



## Installation Guide

# STRA - Wye Delta Starter Kit



Model: Trane CenTraVac Chillers

This document applies to service offering applications only.

### **⚠ 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.



# 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.

**⚠ WARNING****Hazardous Voltage w/Capacitors!**

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury. Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

**NOTICE****Compressor Damage!**

Failure to disconnect power prior to evaluating the refrigerant system, or application of power while the refrigerant system is in a vacuum could cause compressor motor damage due to the nature of the solid state starter.

Disconnect all electric power including remote disconnects prior to evacuating refrigeration. System power shall not be applied to the chiller while the refrigerant system is in a vacuum.

## Trademarks

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## Revision History

Document updated to reflect Service Offering number.

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# General Information

Upgrading the unit controls to AdaptiView generation in combination with the starter upgrade is recommended as this provides the most advanced generation of Trane chiller starter control and protections. Refer to the applicable AdaptiView upgrade schematics for wiring guidance and markings.

**Important:** Always follow safe electrical practices while installing the new starter. Be certain to route new wiring neatly through the starter panel. Do not allow the wiring to come in contact with any sharp objects. It is advised to place fish paper between the bottom of the starter cabinet and wiring.

**NOTICE**

**Compressor Motor Damage!**

Failure to disconnect power prior to evacuating the refrigerant system, or application of power while the refrigerant system is in a vacuum, will cause compressor motor damage due to the nature of the solid state starter.

Disconnect all electric power including remote disconnects prior to evacuating refrigerant. System power shall not be applied to the chiller while the refrigerant system is in a vacuum.

**Important:** Do not energize the unit if the refrigerant side of the system is in a vacuum.

Catastrophic damage to the compressor motor will occur if supply power is applied while the system is in a vacuum.

## About this Kit

Figure 1. Wye delta kit

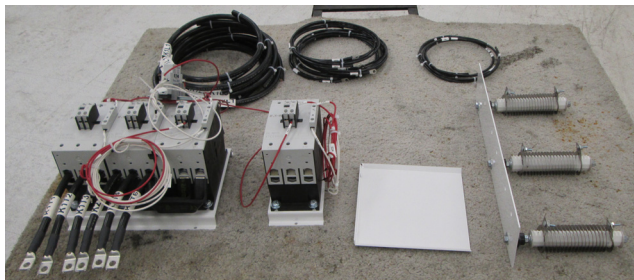


Table 1. Kit materials

	K1, K2, K3, K4 Contactors with Lugs	Resistor Set	Incoming Power Cables 60-inch with One 3/8 Lugged End	Motor Power Cables with One 3/8 Lugged End	2K11 Control Contactor
WD Refresh - All	Y	Optional	N*	N*	Y
WD Conversion - Transition and Direct Mount	Y	Y	Y	Y	Y
WD Conversion - Remote	Y	Y	Y	N	Y
IT Refresh	NA	NA	N	N	Y

**Note:** \* Cables provided with 207 Amp refresh.

The Wye Delta kit allows the field refresh or conversion of low voltage CenTraVac chiller starters. Its installation provides new OEM Trane components to replace the existing starter working power components.

The refresh includes new power contactors and the option of replacing the resistor bank. The kits for sizes 606 amps and smaller are designed to re-use the existing starter power cables. The contactors include factory installed control wiring with sufficient lengths to allow connection to the chiller controls.

The conversion kit allows an existing cross line or solid state starter to be converted to Wye Delta operation. This kit includes all components found in a starter refresh kit plus the necessary power cabling needed for installation.

## Wye Delta Conversion

The conversion kit allows an existing cross line or solid state starter to be converted to Wye Delta operation.

**Note:** This conversion requires the CenTraVac motor to have 6 terminals. Three terminal CenTraVac motors are incompatible with wye delta operation.

The kit is Classic, UCP1, UCP2, DynaView and AdaptiView. If the chiller's original control system is being retained as part of the installation, use the original schematics and wire markings to do the installation.

## About Solid State Starter Kit

The solid state starter kit allows the field refresh of Trane low voltage starters having Cutler Hammer S811 or S811+ "IT" type starters. This kit is intended for Refresh applications only, it is not recommended for a field conversion of an existing Wye Delta starter to solid state configurations.

The refresh kit includes a new Cutler Hammer IT S811+ starter module, starter module external fan, cabinet fan, surge suppressor module, power supply, and 2K11 relay.

## Kit Materials



## General Information

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### Notes:

- *The starter contactor sets are installed on mounting plates. The shorting bars, interlocks, aux contactors and control wires are installed. Contactors 935 amps and smaller have compression lugs. 1200 amp contactors are set up for flexibars.*
- *2K11 contactors and starter resistors have a replacement rate of less than 0.1 percent per year. Their replacement is not recommended as part of the refresh. However a 2K11 relay is provided with all kits as they are required for UCP1 and older upgrades to AdaptiView controls as well as on all conversions.*
- *The starter resistor set is provided with mounting bracket, cut to length cables, and crimp on terminals.*
- *Contactors Extension bars allow contactors to be bolted to existing power distribution bars.*
- *Field installed fasteners and resistor terminals (If resistors are ordered).*
- *Schematics*

### Wye Delta Refresh Kits (606 amps and Smaller)

- Field Installed Fasteners
- K1 – K4 Contactors, with Control Wires and Jumpers Installed
- 2K11 Relay
- Cable Tags
- Schematics
- Optional - Starter Resistor Set with Cut to Length Cables and Resistor Terminals

### Wye Delta Conversion Kits (606 amps and Smaller)

- Field Installed Fasteners
- K1 – K4 Contactors, with Control Wires and Jumpers Installed
- 2K11 Relay
- Cable Tags
- Schematics
- Starter resistor set with cut to length cables
- Field Installed Fasteners and Resistor Terminals
- Trim to length locomotive style flexible motor terminal motor cables having motor lugs on one end\*.
- UCP2 Connector Plugs for RTHB/RTHC Wye Delta Conversion Kits

### Wye Delta Kits Refresh and Conversion (Larger than 606 amps)

These kits can only be ordered for remote type starters. These should be handled as specials because of the replacement Cutler Hammer XT provided are physically larger than the

existing Advantage Contactor. As a result, the difficulty of mounting of contactors and potentially mounting cables makes it an unattractive installation. However, we will review this application before we accept the special order and discuss whether the use of a complete new starter may be a better alternative.

### Kit Materials - IT Refresh Kit

This kit is intended for application with existing Cutler Hammer IT starters. It includes the components to refresh and upgrade the starter to present specification including:

- Current Generation IT Starter Module S811+
- Cabinet Fan
- IT Starter Cooling Fan
- Surge Suppressor Kit
- 24 Vdc Power Supply
- 2K11 Relay

### Required Tools

- Drill Bits
- Ring crimping tool for resistor cables
- Miscellaneous hand tools for cutting cables
- Miscellaneous hand tools for fastening components to starter
- Wire markers for control wires

### Before you Start

1. Be sure to evaluate the existing starter for modifications or incorrect power routing that could interfere with installing the new components. This is especially true when you are converting a solid state starter to Wye Delta operation. The concern is that the power cables will be routed where the contactors have to be located, making the installation impossible.
2. Confirm that the Chiller RLA is within the RLA range printed on the starter kit nameplate. If the starter is too small, contact service products customer support to order a correctly sized starter. If the starter range is greater than the chiller RLA, contact service products customer support to investigate how to order a correctly sized resistor kit.
3. Confirm that the Chiller voltage is correct for the voltage printed on the starter kit nameplate. If the voltage is incorrect, contact order services to investigate how to order a correctly sized resistor kit.



# Model Number Descriptions

## STRA0200FAABC1

### Digit 1, 2, 3, 4

Starter Retrofit Release A

### Digit 5, 6, 7, 8

Maximum RLA

### Digit 9 — Volt

- A = 200 V, 60 Hz
- B = 208 V, 60 Hz
- C = 230 V, 60 Hz
- D = 380 V, 60 Hz
- R = 380 V, 50 Hz
- T = 400 V, 50 Hz
- U = 415 V, 50 Hz
- F = 460 V, 60 Hz
- G = 480 V, 60 Hz
- H = 575 V, 60 Hz
- J = 600 V, 60 Hz

### Digit 10, 11

Design Sequence

### Digit 12 — Unit Type

- A = RTHA
- B = RTHB
- C = RTHC
- D = RTHD
- 1 = CTV Transition Mount
- 2 = CTV Direct Mount
- 3 = CTV Remote Mount

### Digit 13 — Starter Type

- W = Wye Delta Refresh
- C = Wye Delta Conversion
- A = Solid State Conversion
- T = IT Refresh

### Digit 14 — Motor Terminal Size

- 0 = No Motor Cable
- 1 = 3/8 in.
- 2 = 5/8 in.

### Digit 15 — Input Cable

- 0 = No Input Cable
- 1 = Input Cable

### Digit 16 — Resistor Set

- 0 = No Resistors
- 1 = 606 Amp and Smaller
- 2 = G,T. 606 Amp

# Resistor Check and Installation Procedure

Use the unit RLA and Voltage to confirm that the correct resistors are provided and that the resistor jumpers are correctly set before installing on the chiller. Refer to the starter photographs to determine the correct resistor mounting location. There are three resistor set mountings to choose from:

- You can drill through the side or top of the panel using the holes in the resistor bracket as a template and then, rivet or screw the assembly to the cabinet.

- You can counter sink holes in the back of the cabinet to clearance the resistor mounting bolts and then rivet or screw the bracket to the back of the cabinet.
- You can move the resistor sets from the bracket and bolt the individual resistors to the factory-provided holes in the back of the cabinet.

