Installation, Operation, and Maintenance

# Trane Rental Services

## Temporary Transformers


**⚠ SAFETY WARNING**

**Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.**

August 2023 **CHS-SVX03H-EN**

# Introduction

Read this manual thoroughly before operating or servicing this unit.

## Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

| | |
|---|---|
| **⚠WARNING** | Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
| **⚠CAUTION** | Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices. |
| ***NOTICE*** | Indicates a situation that could result in equipment or property-damage only accidents. |

### Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

### Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

**⚠WARNING**

**Proper Field Wiring and Grounding Required!**

**Failure to follow code could result in death or serious injury. All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.**

**⚠WARNING**

**Personal Protective Equipment (PPE) Required!**

**Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:**

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labeling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

**⚠WARNING**

**Follow EHS Policies!**

**Failure to follow instructions below could result in death or serious injury.**

- **All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Trane personnel should always follow local regulations.**

# Copyright



# Trademarks



# Revision History

Updated the following drawings in the Dimensions and Weights chapter.

- 75 kVA Step-up (208V to 480V) transformer RSTB0075G2AA-G2AD
- 150 kVA Step-up (208V to 480V) transformer RSTB0150G2AQ-G2AV
- 300 kVA Step-up (208V to 480V) transformer RSTB0300G2AX-G2BE
- 1000 kVA Step-down (4160V to 480V) transformer RSTM1000G2AA
- 1500 kVA Step-down (4160V to 480V) transformer RSTM1500G2AA

# Table of Contents

# Model Number Descriptions

## Trane Rental Services Designator

Each autotransformer has a unique designator in addition to the manufacturer part number. All inquiries should reference the model number

**Digit 1, 2, 3 — Rental Service Transformers**

RST = Rental Service Transformers

**Digit 4 — Primary Voltage**

B = 208
C = 240
G = 480
J = 600
M = 4160
Q = MULTI-TAP 4160/2400/480
R = MULTI-TAP 4160/2400/600/480
Z = MULTI-TAP 600/480/240/208

***Note:*** *All are referenced to 60 Hz, 3-phase systems.*

**Digit 5, 6, 7, 8 — Transformer (kVA)**

0075 = 0075 kVA
0150 = 0150 kVA
0300 = 0300 kVA
0500 = 0500 kVA
0750 = 0750 kVA
1000 = 1000 kVA
1500 = 1500 kVA

**Digit 9 — Secondary Voltage**

B = 208
C = 240
G = 480
J = 600
M = 4160
Q = MULTI-TAP 4160/2400/480
R = MULTI-TAP 4160/2400/600/480
Z = MULTI-TAP 600/480/240/208

***Note:*** *All are referenced to 60 Hz, 3-phase systems.*

**Digit 10 — Manufacturer**

0 = Ward
1 = Delcor
2 = Trystar

**Digit 11, 12 — Incremental Designator**

AA
AD
AQ
AV
AX
XX

# General Information

## Overview

This installation manual covers the transformers available to rent for temporary cooling solutions.

Transformers are provided to enable connection between the customer power supply and other Trane Rental equipment. This does not include the power supply voltage for the unit.

***Important:*** *Trane Rental Services transformers are only for 60 Hz, 3-phase power applications.*

Trane Rental Services inventory of rental transformers changes periodically. Contact TRS if the transformers in this document do not meet the specific needs of a project (voltages higher than 4,160V, single phase applications). Trane Rental Services will check current inventory or may locate a transformer for the specific application.

### Unit Description

**⚠WARNING**

**Improper Cable Usage!**

**Failure to use the proper conductors could result in death, serious injury, possible equipment or property-only damage. Any electrical cable provided by Trane Rental Services is intended for use coil taps for 600V and below. Connections to any other voltage taps must be made with conductors provided by others.**

**All transformers must be installed per the National Electric Code (NEC) and/or applicable local codes.**

Trane Rental Services offers a wide variety of transformers to lease for temporary cooling needs. Transformers are designed to use Trane Rental Services equipment in applications where voltage provided is different than the equipment voltage.

Transformers come complete on forklift compatible bases and ready to install. Transformers are dry type and have NEMA 3R enclosures.

Some Trane Rental transformers are autotransformers. Autotransformers are not isolation transformers.There is no protection between the primary and secondary coils in the event of a short circuit. The customer is responsible to provide disconnects and overcurrent protection required by the NEC.

Primary and secondary are used to identify different coils. They do not indicate which coil is connected to supply or load. The electrical supply is always connected to the coil with the corresponding voltage, and likewise for the electrical load.

### Enclosure Types

**NEMA 3R** - Enclosure constructed for either indoor or outdoor use and provides a degree of protection to personnel against contact and to equipment against falling dirt, rain, sleet, snow, and will be undamaged by the external formation of ice on the enclosure.

**Autotransformer** - An autotransformer is an electrical transformer where primary and secondary coils have some or all windings in common. The majority of the rental fleet is standard at 460V, 3-phase, 60 Hz. This will enable the autotransformer to be supplied for either a step up or step down application (208V or 575V primary - 460V secondary). These are sometimes referred to as multi-tap transformers.

### Transformer Sizing Considerations

The current on one side of a 3-phase transformer can be calculated by using the following relationship:

**Where:**

**P** = 3 phase power (in VA)

**I** = current (in Amperes)

**V** = voltage (in Volts)

**P** = I x V x 1.73

**I** = P / (V x 1.73)

Power on the secondary side and the power on the primary side are always equal to each other:

$P_{primary} = P_{secondary}$

**Therefore:**

$I_{primary} \times V_{primary} \times 1.73 = I_{secondary} \times V_{secondary} \times 1.73$

**Rearranging for general use:**

(can be used to find amperage on primary or secondary coil):

$$I_{new} = \frac{I_{old} \times V_{old}}{V_{new}}$$

**Example:**

A transformer has been installed a building 208V, 3 phase electrical service will be able to power the 480V, 3 phase rental equipment.

If rental equipment is connected to the transformer and will draw 65A at 480V, how many amps will be drawn from the building's electrical service at 208V?

$V_{old} = 480V$

$I_{old} = 65A$

$V_{new} = 208V$

$$I_{new} = \frac{I_{old} \times V_{old}}{V_{new}} = \frac{(65A) \times (480V)}{(208V)} = 150A$$

The power is the same no matter what side the user will calculate from:

- 480V x 65A x 1.73 = 53,976VA = 54kVA
- 208V x 150A x 1.73 = 53,976VA = 54kVA

The transformer size selected must be greater than 54 kVA.

Avoid using a transformer at the maximum rating. It is acceptable to use a much larger transformer than needed, but exercise caution.

# Dimensions and Weights

**⚠WARNING**

**Heavy Objects!**

**Failure to properly lift unit could result in death or serious injury or possible equipment or property-only damage.**
**Use a forklift of suitable capacity to move the unit.**

**Table 1. Unit weights and dimensions**

| Transformer kVA | Mfg | Wt (lb) | Length (inch) | Width (inch) | Height (inch) |
|---|---|---|---|---|---|
| 75 | Trystar (step up) | 1,100 | 55 | 32 | 47 |
| 150 | Trystar (step down) | 1,470 | 64 | 44 | 63 |
| | Trystar (step up) | 1,585 | 64 | 39 | 51 |
| | Trystar (step up) | 1,550 | 60 | 39 | 55 |
| 300 | Ward | 1,900 | 36 | 42 | 48 |
| | Delcor | 1,850 | 46 | 38 | 50 |
| | Trystar | 2,395 | 63 | 39 | 60 |
| | Trystar | 2,750 | 66 | 39 | 62 |
| 500 | Ward | 2,600 | 41 | 46 | 56 |
| | Delcor | 2,800 | 52 | 46 | 68 |
| | Trystar | 3,430 | 80 | 43 | 67 |
| 750 (600V) | Ward | 3,600 | 46 | 54 | 60 |
| 750 (4160V) | Ward | 4,400 | 48 | 58 | 60 |
| 750 | Delcor | 4,300 | 66 | 53 | 73 |
| 1000 | Ward | 5,000 | 48 | 58 | 60 |
| | Delcor | 5,800 | 79 | 54 | 82 |
| | Trystar (step down) | 8,000 | 132 | 62 | 78 |
| 1500 | Trystar (step down) | 9,000 | 132 | 62 | 78 |

