forks completely under the unit for lifting.
  - Using slings and a spreader bar.
  - Using a pallet jack with blocking that completely supports the transformer across the bottom.
2. Enclosures with Eye Hooks or Lifting Tabs.
  - Transformers that have external lifting features on the enclosure may only be for lifting the enclosure. If not specified for complete transformer lifting, please check with the factory to make sure the total weight of the unit can be lifted.
3. Pad Mounted Transformers
  - See page 3 and 4 for the recommended overhead lifting procedure for pad mounted transformer lifting.

## INSTALLATION

There are several points to consider when selecting the location for dry type transformers. They are load location, accessibility, ventilation, noise (see transformer noise), dirt and dust, corrosive fumes, excessive moisture and chemical contamination. If the location is to be an electrical equipment room, ventilation and ambient temperature must be considered. For transformers up to 50 KVA, the inlet and outlet vents must have a total net area of two square feet. Higher KVA ratings should have venting based on four square inches per KVA. It is suggested that all venting be sized on a 50% efficiency basis due to screens and louvers in all vents. Inlet vents should be at floor level and outlet vents should be well above the top of the transformer housing. This will provide a full convection air flow.

If the location is to be outside, either sheltered or unsheltered, consider the following: provide shade or position away from the sun. Sun loading on the housing can considerably increase the internal temperature and therefore decrease the transformer's ability to dissipate its working heat. Shrubbery may be planted around the transformer. However, consideration must be given to the application of fertilizers and forced watering. In all cases, it is recommended that the unit be placed on a concrete pad four inches above grade level to assure there is adequate drainage. Locate all units at least nine inches from any adjacent structure except the mounting surface.

Contact Acme technical service for those locations more than 3300 feet (1000 meters) above sea level.

## CONNECTIONS

All cable should be routed through the bottom of the housing and should be of the size and type specified in N.E.C. Article 310. Connections must be made as shown on the name plate or connection diagram. Use torque ratings as per chart A.

Acme dry type transformers utilize both copper and aluminum terminations. In order to insure a safe, non-oxidizing connection, it is strongly recommended that a good quality joint compound be applied. Some of the available compounds are Thomas & Betts 1059, Penetrox A and Alnox-UG. These compounds are conductive and all excess material should be removed. All cables should be terminated with proper UL listed screw or crimp type connectors. The wrapping or twisting of the cable around the transformer terminals should never be used as a method of termination.

Chart A

Bolted Wire Connectors		Lug Type Connectors	
Bolt Size	Torque Inch Pounds	Wire Size (AWG)	Torque Inch Pounds
1/4 - 20	70	#14 to #8	70
5/16 - 18	120	#6 to #4	100
3/8 - 16	225	#3 to #1	120
1/2 - 13	480	1/0 to 2/0	150
		3/0 to 200 MCM	210
		250 to 400 MCM	260
		500 to 750 MCM	300

NOTE: Tighten, wait several seconds, then retighten all connecting lugs and bolts.



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Acme supplies several methods for bolting connections. These are shown in figures #1 and #2. It is important that the line-up of each component be closely followed. In no instance should any hardware be placed between the two conduction surfaces. The housing has been designed with wiring spaces in accordance with the National Electrical Code. Cables should be sized based on ampacity at 125% of name plate ratings using a factor of 60°C through 100 amperes and 75°C above 100 amperes. Maintain electrical clearances per N.E.C. 373-11. Use additional solid insulation for questionable clearances.

N.E.C. 450-9 article 250 and UL require that the transformer housing be grounded. This ground lead must be connected between the housing and the normally grounded secondary terminal. If the transformer is to be used in an ungrounded circuit, follow special "Ungrounded Connections," as required.

After final connection, inspect all terminations. Remove all debris and loose articles. Loosen the bolts that hold the transformer to the housing. This will allow the vibration pads to expand to their full thickness, resulting in a quieter operation. Securely tighten all housing bolts to eliminate possible vibration.