**Note:** Use caution when handling the resistors. Getting grease on the resistor elements will cause premature failure.

Figure 2. 208 V resistors voltage and capacity table

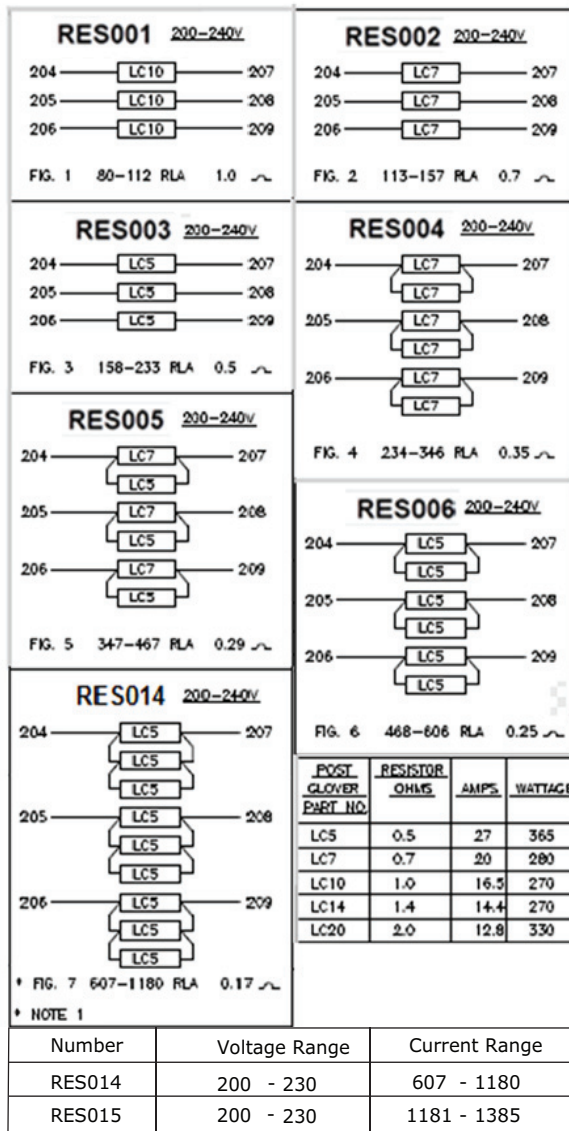
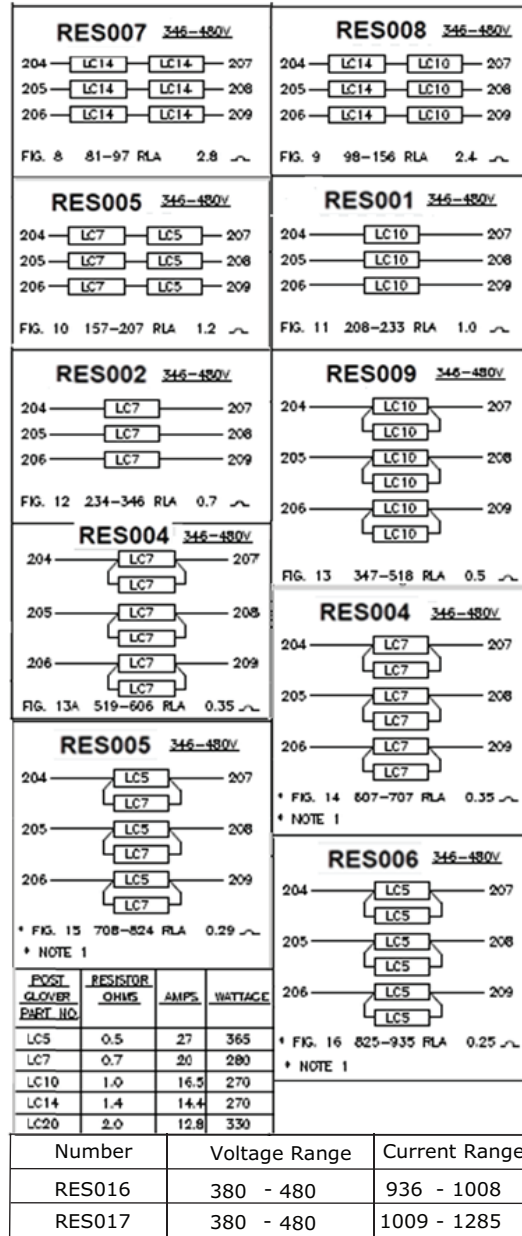
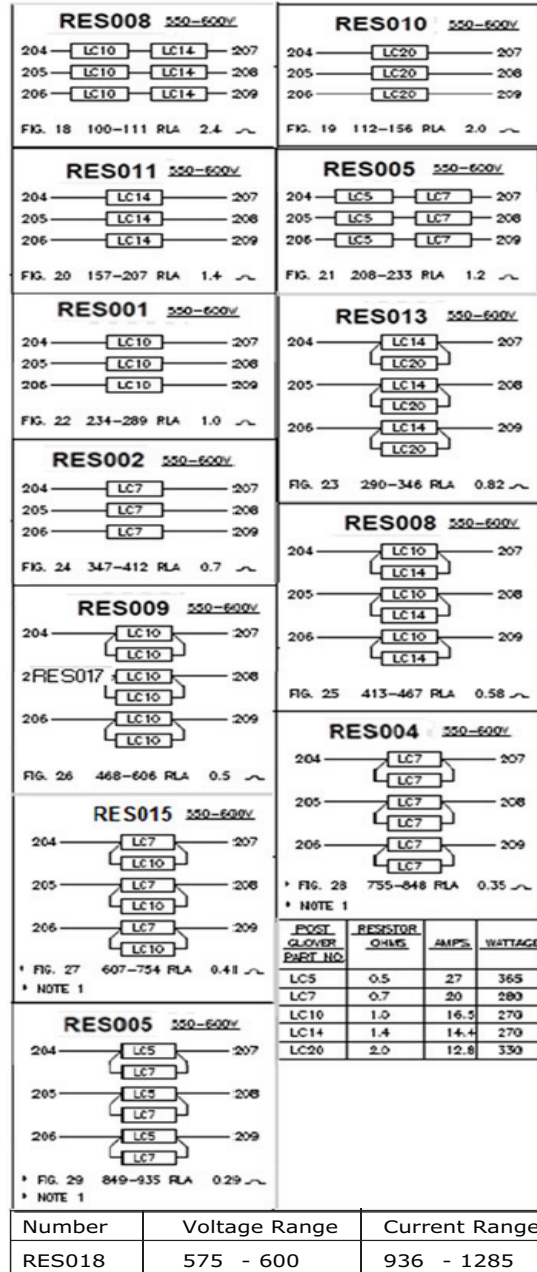


Figure 3. 460 V resistors voltage and capacity table



# Resistor Check and Installation Procedure

Figure 4. 575 V resistors voltage and capacity table





# Wye Delta Installation

## ⚠ WARNING

### Hazardous Voltage!

Failure to follow instructions below 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.

## Install Kit Power Components

Starter panel images show the basic layout of the Wye Delta starter with the power components that need to be installed. Note that it is likely but not certain that the mounting hole locations for the new contactors may be the same as those provided on the panel for the original contactors. If they are, you can remove the contactors from the base and mount to the original holes.

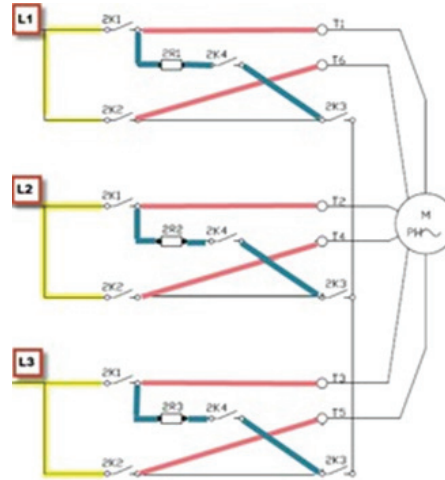
## Power Wiring

### Configurations

Re-use the existing power cables for Wye Delta Refresh kits. For 207 amp size Wye Delta refresh kits, replacement cut to length incoming and motor cables are provided. Use these only if the existing cables are too big to work with the new K1 and K2 contactors.

With Wye Delta conversion kits, new incoming power cables to the K1 and K2 contactors and motor terminal cables are provided. For conversion, you can use these or use the existing solid state starter cables as per your preference. Trim the cables to the appropriate length, install and mark as per schematic.