# Primary/Secondary Transformers

**Figure 1. 75 kVA Step-up (208V to 480V) transformer RSTB0075G2AA-G2AD**

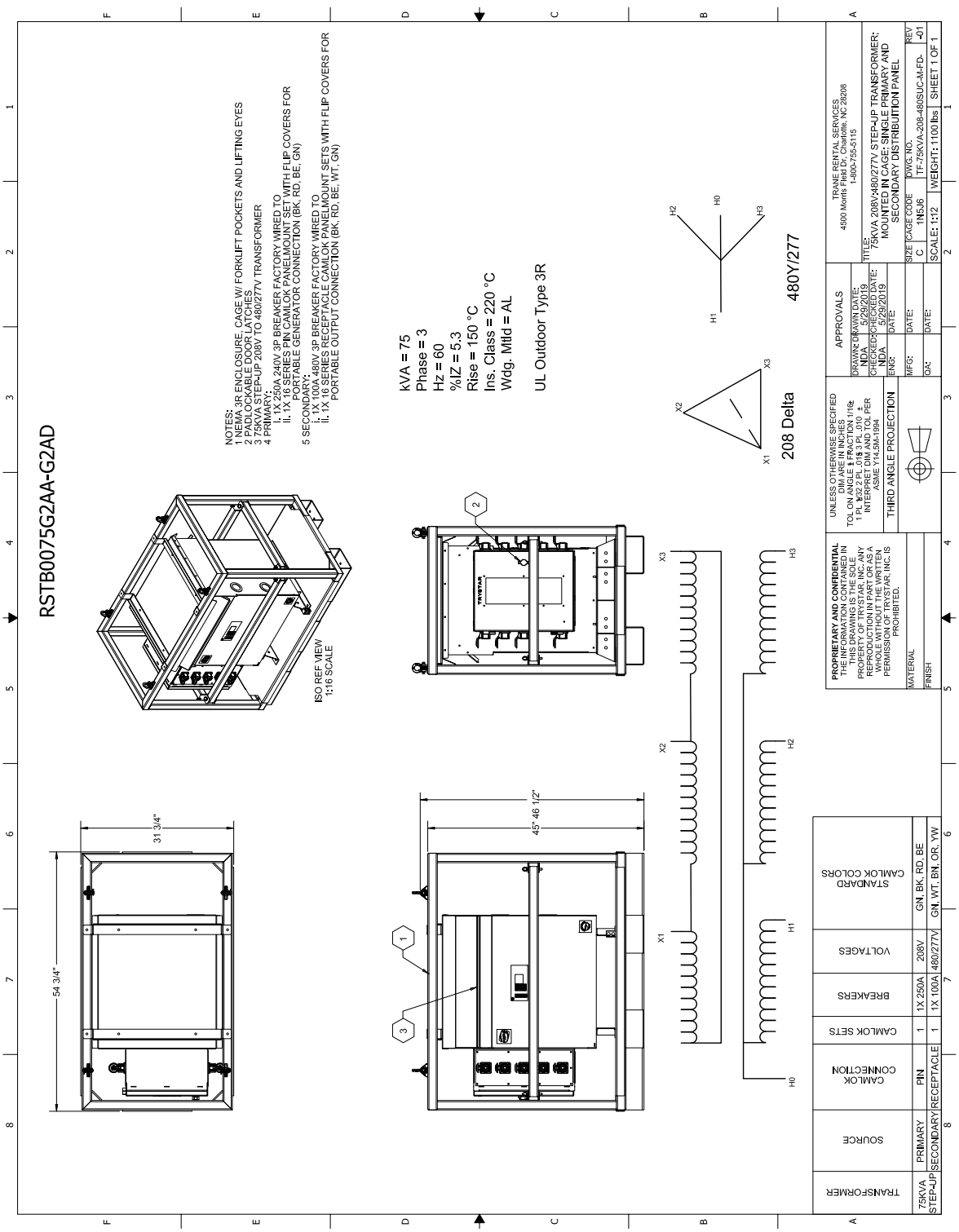


**Figure 2. 150 kVA Step-up (208V to 480V) transformer RSTB0150G2AQ-G2AV**

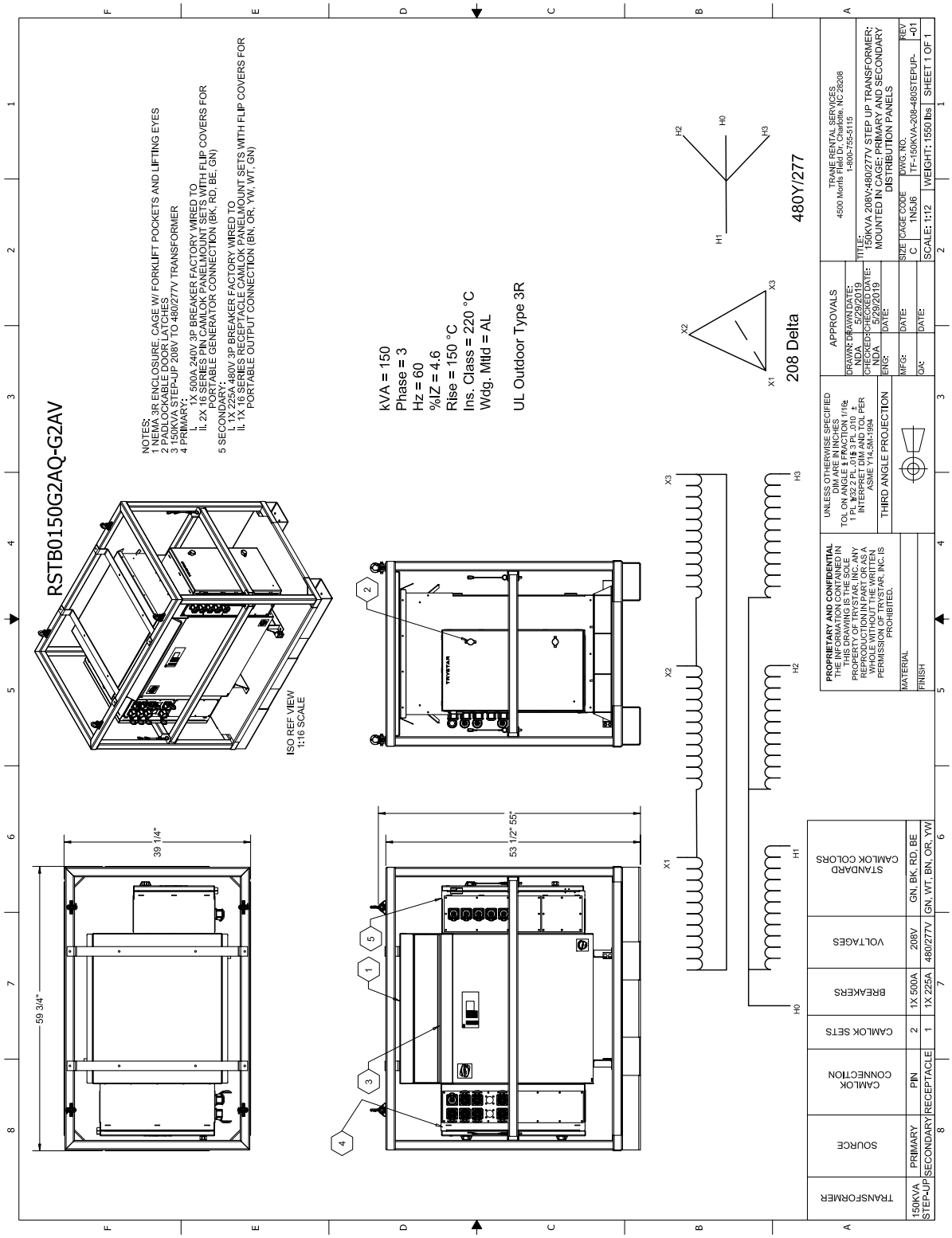


**Figure 3. 300 kVA Step-up (208V to 480V) transformer RSTB0300G2AX-G2BE**

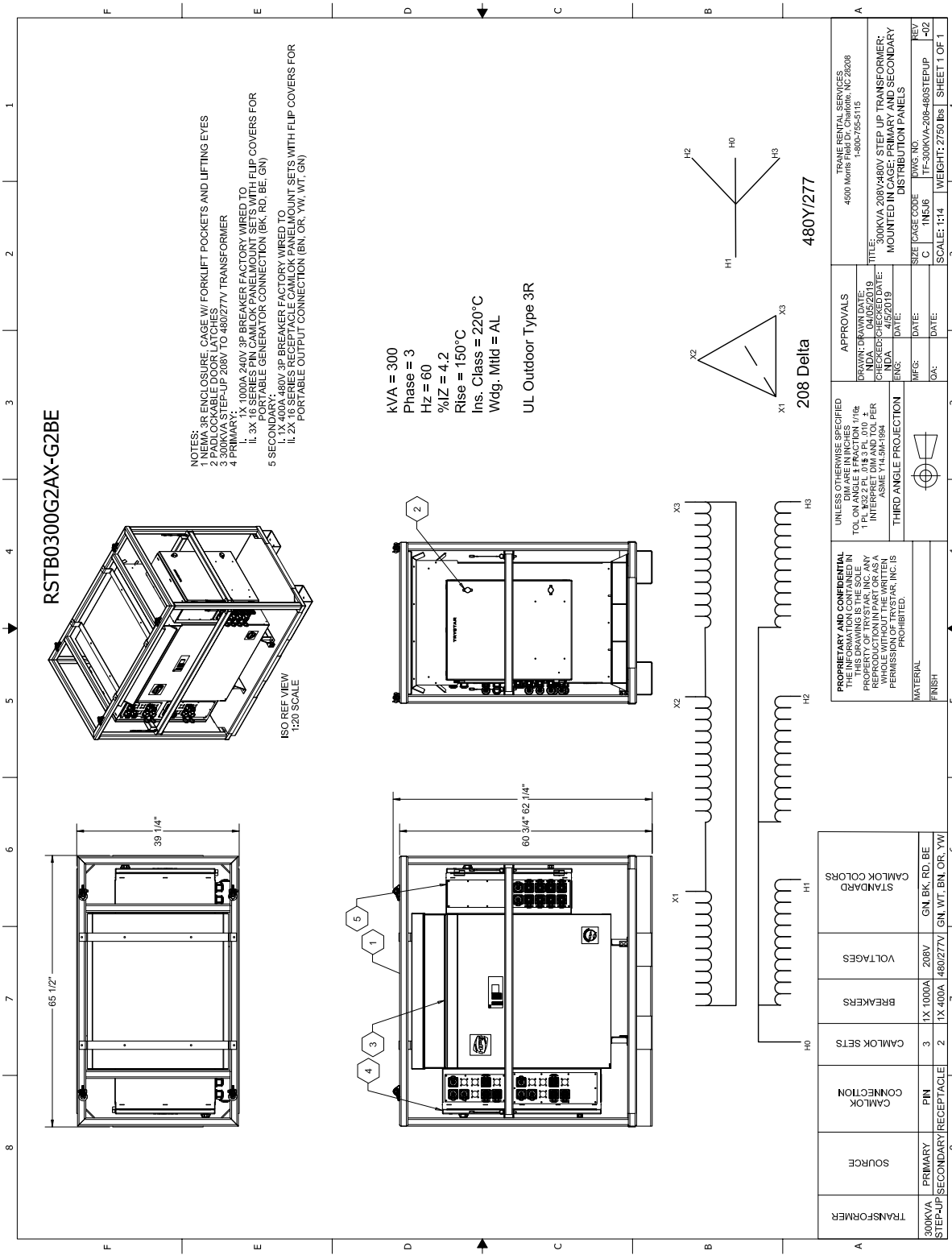


