



Installation Instructions

AFDR Retrofit Air-cooled Adaptive Frequency Drive™

For Use with RTHD Chillers



Model Number: RTHD

This document applies to service offering application 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**Conform to All Applicable National, State, and Local Electrical Codes!**

Failure to follow all applicable codes could result in an arc flash event, electrocution, explosion, or fire, which could result in death or serious injury.

Users **MUST** conform to all applicable national, state, and local electrical codes during the electrical installation and servicing of this product.

⚠ WARNING**Refrigerant under High Pressure!**

Failure to follow instructions below could result in an explosion which could result in death or serious injury or equipment damage.

System contains refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

⚠ 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**Excessive Cable Lengths Between AFDR Drive and Compressor Motor!**

Trane assumes no responsibility for equipment damage caused by use of improper cable lengths. The variable frequency drive industry recommends that the length of the electrical cables connecting a drive unit to a motor should be kept to less than 250 feet to protect the motor from reflected voltage waves that can cause the motor to fail. Cable lengths that exceed 250 feet between the drive and the motor create the potential for damage to occur to the motor windings and/or insulation.

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General Information

The step-by-step instructions outlined in this manual describe the procedures required to successfully install an AFDR retrofit air-cooled Adaptive Frequency Drive™ package in place of an existing starter on a Trane RTHD helical rotary liquid chillers. This only applies to chillers having a Tracer® AdaptiView™ controller. If the RTHD chiller has a CH530, it must be replaced with the Tracer AdaptiView RTHD rotary chiller display upgrade kit (RCDA; sold separately).

The AFDR can be ordered as a close floor mount, remote floor mount, or remote wall mount. Voltage options include 460/480 volts, 380/400 volts, and 575/600 volts. D-Frame size AFDH drive packages can be ordered in a unit-mounted, stand-mounted, or remote floor-mounted cabinet configuration. The AFDR units can be equipped with a drive having a maximum rating of 190 amps, 240 amps, 302 amps, 361 amps, 443 amps, or 535 amps for 460V/480V, and 131 amps, 155 amps, 193 amps, 242 amps, 344 amps, or 400 amps for 575V/600V.

Other Literature Required Before Ordering or Installing an AFDR Retrofit

This manual must be used in conjunction with the following publications:

- *Optimus™ Water-Cooled Chillers Model RTHD Installation, Operation, and Maintenance* (RTHD-SVX01*-EN).
- *TR200 Programming Guide* (BAS-SVP04*-EN).
- *TR200 New D-Frame, 110–400kW Operating Instructions* (BAS-SVX54*-EN).
- *RCRA - Tracer® AdaptiView™ Rotary Chiller Control Upgrade For RTHA Chillers Installation Instructions* (SO-SVN030*-EN).

Note: *Instructions provided in SO-SVN030*-EN directly impact AFDR installation; review literature carefully!*



Model Number Descriptions

For service purposes, Trane model AFDR air-cooled drive upgrade packages are assigned a multiple character alphanumeric model number that precisely identifies each unit.

An explanation of the identification code that appears on the unit nameplate is shown below. Use of the service model number will enable the owner/operator, installing contractors, and service technicians to define the operation, components, and options for any specific unit.

Refer to the model number printed on the nameplate when ordering replacement parts or requesting service.

Digit 1, 2, 3 — Unit Function

- A = Adaptive
- F = Frequency
- D = Drive

Digit 4 — Development Sequence

- R = Development Sequence (Air Cooled)

Digit 5, 6, 7, 8 — Unit Performance RLA

0312= 312 Rated Load Amps

Digit 9 — Chiller Voltage

- F = 460 Volts 60 Hz 3 Phase
- G = 480 Volts 60 Hz 3 Phase
- H = 575 Volts 60 Hz 3 Phase
- J = 600 Volts 60 Hz 3 Phase
- R = 380 Volts 50 Hz 3 Phase (Special)
- T = 400 Volts 50 Hz 3 Phase (Special)

Digit 10, 11 — Design Sequence

- AA = Next Generation D-Frame

Digit 12, 13 — Maximum Drive Output Current

575 V/600 V

- 1B = 131 Maximum (60 Hz)
- 1C = 155 Maximum (60 Hz)
- 2B = 192 Maximum (60 Hz)
- 0L = 242 Maximum (60 Hz)
- 0M = 290 Maximum (60 Hz)
- 0N = 344 Maximum (60 Hz)
- 0P = 400 Maximum (60 Hz)

460 V/480 V

- 0A = 190 Maximum (60 Hz)
- 0B = 240 Maximum (60 Hz)
- 0C = 302 Maximum (60 Hz)
- 0D = 361 Maximum (60 Hz)
- 0E = 443 Maximum (60 Hz)
- 1A = 535 Maximum (60 Hz)

Digit 14 — Chiller Control Type

- 1 = Tracer® AdaptiView™ Controls
- 2 = CH531/Tracer AdaptiView Controls

Digit 15 — AFD Type

- 1 = NEMA 1 (IP21)
- 2 = NEMA 12 (IP54) (Special)

Digit 16 — Mounting Type

- A = Close Mount – Conduit and Power Wire Provided
- B = Remote Floor Mount – Field Provided Power Wiring
- C = Remote Wall Mount – Field Provided Power Wiring

Digit 17, 18 — Design Specials

- 00 = None
- AA = Yes



Environmental Conditions

Important: *The location of the AFDR is important if proper performance and normal operating life is to be expected. Therefore, unless designed for special environments, the controller should be installed in an area where the following conditions exist.*

- Verify that NEMA 1 enclosure is installed where it can be kept clean and dry, away from oil, coolants, or other airborne contaminants. The enclosure must be installed in a non-corrosive location.
- The area chosen should allow the space required for proper air flow. Adequate clearance for air circulation around the enclosure is a 6-inch (15.25 cm) minimum clearance required wherever vents are located in the cabinet.
- The area chosen should allow for service clearance in front of the enclosure. Three feet (0.91 m) is recommended for door swing and working space; more space may be required by local building codes or for service equipment, such as hoists used for drive replacement. Because codes and equipment may vary, determine the amount of space required for each specific installation.
- Do not install the drive over 3300 ft (1000 m) above sea level without derating output power. For every 300 ft (91.4 m) over 3300 ft (1000 m) above sea level, derate the output current 1 percent.
- Line frequency is 60 Hz.
- Line voltage options are 460, 480, 575 or 600 volts; variation must be within ± 10 percent.
- Verify that the drive location will meet the environmental conditions specified in [Table 1](#).

Table 1. Environmental conditions

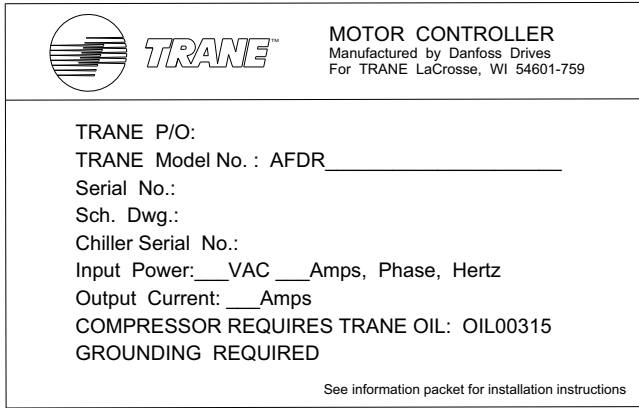
Condition	Specification
Operating Temperature (inside NEMA 1 enclosure)	32°F to 131°F (0°C to 55°C)
Ambient Temperature (outside NEMA 1 enclosure)	32°F to 104°F (0°C to 40°C)
Storage Temperature (Ambient)	-40°F to 149°F (-40°C to 65°C)
Humidity	5% to 95% (non-condensing)



Nameplates

A nameplate is included for each AFDR air-cooled drive unit. Always provide the model number and serial number that is printed on this nameplate when making warranty inquiries, ordering parts, or ordering literature for the unit.

Figure 1. AFDR nameplate example



The AFDR nameplate label (Trane Motor Controller Nameplate) is customized for each AFDR order and is specific to each RTHD unit. The Trane Motor Controller Nameplate and must be installed on the Trane TR200 drive. Remove the adhesive backing and locate the label on the TR200 drive next to the AFD nameplate. The existing nameplate located on the RTHD chiller panel must also remain in place. When programming the current limit value into Tracer® TU, always use the Trane Motor Controller Nameplate that is place on the TR200 drive.

Output Current

The output current listed on the Trane motor controller nameplate on the AFD (see Figure 1) is the maximum current that the drive will be required to provide when the compressor motor is operated at a frequency that results in reduced motor voltage. The output current is used by the RTHD chiller controller for correctly limiting chiller capacity under these conditions. The output current listed on the Trane motor controller nameplate on the AFD should NOT be confused with the chiller nameplate Rated Load Amps (RLA), which are unchanged by the retrofit. The RLA is now to be considered the input current to the chiller.

AFDR Controls

If there is an existing CH530 controller, the Tracer® AdaptiView™ RTHD rotary chiller display upgrade kit (RCDA) must be installed. Refer to RCDA - Tracer AdaptiView™ Display Upgrade Kit RTHD Rotary Chiller Installation Instructions (SO-SVN030*-EN) before installing the AFDR drive.

If the RTHD to be retrofitted to AFD already has a UC800 Tracer AdaptiView controller, that can be reused.