Figure 5. Power wiring



- Yellow = Incoming power cable
- Red = Motor terminal cable
- Blue = Shorting resistor wires
- Black = Motor



Figure 6. Configuration of transition mount starters 606 amps and smaller

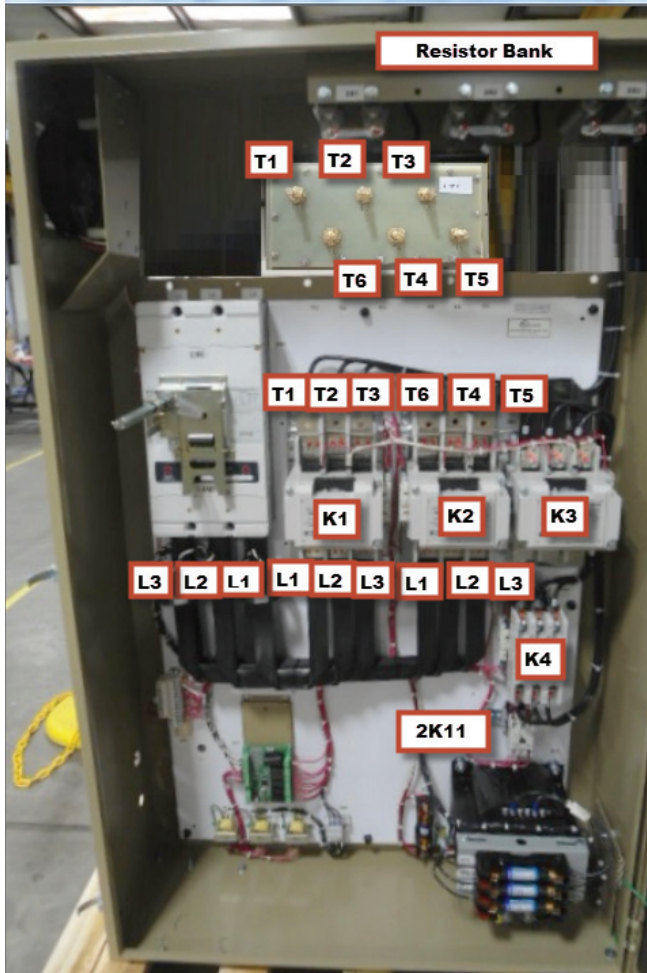


Figure 7. Configuration of transition mount starter 607 amps and larger

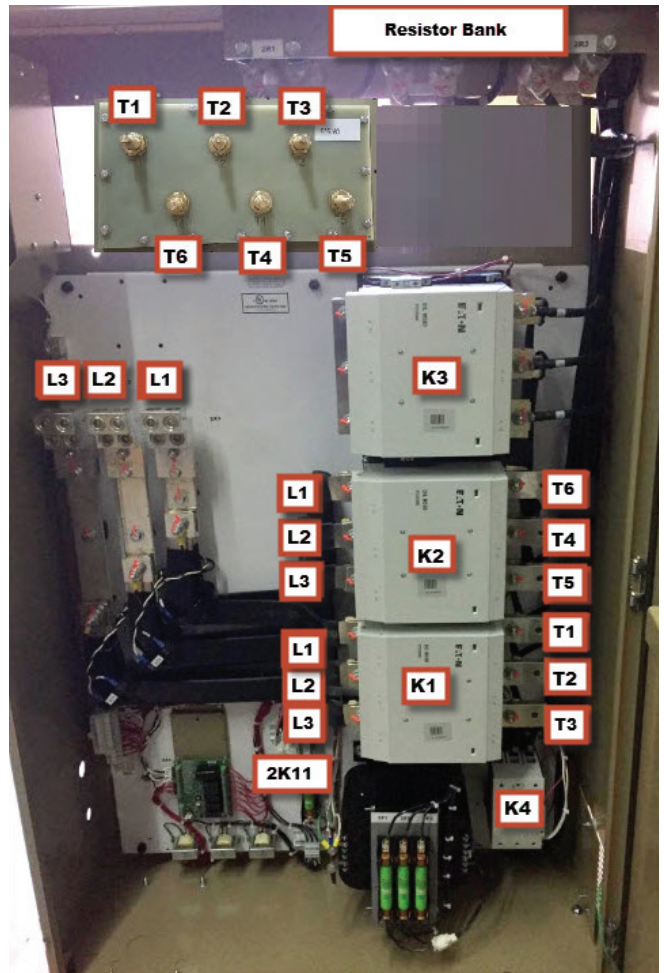




Figure 8. Configuration of all direct mount starters

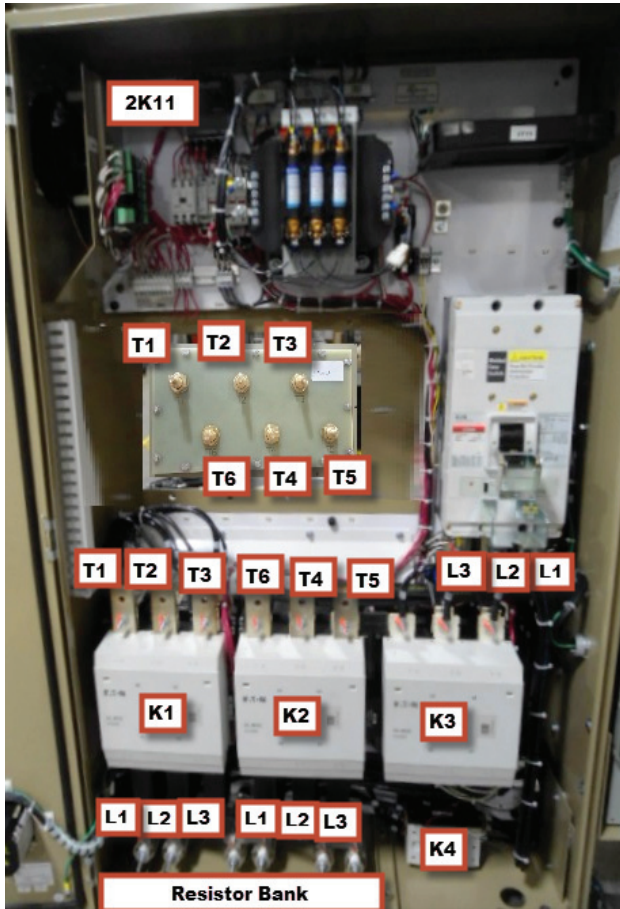


Figure 9. Configuration of single door remote mount starters

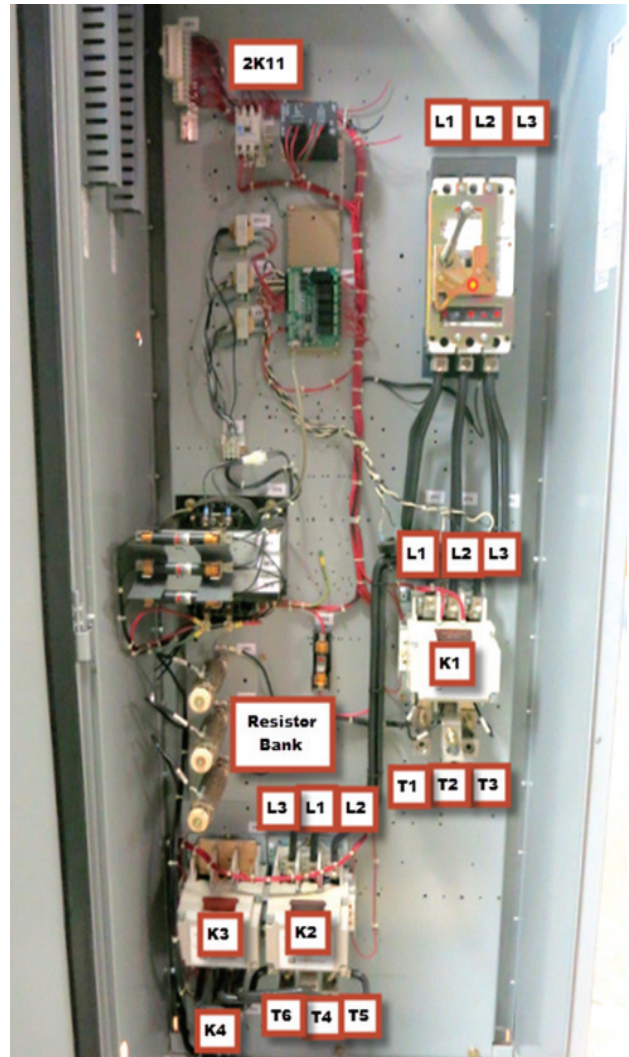
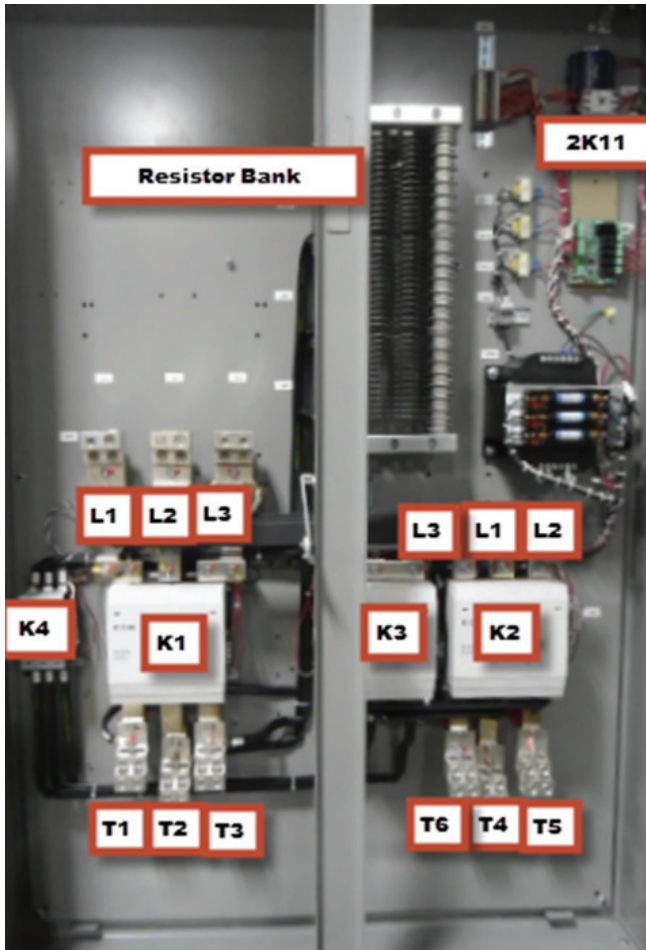


Figure 10. Configuration of double door and triple door remote mount starters



### IT Starter Component Installation

#### **⚠ WARNING**

##### **Hazardous Voltage!**

Failure to follow instructions below 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.

## Install IT Kit Power Components

Install components as per the instructions in CTV-SVB47A-EN.

A replacement 24 Vdc power supply PWR00155 and a replacement 2K11 relay CTR01877 are provided with each kit in addition to the materials listed in the below table.