**Figure 4. 500 kVA Step-up (208V to 480V) transformer RSTB0500G2XX**

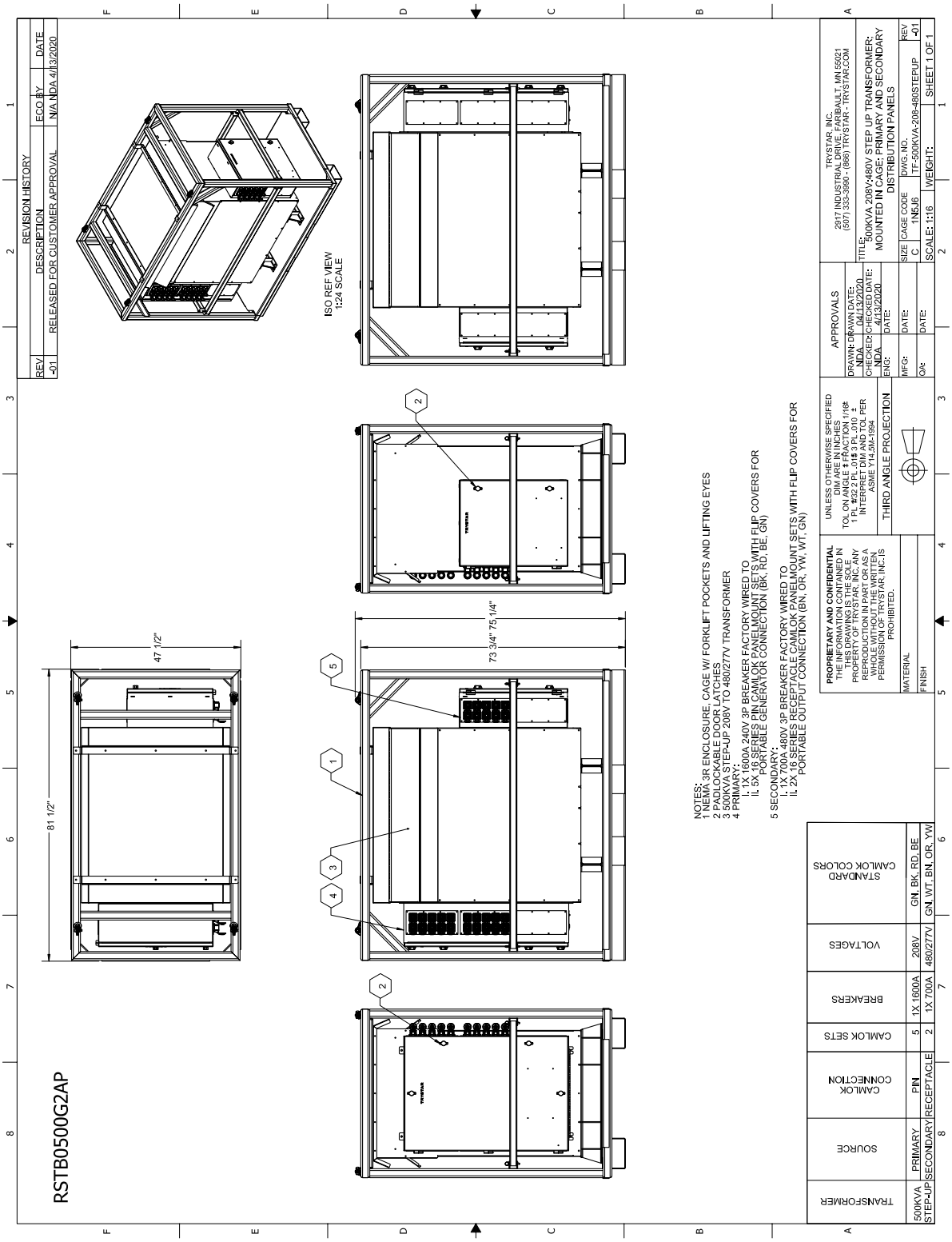


**Figure 5. 150 kVA Step-down transformer (480/208 only) RSTG0150B2XX**

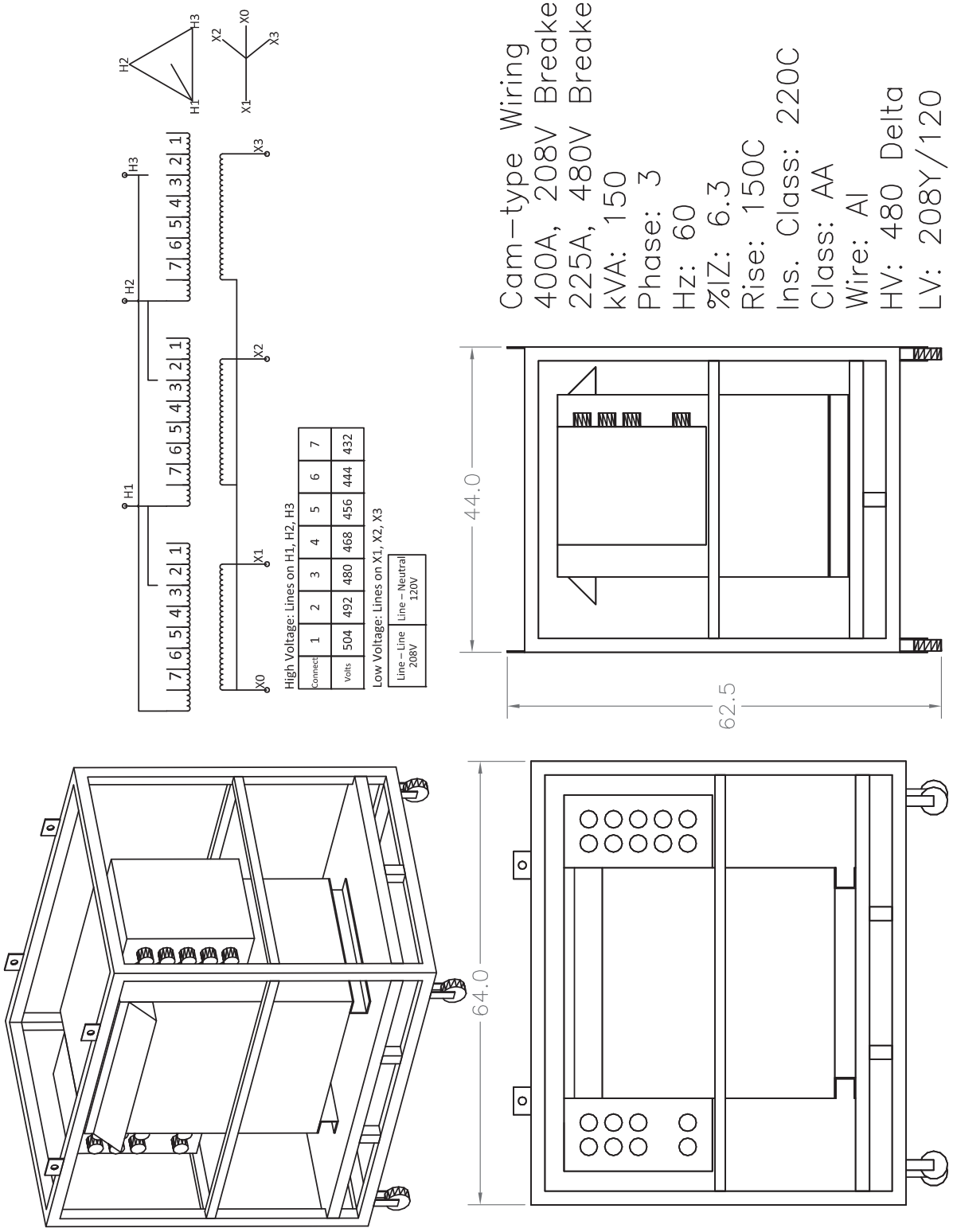


**Figure 6. 1000 kVA Step-down (4160V to 480V) transformer RSTM1000G2AA**

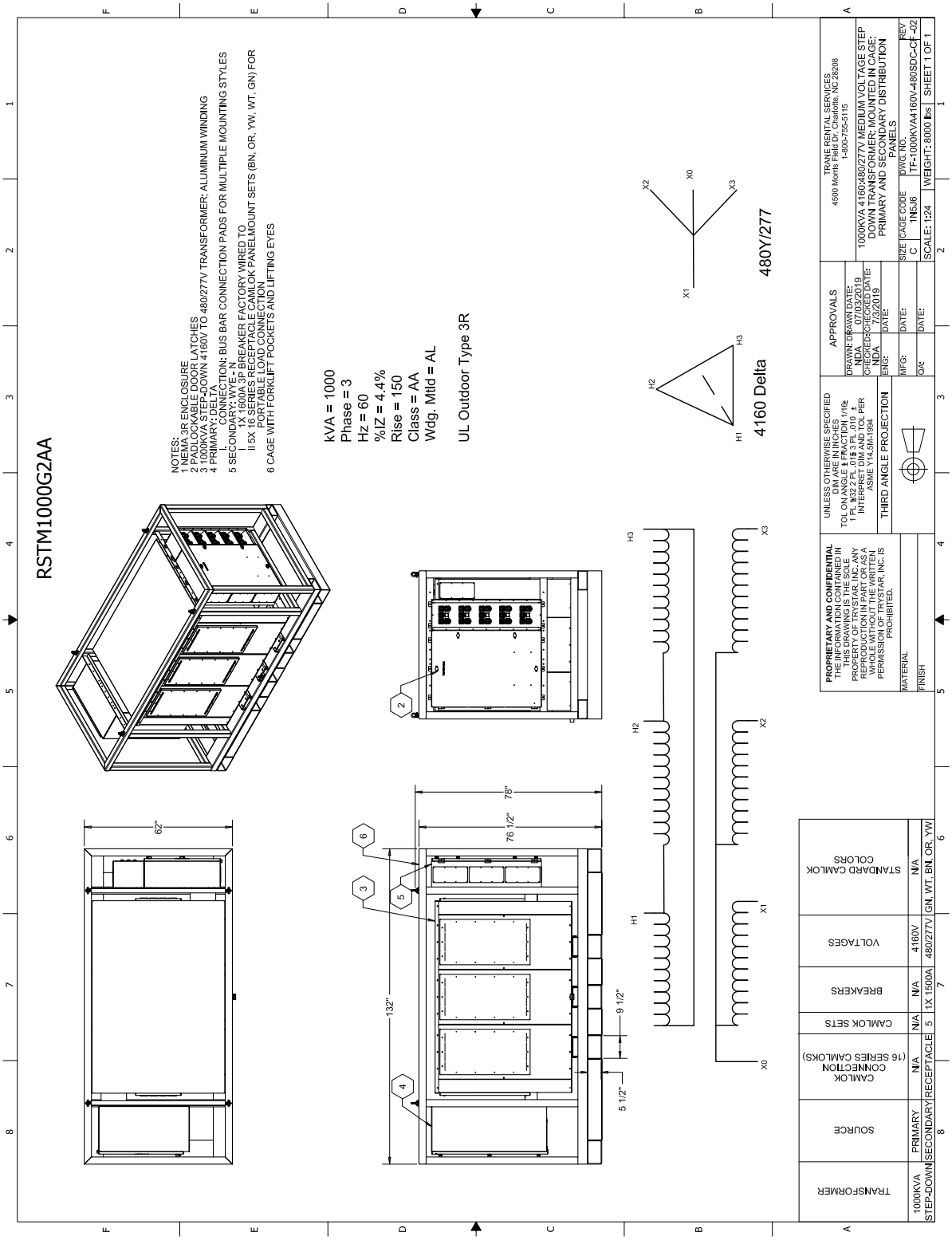
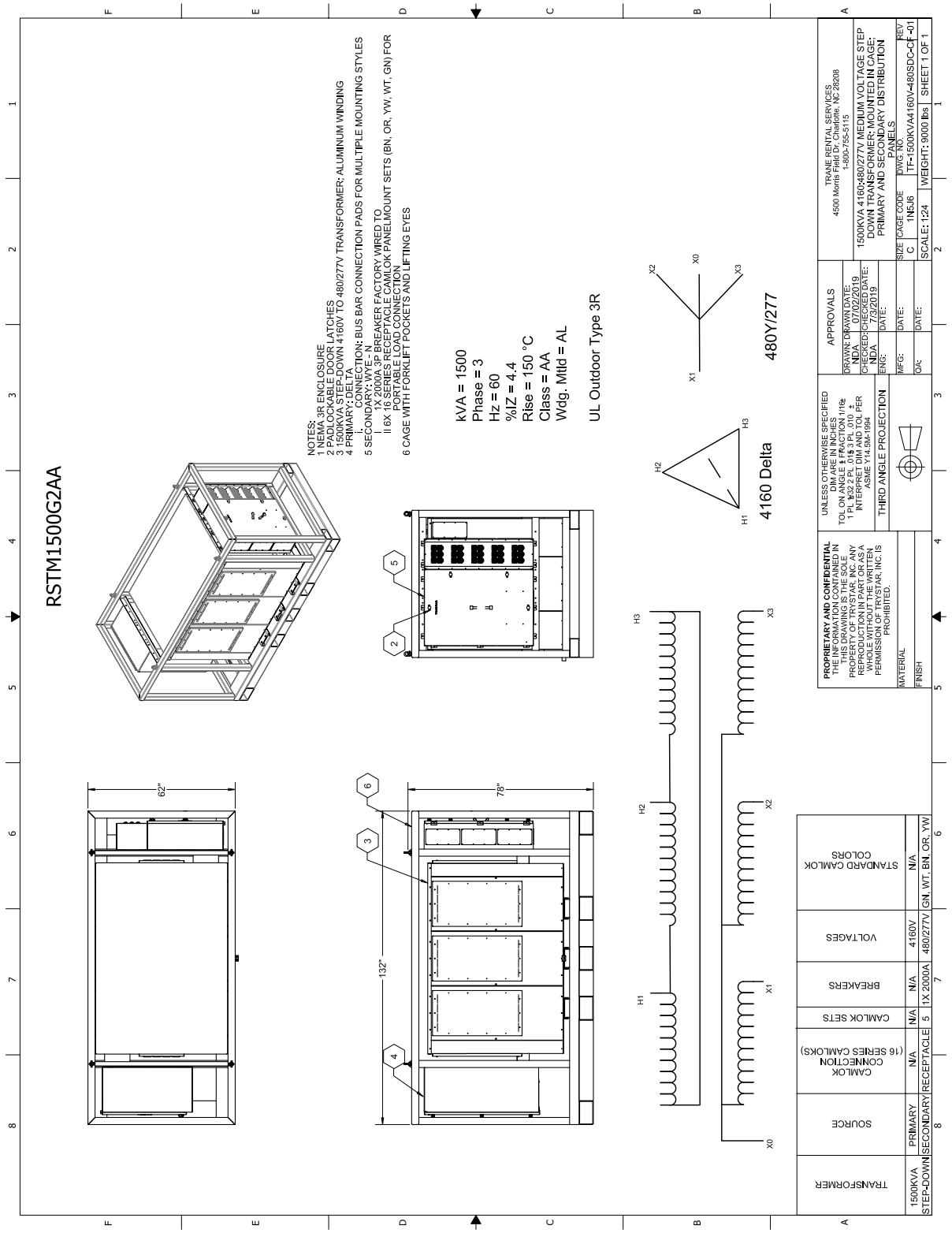