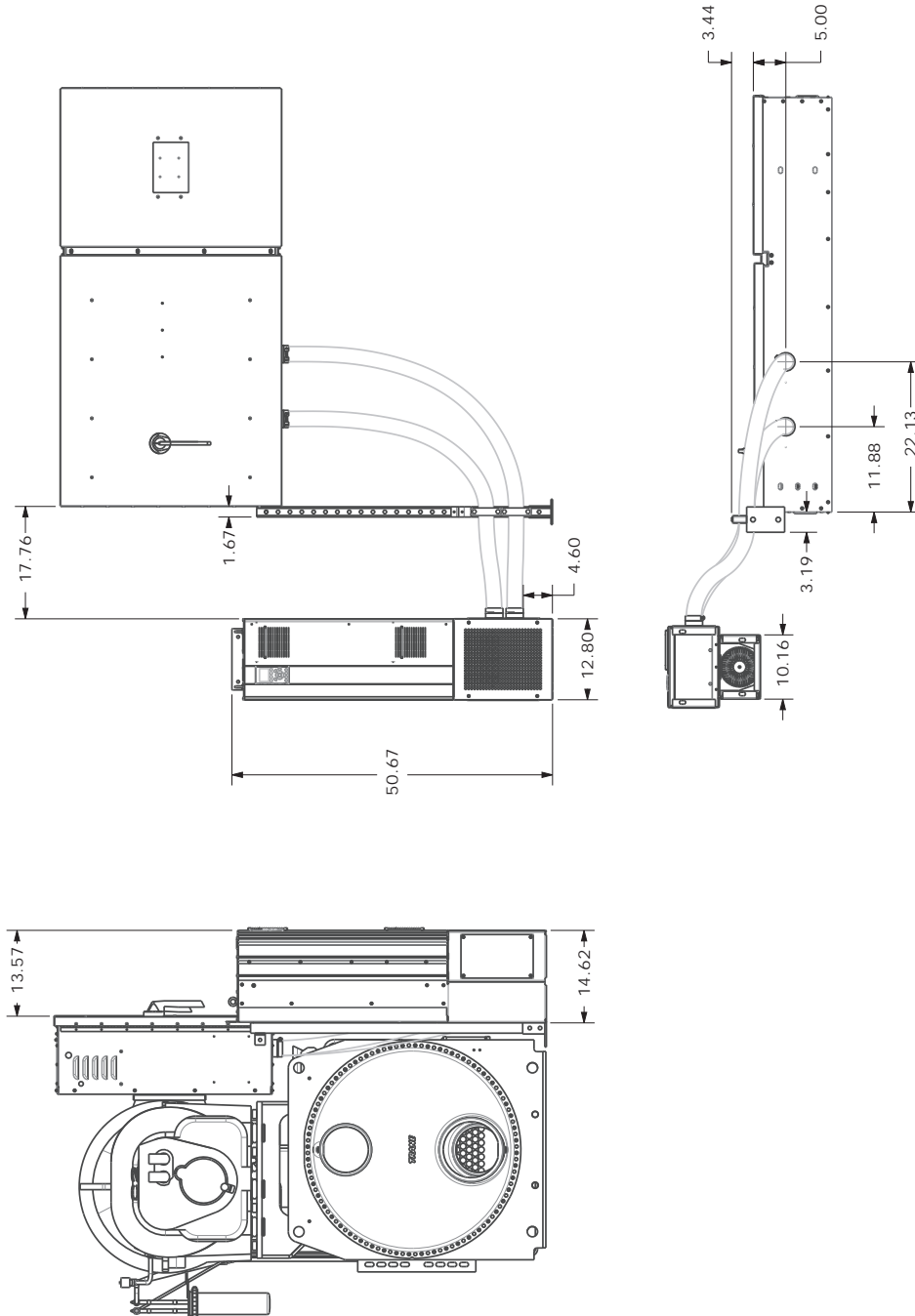
Important: Regardless if it is new or existing, the UC800 must have a software upgrade to support the AFDR. For more information, refer to “UC800 Software Installation and Configuration,” p. 50.



Dimensions

Unit Submittal Drawings

Figure 2. D1 drive, 2 conduit, 460 and 575V, below 185 amps - standard drive orientation





Dimensions

Figure 3. D1 drive, 2 conduit, 460 and 575V, below 185 amps - rotated drive orientation

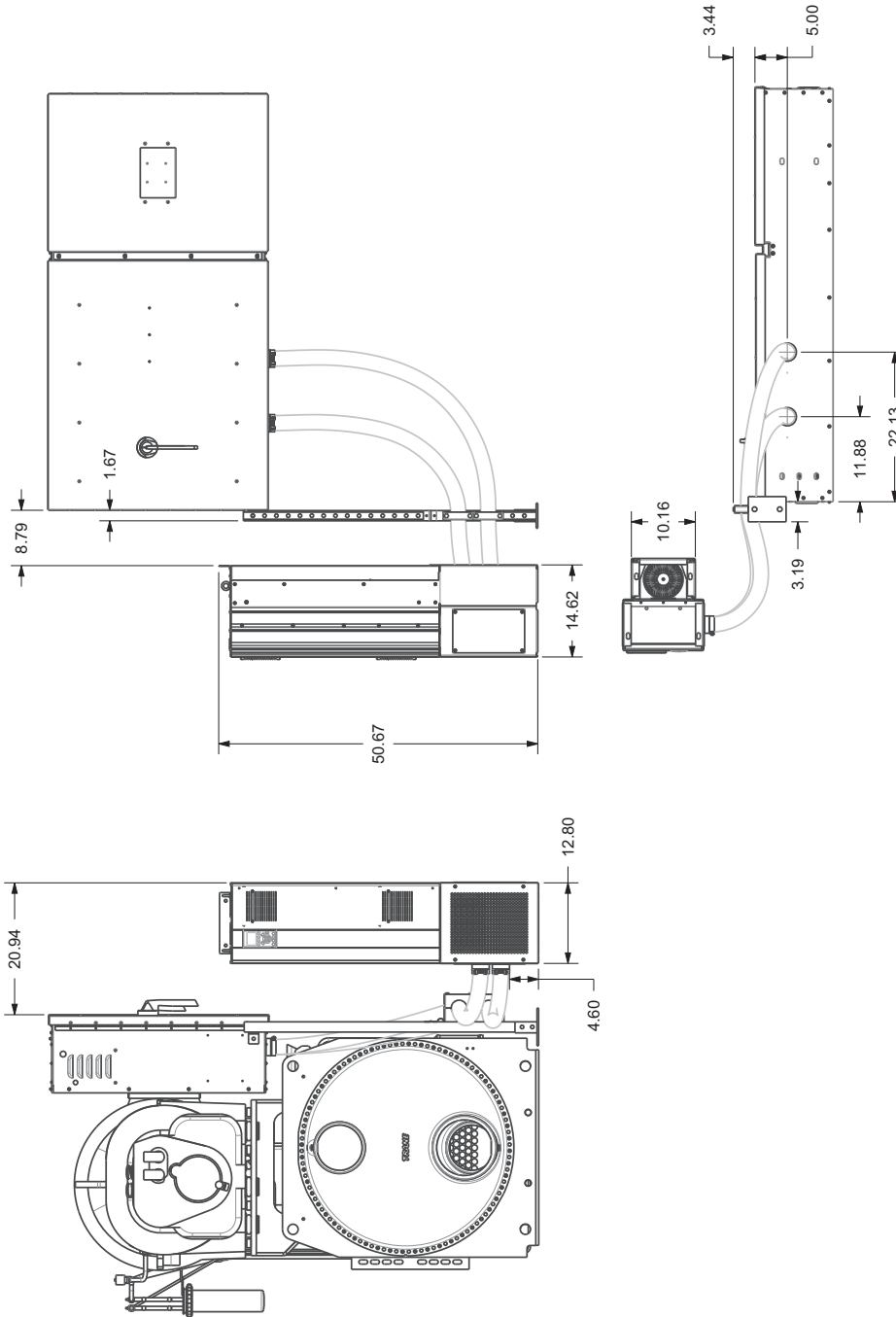
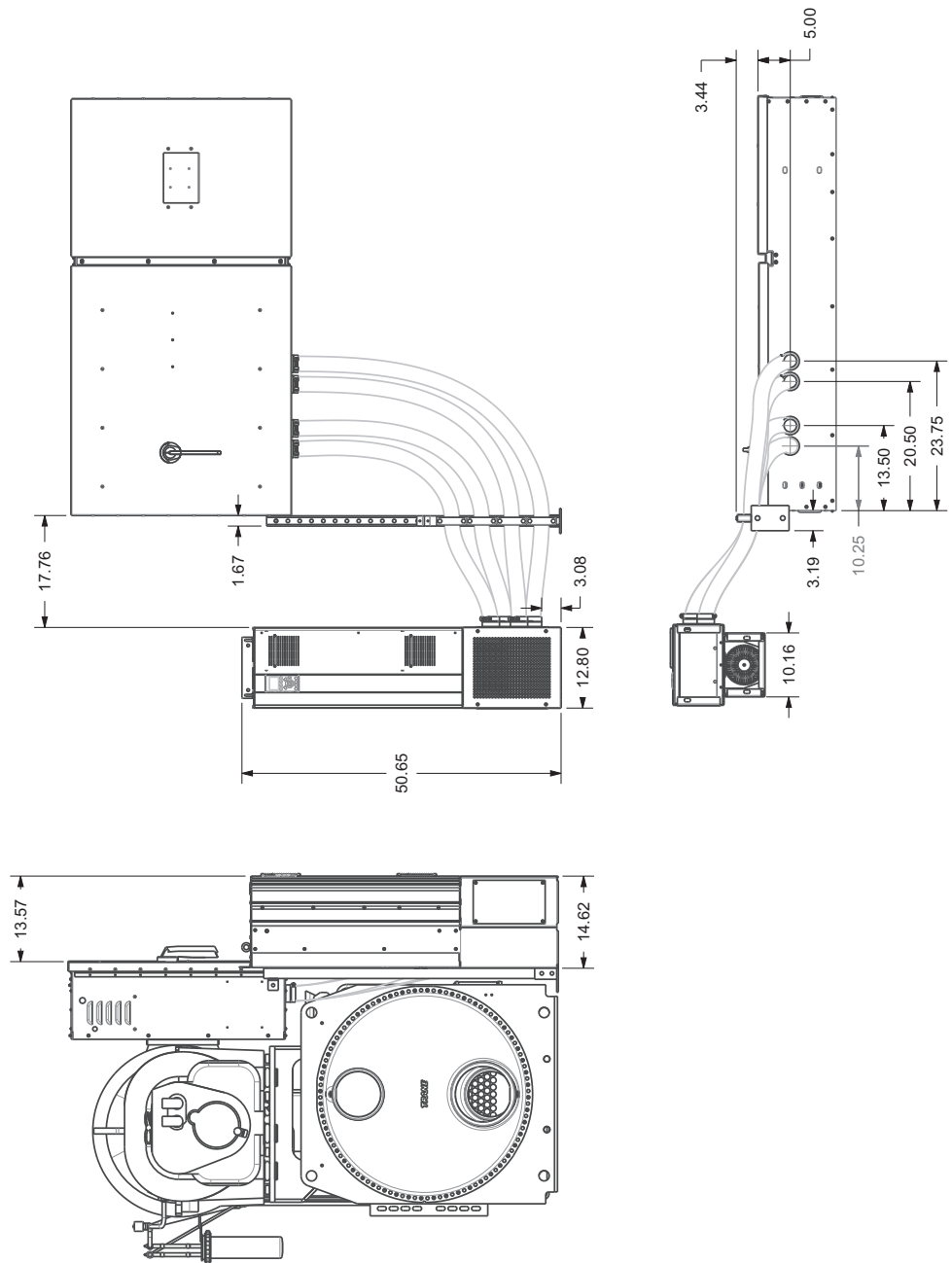


Figure 4. D1 drive, 4 conduit, 460V, 185 to 334 amps - standard drive orientation