**Table 2. Materials provided for IT starter S811+ refresh**

IT Kit S811+, 110 mm, 135 amp, 233 MRLA	MOD02158	Module; IT Starter S811+, 110 mm, 135 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15539	KIT; EMM18 fan retrofit
	SPS00053	Suppressor; Surge, 600V MOV for 65, 100 mm IT Starter
IT Kit S811+, 200 mm, 180 amp, 311 MRLA	MOD02157	Module; IT Starter S811+, 200 mm, 180 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15800	KIT; Fan face mount, S811T/U and T801T/U
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 200 mm, 240 amp, 415 MRLA	MOD02154	Module; IT Starter S811+, 200 mm, 240 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15800	KIT; Fan face mount, S811T/U and T801T/U
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 200 mm, 304 amp, 526 MRLA	MOD02152	Module; IT Starter S811+, 200 mm, 304 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15800	KIT; Fan face mount, S811T/U and T801T/U
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 200 mm, 360 amp, 623 MRLA	MOD02161	Module; IT Starter S811+, 200 mm, 360 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15800	KIT; Fan face mount, S811T/U and T801T/U
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 200 mm, 420 amp, 727 MRLA	MOD02159	Module; IT Starter S811+, 200 mm, 420 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15800	KIT; Fan face mount, S811T/U and T801T/U
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 200 mm, 500 amp, 866 Max	MOD02156	Module; IT Starter S811+, 200 mm, 500 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15800	KIT; Fan face mount, S811T/U and T801T/U
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 290 mm, 360 amp, 623 MRLA	MOD02155	Module; IT Starter S811+, 290 mm, 360 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15799	KIT; Fan face mount, S811V and T801V
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 290 mm, 420 amp, 727 MRLA	MOD02162	Module; IT Starter S811+, 290 mm, 420 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15799	KIT; Fan face mount, S811V and T801V
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 290 mm, 500 amp, 866 MRLA	MOD02160	Module; IT Starter S811+, 290 mm, 500 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15799	KIT; Fan face mount, S811V and T801V
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 290 mm, 650 amp, 1120 MRLA	MOD02153	Module; IT Starter S811+, 290 mm, 650 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15799	KIT; Fan face mount, S811V and T801V
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter



## Wye Delta Installation

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**Table 2. Materials provided for IT starter S811+ refresh (continued)**

IT Kit S811+, 290 mm, 720 amp, 1247 MRLA	MOD02163	Module; IT Starter S811+, 290 mm, 720 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15799	KIT; Fan face mount, S811V and T801V
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter
IT Kit S811+, 290 mm, 850 amp, 1472 MRLA	MOD02164	Module; IT Starter S811+, 290 mm, 850 amp rating
	KIT15538	KIT; Single fan retrofit
	KIT15799	KIT; Fan face mount, S811V and T801V
	SPS00054	Suppressor; Surge, 600V MOV for 200, 290 mm IT Starter



# Starter Dry Run Procedure - UCP1

## UCP1 Dry Run Starter Test

During startup commissioning prior to line voltage being applied, the chiller starter is sequenced to confirm the wiring and components have been properly installed.

**Important:** *This is a dry run test. The main power to the starter/contactors/motor must be removed through some disconnection means.*

## Temporary Auxiliary 120 Vac Power

Control power to the contactors (115 Vac) and other 115 Vac control loads must be provided by other means (drop cord from a 120 Vac outlet). The fuses on the primary of the combined control power transformer must be removed to prevent reverse transformation from creating hazardous high voltages on the line side and powering the potential transformers (resulting in a diagnostic). The external 115 Vac connection should be made directly (with proper phasing) to the 120 V secondary of the combined transformer and all other wiring and secondary fuses should remain intact. Remember that the L2 side of the 115 volts CPT is grounded and thus ultimately to an earth ground. GFI outlet or cords will fault unless this ground is temporarily disconnected.

## Setup

1. Remove Line Voltage.
2. Check Phasing.
3. Pull 2F1, 2F2, 2F3 fuses.
4. Apply external 115V to 1TB5-11 (hot) and 1TB5-2 (neutral).
5. Turn Control **On** to ensure Heaters continue to be energized; 1S1 closed.
6. Make 2 sets of jumpers with open toggle switches.
7. Bypass 2U1 Phase Reversal Contacts; this is achieved by adding an additional wire jumper from 2TB2-6 to the 2K5 coil. Or see the chiller wiring diagram to bypass 2U1 contact right at the 2K5 Pilot Relay.
8. **Start Switch** - Put one set of open toggle jumpers between 1TB2-9 and 1TB2-7 (open switch).
9. **Transition Switch** - Put one set of open toggle jumpers between 1TB2-5 and 1TB2-6 (open switch).

## Test Procedure - A successful run test consists of the following operations:

1. Close **Start Switch** (Y-mode of motor operation).
  - a. Verify 2K5 Pilot Relay energize.
  - b. Verify 2K3 Shorting Contactor energize.
  - c. Verify 2K1 Start Contactor energize.
2. After 8 seconds, close **Transition Switch** (Delta-mode of motor operation).
  - a. Verify 2K1 Start Contactor remains energize.
  - b. Verify 2K4 Transition Contactor energize.

- c. Verify 2K2 Run Contactor energize.
- d. Verify 2K3 Shorting Contactor de-energize.

## Completion

Upon successful completion of dry run test, restore unit to normal condition by reversing changes in setup and removing jumpers.

Ready to start if heater has been energized for 3 hours.



# Starter Dry Run Procedure - UCP2

**Note:** *Configure unit starter type as Wye Delta before attempting dry run test.*

## UCP2 Dry Run Starter Test

During startup commissioning prior to line voltage being applied, the chiller starter is sequenced to confirm the wiring and components have been properly installed. The UCP2 allows this check out procedure via the service test function.

**Important:** *This is a dry run test. The main power to the starter/contactors/motor must be removed through some disconnection means.*

### Temporary Auxiliary 120 Vac Power

Control power to the contactors (115 Vac) and other 115 Vac control loads must be provided by other means (drop cord from a 120 Vac outlet). The fuses on the primary of the combined control power transformer must be removed to prevent reverse transformation from creating hazardous high voltages on the line side and powering the potential transformers (resulting in a diagnostic). The external 115 Vac connection should be made directly (with proper phasing) to the 120 V secondary of the combined transformer and all other wiring and secondary fuses should remain intact. Remember that the L2 side of the 115 volts CPT is grounded and thus ultimately to an earth ground. GFI outlet or cords will fault unless this ground is temporarily disconnected.

Starter Dry-Run is enabled at the service test by putting the chiller in local stop and enabling starter dry run in a menu.

- Chiller must be in local stop

The dry run starter test provides the field with a means of exercising the STARTER Module contacts which then will control the electromechanical starter contactors without line voltage applied.

**Note:** *The test will exercise the modules contacts, however the user must look at the starter wiring schematic to determine exactly what is being energized via the particular module contact being exercised / tested.*

The service technician selects the action from a selection of predefined sequences.

The transition complete input status is monitored as the second line on the CLD during the starter Dry Run modes.

Starter dry run provides the following states or sequences of operation:

**Disabled:** Starter Dry Run is not active. This is the module power-up /reset default state.

**Note:** *Any of the following states are exited when the Main Processor is reset, one of the other states or sequences are selected within service tests, or the dry run failure diagnostic is generated.*

**Start Relay On:** In this mode the Start Relay On -Closes N.O. contacts at 2U2 J8- 1 to 2, and Stop Relay On- Closes

N.O. Contacts at J6- 1 to 3. Relays are both energized simultaneously. Two seconds later the Start Relay is de-energized. The final state of this sequence is with only the Stop Relay energized.

**Shorting Relay On:** Energize the Shorting Relay -Closes N.O. Contacts at J12- 1 to 3, at the Starter Module.

**Transition Relay On:** Energizes the Transition Relay- Closes N.O. Contacts at J14- 1 to 2, at the Starter Module.

**Run Relay On:** Energize the Run Relay-Closes N.O. Contacts at J10- 1 to 3, at the Starter Module.

**Start and Run Relays On:** In this mode, a sequence of events occurs.

- The Start and Stop Relays are both energized simultaneously.
- Two seconds later, the Start Relay is de-energized.
- Two seconds after, the Start Relay is de-energized, the Run Relay is energized.

The final state of this sequence is with only the Stop and Run Relays energized.

During Starter Dry Run, the control monitors phase current and voltage; If a voltage signal greater than 5V is detected at the board edge of the starter module, or greater than 10% RLA current is detected, the test is terminated immediately and the Dry Run Failure diagnostic is generated.

**References:** *Service alert 148, CVHE-OM-C, CVHE-CLD-1a, CVHE-SB-32, CVHE-W-8A.*





# Starter Dry Run Procedure - CH530

CH530/AdaptiView when wired with direct control of contactors.

**Note:** *There is no dry run testing for contactors wired in the original UCP1 configuration even if controlled by CH530/AdaptiView.*

## CH530/AdaptiView Dry Run Starter Test

During startup commissioning prior to line voltage being applied, the chiller starter can be dry run sequenced to confirm the wiring and components have been properly installed. CH530 allows this check out procedure via the service tool function only. [For electromechanical starter checkout, not applicable to Solid State or AFD, as these starter types would require line voltage to be applied to function].

**Important:** *This is a dry run test. The main power to the starter/contactors/motor must be removed through some disconnection means.*

### Follow Lock Out / Tag Out Procedures.

#### Prevent Backfeed of Voltage

The control power 120 volt fuse, must be removed; otherwise the 120 Vac will be stepped up to line voltage and reverse transformation creating hazardous high voltages on the line side and powering the potential transformers (also resulting in CH530 diagnostics).

#### Temporary Auxiliary 120 Vac Power

Control power to the contactors (115 Vac) and other 115 Vac control loads must be provided by other means (drop cord from a 120 Vac outlet).