**Figure 7. 1500 kVA Step-down (4160V to 480V) transformer RSTM1500G2AA**



# Auto Transformers

**Figure 8. 300 kVA Autotransformer (600 volts and lower) CSTZ0300Z0XX**

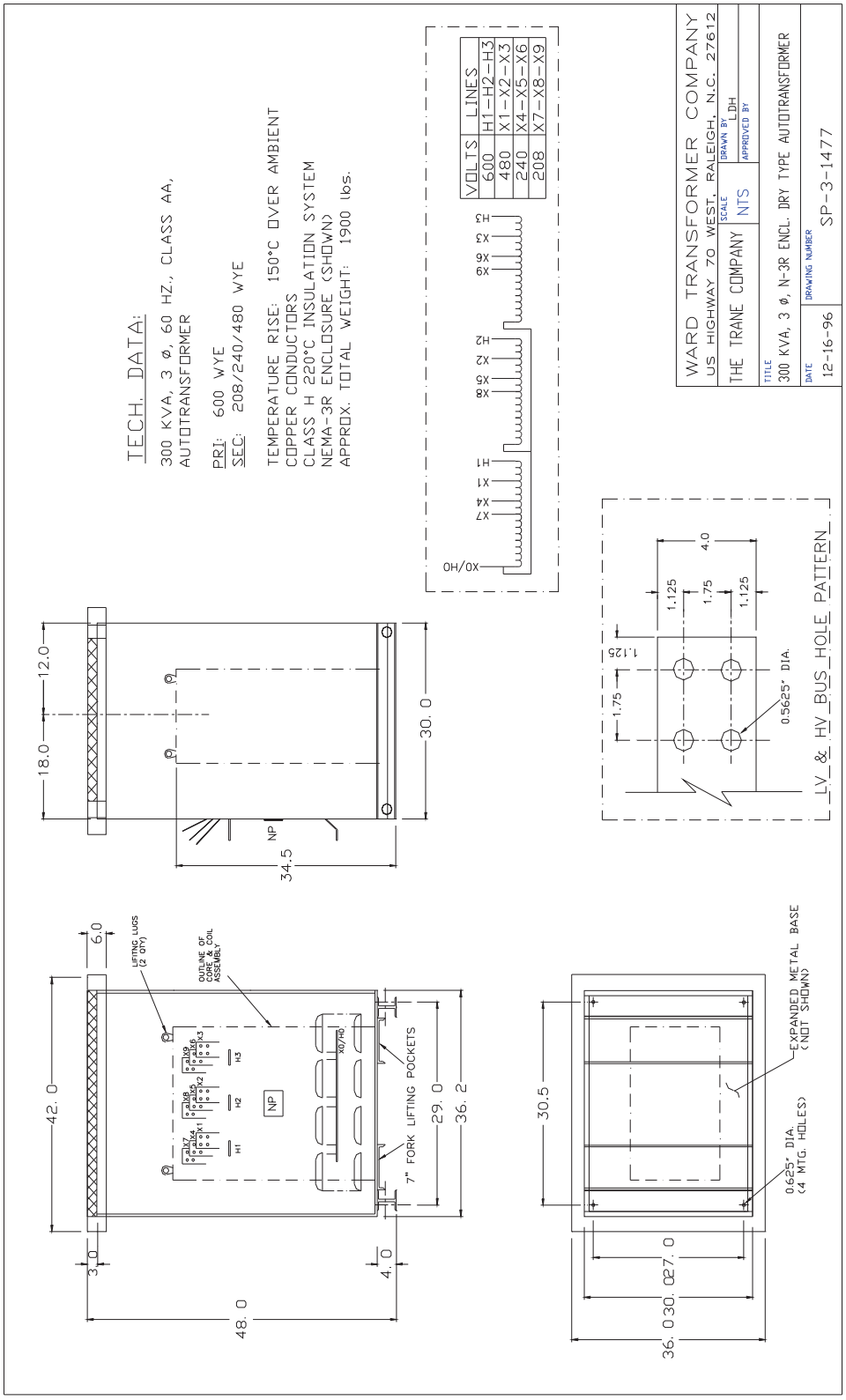


**Figure 9. 300 kVA Autotransformer (600 volts and lower) CSTZ0300Z1XX**

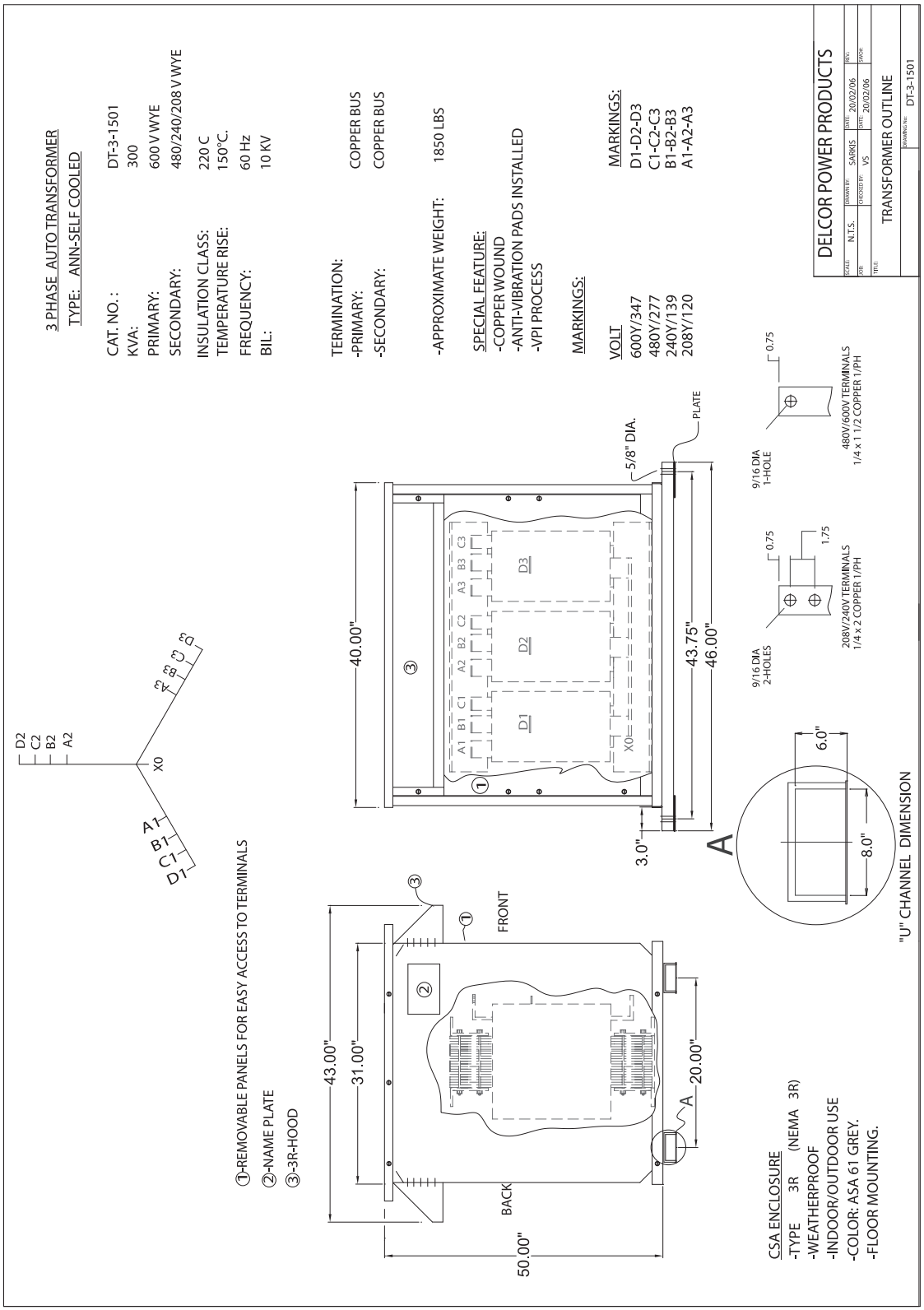


**Figure 10. 500 kVA Autotransformer (600 volts and lower) CSTZ0500Z0XX**

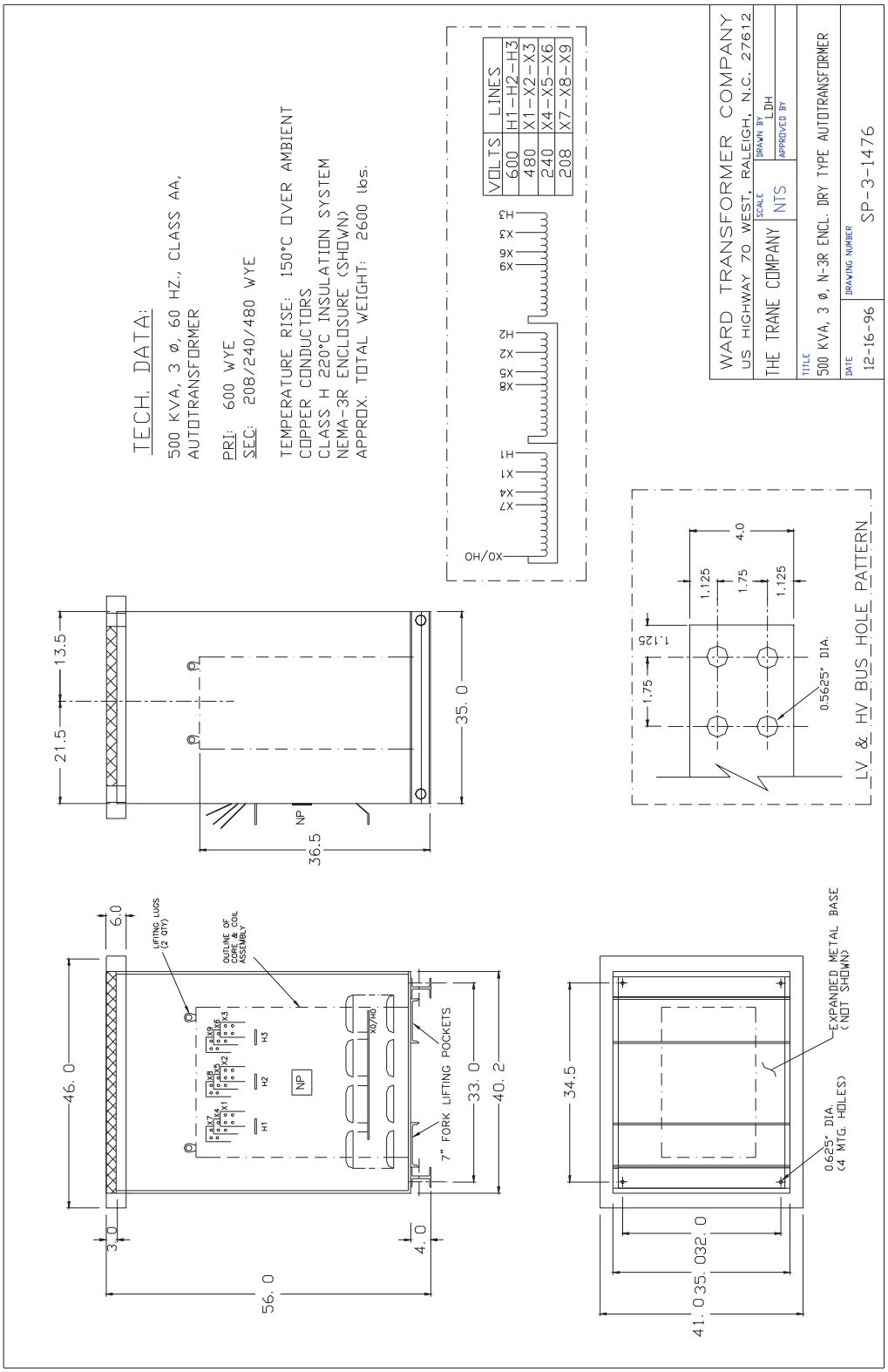


**Figure 11. 500 kVA Autotransformer (600 volts and lower) CSTZ0300Z1XX**

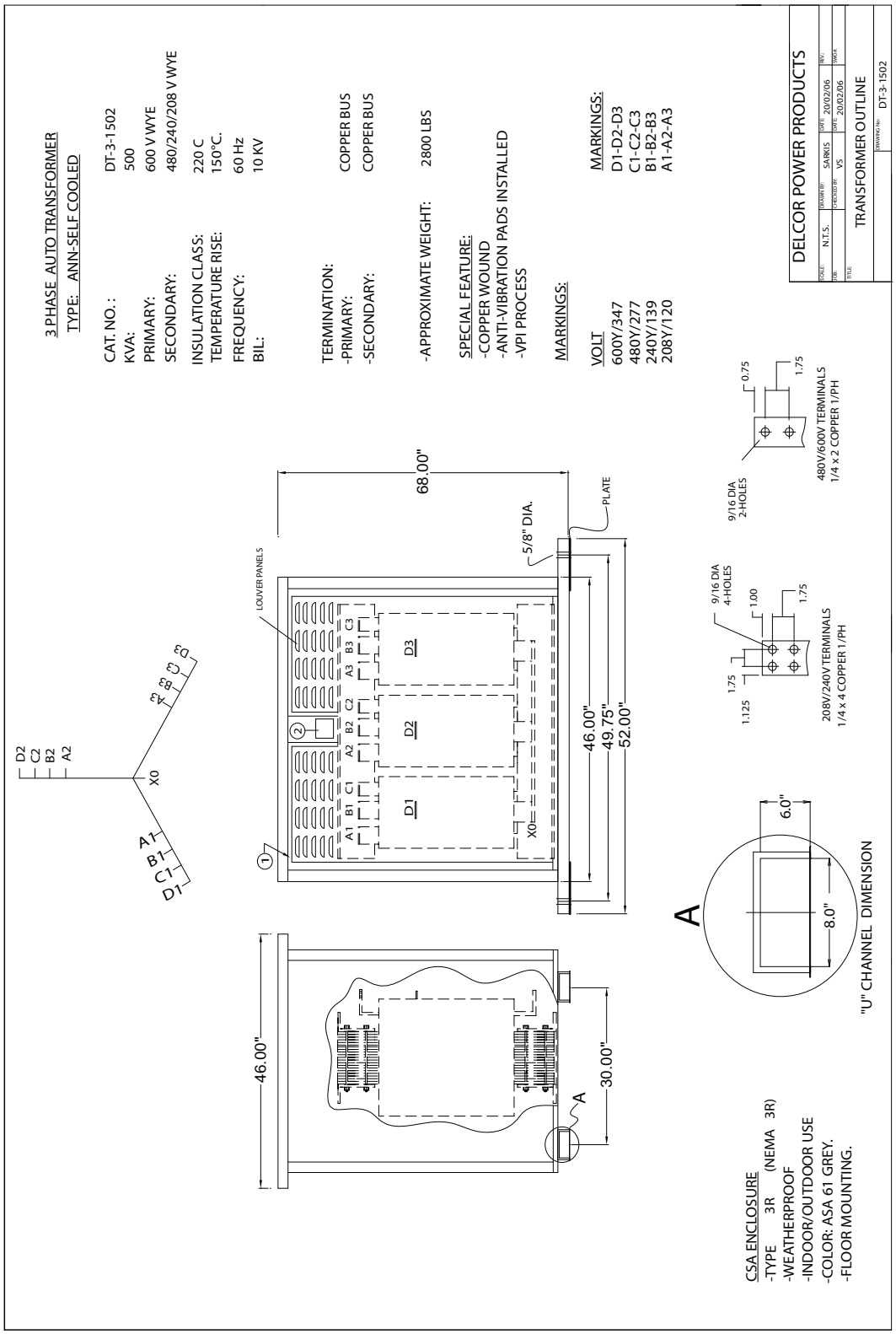


**Figure 12. 750 kVA Autotransformer (600 volts and lower) CSTZ0750Z0XX**

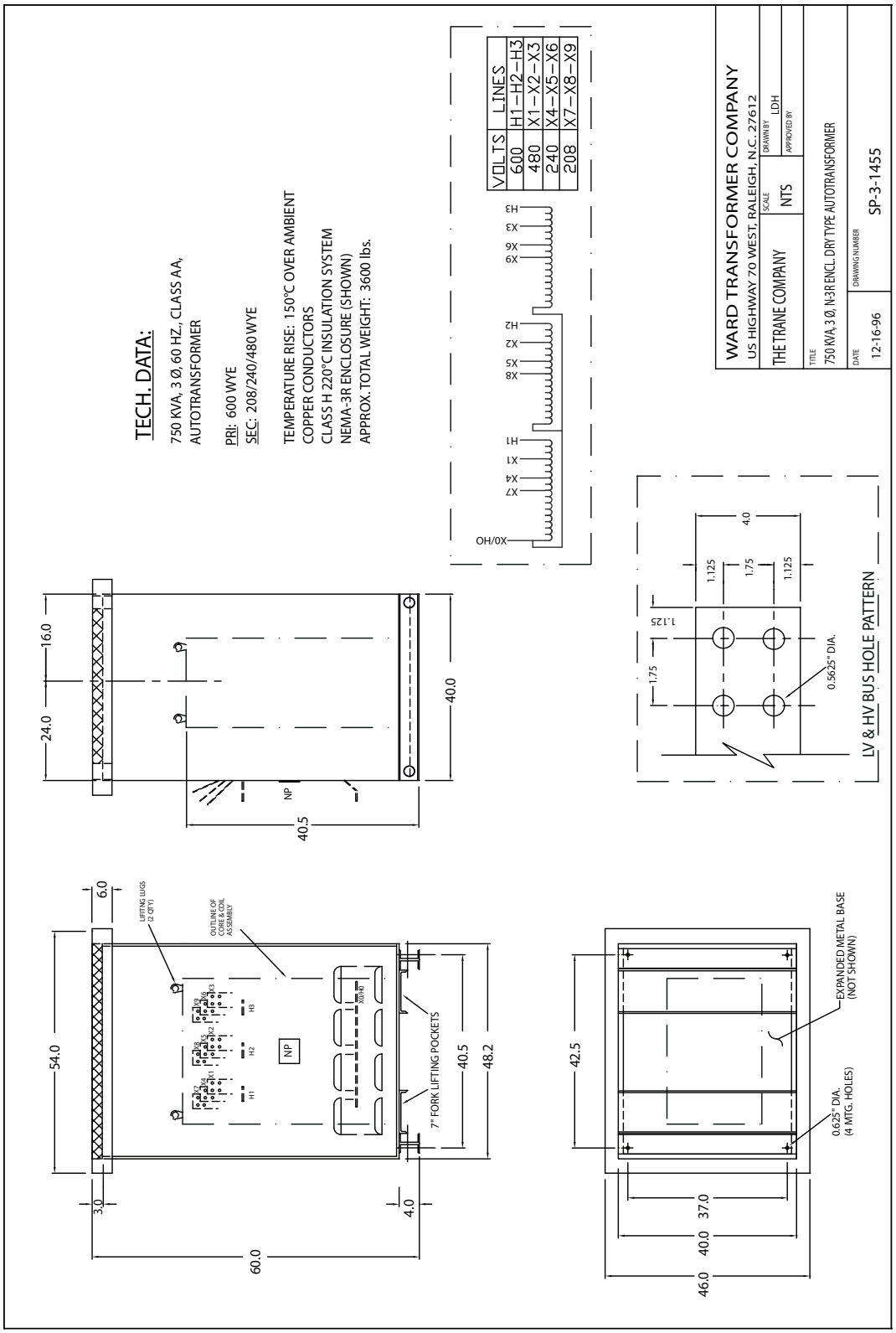


**Figure 13. 750 kVA Autotransformer (600 volts and lower) CSTZ0750Z1XX**

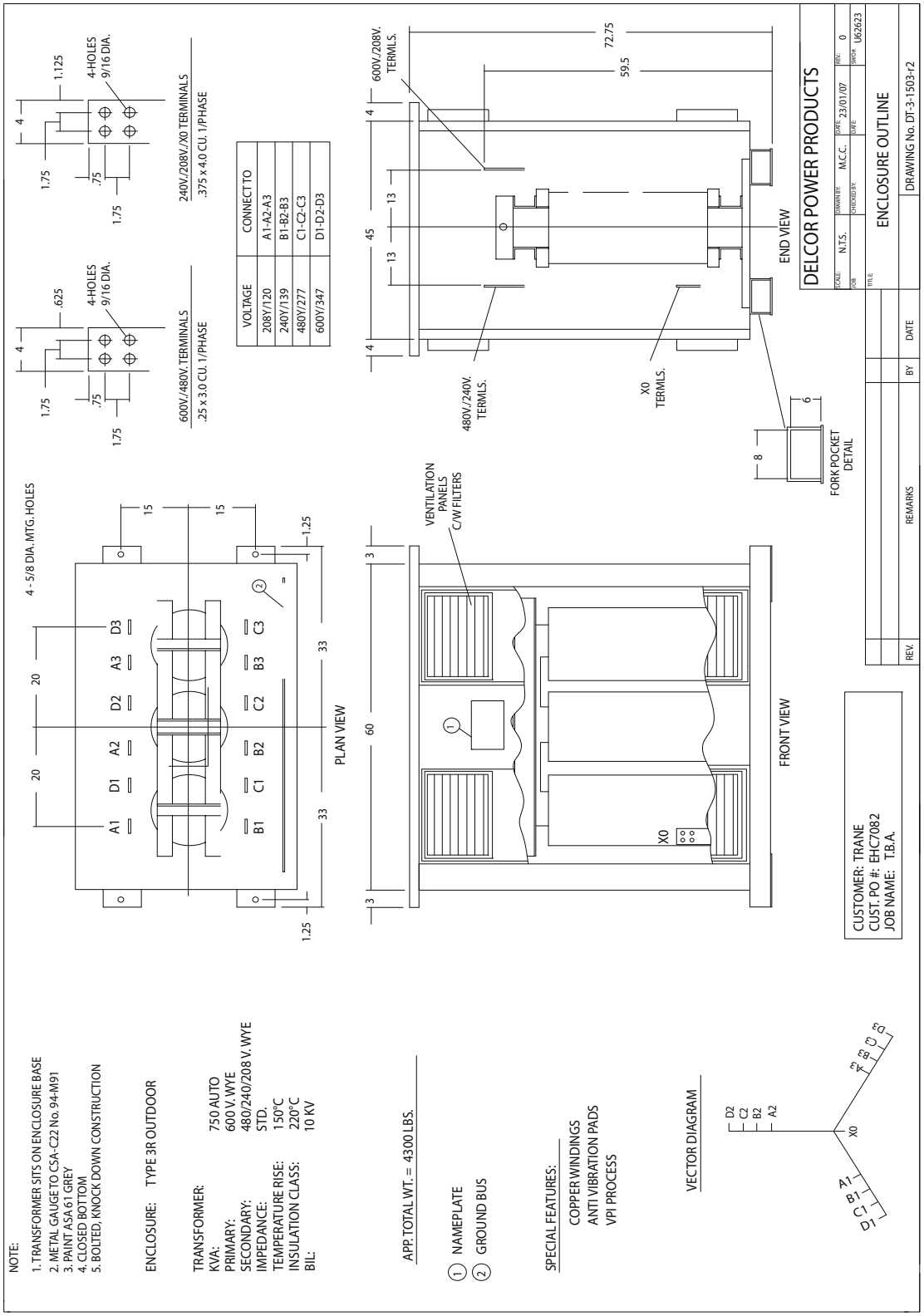


**Figure 14. 750 kVA Autotransformer (480 volts and above) CSTQ0750Q0XX**

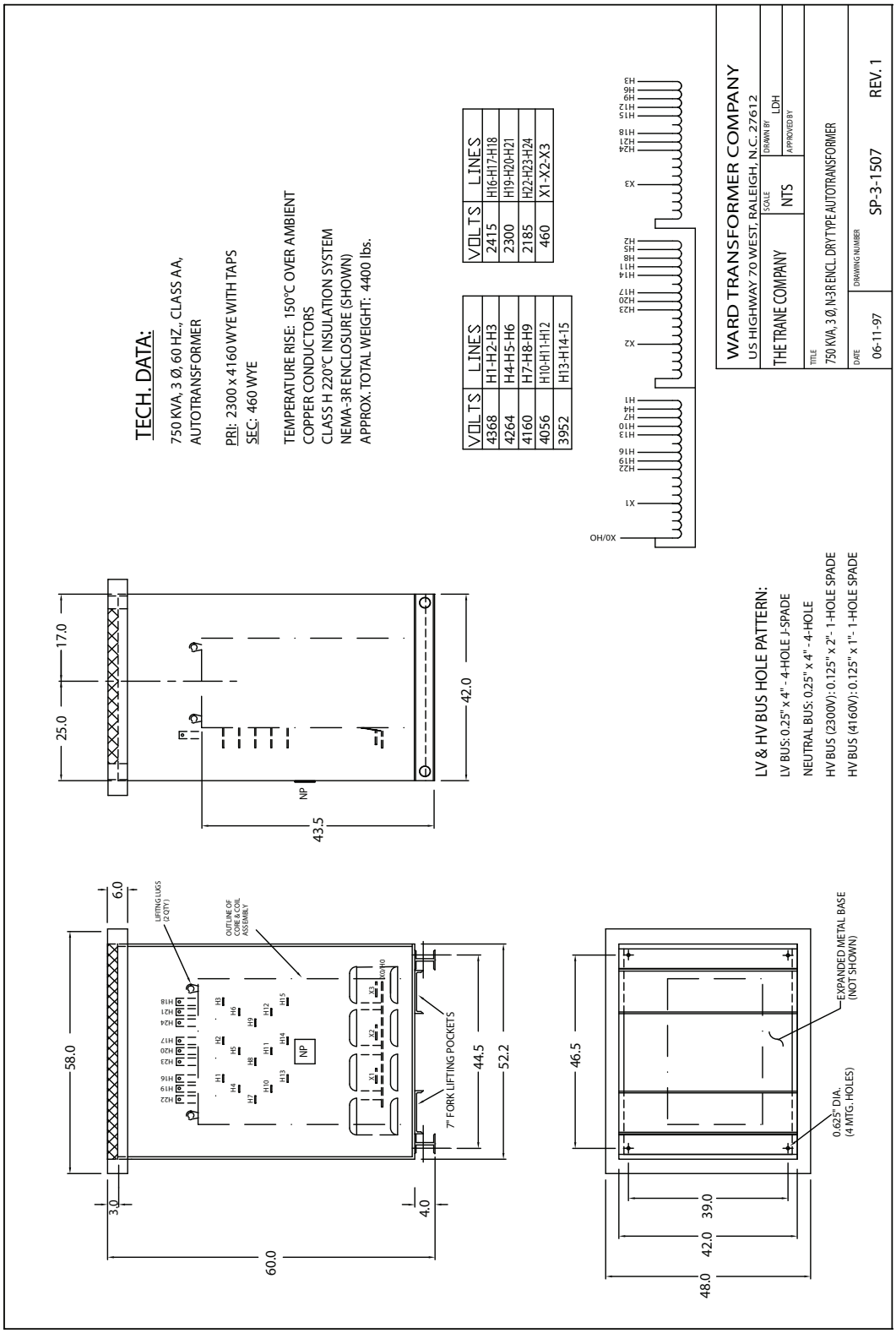


**Figure 15. 1000 kVA Autotransformer (480 volts and above) CSTR1000R0XX**

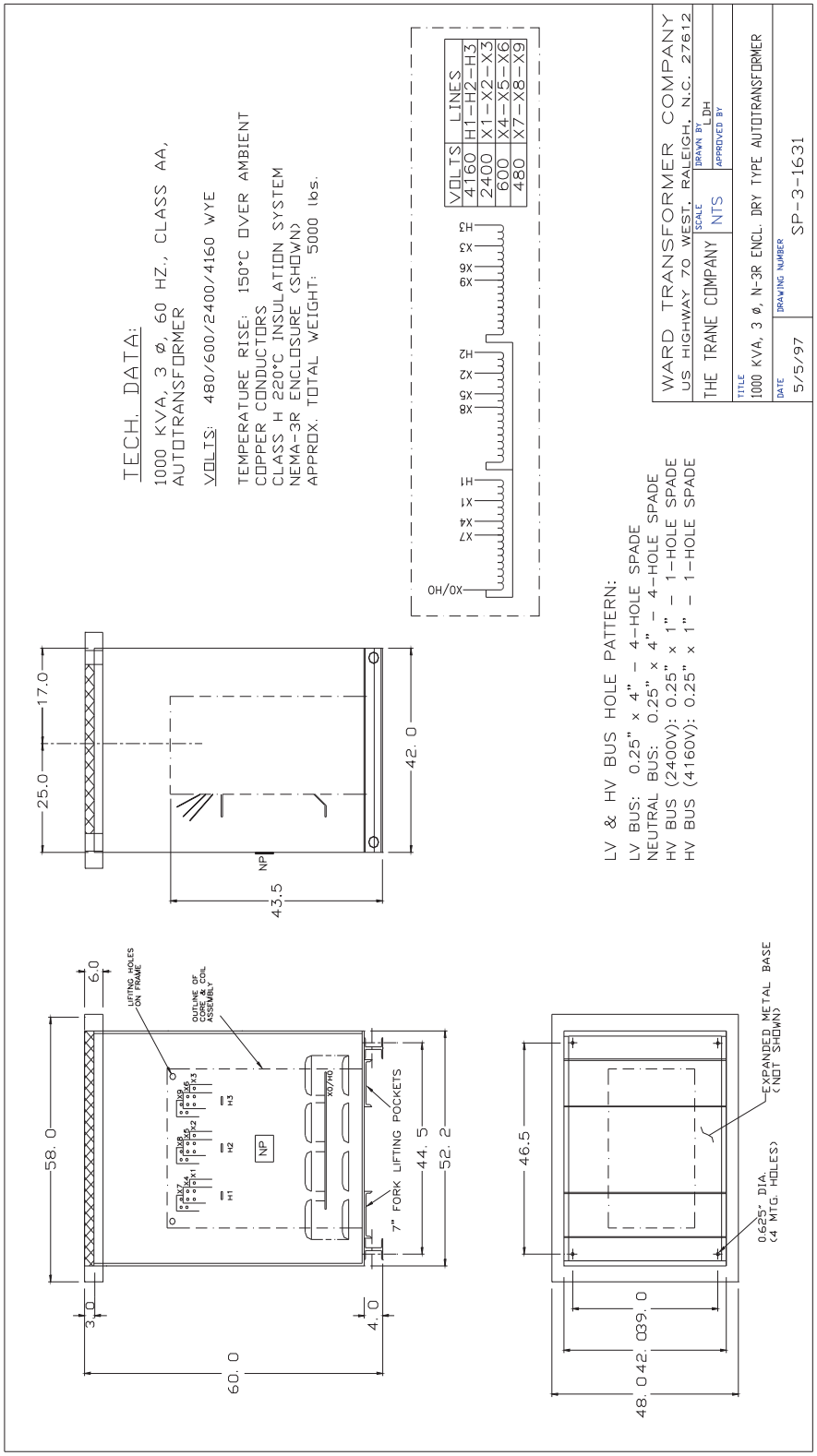
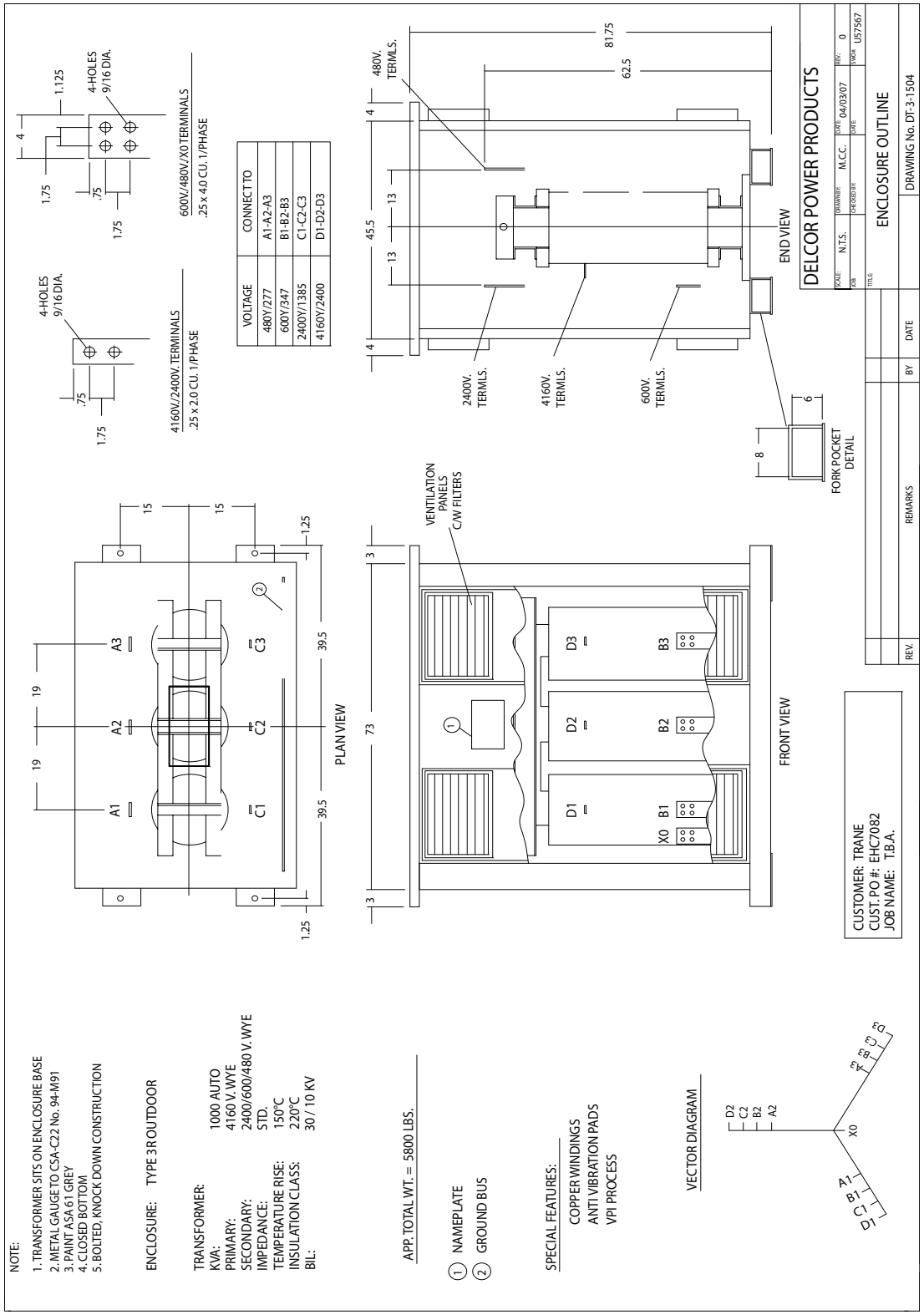


**Figure 16. 1000 kVA Autotransformer (480 volts and above) CSTR1000R1XX**



# Installation

All transformers must be installed per the National Electric Code (NEC) and/or applicable local codes. Canadian installation must conform to CSA and/or applicable local codes.