### TYPICAL CONNECTOR INSTALLATIONS

FIGURE 1

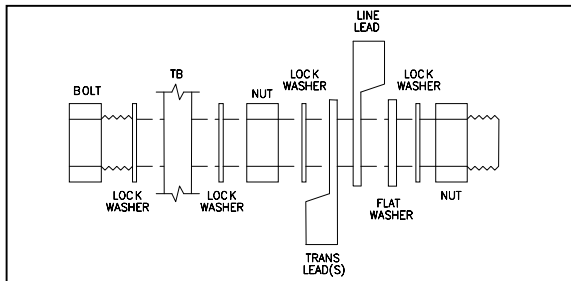
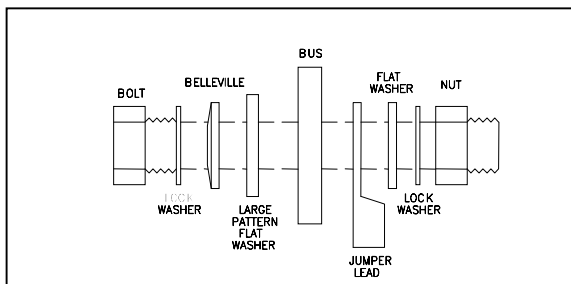


FIGURE 2



### TRANSFORMER NOISE

All alternating current devices that utilize a steel core will emit noise. This is an inherent characteristic and cannot be completely

eliminated. Acme has engineered its transformers to minimize this problem. Since the noise is a vibration or range of vibrations, the following suggestions are offered to further reduce the noise level

1. Install the complete unit on vibration pads (available from Acme) and use flexibleconduit and conduit couplings.
2. Avoid areas that have a tendency to amplify sound. Halls and stairways constructed of steel, concrete and masonry have excellent ability to echo or resonate.
3. Mount the transformer on surfaces of high mass construction. Walls, balconies and floors constructed with light materials will amplify the noise. As a rule of thumb, amplification will occur if the mounting area has a weight of less than the weight of the transformer.
4. The mounting surface should be level and square to eliminate distortion to the transformer housing.
5. Use baffles and sound absorbent materials.

### TRANSFORMER LOADING

Transformer name plate ratings ( \_\_\_ KVA \_\_\_°C Rise) are based on cooling air at 40°C. For installations with ambient above 40°C, the following de-rating formula should be used:

For each degree centigrade above 40°C, decrease the allowable load by 1.0% of the rated KVA. Temperature measurements can be averaged over a 24-hour period providing that the maximum temperature at any point does not exceed the average by 10°C.

Do not use this guide if average cooling air is above 50°C. Contact your nearest Acme representative for proper sizing.

### MAINTENANCE

All electrical equipment should have scheduled maintenance for long, trouble-free operation. It is suggested that all dry type transformers be cleaned and inspected yearly.

De-energize the unit and remove access panels. Clean accumulated dirt and dust from all surfaces. Blow out all cooling ducts with compressed air or nitrogen. Do not use air pressure over 30 pounds per square inch. Pay particular attention to terminal boards, leads, cooling ducts and screens.

Avoid the use of solvents due to the possible deterioration of the insulating materials. If there is evidence of moisture, the unit should be dried using heated air. Do not exceed 220°F (105°C). Lamps, heaters or blowers may be employed. The drying process could take from 48 to 72 hours depending on the size of the unit. Extreme caution must be followed to ensure that the unit is completely clean and dry before being energized. This is particularly applicable to medium voltage magnetics. IF the drying process must be followed, the unit should be meggered after drying and before energizing to check for an acceptable insulation system. Please consult the factory for the proper megger readings if necessary.