The external 115 Vac connection should be made directly (with proper phasing) L1 to the fuse holder **LOAD SIDE** terminal, and L2 to the L2 secondary of the control power transformer and all other wiring and secondary fuses should remain intact. Remember that the L2 side of the 115 volts CPT is grounded and thus ultimately to an earth ground. GFI outlet or cords will fault unless this ground is temporarily disconnected.

The CH530 provides a factory and field service Starter Dry-Run feature. Starter Dry-Run is enabled at the service tool by putting the chiller in local stop and enabling starter dry run in a menu. The Main Processor must be in local stop.

The dry run starter test provides the field with a means of exercising the **STARTER LLID** (Module) contacts which then will control the electromechanical starter contactors without line voltage applied.

**Note:** *The test will exercise the modules contacts, however the user must look at the starter wiring schematic to determine exactly what is being energized via the particular module contact being exercised / tested.*

The service technician selects the action from a selection of pre-defined sequences.

The following monitor items are incorporated into TechView:

- Starter Dry Run - Starter Status
- Starter Dry Run - Transition Complete Input status

Starter Dry Run provides the following states or sequences of operation:

**Disabled:** Starter Dry Run is not active. This is the CH530 power-up / reset default state.

**Note:** *Any of the following states are exited when the Main Processor is reset, one of the other states or sequences are selected at the service tool, or the dry run failure diagnostic is generated.*

**Start Relay On:** In this mode the Start Relay On -Closes N.O. Contacts at J8- 1 to 2, and Stop Relay On- Closes N.O. Contacts at J10- 1 to 3. Relays are both energized simultaneously.

Two seconds later the Start Relay is de-energized. The final state of this sequence is with only the Stop Relay energized.

**Shorting Relay On:** Energize the Shorting Relay -Closes N.O. Contacts at J4- 1 to 3, at the Starter Module.

**Transition Relay On:** Energizes the Transition Relay- Closes N.O. Contacts at J12- 1 to 2, at the Starter Module.

**Run Relay On;** Energize the Run Relay-Closes N.O. Contacts at J6- 1 to 3, at the Starter Module.

**Start and Run Relays On:** In this mode a sequence of events occurs.

- The Start and Stop Relays are both energized simultaneously.
- Two seconds later, the Start Relay is de-energized.
- Two seconds after the Start Relay is de-energized, the Run Relay is energized.

The final state of this sequence is with only the Stop and Run Relays energized.

During Starter Dry Run, the CH530 monitors phase current and voltage; If a voltage signal greater than 5V is detected at the board edge of the CH530 starter LLID, or greater than 10% RLA current is detected, the test is terminated immediately and the Dry Run Failure diagnostic is generated.



# Wye Delta Schematic

2311-0403	Wye Delta Production Unit Mount Schematic
5071-0492	Wye Delta UCP2 AdaptiView Upgrade Starter Control Schematic
5071-0455	Wye Delta UCP1 AdaptiView Upgrade Starter Control Schematic
5071-0453	Wye Delta Classic AdaptiView Upgrade Starter Control Schematic
5071-0451	Wye Delta Double Door AdaptiView Upgrade Starter Control Schematic
5071-0449	Wye Delta Single Door AdaptiView Upgrade Starter Control Schematic
2311-0411	Solid State IT Unit Mount Schematic
CTV-SVB47A-EN	Solid State IT Installation Guidance and Schematics



# Component Dimensions

Figure 11. Transition and direct mount 207 amps

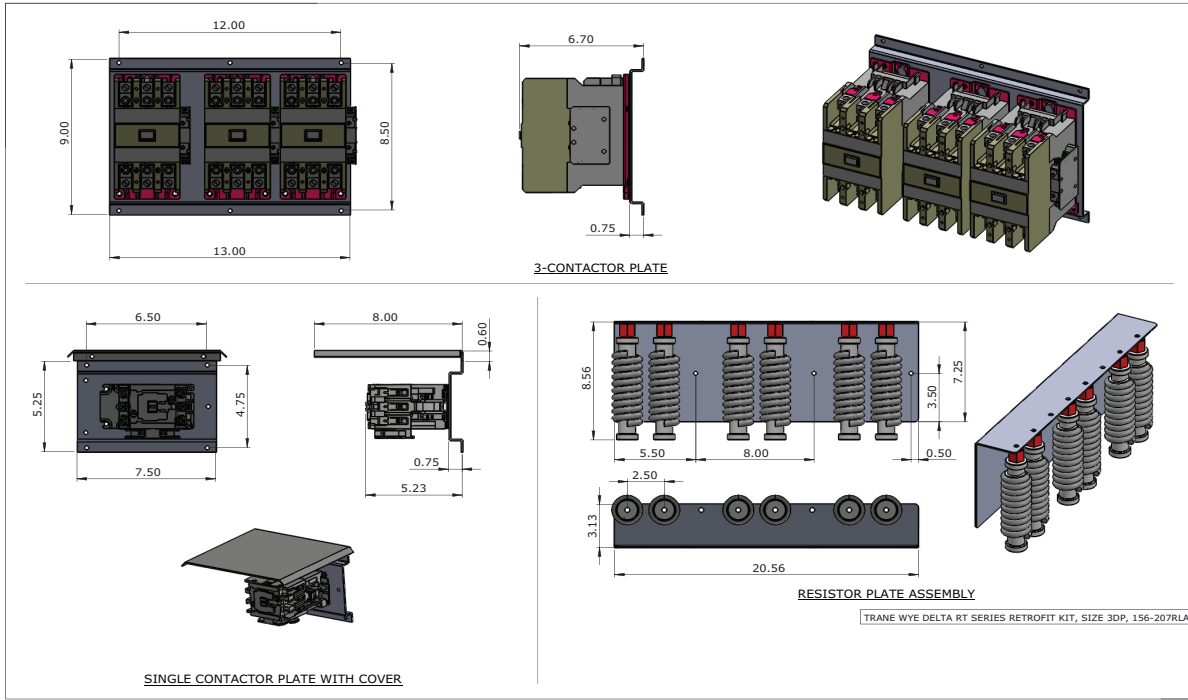
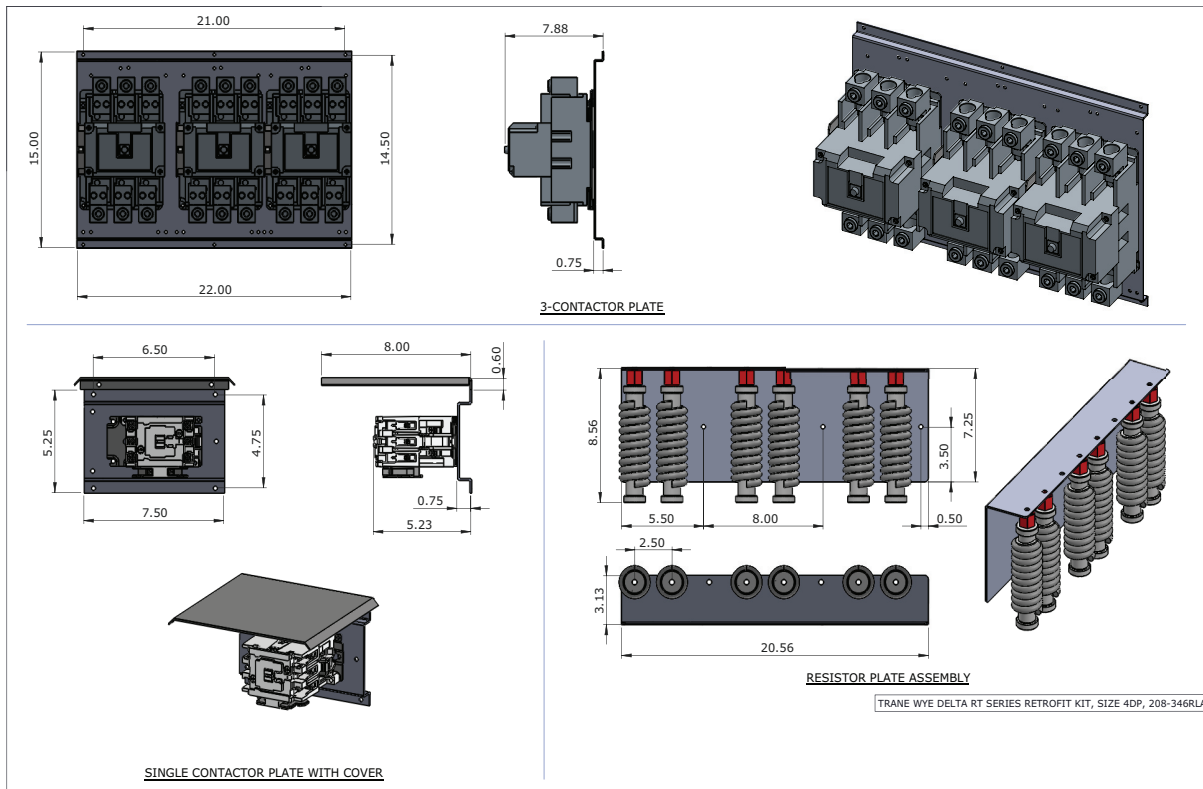