Dimensions

Figure 5. D1 drive, 4 conduit, 460V, 185 to 334 amps - rotated drive orientation

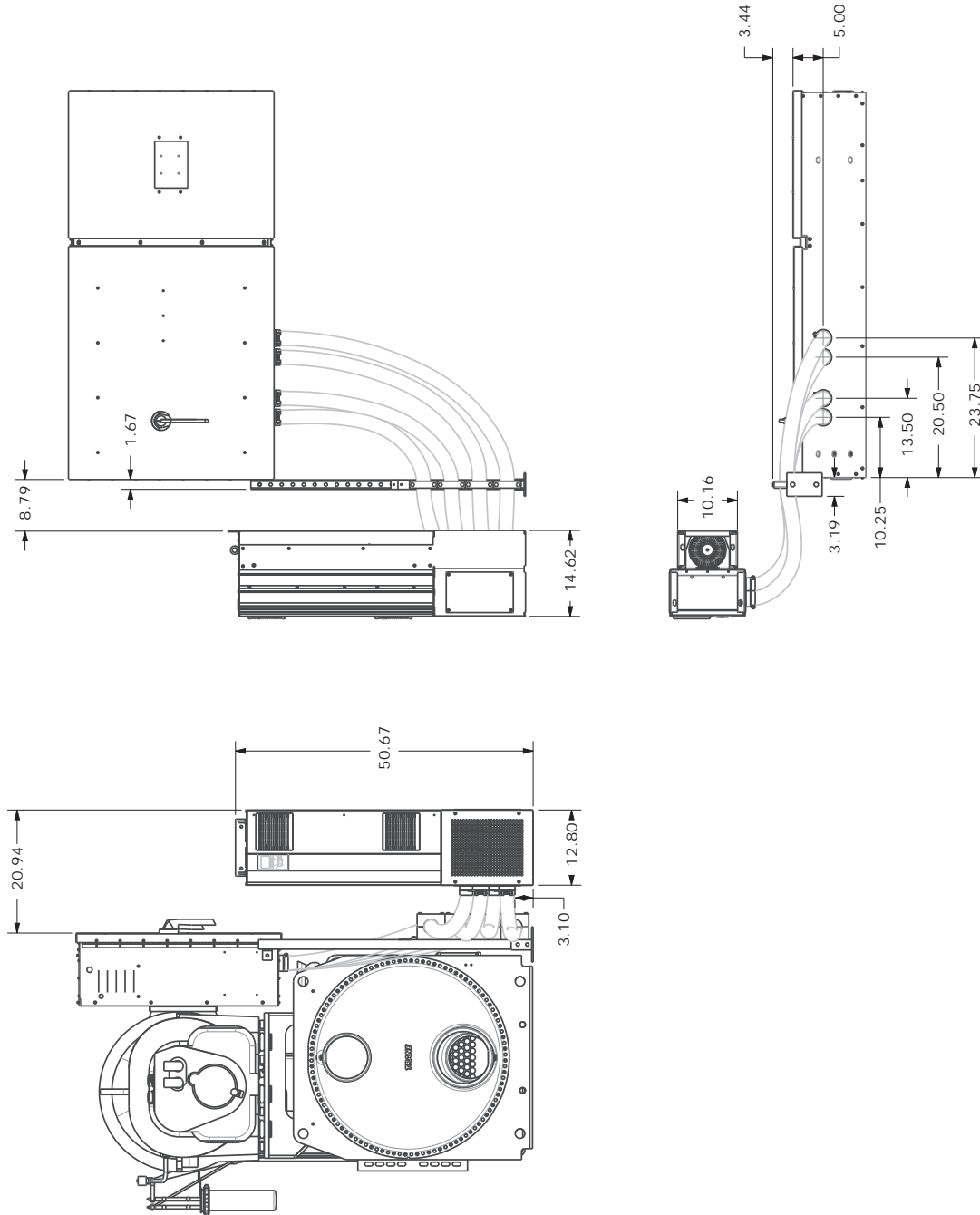
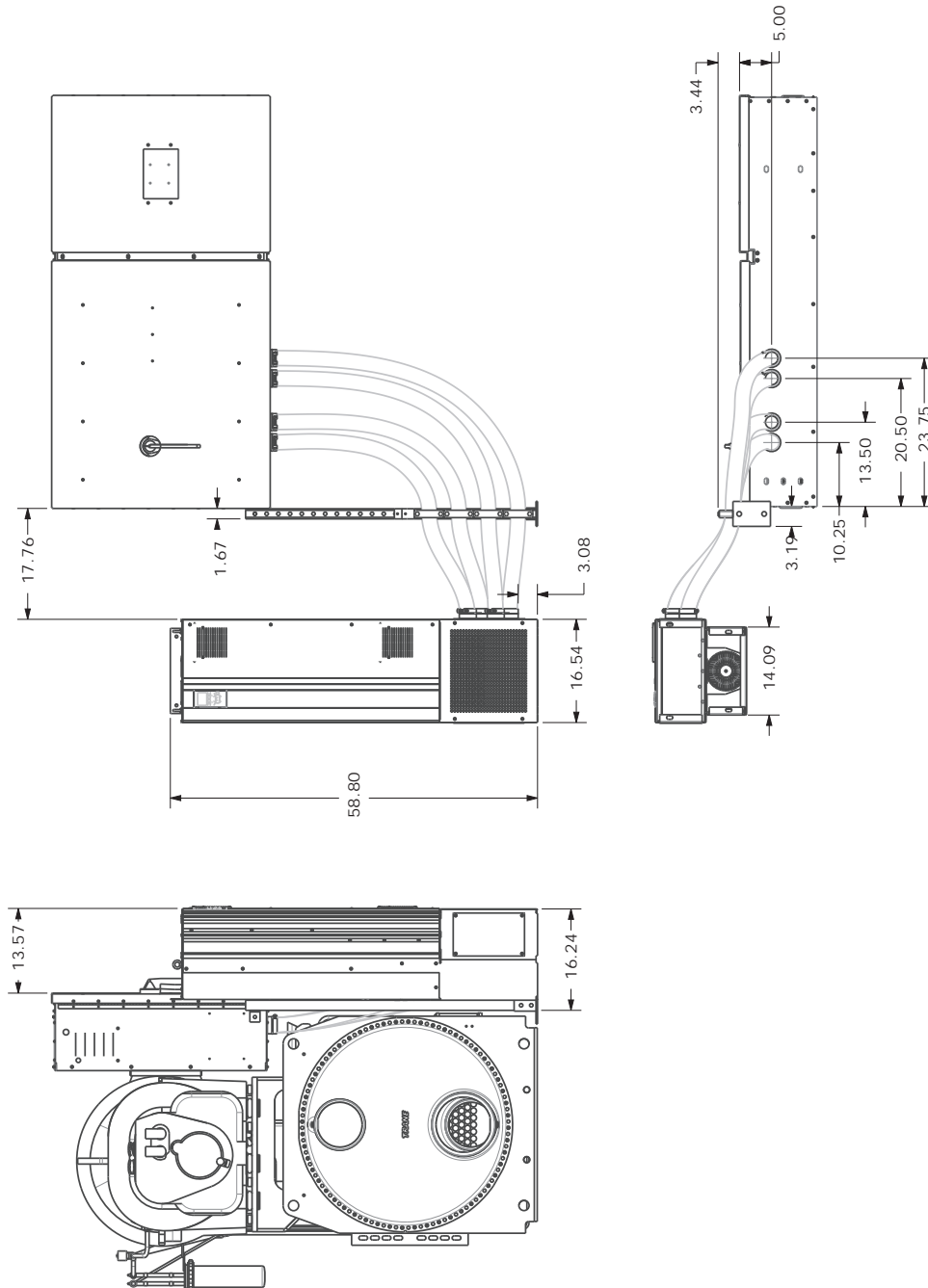


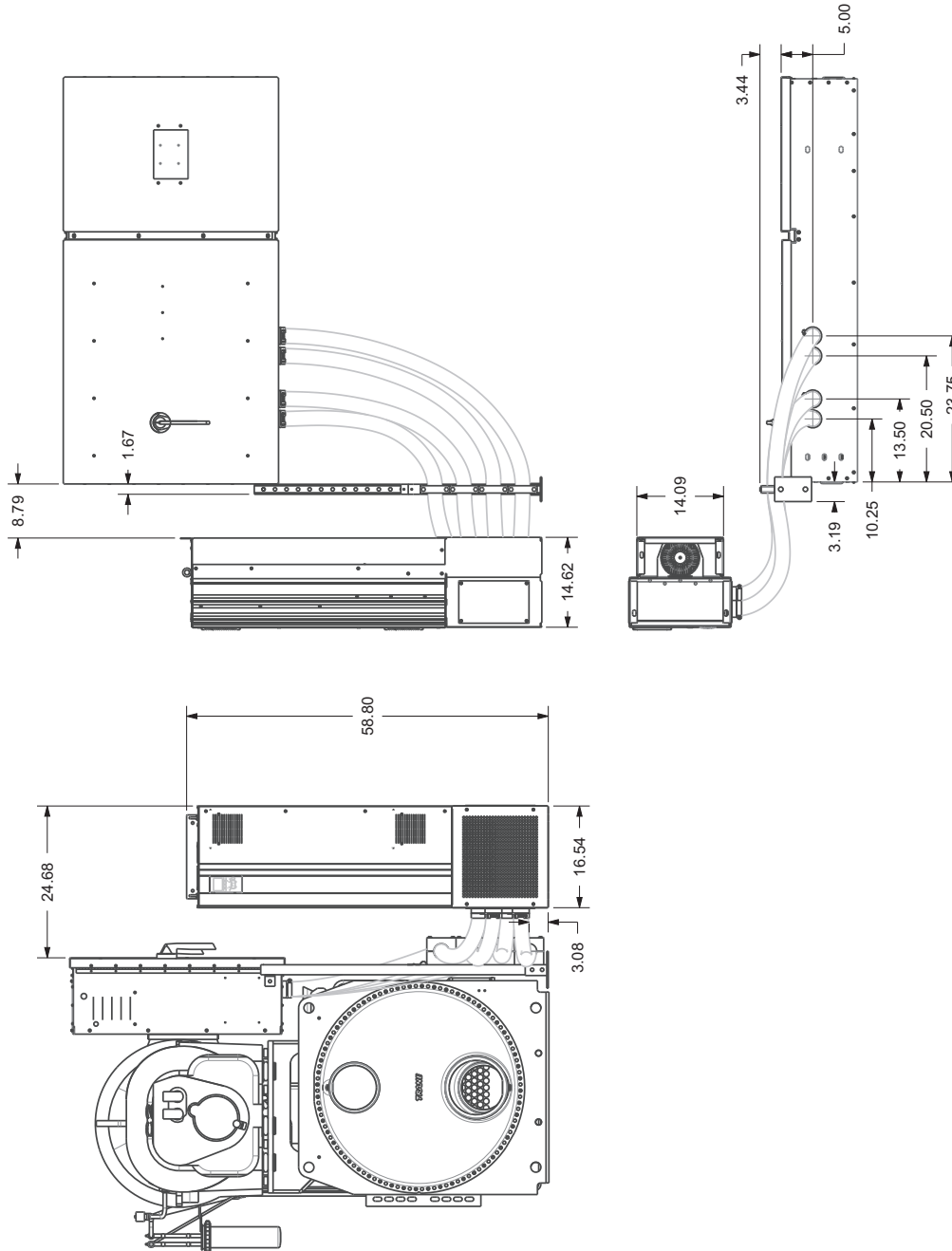
Figure 6. D2 drive, 4 conduit, 460 and 575V, 186 to 336 amps - standard drive orientation