**Performance Tested and Proven!**

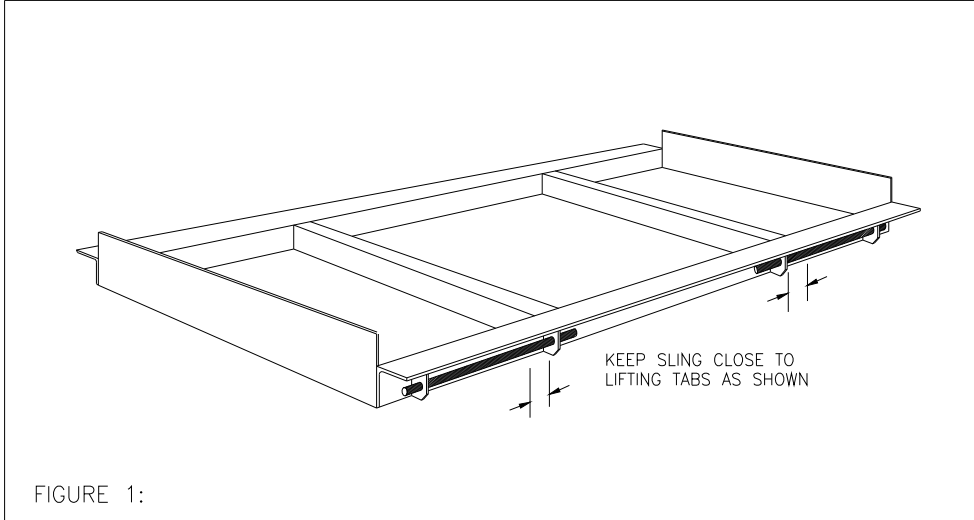


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## INSTRUCTIONS FOR INSTALLATION, OPERATION, AND MAINTENANCE OF DRY TYPE TRANSFORMERS PAD MOUNT TRANSFORMER OPTIONAL OVERHEAD LIFTING INSTRUCTIONS



**Note:** Pad mount units are shipped on full skids or on runners lagged to the base. These units can be unloaded and moved by fork truck. However, if overhead lifting is to be used, follow these instructions to avoid injury or unit damage.

The pad mounted transformer is built on a rigid base. The base allows for lifting the entire transformer at one time.

Rods of the appropriate size and strength are to be placed through holes provided in the lifting tabs as shown in Figure 1 above.

A crane is required to unload the transformer. The weight of the transformer is shown on the nameplate or outline drawings.

As shown in Figure 1, slings are to be slid along the bars as close to the lifting tabs as possible. Failure to position the sling correctly may result in bending and possible breakage of the bar.

### ***DANGER***

#### ***HAZARD OF FALLING EQUIPMENT AND CRUSHING***

1. Always follow these instructions when using a crane to unload the transformer. The transformer is top heavy and may become unbalanced.
2. Lifting tabs are not to be used alone with shackles for lifting. Tabs are designed to be used as shown.
3. At all times personnel with experience and or knowledge of lifting industrial equipment should be responsible for unloading the transformer.

FAILURE TO FOLLOW THESE PRECAUTIONS MAY RESULT IN DEATH OR SERIOUS INJURY.



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**INSTRUCTIONS FOR INSTALLATION, OPERATION,  
AND MAINTENANCE OF DRY TYPE TRANSFORMERS  
PAD MOUNT TRANSFORMER OPTIONAL OVERHEAD LIFTING  
INSTRUCTIONS (cont.)**

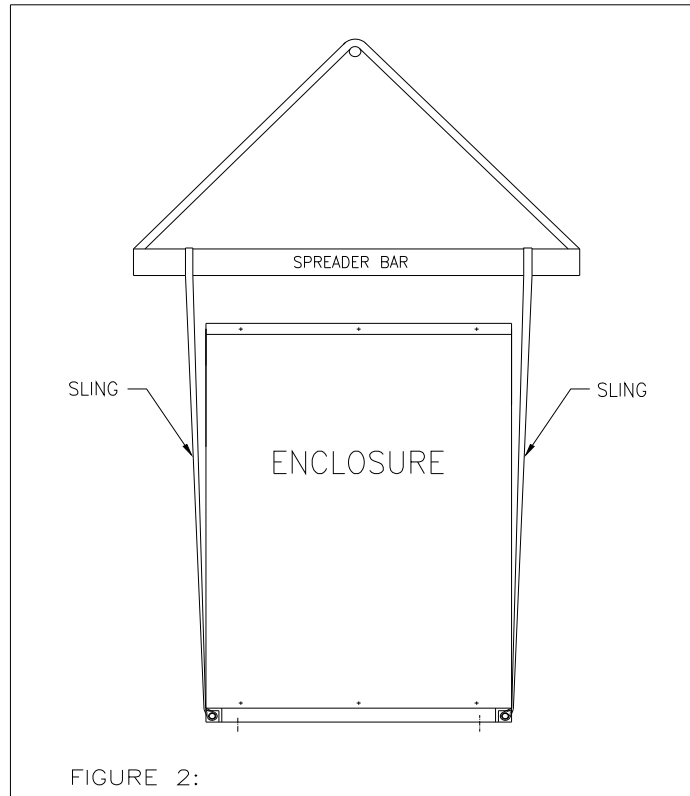


FIGURE 2:

It is important the slings are positioned on the spreader bar to allow clearance for the enclosure. Always handle the transformer in the upright position to prevent damage to the core and coil assembly. Do not tilt the transformer.

After the transformer has been off loaded, a crane is preferred to move the transformer into position. When a crane cannot be used the transformer can be skidded or moved on rollers.

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