**⚠WARNING**

**Live Electrical Components!**

**Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.**
**When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.**

**⚠WARNING**

**Hazardous Voltage!**

**Failure to disconnect power before servicing could result in death or serious injury.**
**Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.**

***NOTICE***

**Use Copper Conductors Only!**

**Failure to use copper conductors could result in equipment damage as the equipment was not designed or qualified to accept other types of conductors.**

**⚠WARNING**

**Improper Cable Usage!**

**Failure to use the proper conductors could result in death, serious injury, possible equipment or property-only damage. Any electrical cable provided by Trane Rental Services is intended for use coil taps for 600V and below. Connections to any other voltage taps must be made with conductors provided by others.**

**Table 2. Three-phase transformer full-load currents in amperes**

| Transformer kVA | Rated Phase to Phase Voltage | | | | | |
|---|---|---|---|---|---|---|
| | 208 | 240 | 480 | 600 | 2400 | 4160 |
| 75 | 208.0 | N/A | 90.0 | N/A | N/A | N/A |
| 150 | 400.0 | N/A | 180.0 | N/A | N/A | N/A |
| 300 | 832.7 | 721.7 | 360.9 | 288.7 | N/A | N/A |
| 500 | 1387.9 | 1202.9 | 601.4 | 481.1 | N/A | N/A |
| 750 (600V) | 2081.9 | 1804.3 | 902.1 | 721.7 | N/A | N/A |
| 750 (4160V) | N/A | N/A | 902.1 | 721.7 | 180.4 | 104.1 |
| 1000 | N/A | N/A | 1202.9 | 962.3 | 240.6 | 138.8 |
| 1500 | N/A | N/A | 1804.3 | N/A | N/A | 208.2 |

## Unloading, Handling, and Storage

**⚠WARNING**

**Heavy Objects!**

**Failure to properly lift unit could result in death or serious injury or possible equipment or property-only damage.**
**Use a forklift of suitable capacity to move the unit.**

Handle the transformer with care to prevent damage to the enclosure or the core and coil assembly. It is recommended to use a fork lift with forks extended completely under the entire unit. Forks should extend out past the opposite side a small amount for full pickup coverage. Alternately, use the lifting eyes or openings provided to lift the unit off an open truck or storage area.

***Note:*** *Check the nameplate weight before attempting to lift the transformer.*

When lifting the transformer, verify the equipment and cables can handle the load. Where steel cables or nylon straps are used, it is recommended to use spreader bars to keep the cable from damaging the enclosure of the transformer. If conditions allow, use convention slings or ropes.

Always have the transformer in the upright position when moving the unit. The transformer should never be slid across the ground or floor unless mounted on a skid or rollers designed for this purpose. Damage could result to the enclosure.

Dollies with casters or a flat base can make the operation of moving the equipment easier.

Always store the transformer in a warm dry location with uniform temperature to prevent condensation. Use a plastic cover to keep out dust and contaminates during storage.

# Location

## Atmosphere

NEMA 3R or outdoor design units require a rain shield or suitable housing for protection from the elements.

## Temperature

Temperature in the installation area must be normal for the rated design. Transformers are designed to operate at a maximum ambient air temperature of 40°C and a maximum temperature rise of 150°C.

At higher or lower ambient temperatures loading can be adjusted to its maximum value by the following values:

1. For each degree of C that the average ambient of 30°C exceeds the maximum load on the transformer must be reduced by 1% rating of the kVA.

**Example:** 300 kVA - 1% = 297 kVA

2. For each degree of C that the average ambient is less than 30°C the maximum load can be increased by .67% of the rated kVA.