Dimensions

Figure 7. D2 drive, 4 conduit, 460 and 575V, 186 to 336 amps - rotated drive orientation



Drive Dimensions

Figure 8. D1 drive dimensions - sheet 1 of 2

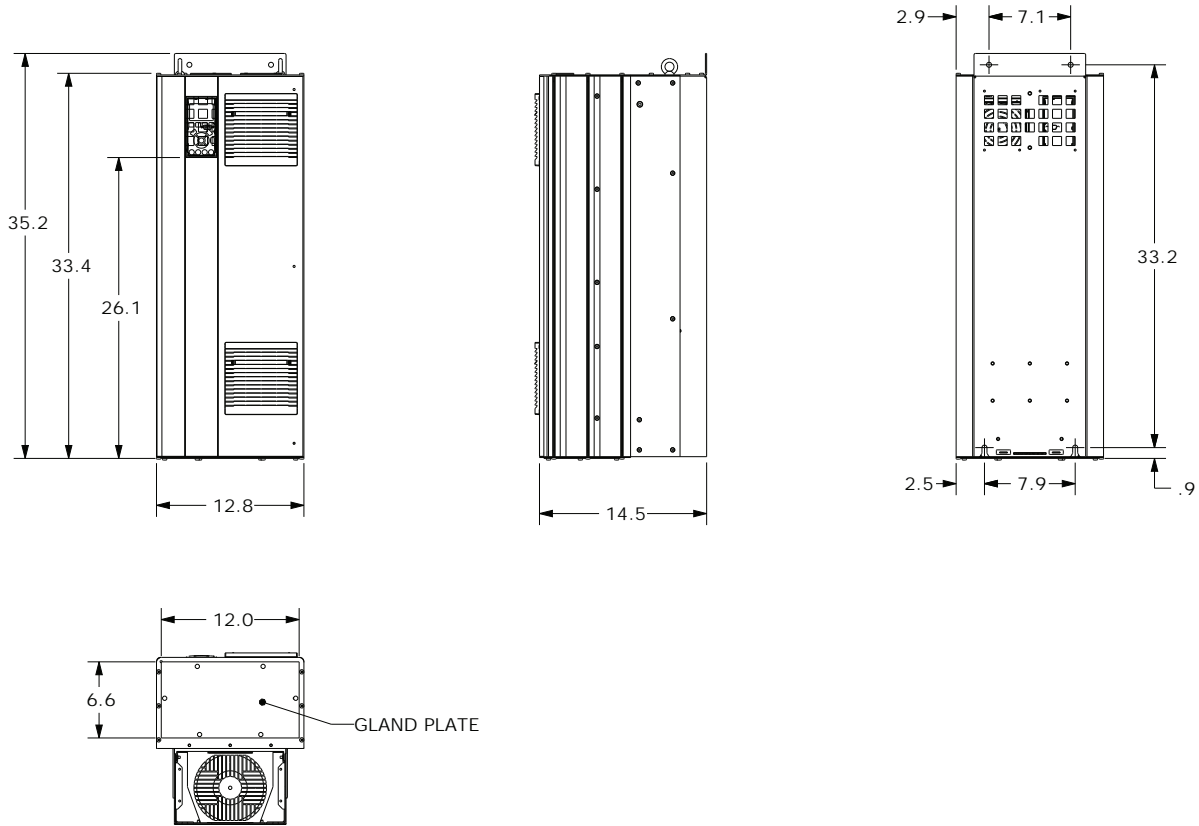
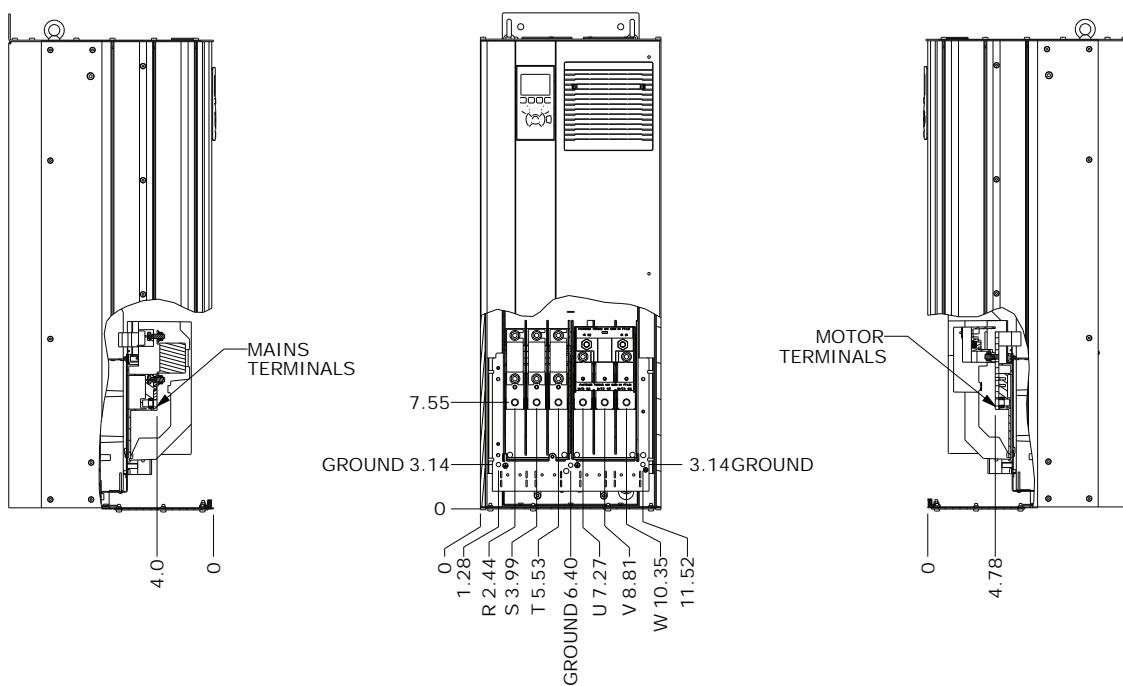


Figure 9. D1 drive dimensions - sheet 2 of 2





Dimensions

Figure 10. D2 drive dimensions - sheet 1 of 2

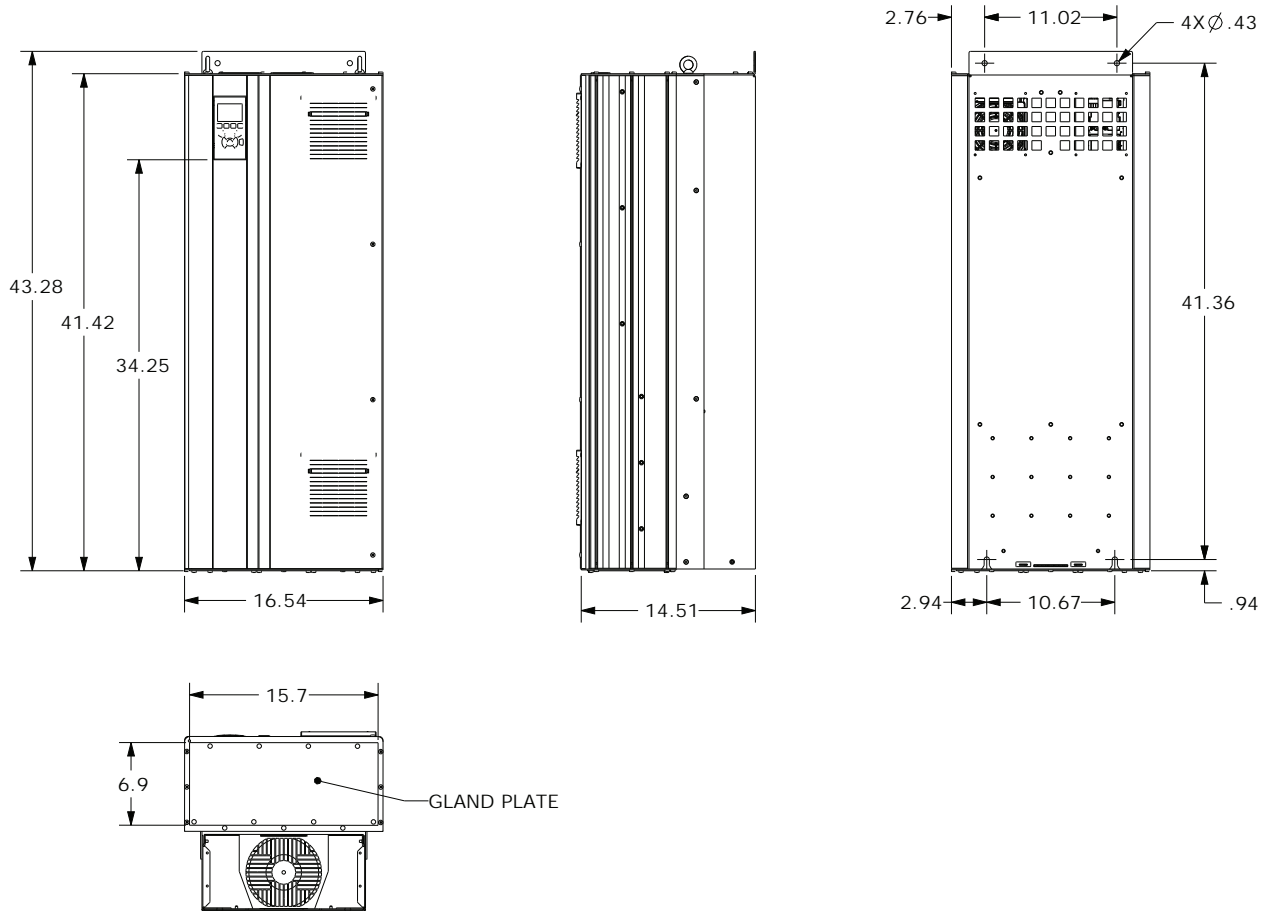
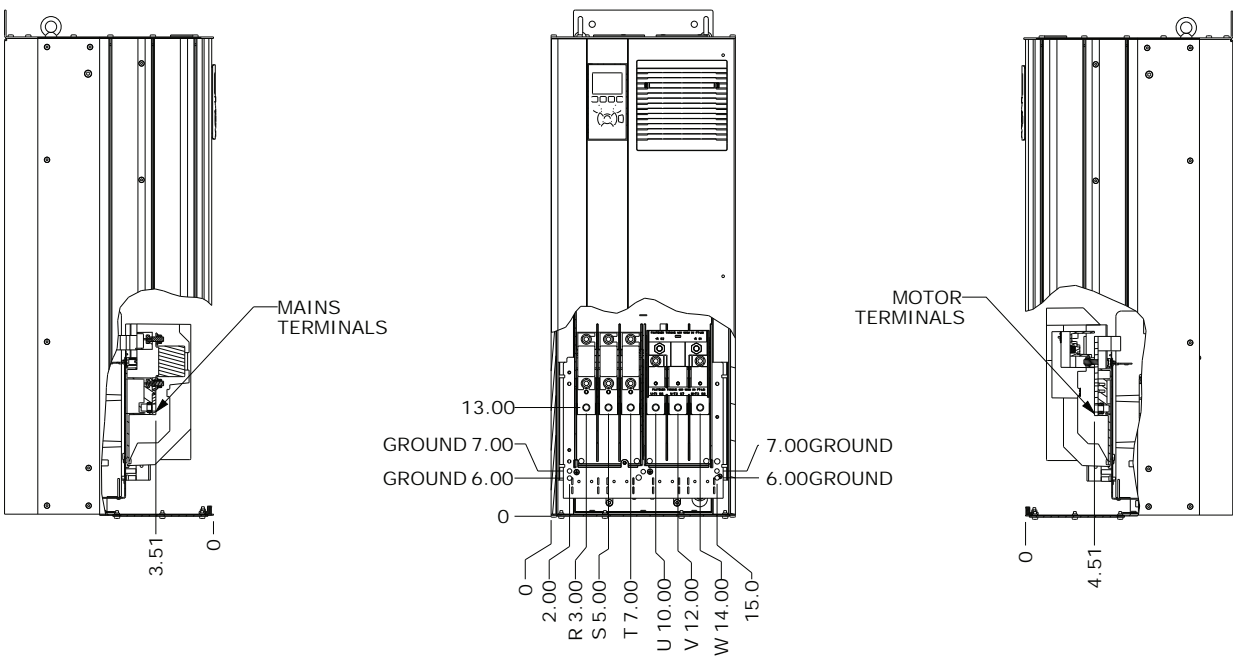