Figure 12. Transition and direct mount 346 amps



# Component Dimensions

Figure 13. Transition and direct mount 606 amps

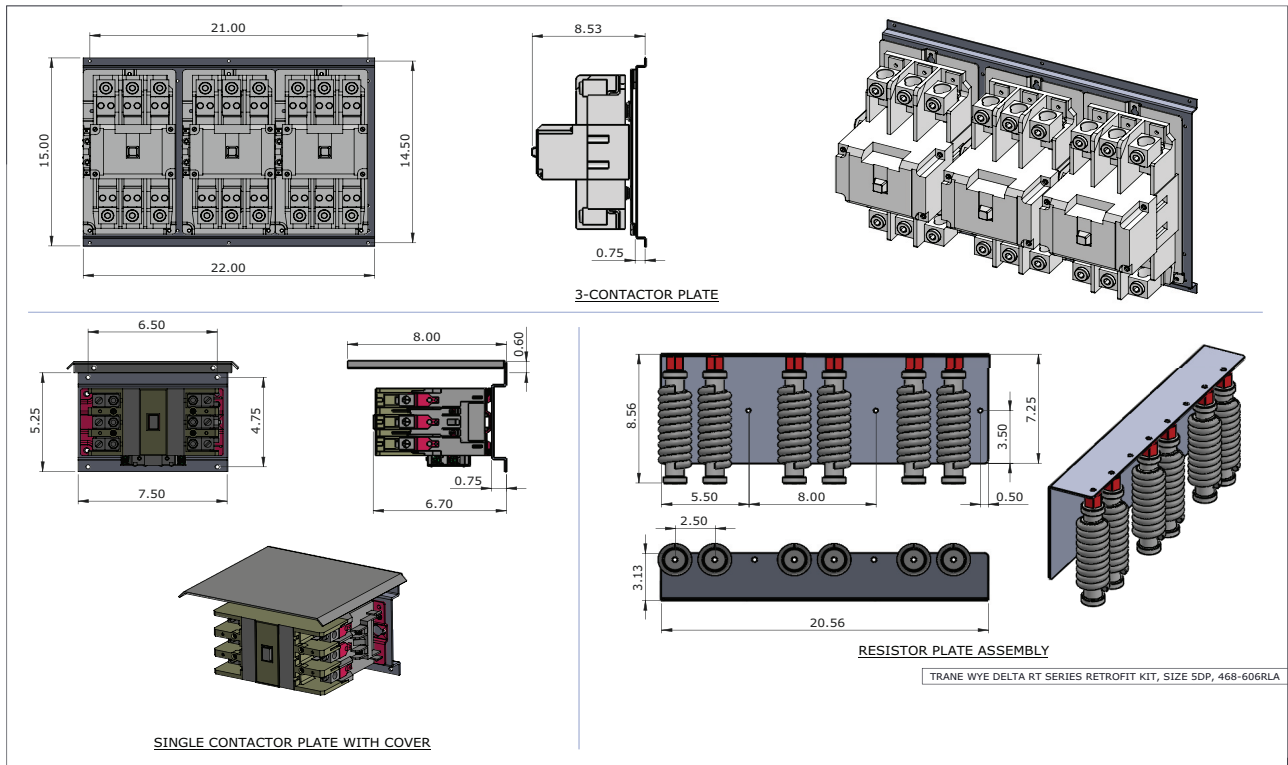


Figure 14. Remote mount 207 amps

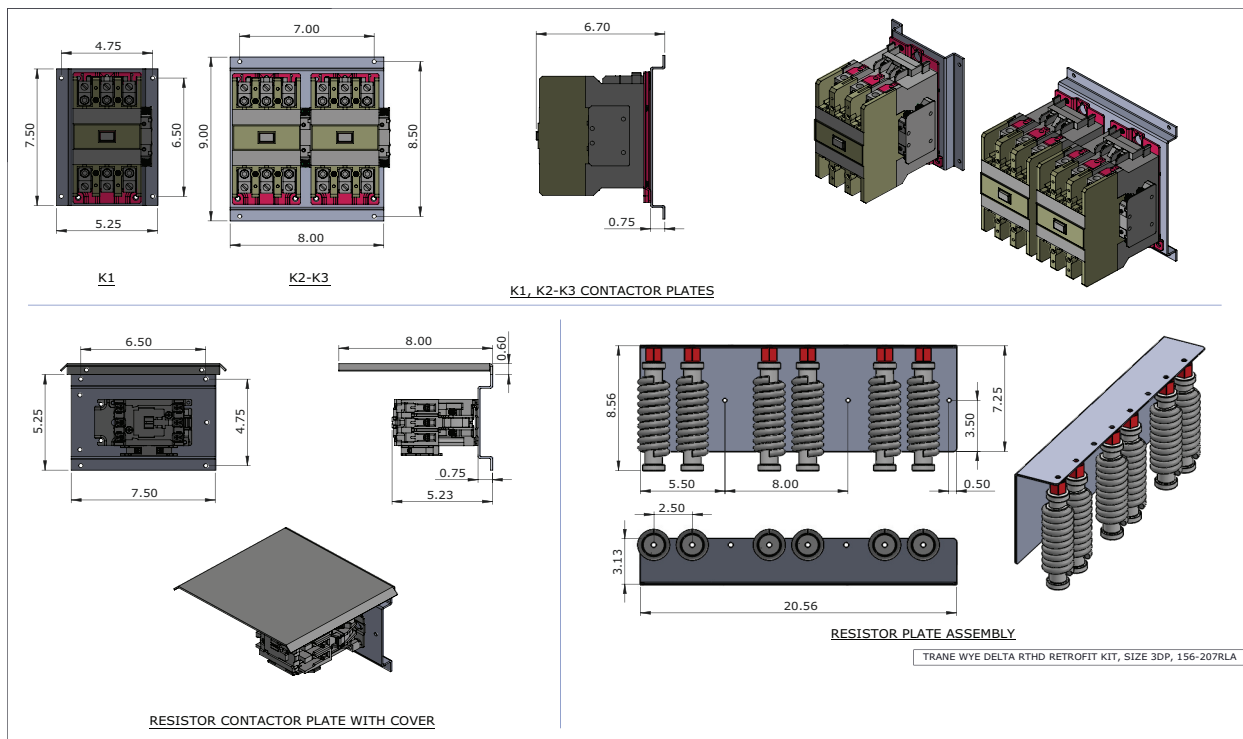


Figure 15. Remote mount 346 amps

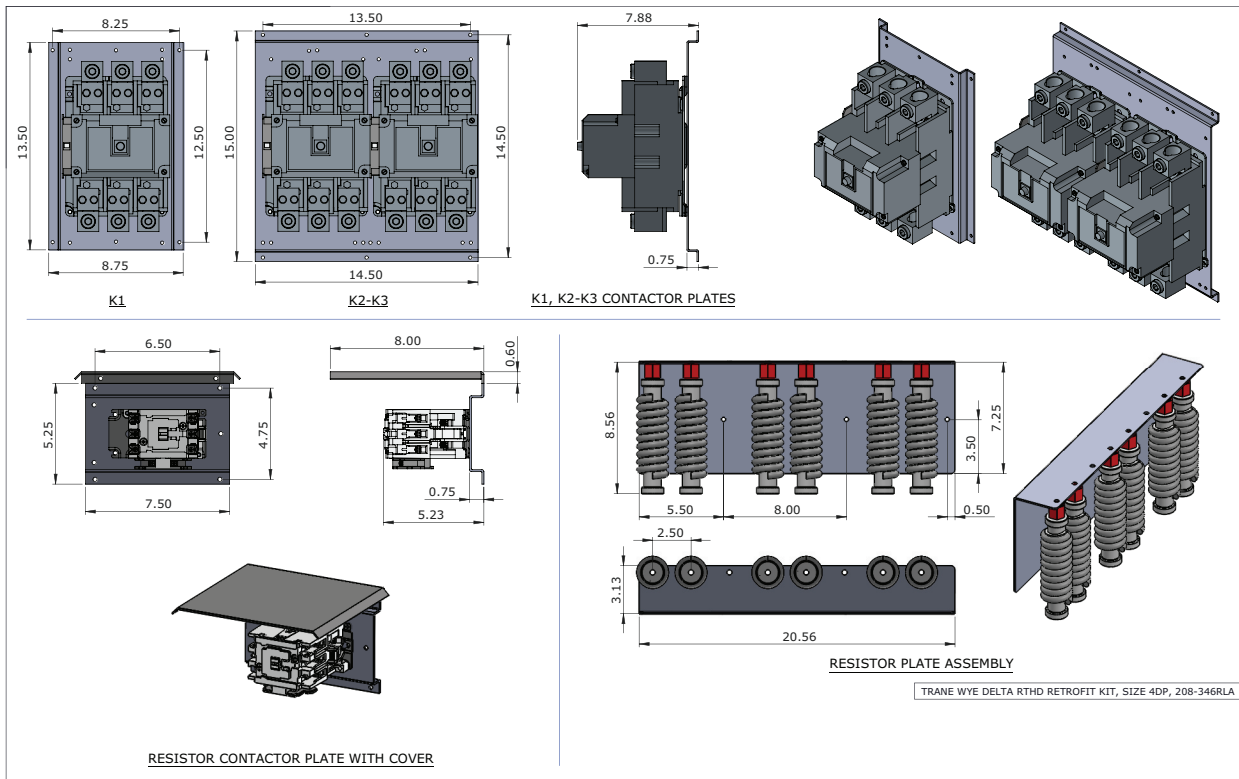


Figure 16. Remote mount 467 amps

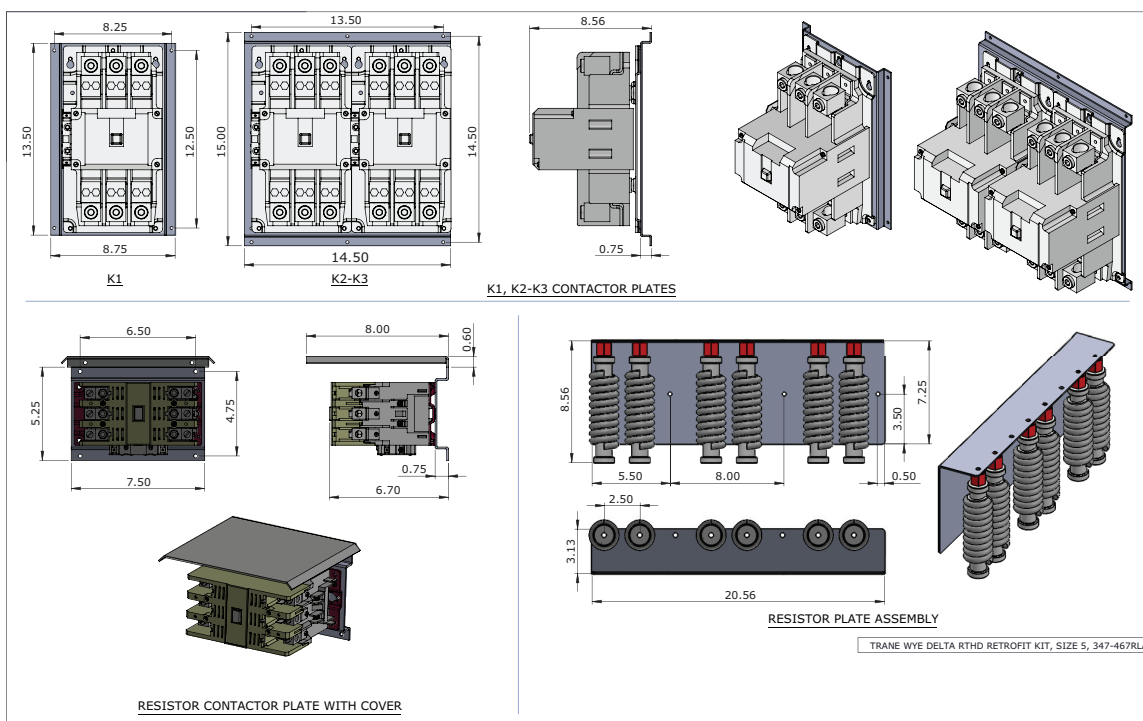


Figure 17. Remote mount 606 amps

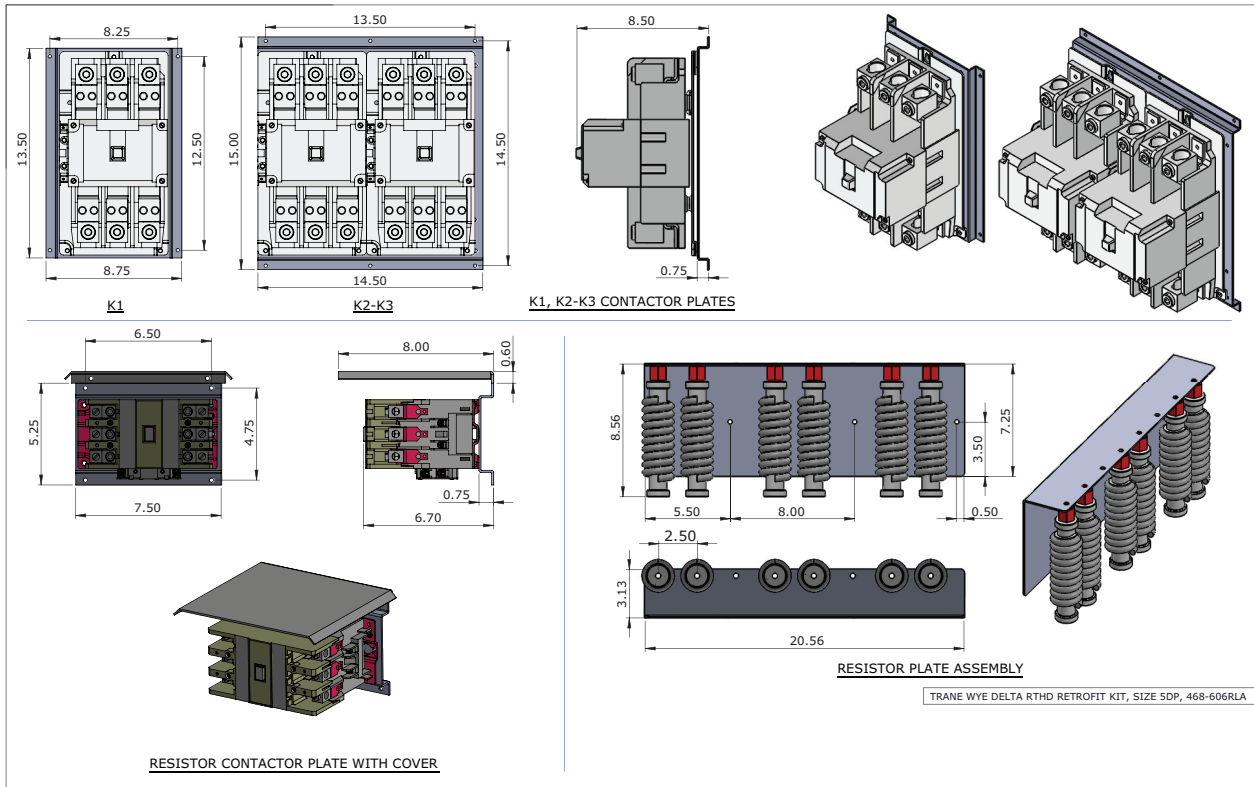


Figure 18. Remote mount 935 amps

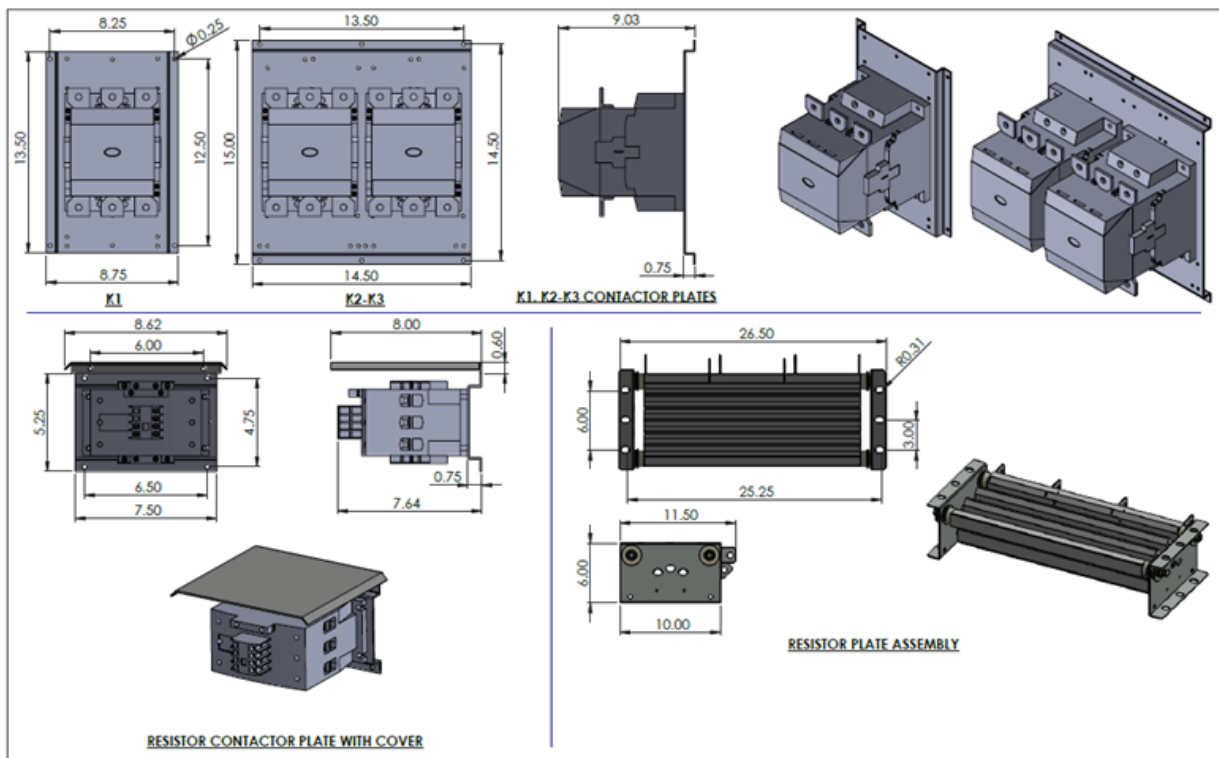


Figure 19. Remote mount 1212 amps

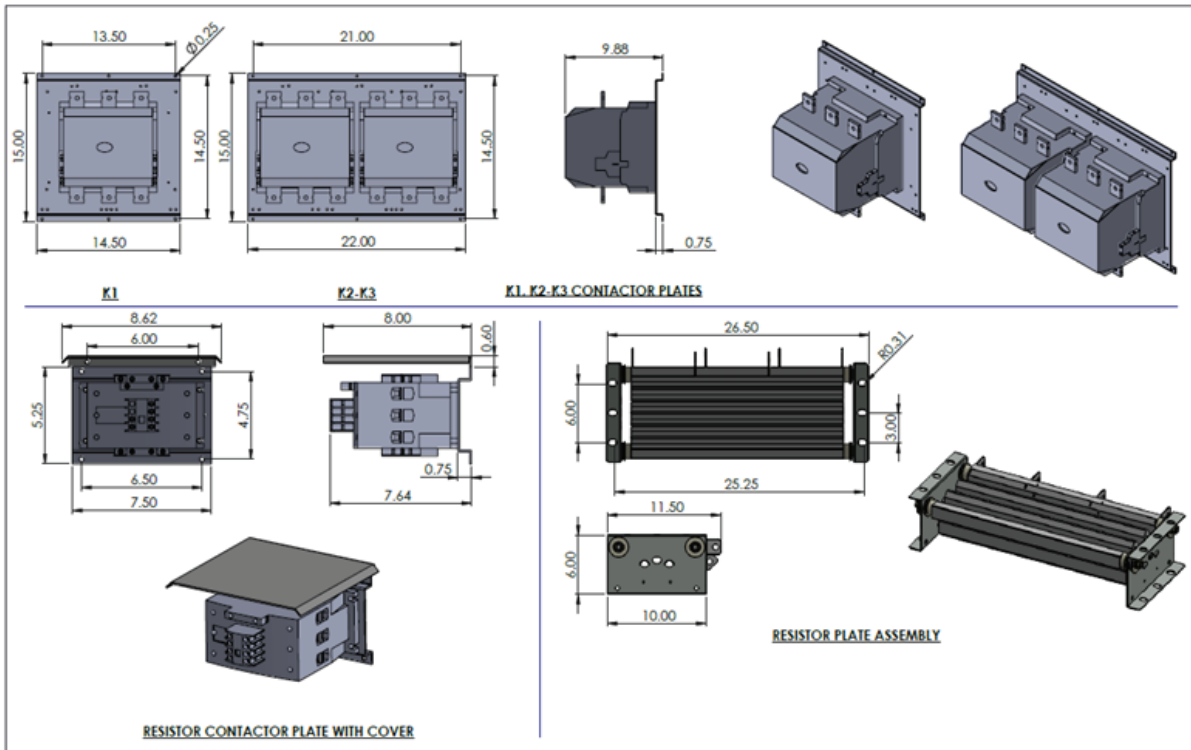
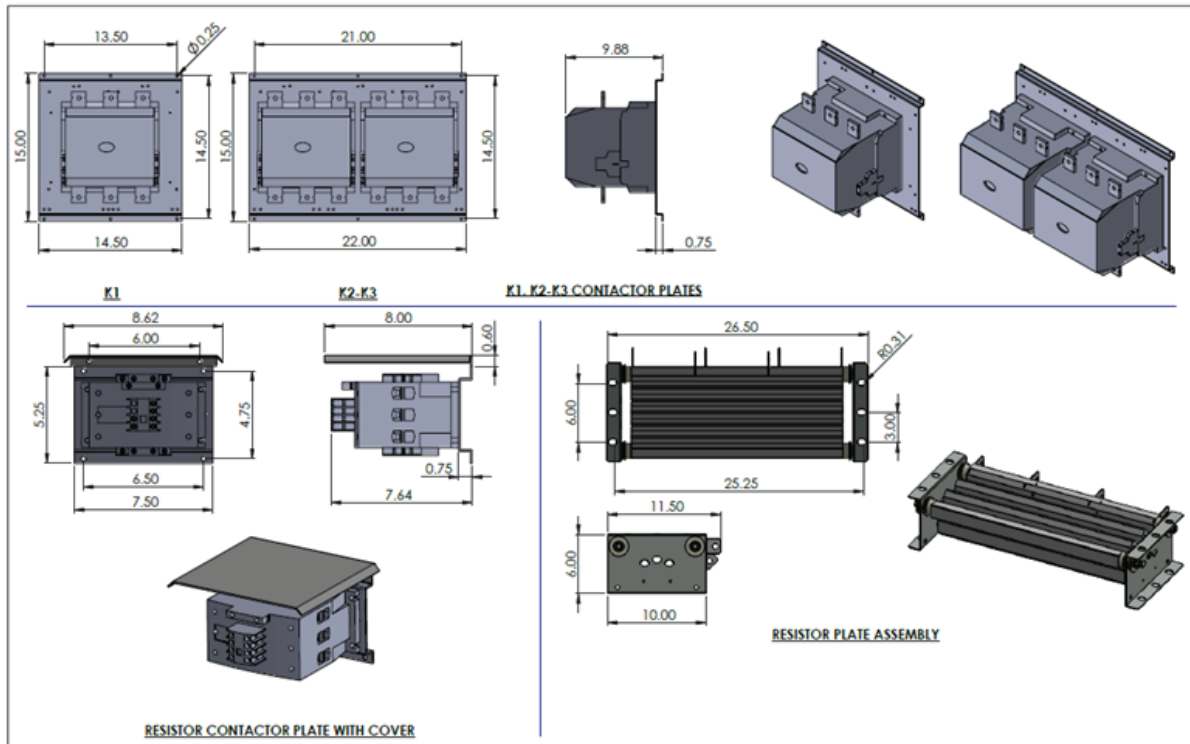


Figure 20. Remote mount 1385 amps





## Component Dimensions

# Kit Component Part Numbers

Table 3. Kit component part numbers

Trane Part Number	Manufacturer Part Number	Description
011400010100	N/A	Trane Wye Delta RTH Series Expedite Fee
011400020100	N/A	Trane CenTraVac Starter Expedite Fee
011400030100	N/A	Trane CenTraVac AFD Expedite Fee
011400040100	CNT001	CNT001 207 3DP RTABC, CVT, CVD
011400050100	CNT002	CNT002 346 4DP RTABC, CVT, CVD
011400060100	CNT003	CNT003 467 5 RTHABC
011400070100	CNT004	CNT004 606 5DP RTABC, CVT, CVD
011400080100	CNT006	CNT006 207 3DP RTHD, CVR
011400090100	CNT007	CNT007 346 4DP RTHD, CVR
011400100100	CNT008	CNT008 467 5 RTHD, CVR
011400110100	CNT009	CNT009 606 5DP RTHD, CVR
011400540100	CNT010	CNT010 935 6 CVR
011400550100	CNT011	CNT011 1212 6DP CVR