**Example:** 300 kVA + .67% = 302 kVA

- Formula to convert from °F to °C: [(Temp. in °F - 32)/1.8]
- Formula to convert from °C to °F, [(Temp. in °C x 1.8) + 32]

## Ventilation

Place transformers in an area with good ventilation. Proper cooling of a dry type transformer depends on circulation of clean air free from dust, dirt, or corrosive elements. Filtered air is preferable and may be mandatory in some cases of extreme air pollution. This can help reduce the maintenance of the transformer.

- Height of the vault and location opening can affect the transformer loading due to airflow or lack of airflow.
- A minimum 12-inches should be provided on all sides of a dry type transformer and between adjacent units.
- Wall mount transformers should have at least 6-inches of space beneath the transformer to provide adequate ventilation.
- Free standing or floor mount transformers with bottom ventilation must be on the feet provided with a minimum clearance of 12-inches front to rear for access to proper air flow for bottom ventilation.

# Installation

- Dry type transformers can be mounted on various surfaces and with different methods of mounting. The transformer should be mounted in an upright position. This will allow for effective ventilation.
- Confirm the surface where the transformer is mounted is strong enough to handle the weight of the unit. Before installation, check the nameplate for the weight.
- It is recommended the surface is flat and level. If not flat and level, additional noise from vibrations may be heard. Installation of a dry type transformer includes the need to supply impulse protective devices such as arresters. Dry types do not have the same impulse levels as their liquid filled counterpart. If units could be exposed to lightning strikes or heavy switching transients, proper protective equipment should be provided.

# Grounding

**⚠WARNING**

**Hazardous Voltage!**

**Failure to disconnect power before servicing could result in death or serious injury.**
**Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.**

The enclosure of the transformer and the core assembly should be permanently grounded in accordance with the latest National Electric Code requirements. In most cases it is improper to use the X0 terminal when bonding to ground. Local requirements may vary. Consult the electrical contractor for additional information.

# Tap Settings

Units are shipped without wiring lugs. For multi-tap autotransformers, wiring lugs are required to complete installation. It is the responsibility of the customer to have a qualified electrician, or licensed contractor, specify, supply, and install the wiring lugs.

Determination of the required lugs for installation will include, but may not be limited to, the terminal sizes and hole patterns on the transformer taps and the size and quantity of wire being used to connect the equipment. Refer to the Bus Terminal Dimensions table and drawing for each transformer for this information.

***Important:*** *Lugs will be required for wiring of both the primary and secondary coil.*

Primary/secondary dedicated step-up or step-down units are equipped with cam-type electrical connections. Units do not require lugs and cannot be hard wired. See the following table.

**Table 3. Transformer bus terminal dimensions for lug sizing (lugs not provided)**

| Transformer Size | Mfg. | LV Bus | HV Bus |
|---|---|---|---|
| 75 kVA Step Up Transformer (208/480 only) | Trystar | N/A (Cam-type connection) | N/A (Cam-type connection) |
| 150 kVA Step Down Transformer (480/208 only) | Trystar | N/A (Cam-type connection) | N/A (Cam-type connection) |
| 150 kVA Step Up Transformer (208/480 only) | Trystar | N/A (Cam-type connection) | N/A (Cam-type connection) |
| 300 kVA Step Up Transformer (208/480 only) | Trystar | N/A (Cam-type connection) | N/A (Cam-type connection) |
| 500 kVA Step Up Transformer (208/480 only) | Trystar | N/A (Cam-type connection) | N/A (Cam-type connection) |
| 1000 kVA Step Down Transformer (4160/480 only) | Trystar | N/A (Cam-type connection) | 0.5 in. dia. x 4 inch - 2 hole |
| 1500 kVA Step Down Transformer (4160/480 only) | Trystar | N/A (Cam-type connection) | 0.5625-inch dia x 4-inch - 2 hole |
| 300 kVA AutoTransformer (600 volts and lower) | Ward | 0.5625-inch dia. x 4-inch - 4 hole | 0.5625-inch dia. x 4-inch - 4 hole |
| 500 kVA AutoTransformer (600 volts and lower) | Ward | 0.5625-inch dia. x 4-inch - 4 hole | 0.5625-inch dia. x 4-inch - 4 hole |
| 750 kVA AutoTransformer (600 volts and lower) | Ward | 0.5625-inch dia. x 4-inch - 4 hole | 0.5625-inch dia. x 4-inch - 4 hole |
| 300 kVA AutoTransformer (600 volts and lower) | Delcor | 0.5625-inch dia. x 2-inch - 2 hole | 0.5625-inch dia. x 1.5-inch - 1 hole |
| 300 kVA AutoTransformer (600 volts and lower) | Delcor | 0.5625-inch dia. x 4-inch - 4 hole | 0.5625-inch dia. x 2-inch - 2 hole |
| 300 kVA AutoTransformer (600 volts and lower) | Delcor | 0.5625-inch dia. x 4-inch - 4 hole | 0.5625-inch dia. x 4-inch - 4 hole |

| Transformer Size | Mfg. | 480/600V Bus | 2300/2400V Bus | 4160V Bus |
|---|---|---|---|---|
| 750 kVA Autotransformer (above 600 volts) | Ward | 0.25-inch dia. x 4-inch - 4 hole | 0.125-inch dia x 2-inch - 1 hole | 0.125-inch dia x 1-inch - 1 hole |
| 1000 kVA Autotransformer (above 600 volts) | Ward | 0.25-inch dia. x 4-inch - 4 hole | 0.25-inch dia. x 1-inch - 1 hole | 0.2-inch dia. x 1-inch - 1 hole |
| 1000 kVA Autotransformer (above 600 volts) | Delcor | 0.5625-inch dia. x 4-inch - 4 hole | 0.5625-inch dia. x 2-inch - 2 hole | 0.5625-inch dia. x 2-inch - 2 hole |

# Drying of Core and Coil Assembly

If the transformer has been stored outdoors or it has been subjected to an extended shut down under high humidity conditions, it may be required to dry the transformer out.

- Check the unit by a Megger for proper ratings based on the voltage to see if required.
- If readings are low, the transformer should be dried before applying rated voltage and loading the unit.

1. All free moisture should be blown or wiped from the coils, core and bus work. Apply heat using space heaters to help dry surface moisture in the enclosure. Use fans to blow the heated air up through the coils, bottom to top to help speed up the process. Do not exceed the insulation temperature rating or coil damage could occur.

***Important:*** *Heated air should pass through the ventilation ducts in the coil assembly.*

2. Drying time will depend on the transformer size, voltage, and amount of moisture present. The higher the parameters, the longer to dry the transformer.
3. Check the winding insulation resistance during the process with a Megger. Insulation resistance will increase during the drying process and the heat should continue until it reaches a plateau. The resistance measurements should be taken in the same manner on all windings.

# Precautions to Minimize Sound

## Level

There are a number of installation precautions and mounting techniques that will help in the reduction of audible sound levels in energized transformers. Some of the more pertinent information and notes are below:

- Proper location is the first consideration in an installation to keep within or below the prescribed decibel limit of the area.
- Keep the transformer away from the area that the noise would be the least tolerated.
- Avoid mounting the transformer in a room corner close to the ceiling. Three sided corners act as a megaphone and amplify the sound level.
- Avoid installing in corridors or corners in a stairwell. The transformer sound can be reflected from the walls. This added to the primary sounds of the transformer, can increase the decibel level buildup.
- Where feasible, experiment with the location of the transformer operation and position to determine which area is the best location and orientation for decreased sound level.
- Where necessary, the walls of the transformer room could be covered with a sound dampening material such as fiberglass, acoustical tile, kimsul, and similar materials to reduce the propagation of transformer noise to any adjacent areas.

***Note:*** *It should be noted that such material has a major effect on the high harmonics of the transformer, but little effect on the normal hum associated with the unit. While special sound insulation materials are available for the 120 cps frequency range, cost may make them impractical for the application.*

## Mounting

Transformer mounting methods can be important in the control and reduction of the audible sound coming from the unit. Isolate noise and prevent mechanical transmission to the supporting enclosure, structure, and bus connections. This can be accomplished with a single or combination of installation techniques:

- Use solid mounting (reinforced concrete floor or wall) where the transformer can be heavy solid mass which cannot be vibrated audibly.
- Install a flexible mounting technique on a structural frame, wall, ceiling, or column. Use special vibration or isolation pads called **flexible mounts** or **vibration dampeners**.

***Important:*** *Avoid solid metal contact between the transformer and the supporting surface. The vibration of the pads will be short circuited. These pads can be furnished and installed by an electric contractor.*

- Use flexible connectors between the transformer bus and the raceway or system bus connections. This will help prevent the transmission of noise vibrations from the enclosure to the raceway system, panels, and other mechanical components. Between the enclosure and the raceways, flexible metal conduit, and non-metallic tubing can be used for these relatively short connections.
- Dry type transformers are provided with vibration dampening pads between the core and coil assembly mounting and the case. This mounting is tightly secured with nuts and bolts for mechanical strength during shipping. After installation of the transformer, these should be loosened for effective vibration dampening and minimizing additional noise.
- Lifting eyes may contribute to the noise and should be removed after installation.

# Maintenance

## Dry Type Transformer Maintenance Instructions

Transformers require occasional maintenance for proper operation. Inspect the unit regularly to determine whether corrective measures should be taken.

1. Frequency of inspections depend on the area of installation. If the area is normally clean and dry, an annual inspection may be adequate. In other locations, if the area is contaminated with dust or chemical concerns, a three to six month interval is recommended. To start, check within three months to see if the unit is experiencing any problems.
2. With the transformer de-energized (always check the main switch), access the inside of the transformer by removing the external panels and put them aside. Inspect for dirt on the coil surfaces and at areas where airflow could be restricted. If excessive dirt is found on the windings and insulators, clean the unit immediately. Dirt can cause tracking and poor air circulation, causing overheating.
3. To clean the winding ducts, force air through them. Carefully clean the top, sides, and bottom end of the coils. A vacuum cleaner is recommended to clean the coils in the first step of the process. Use a compressor to blow out the coils with clean, dry air.

   ***Note:*** *Air should not be over 30 psi.*
4. Check for loose connections which could cause heating and loss of power. Check condition of the tap changer, terminal board, and general condition of the transformer.
5. Check for signs of insulation overheating and voltage creepage over the insulation surface. Evidence of overheating or creepage will be the change in color of insulation in some areas, tracing, or tracking with carbonization.
6. Monitor enclosure condition. If signs of rust or corrosion are evident, corrective measures should be taken where necessary.
7. In humid environments, if the unit shuts down for 12-24 hours, install small strip heaters to avoid the effects of possible condensation in the enclosure and on the coils.

## Notes

Trane - by Trane Technologies (NYSE: TT), a global climate innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.



CHS-SVX03H-EN 10 Aug 2023
Supersedes CHS-SVX03G-EN (Jun 2021)