# INSTALLATION, OPERATION AND MAINTENANCE OF GENERAL PURPOSE DRY TYPE TRANSFORMERS

600 VOLTS AND BELOW

## 1. GENERAL

The installation, operation and maintenance of dry type transformers should be performed by an electrician or other qualified personnel who are familiar with international, national, and/or local electrical codes and with the potential shock hazards associated with electrical equipment.

These instructions cover two types of enclosure construction: ventilated and encapsulated.

A) Ventilated units are NEMA type 2 enclosures suitable for indoor use. They are UL-3R listed and CSA certified for outdoor use with the addition of an optional weather shield kit. The proper weather shield pan number is listed on the nameplate.

B) Encapsulated units are NEMA 3R enclosures suitable for either indoor use in harsh environments or for outdoor use. CE marked units have a protection index of IP23.

This transformer is ready for installation and operation. It must be installed per the National Electrical Code® and local code requirements. It is recommended that these instructions be read carefully prior to installation and kept for future reference.

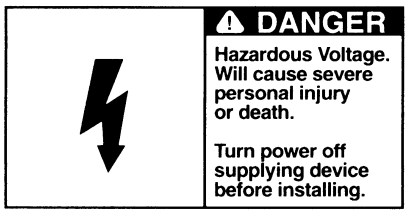
CE marked transformers must be installed per EN 60742.

## 2. INSPECTION AND HANDLING

The transformer should be inspected carefully upon receipt to check for any visible or concealed damage that may have occurred during shipment. If damage is found, a claim should be filed immediately with the carrier.

Single and three phase transformers, in smaller KVA sizes, are provided with lifting ears. Larger KVA sizes are palletized and can be lifted with appropriately sized fork lifts or hoisted by the lifting lug bolts provided on the core frame after removal of the top cover. Incorrect handling can bend the enclosure or cause other damage or result in personal injury.

## 3. INSTALLATION




WARNING: There is a potential danger of electrical shock when working on electrical equipment! Make sure power is off before installation. Replace all covers before energizing transformer.

A) Ventilated Dry Type Transformers

Ventilated units can be installed indoors or outdoors. Outdoor installation requires the addition of a weather shield to be UL-3R listed. For outdoor installation, check electrical codes for the proper protection of transformer against adverse weather conditions.

Ventilated units should be installed in a upright position on walls (optional wall mounting brackets are available for certain KVA sizes), beams, platforms, floors or other structures capable of supporting their weight.

The ambient air should be dry and free from dust, dirt, corrosive fumes, heat or other adverse conditions. The unit should be installed a minimum of 6“ from the wall or other obstructions that might prevent proper air flow through the vents.

Ventilated transformers are designed for operation in an average ambient temperature of 30 degrees C (86° F) and a maximum of 40 degrees C (104° F) not to be exceeded.

Large KVA sizes contain „shipping bolts“ to prevent damage during shipping. These should be removed just prior to installation of the unit.

B) Encapsulated Dry Type Transformers

Encapsulated units can be installed indoors or outdoors. When installed outdoors, these units should be installed with the wiring compartment down to prevent the entrance of moisture. Some encapsulated units have a top entry wiring compartment and can be installed vertically (wiring compartment up).

For indoor floor mounting of an encapsulated unit that has a bottom entry wiring compannment, the unit can be installed horizontally (on its back side) for ease of making wire connections.

## 4. ELECTRICAL CONNECTIONS

WARNING: Danger of electrical shock! Do not remove parts or make connections while the transformer is energized.

Refer to the transformer nameplate label or enclosed wiring diagram for primary and secondary voltage combinations, frequency and number of phases. Tap connections and voltage combinations are also listed on the diagram or nameplate.

CAUTION: Do not make connections other than those shown. The transformer must be as large (KVA) as the load it must operate. Never exceed the nameplate rating as this could result in overheating, reduced life expectancy, or in worst cases, fire.