011400560100	CNT012	CNT012 1385 7 CVR
011400120100	CAB001	CAB001 207 Amp 60" 3/8" Lug
011400130100	CAB002	CAB002 346 Amp 60" 3/8" Lug
011400140100	CAB003	CAB003 467 Amp 60"all 3/8" Lug
011400150100	CAB004	CAB004 606 Amp 60" 3/8" Lug
011400160100	CAB005	CAB005 207 Amp, 3/8 Mot RTHA/B
011400170100	CAB006	CAB006 RTHA/B 207 Amp RTHA/B
011400180100	CAB007	CAB007 346 Amp, 3/8 Mot RTHA/B
011400190100	CAB008	CAB008 346 Amp, 5/8 Mot RTHA/B
011400200100	CAB009	CAB009 467 Amp, 5/8 Mot RTHA/B
011400210100	CAB010	CAB010606 Amp, 5/8 Mot RTHA/B
011400220100	CAB011	CAB011207 Amp, 5/8 Mot RTHC/D
011400230100	CAB012	CAB008 346 Amp, 5/8 Mot RTHC/D
011400240100	CAB013	CAB009 467 Amp, 5/8 Mot RTHC/D
011400250100	CAB014	CAB010 606 Amp, 5/8 Mot RTHC/D
011400420100	CAB015	CAB015 346 Factory Install Mot
011400430100	CAB016	CAB016 467 Factory Install Mot
011400440100	CAB017	CAB017 606 Factory Install Mot
011400450100	CAB018	CAB018 960 Factory Install Mot
011400460100	CAB019	CAB019 1316 Install Factory Mot
011400570100	CAB020	CAB027 960 Amp 60" 3/8" Lug
011400580100	CAB021	CAB028 1316 Amp 60" Flexibar
011400260100	RES001	RES001 3x1 Ohm
011400270100	RES002	RES002 3x0.7 Ohm
011400280100	RES003	RES003 3x0.5 Ohm
011400290100	RES004	RES004 6x0.7 Ohm
011400300100	RES005	RES005 3x0.5 + 3x0.7 Ohm
011400310100	RES006	RES006 6x0.5 Ohm
011400320100	RES007	RES007 6x1.4 Ohm
011400330100	RES008	RES008 3x1 + 3x1.4 Ohm
011400340100	RES009	RES009 6x1 Ohm