Figure 11. D2 drive dimensions - sheet 2 of 2



Pedestal Drawings

Figure 12. Pedestal drawing - D1 drive

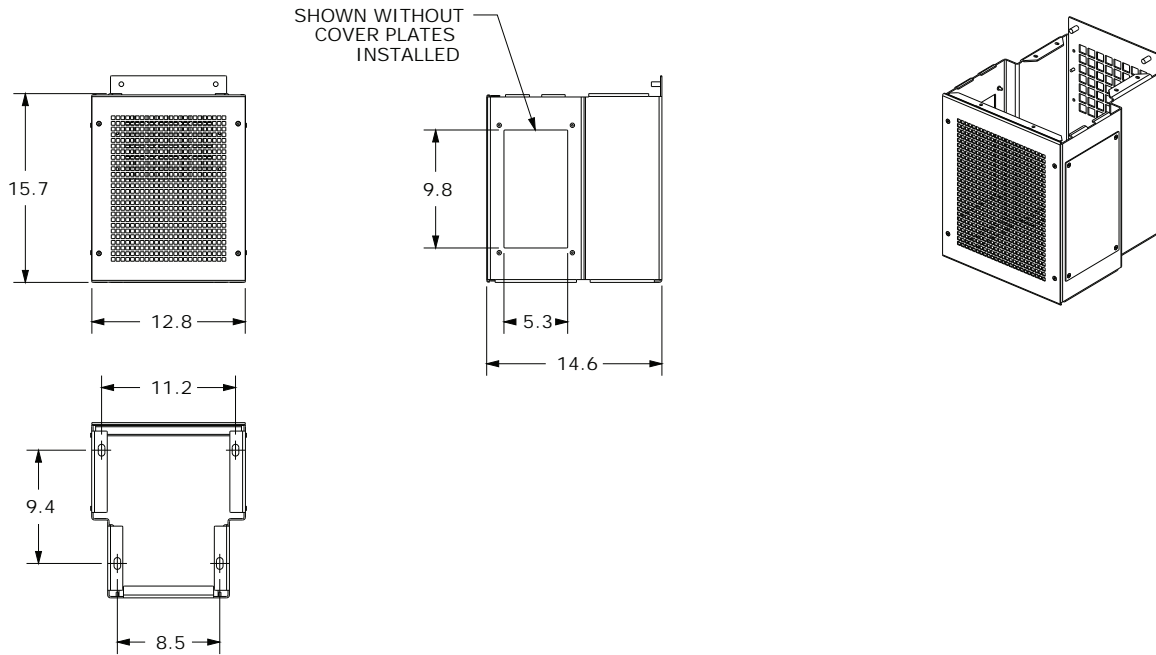
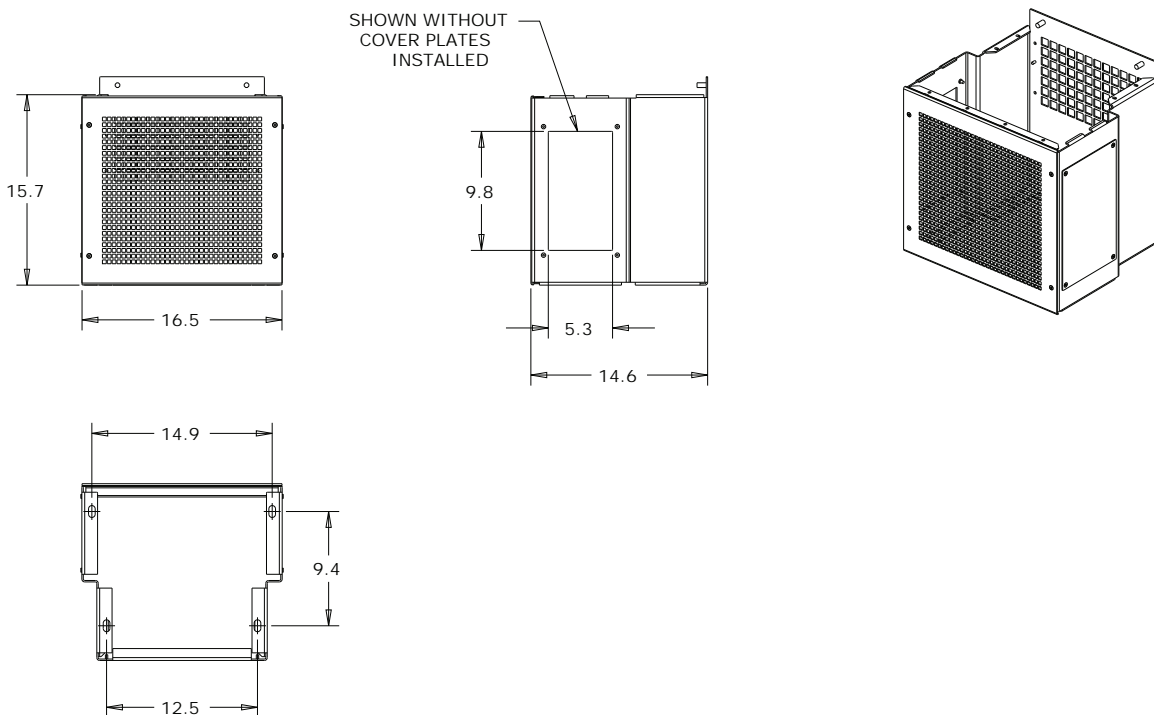


Figure 13. Pedestal drawing - D2 drive





Pre-Installation

Required Tools

Normal service tools are required to perform the majority of the work. A service technician with a well stocked tool chest should have the right tools to perform the job. In addition to the normal service tools and hardware, the following is a partial list of specific field supplied hardware/software components and special tools that are also required to perform the display retrofit:

- RS-232 male DB9 to female DB9 pin to pin serial cable to connect the DynaView™ to a PC or laptop computer
 - Note:**
 - The cable must NOT be a **null-modem** cable.
 - The cable must be less than 50 feet in length.
- Type A to Type B USB cable to connect the Tracer® UC800 controller to a PC or laptop computer
- A PC or laptop computer equipped with the following:
 - KestrelView™ service software, version 14.0 or newer
 - Tracer TU service software, version 9.0.322 or newer

- RTHD UC800 firmware build 3.03 or later (refer to “Preparing Tracer® TU on the Service Computer,” p. 25)
- South pole magnet screwdriver (TOL01343)
- Electronics vacuum
- Drill
- 3/16-inch drill bit
- 3/8-inch drill bit for display arm
- 2.5-inch hole saw (close mount kit only)
- Phillips screwdriver
- Wrench for fastening the bolts for the panel
- Wire cutter for large and small gage wire
- Vacuum pump
- Oil pump
- Impact drill for concrete

Parts

Table 2. Components – close mount 460 volts

Kit Part Number	Mnemonic	Part Number	Description	Qty	
Close Mount Components					
127500010001	RNG02318	X13640734010	Choke Core M-116	5	
		531405110100	Core Support Bracket	1	
		531405470100	Buss Bar, Formed (for motor connection)	2	
		531405480100	Buss Bar, Straight (for motor connection)	1	
	BRD02944	X13650733060	Dual Relay output Ref 1A8 (latest revision)	1	
	HLD00579	X13260721020	Relay, 4PDT, 120VAC, 8amps	2	
	RAL01142	X13260722010	Relay Socket, 4PDT, Din rail mount	2	
		X13500224070	Din rail 4inch	1	
		X13491363010	Din Rail End Stop	4	
		507117910001	Strut Channel, 1.625-inch x 1.625-inch x 5ft (black color)	1	
		507117920001	Strut Channel Base, 4-inch x 6-inch (black color)	1	
		507117930001	Strut Channel L Bracket	1	
		507117960001	.75-inch conduit connector 90 degree	1	
		507117970001	.75-inch Conduit Connector Straight	1	
		X19080029040	0.75-inch conduit - AFD/relay signal wires	20 ft	
		X19010309470	single conductor cable - 16awg UL 1230 blk	125 ft	
		CAB01534	X19051625030	Global harness Female to Amp connector 78.74-inch	1
		CAB01153	X19051624030	Global harness Male to Amp connector 78.74-inch	1
		CAB01150	X19051623020	Extension Harness - 78.74-inch	1
			X39002507010	Label, Warning (AFD)	1
			507117810001	Label, Nameplate	1
			SO-SVN048*-EN	KIT IOM (supplied by Trane)	1
			507117830001	Schematics Printed on mylar	1
		BAS-SVX54*-EN	Drive IOM	1	
		507118200001	AFD Label	1	
		X39003759010	Label, Technical support	1	

Table 2. Components – close mount 460 volts (continued)