PART NO. A-701953-A

# INSTALLATION, OPERATION AND MAINTENANCE OF GENERAL PURPOSE DRY TYPE TRANSFORMERS

## 600 VOLTS AND BELOW

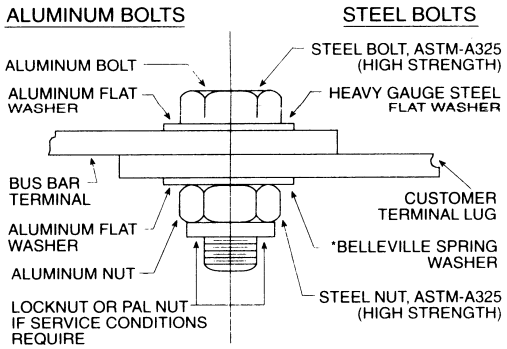
A) Ventilated Dry Type Transformers

Proper assembly of the connector (lug) to the transformer terminal is extremely important. Make certain that the connector is sized for the cable and is of the correct type to match cable and terminal metals. Always follow recommendations of the connector (lug) manufacturer. Space and insulate connectors per the NEC®.

### INSTRUCTIONS FOR ALUMINUM BUS BAR CONNECTIONS

The following steps should be followed when making connections to transformers with ALUMINUM BUS BAR TERMINALS.

1) Remove oxide form joint area of transformer bus terminal. This may be done with a wire brush or emery cloth. Other tools may be used but care should be taken to avoid scratching or gouging terminal.
2) Coat terminal area with joint compound, following manufacturer's instructions.
3) Make connections using one of the boiling methods shown.




CAUTION: Care should be taken to avoid shearing aluminum bolts. Follow manufacturer's maximum torque rating.

* Place cup in washer toward bus bar. Draw washer to flat position for proper torque.

B) Encapsulated Dry Type Transformers

Proper assembly of the field wiring to the transformer leads is extremely important. Make certain that the connector or terminal is sized for the cable. Space and insulate connectors or terminals per the NEC®.

CE marked transformers must be connected per EN 60742.

### 5. GROUNDING

All dry type transformers have a ground stud in the enclosure. The transformer enclosure should be solidly grounded to protect personnel. The customer supplied grounding conductor should have a current-carrying capacity to meet international, national, and/or local requirements.

### 6. MAINTENANCE

Non-ventilated encapsulated styles only require periodic wiping of dust and dirt from the outside of the case under normal conditions and environments. Adverse conditions may require more frequent inspections.

Ventilated units should be inspected within one to three months after initial installation. Air ducts should be kept clear at all times. Vacuum cleaners or low pressure compressed dry air can be used to remove dirt or dust. A regular inspection schedule for cleaning and maintenance will help ensure added safety and longer transformer life.

If a dry type transformer accidentally gets wet, it must be cleaned and thoroughly dried before energizing. Otherwise, complete failure could result!

CAUTION: Never perform internal maintenance while the unit is energized!

### 7. STORAGE

Both ventilated and encapsulated transformers should be stored in a clean, dry area. Care should be taken to prevent moisture or condensation from entering the transformer, and vent openings should be covered on ventilated units. If stored outside, the transformer must be covered and protected from water, dust and other airborne contaminants.

### 8. LIMITED PRODUCT WARRANTY

All dry type transformers are warranted against defects in materials and workmanship. This is a limited product warranty and certain conditions apply. Please contact the manufacturer for further information on warranty claims.

NOTICE: These instructions are general in nature and may not cover all variations in transformer design or conditions of installation, operation and maintenance in enough detail to meet customer needs. Additional instructions may be included with this transformer. If you need further information or should a problem arise, please contact the manufacturer.

PART NO. A-701953-A

## PRIMARY FUSE SIZING CHART FOR SINGLE PHASE TRANSFORMERS *

| | 120 | 190 | 200 | 208 | 220 | 240 | 277 | 380 | 400 | 416 | 440 | 480 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 1-1/4 | — | — | — | — | 8/10 | — | — | — | — | — | 1/2 | 1/4 |
| 100 | 2-1/2 | — | — | — | — | 1-1/4 | — | — | — | — | — | 8/10 | 1/2 |
| 150 | 4 | — | — | — | — | 2 | — | — | — | — | — | 1 | 8/10 |
| 250 | 3-1/2 | — | — | — | — | 3-2/10 | — | — | — | — | — | 1-6/10 | 1-1/4 |
| 500 | 7 | — | — | — | — | 3-1/2 | — | — | — | — | — | 3-2/10 | 2-1/2 |
| 750 | 12 | — | — | — | — | 5-6/10 | — | — | — | — | — | 5 | 4 |
| 1000 | 15 | 9 | 9 | 9 | 8 | 7 | 6-1/4 | 4-1/2 | 4-1/4 | 4-1/4 | 4 | 3-1/2 | 5 |
| 1500 | 17-1/2 | 15 | 15 | 15 | 12 | 12 | 10 | 7 | 6-1/4 | 6-1/4 | 6 | 5-6/10 | 4-1/2 |
| 2000 | 25 | 15 | 15 | 15 | 12 | 15 | 15 | 9 | 9 | 9 | 8 | 7 | 6 |
| 3000 | 35 | 20 | 20 | 20 | 17-1/2 | 17-1/2 | 15 | 15 | 15 | 15 | 12 | 12 | 9 |
| 5000 | 60 | 35 | 35 | 35 | 30 | 30 | 25 | 20 | 17-1/2 | 17-1/2 | 15 | 15 | 15 |
| 7500 | 80 | 50 | 50 | 50 | 45 | 40 | 35 | 25 | 25 | 25 | 25 | 20 | 17-1/2 |
| 10000 | 110 | 70 | 70 | 70 | 60 | 60 | 50 | 35 | 35 | 35 | 30 | 30 | 25 |
| 15000 | 175 | 100 | 100 | 100 | 90 | 80 | 70 | 50 | 50 | 50 | 45 | 40 | 35 |
| 25000 | 300 | 175 | 175 | 175 | 150 | 150 | 125 | 90 | 80 | 80 | 80 | 70 | 60 |