011400350100	RES010	RES010 3x2 Ohm

**Table 3. Kit component part numbers (continued)**

Trane Part Number	Manufacturer Part Number	Description
011400360100	RES011	RES011 3x1.4 Ohm
011400370100	RES012	Trane Resistor Kit RES012
011400380100	RES013	RES013 3x1.4 + 3x2 Ohm
011400590100	RES014	Trane Resistor Kit RES014
011400600100	RES015	RES015 3x0.7 + 3x1 Ohm
011400610100	RES016	RES014 LowV Grid 607 - 1180
011400620100	RES017	RES015 LowV 1181 - 1385
011400630100	RES018	RES016 MedV 936 - 1008
011400640100	RES019	RES017 MedV 1009 - 1385
011400650100	RES020	RES018 HiV 936 - 1285
011400660100	N/A	IT Kit S811+, 110MM, 135 Amp, 233 MRLA
011400670100	N/A	IT Kit S811+, 200MM, 180 Amp, 311 MRLA
011400680100	N/A	IT Kit S811+, 200MM, 240 Amp, 415 MRLA
011400690100	N/A	IT Kit S811+, 200MM, 304 Amp, 526 MRLA
011400700100	N/A	IT Kit S811+, 200MM, 360 Amp, 623 MRLA
011400710100	N/A	IT Kit S811+, 200MM, 420 Amp, 727 MRLA
011400720100	N/A	IT Kit S811+, 200MM, 500 Amp, 866 MRLA
011400730100	N/A	IT Kit S811+, 290MM, 360 Amp, 623 MRLA
011400740100	N/A	IT Kit S811+, 290MM, 420 Amp, 727 MRLA
011400750100	N/A	IT Kit S811+, 290MM, 500 Amp, 866 MRLA
011400760100	N/A	IT Kit S811+, 290MM, 650 Amp, 1120 MRLA
011400770100	N/A	IT Kit S811+, 290MM, 720 Amp, 1247 MRLA
011400780100	N/A	IT Kit S811+, 290MM, 850 Amp, 1472 MRLA

**Note:** CVT = CenTraVac Transition, CVD = CenTraVac Direct, CVR = CenTraVac Remote.

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