Kit Part Number	Mnemonic	Part Number	Description	Qty
127500010001		507118300001	Motor Terminal Shield	1
Conduit Kits				
127500020001 2 Conduit Kit		X19038200000	Connector, 2-inch conduit	4
		X19120032060	2-inch Conduit sleeve	4
		507118010001	PWR WIRE ASSEMBLY D1 - B	1
		507118030001	PWR WIRE ASSEMBLY D1 - D	1
		507118080001	Modified pedestal plate (Dwg provided)	1
		507117990001	AFD Drive Pedestal D1H	1
127500030001 4 Conduit Kit (small base)		X19038200000	Connector, 2-inch conduit	8
		X19120032060	2-inch Conduit sleeve	8
		507118000001	PWR WIRE ASSEMBLY D1 - A	1
		507118010001	PWR WIRE ASSEMBLY D1 - B	1
		507118020001	PWR WIRE ASSEMBLY D1 - C	1
		507118030001	PWR WIRE ASSEMBLY D1 - D	1
		507118110001	Modified pedestal plate (Dwg provided)	1
		507117990001	AFD Drive Pedestal D1H	1
127500040001 4 Conduit Kit (large base)		X19038200000	Connector, 2-inch conduit	8
		X19120032060	2-inch Conduit sleeve	8
		507118040001	PWR WIRE ASSEMBLY D2 - A	1
		507118050001	PWR WIRE ASSEMBLY D2 - B	1
		507118060001	PWR WIRE ASSEMBLY D2 - C	1
		507118070001	PWR WIRE ASSEMBLY D2 - D	1
		507118110001	Modified pedestal plate (Dwg provided)	1
		507118180001	AFD Drive Pedestal D2H	1
VFD DRIVE (one only)				
127500110001		X13171807001	AFD DRIVE, 460V, IP21, 110KW,134X2754, TR-200N110T4E21H2TGC7XXSXXXXAXBXXXXDX	
127500120001		X13171807002	AFD DRIVE, 460V, IP21, 132KW, 134X2755, TR-200N132T4E21H2TGC7XXSXXXXAXBXXXXDX	
127500130001		X13171807003	AFD DRIVE, 460V, IP21, 160KW, 134X2756, TR-200N160T4E21H2TGC7XXSXXXXAXBXXXXDX	
127500140001		X13171807004	AFD DRIVE, 460V, IP21, 200KW, 134X2757, TR-200N200T4E21H2TGC7XXSXXXXAXBXXXXDX	
127500150001		X13171807005	AFD DRIVE, 460V, IP21, 250KW, 134X2758, TR-200N250T4E21H2TGC7XXSXXXXAXBXXXXDX	
127500160001		X13171807006	AFD DRIVE, 460V, IP21, 315KW, 134X2759, TR-200N315T4E21H2TGC7XXSXXXXAXBXXXXDX	
CONTROLS (one only)				
		NONE - UC800	Only for customers with existing UC800 controls	
		18800260100	UC800/TD7 upgrade Kit with arm	
		18800270100	UC800/TD7 upgrade Kit without arm	



Pre-Installation

Table 3. Components – remote mount 460 volts

Kit Part Number	Mnemonic	Part Number	Description	QTY	Package Label	Serviceable Component
Remote Mount Components						
127500050001	RNG02318	X13640734010	Choke Core	5	1K14, 1K15 Relays	
		531405110100	Core Support Bracket	1		
		531405470100	Buss Bar, Formed (for motor connection)	2		
		531405480100	Buss Bar, Straight (for motor connection)	1		
		X13650733060	Dual Relay output Ref 1A8 (latest revision)	1		
	BRD02944	X19220085030	Housing; 4 Circuit Term (Phoenix connector) for 1A8	2		
	HLD00579	X13260721020	Relay, 4PDT, 120VAC, 8amps	2		
	RAL01142	X13260722010	Relay Socket, 4PDT, Din rail mount	2		
		X13500224207	Din rail 4-inch	2		
		X13491363010	Din Rail End Stop	4		
		SO-SVN048*-EN	KIT IOM (supplied by Trane)	1		
		507117830001	Schematics Printed on mylar	1		
		BAS-SVX54*-EN	Drive IOM	1		
		507118200001	AFD Label	1		
		507118300001	Motor Terminal Shield	1		
	X39003759010	Label, Technical support	1			
VFD DRIVE (one only)						
127500110001		X13171807001	AFD DRIVE, 460V, IP21, 110KW,134X2754, TR-200N110T4E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500120001		X13171807002	AFD DRIVE, 460V, IP21, 132KW, 134X2755, TR-200N132T4E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500130001		X13171807003	AFD DRIVE, 460V, IP21, 160KW, 134X2756, TR-200N160T4E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500140001		X13171807004	AFD DRIVE, 460V, IP21, 200KW, 134X2757, TR-200N200T4E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500150001		X13171807005	AFD DRIVE, 460V, IP21, 250KW, 134X2758, TR-200N250T4E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500160001		X13171807006	AFD DRIVE, 460V, IP21, 315KW, 134X2759, TR-200N315T4E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
CONTROLS (one only)						
		NONE - UC800	Only for customers with existing UC800 controls			
		18800260100	UC800/TD7 upgrade Kit with arm			
		18800270100	UC800/TD7 upgrade Kit without arm			
OPTIONAL PEDESTAL						
		507117990001	Optional AFD Drive Pedestal D1H Below 334 Amps	1	Drive Mount hardware - (label nuts and screws only)	
		507118180001	Optional AFD Drive Pedestal D2H 335 Amps - 455 Amps	1	Drive Mount hardware - (label nuts and screws only)	

Table 4. Components – close mount 575 volts

Kit Part Number	Mnemonic	Part Number	Description	QTY	
Close Mount Components					
127500060001	RNG02318	X13640734010	Choke Core M-116	5	
		531405110100	Core Support Bracket	1	
		531405470100	Buss Bar, Formed (for motor connection)	2	
		531405480100	Buss Bar, Straight (for motor connection)	1	
	BRD02944	X13650733060	Dual Relay output Ref 1A8 (latest revision)	1	
	HLD00579	X13260721020	Relay, 4PDT, 120VAC, 8amps	2	
	RAL01142	X13260722010	Relay Socket, 4PDT, Din rail mount	2	
		X13500224070	Din rail 4-inch	1	
		X13491363010	Din Rail End Stop	4	
		507117910001	Strut Channel, 1.625-inch x 1.625-inch x 5ft (black color)	1	
		507117920001	Strut Channel Base, 4-inch x 6-inch (black color)	1	
		507117930001	Strut Channel L Bracket	1	
		507117960001	.75-inch conduit connector 90 degree	1	
		507117970001	.75-inch Conduit Connector Straight	1	
		X19080029040	0.75-inch Conduit - AFD/relay signal wires	20 ft	
		X19010309470	single conductor cable - 16awg UL 1230 blk	125 ft	
		CAB01534	X19051625030	Global harness Female to Amp connector 78.74-inch	1
		CAB01153	X19051624030	Global harness Male to Amp connector 78.74-inch	1
		CAB01150	X19051623020	Extension Harness - 78.74-inch	1
			X39002507010	Label, Warning (AFD)	1
			507117810001	Label, Nameplate	1
			SO-SVN048*-EN	KIT IOM (supplied by Trane)	1
			507117830001	Schematics Printed on mylar	1
			BAS-SVX54*-EN	Drive IOM	1
			507118200001	AFD Label	1
			X39003759010	Label, Technical support	1
			507118300001	Motor Terminal Shield	1
	Conduit Kits				
	127500070001 2 Conduit Kit		X19038200000	Connector, 2-inch conduit	4
			X19120032060	2-inch conduit Sleeve	4
		507118010001	PWR WIRE ASSEMBLY D1- B	1	
		507118030001	PWR WIRE ASSEMBLY D1- D	1	
		507118080001	Modified pedestal plate (Dwg provided)	1	
		507117990001	AFD Drive Pedestal D1H	1	
127500080001 4 Conduit Kit (large base)		X19038200000	Connector, 2-inch conduit	8	
		X19120032060	2-inch conduit Sleeve	8	
		507118040001	PWR WIRE ASSEMBLY D2- A	1	
		507118050001	PWR WIRE ASSEMBLY D2 -B	1	
		507118060001	PWR WIRE ASSEMBLY D2 -C	1	
		507118070001	PWR WIRE ASSEMBLY D2 -D	1	
		507118110001	Modified pedestal plate (Dwg provided)	1	
		507118180001	AFD Drive Pedestal D2H	1	
VFD DRIVE (one only)					
127500170001		X13171808001	AFD DRIVE, 600V, IP21, 110KW, 134X2760, TR-200N110T7E21H2TGC7XXSXXXXXAXBXCXXXXDX		
127500180001		X13171808002	AFD DRIVE, 600V, IP21, 132KW, 134X2761, TR-200N132T7E21H2TGC7XXSXXXXXAXBXCXXXXDX		



Pre-Installation

Table 4. Components – close mount 575 volts (continued)

Kit Part Number	Mnemonic	Part Number	Description	QTY
127500190001		X13171808003	AFD DRIVE, 600V, IP21, 160KW, 134X2762, TR-200N160T7E21H2TGC7XXSXXXXAXBXCXXXXDX	
127500200001		X13171808004	AFD DRIVE, 600V, IP21, 200KW, 134X2763, TR-200N200T7E21H2TGC7XXSXXXXAXBXCXXXXDX	
127500210001		X13171808005	AFD DRIVE, 600V, IP21, 250KW, 134X2764, TR-200N250T7E21H2TGC7XXSXXXXAXBXCXXXXDX	
127500220001		X13171808006	AFD DRIVE, 600V, IP21, 315KW, 134X2765, TR-200N315T7E21H2TGC7XXSXXXXAXBXCXXXXDX	
127500230001		X13171818007	AFD DRIVE, 600V, IP21, 400KW, 134X2766, TR-200N315T7E21H2TGC7XXSXXXXAXBXCXXXXDX	
CONTROLS (one only)				
		NONE - UC800	Only for customers with existing UC800 controls	
		18800260100	UC800/TD7 upgrade Kit with arm	
		18800270100	UC800/TD7 upgrade Kit without arm	

Table 5. Components – remote mount 575 volts

Kit Part Number	Mnemonic	Part Number	Description	QTY	Package Label	Serviceable Component
Remote Mount Components						
127500090001	RNG02318	X13640734010	Choke Core	5	1K14, 1K15 Relays	
		531405110100	Core Support Bracket	1		
		531405470100	Buss Bar, Formed (for motor connection)	2		
		531405480100	Buss Bar, Straight (for motor connection)	1		
	BRD02944	X13650733060	Dual Relay output Ref 1A8 (latest revision)	1		
	HLD00579	X19220085030	HOUSING; 4 CKT TERM (Phoenix connector) for 1A8	2		
	RAL01142	X13260721020	Relay, 4PDT, 120VAC, 8amps	2		
		X13260722010	Relay Socket, 4PDT, Din rail mount	2		
		X13500224207	Din rail 4inch	2		
		X13491363010	Din Rail End Stop	4		
		SO-SVN048*-EN	KIT IOM (supplied by Trane)	1		
		507117830001	Schematics Printed on mylar	1		
		BAS-SVX54*-EN	Drive IOM	1		
		507118200001	AFD Label	1		
507118300001	Motor Terminal Shield	1				
VFD DRIVE (one only)						
127500170001		X13171808001	AFD DRIVE, 600V, IP21, 110KW, 134X2760, TR-200N110T7E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500180001		X13171808002	AFD DRIVE, 600V, IP21, 132KW, 134X2761, TR-200N132T7E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500190001		X13171808003	AFD DRIVE, 600V, IP21, 160KW, 134X2762, TR-200N160T7E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500200001		X13171808004	AFD DRIVE, 600V, IP21, 200KW, 134X2763, TR-200N200T7E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500210001		X13171808005	AFD DRIVE, 600V, IP21, 250KW, 134X2764, TR-200N250T7E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500220001		X13171808006	AFD DRIVE, 600V, IP21, 315KW, 134X2765, TR-200N315T7E21H2TGC7XXSXXXXAXBXCXXXXDX			Y
127500230001		X13171818007	AFD DRIVE, 600V, IP21, 400KW, 134X2766, TR-200N315T7E21H2TGC7XXSXXXXAXBXCXXXXDX			Y