## PRIMARY FUSE SIZING CHART FOR THREE PHASE TRANSFORMERS *

| | 208 | 240 | 416 | 480 | 600 |
|---|---|---|---|---|---|
| 3000 | 15 | 15 | 7 | 6-1/4 | 5 |
| 6000 | 25 | 20 | 15 | 15 | 10 |
| 9000 | 35 | 30 | 17-1/2 | 15 | 15 |
| 15000 | 60 | 50 | 30 | 25 | 20 |
| 30000 | — | — | — | 50 | 40 |

* Recommended Rating for Current Limiting North American Power Fuses.

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## PRIMARY FUSE SIZING CHART FOR SINGLE PHASE TRANSFORMERS *

| | 120 | 190 | 200 | 208 | 220 | 240 | 277 | 380 | 400 | 416 | 440 | 480 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 2 | — | — | — | — | 1 | — | — | — | — | — | 1 | 1 |
| 100 | 4 | — | — | — | — | 2 | — | — | — | — | — | 1 | 1 |
| 150 | 4 | — | — | — | — | 2 | — | — | — | — | — | 1 | 1 |
| 250 | 4 | — | — | — | — | 4 | — | — | — | — | — | 2 | 2 |
| 500 | 8 | — | — | — | — | 4 | — | — | — | — | — | 4 | 4 |
| 750 | 12 | — | — | — | — | 6 | — | — | — | — | — | 6 | 4 |
| 1000 | 16 | 10 | 10 | 10 | 8 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 6 |
| 1500 | 20 | 16 | 16 | 16 | 12 | 12 | 10 | 8 | 8 | 8 | 6 | 6 | 6 |
| 2000 | 25 | 16 | 16 | 16 | 12 | 16 | 16 | 10 | 10 | 10 | 8 | 8 | 6 |
| 3000 | 32 | 20 | 20 | 20 | 20 | 16 | 16 | 16 | 16 | 16 | 12 | 12 | 10 |
| 5000 | 63 | 40 | 32 | 32 | 32 | 32 | 25 | 20 | 16 | 16 | 16 | 16 | 16 |
| 7500 | 80 | 50 | 50 | 50 | 50 | 40 | 40 | 25 | 25 | 25 | 25 | 20 | 16 |
| 10000 | 125 | 80 | 63 | 63 | 63 | 63 | 50 | 40 | 32 | 32 | 32 | 32 | 25 |
| 15000 | 160 | 100 | 100 | 100 | 100 | 80 | 80 | 50 | 50 | 50 | 50 | 40 | 32 |
| 25000 | 315 | 200 | 200 | 160 | 160 | 160 | 125 | 100 | 80 | 80 | 80 | 80 | 63 |

## PRIMARY FUSE SIZING CHART FOR THREE PHASE TRANSFORMERS *

| | 208 | 240 | 416 | 480 | 600 |
|---|---|---|---|---|---|
| 3000 | 16 | 16 | 8 | 8 | 6 |
| 6000 | 25 | 20 | 16 | 16 | 10 |
| 9000 | 32 | 32 | 16 | 16 | 16 |
| 15000 | 63 | 50 | 32 | 25 | 20 |
| 30000 | — | — | — | 50 | 40 |

* Recommended Rating for International Fuses.

PART NO. A-702148-A