Table 5. Components – remote mount 575 volts (continued)

Kit Part Number	Mnemonic	Part Number	Description	QTY	Package Label	Serviceable Component
CONTROLS (one only)						
		NONE - UC800	Only for customers with existing UC800 controls			
		18800260100	UC800/TD7 upgrade Kit with arm			
		18800270100	UC800/TD7 upgrade Kit without arm			
OPTIONAL PEDESTAL						
		507117990001	Optional AFD Drive Pedestal D1H Below 186 Amps	1	Drive Mount hardware - (label nuts and screws only)	
		507118180001	Optional AFD Drive Pedestal D2H 186 Amps - 366 Amps	1	Drive Mount hardware - (label nuts and screws only)	

Global Connector Harnesses

Figure 14. CAB01151 (39-inches) / CAB01153 (78-inches) global connector harness

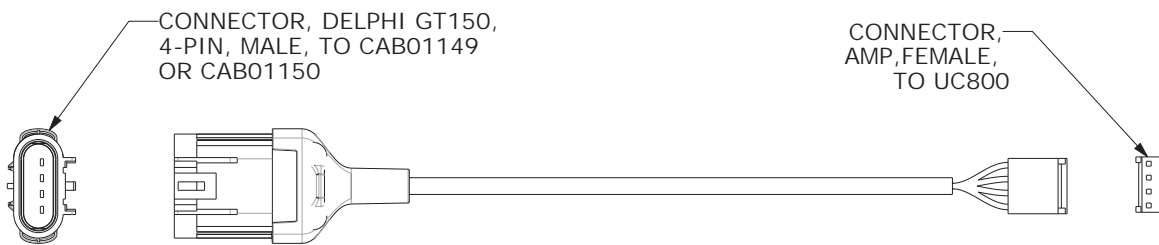


Figure 15. CAB01155 (39-inches) / CAB01534 (78-inches) global connector harness

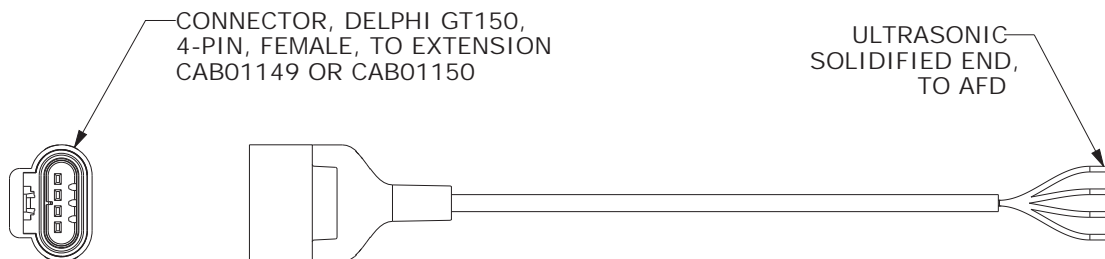
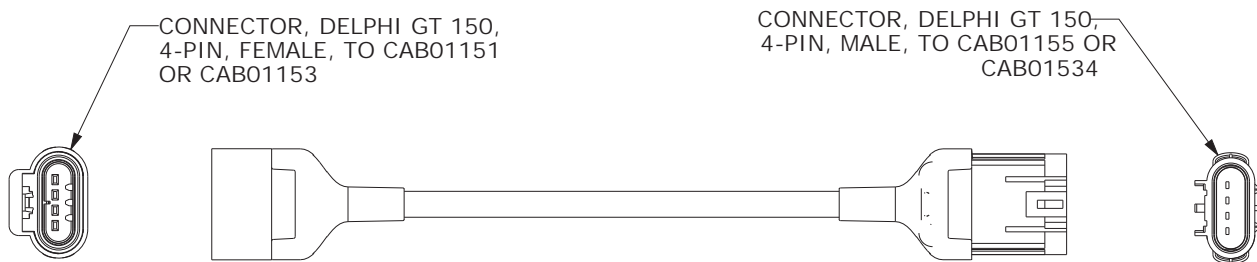


Figure 16. CAB01149 (39-inches) / CAB01150 (78-inches) global connector harness





Pre-Installation

Required Parts – NOT Supplied

- Modbus® cable (for remote or wall mount)

Because the distance varies with each application, Modbus connectors are not provided for remote and wall mount kits. The Modbus connection requires a unique connection type for the UC800 and a unique connection type for the AFD (listed above). The Global Connector Extension is used for spanning the rest of the wire distance between the panel and the AFD. Maximum length 250 feet.

NOTICE

Excessive Cable Lengths Between AFDR Drive and Compressor Motor!

Trane assumes no responsibility for equipment damage caused by use of improper cable lengths. The variable frequency drive industry recommends that the length of the electrical cables connecting a drive unit to a motor should be kept to less than 250 feet to protect the motor from reflected voltage waves that can cause the motor to fail. Cable lengths that exceed 250 feet between the drive and the motor create the potential for damage to occur to the motor windings and/or insulation.

- Global Connector Harness without Conduit
 - CAB01151 (39-inches) or CAB01153 (78-inches) for UC800 connection (See [Figure 14, p. 23.](#))
 - CAB01155 (39-inches) or CAB01534 (78-inches) for AFD connection (See [Figure 16, p. 23.](#))
 - CAB01149 (39-inches) and/or CAB01150 (78-inches) Global Connector Extension for variable distance between the control panel and AFD (See [Figure 16, p. 23.](#))

- Global Connector Harness with Conduit

Note: If conduit is required for Modbus wire, a shielded 16 gage wire pair can be used in lieu of global connectors. Use end connections from CAB01151 and CAB01149. See “[AFD Control Wire Connections](#),” p. 49 [Table 14.](#)

- OIL00315/317
- Oil filter (FLR01683)
- Cold filter (FLR01682)
- 3/8-inch anchor bolts

- Refrigerant
- Control wire and conduit for control power wiring
- 2-1/2-inch hole saw or punch

Gas Pump Replacement in Older RTHD Units (Optional)

For RTHD units manufactured prior to 2012, Trane recommends completing non-mandatory gas pump replacement per *Gas Pump Replacement RTHD/RTHC Installation Instructions* (RTHD-SVN01*-EN).

Preparation in DynaView™

Check the Configuration and Set-Points in the DynaView Display

1. Check the current configuration of the DynaView and confirm that all settings are correct. Make any necessary changes.
2. Check all of the current chiller setpoints programmed into the DynaView and confirm that they are all correct for the unit. Make any necessary changes.

Export the DynaView Configuration and Set-Points

Configuration and setpoint values must be saved from the DynaView control in order to successfully configure the upgraded UC800 controller. Using KestrelView™ on a PC or laptop computer:

1. Generate a Chiller Service Report from the DynaView with Level 4 active. To do this, click on **Reports Menu** and select **Chiller Service Report**.
2. Select all reports to ensure a complete report and convert the report to PDF. The PDF will be required to manually copy configuration and setpoint values with Tracer® TU after the Tracer AdaptiView™ display and UC800 are installed.
3. Verify that the PDF was printed. The PDF will be used when configuring the upgraded UC800 controller within Tracer TU.

After the configurations and settings from the CH530 DynaView controller have been saved to a file on your service computer, the controller change-out can proceed.

Figure 17. Select reports

Select reports	
<input checked="" type="checkbox"/> Chiller Status	<input checked="" type="checkbox"/> TechView Configuration
<input checked="" type="checkbox"/> Chiller Configuration	<input checked="" type="checkbox"/> PC Environment
<input checked="" type="checkbox"/> Chiller Setpoints	<input checked="" type="checkbox"/> Diagnostics
<input checked="" type="checkbox"/> LLID Binding	

Figure 18. KestrelView screenshot - accessing Chiller Service report

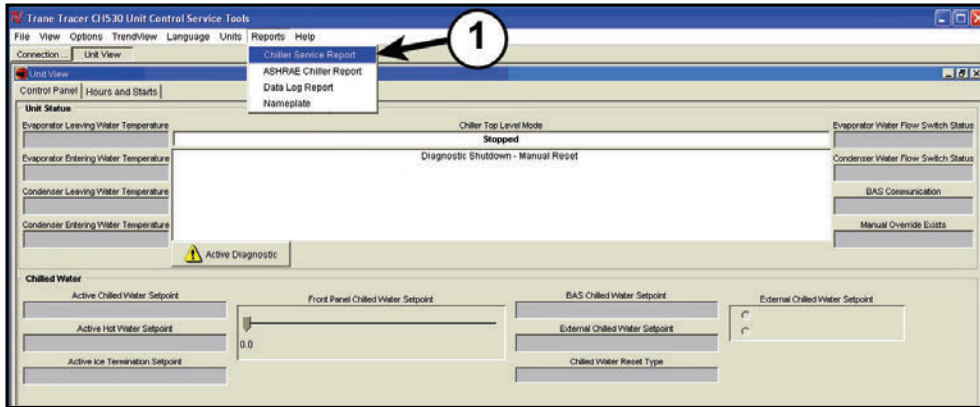


Figure 19. Chiller service report (example)

Wednesday, January 7, 2015
12:34:45 PM CST

Chiller Service Report

Prepared for: RTHD Example Report

Technician: RTHD Example Chiller

Chiller Name: RTHD Example Chiller

Model Number:

Confirm Code:

Serial Number:

Job Name: RTHD Example Report

Work Order Number: 123456789

Location:

Sales Office Name:

Sales Order Number:

Sales Office Address:

Sales Office Phone Number:

Customer Name:

Customer Address:

Customer Phone Number:

Notes:

Chiller Status

Chiller

Active Chilled Water Setpoint	3.17 °C	Evaporator Leaving Water Temperature	— °C
Active Chilled Water Setpoint Source	Front Panel	Chilled Water Pump Relay	On
Active Current Limit Setpoint	100.0 % RLA	Evaporator Water Flow Switch Status (Unfiltered)	No Flow
Active Current Limit Setpoint Source	Front Panel	Condenser Entering Water Temperature	— °C
Active Ice Termination Setpoint	-2.78 °C	Condenser Leaving Water Temperature	— °C
Active Ice Termination Setpoint Source	Front Panel	Condenser Water Pump Relay	Off
Evaporator Entering Water Temperature	— °C	Condenser Water Flow Switch Status	No Flow

Preparing Tracer® TU on the Service Computer

After this retrofit, the UC800 controller will communicate with the TR200 drive via a dedicated Modbus® client connection (independent of the IPC bus). A software upgrade is required to support this. The following steps detail how to obtain and install the necessary software onto the service laptop computer.

1. Tracer® TU service tool version 9.0.322 or newer is required to re-program the chiller's UC800. As of this printing, this version of Tracer TU is available for download

at: [Trane Commercial Downloads - DL-TU - TU-Software \(sharepoint.com\)](https://sharepoint.com).

2. If it is not already present, install this version of Tracer TU on the service computer.
3. After the correct version of Tracer TU is installed on the service computer, return to the same page (see link provided in [Step 1, p. 25](#)), and click the **UC800 Firmware** link.

In the screen that appears, click the **Latest Version : Download** link to download an EXE file. Run the application to select specific chiller products and install the correct software versions for that product.

Figure 20.

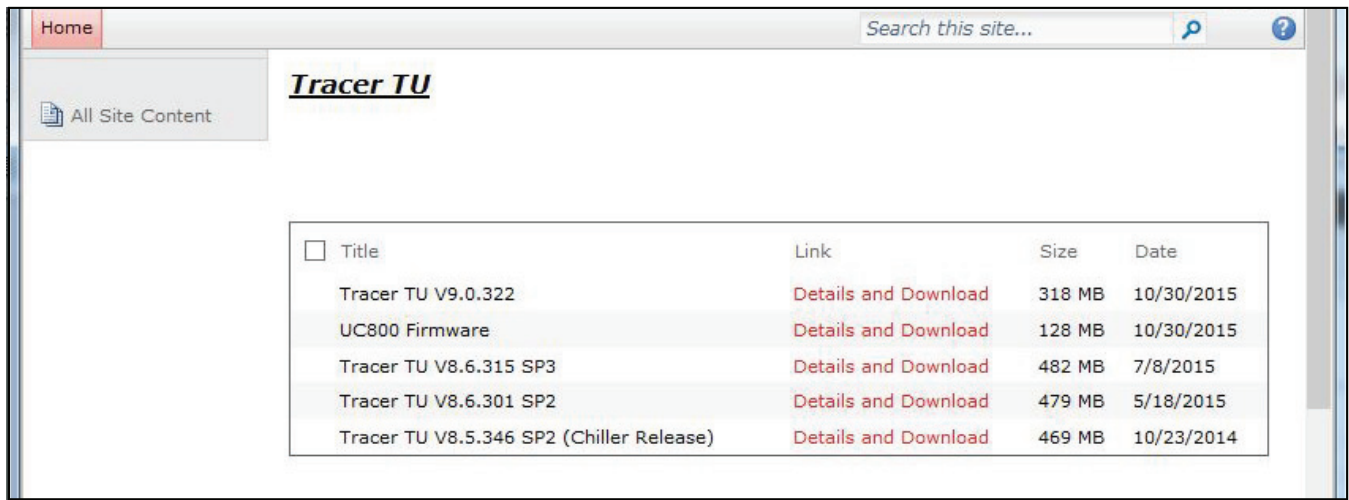


Figure 21.

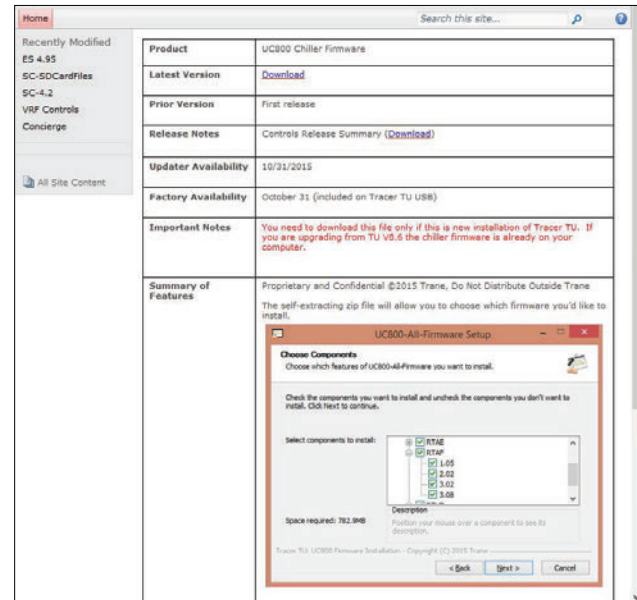
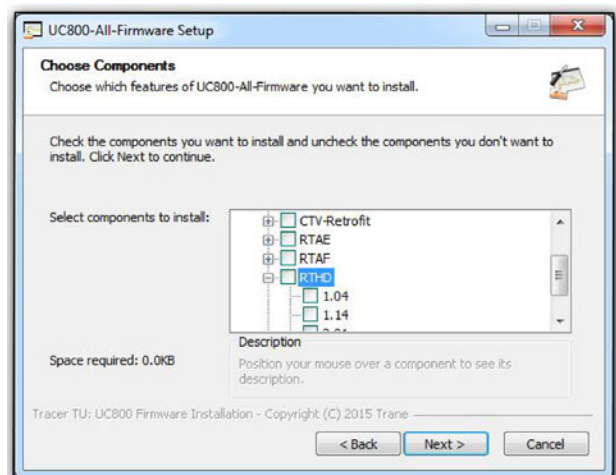


Figure 22.



Figure 23.

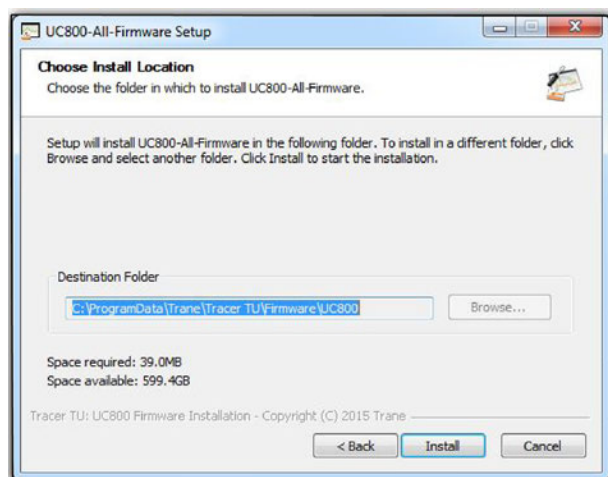


Important: Although it is possible to download all of the products and all of their versions, this is not advisable due to the size of the resulting download.

Note: In general, the latest versions of the various products will already be embedded and present in recent Tracer TU releases. This method is only required to obtain very recent releases for specific product firmware.

- The product firmware required for the AFDR is **RTHD: 3.03** (full software build part number: **6200 0624-3.xx**) or later. Version 3.03 is the first version of the RTHD firmware that supports Modbus® client communications between the UC800 and the TR200 AFD. Check the box for **RTHD: 3.03** and click **Next**.

Figure 24.



- Accept the default destination folder for proper installation into Tracer TU, and click **Install**. The selected code will now be placed into Tracer TU and can be downloaded into the UC800 controller of the RTHD AFDR when convenient.

Oil and Refrigerant Removal

⚠ WARNING

Refrigerant under High Pressure!

Failure to follow instructions below could result in an explosion which could result in death or serious injury or equipment damage.

System contains refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

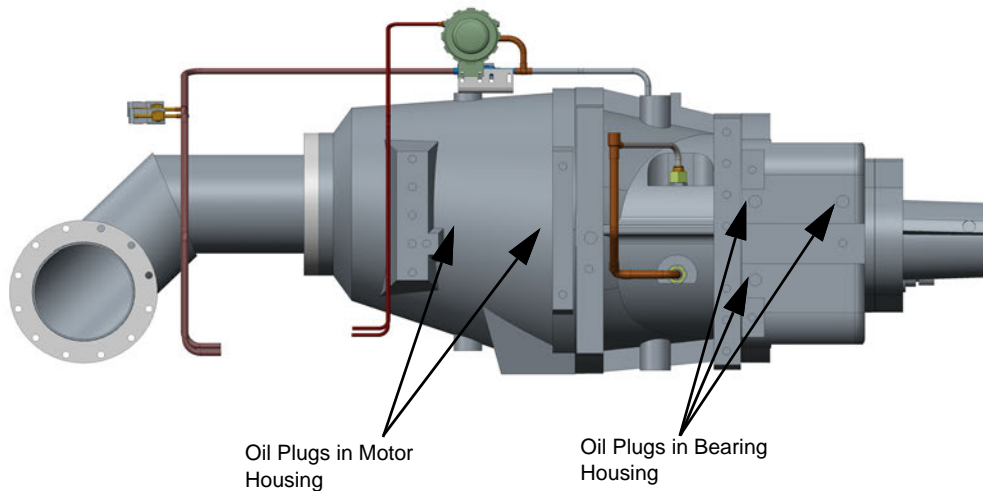
RTHD units with an AFD require a lower viscosity oil to operate. **With an AFD installed on an RTHD chiller, a minimum nominal oil viscosity of 110 cSt must be attained.** The existing oil (OIL00048) must be removed from the RTHD unit and replaced with the new oil (OIL00315/317) (not included) before operating with an AFD.

To attain the minimum nominal viscosity, at least 90 percent of the existing oil must be removed from the chiller; refer to chiller nameplate for original chiller oil charge. Both the oil filter (FLR01683) and cold filter (FLR01682) must be replaced and are not included with this upgrade. It is acceptable to change the oil to the new oil and still run the RTHD unit without the AFD installed, if it is more convenient to change to the new oil and operate the RTHD unit for a period of time before the AFD can be installed.

See [Figure 26, p. 30](#) in the following steps to reference valves locations by number.

Notes:

- Follow all manufacturer's recommendations for recovery equipment usage.
 - Keep all oil removed to measure the total amount of oil removed from the unit.
 - The replacement oil (OIL00315/317) and oil filters are NOT supplied with this upgrade and must be purchased separately.
- Connect hoses from recovery unit to chiller, configured to recover liquid refrigerant (Push-Pull/Mechanical Pump). Use 5/8-inch access valve on the evaporator or condenser (number 25 or number 19).
 - Open valves on chiller and start recovery machine. Complete the transfer of the liquid from the unit to the cylinder(s).
 - Once all of the liquid has been recovered, reconfigure the recovery unit for vapor by moving hose from liquid port to a vapor port to separate the refrigerant from the Solest 68 (OIL00048).
 - Recover vapor down to 0 psi.
 - Weigh and record the total amount of refrigerant removed from chiller.
 - Pressurize the evaporator to 2 psi nitrogen at the valve (number 30).
 - Pressurize the condenser to 2 psi nitrogen at the valve (number 13).
 - Drain the oil at the oil sump valve (number 7).
 - Energize the oil solenoid valve (number 40).
 - Pull the plugs under the gear housing on the compressor (three plugs total) and drain the oil.

Figure 25.


11. Pull the plugs under the motor housing on the compressor (one or two plugs total) and drain the oil.

Note: C-, D-, and E-frame compressors have two plugs; B-frame compressors have one plug.

12. De-energize the oil solenoid valve.

13. Change the oil filter (number 38; not insulated). Change the cold oil filter (number 48; insulation will need to be removed).

14. Perform pressure test.

15. Evacuate the unit to a minimum of 500 microns and perform a rise test.

16. Add the total oil charge according to [Table 6](#). Adding an AFD to the RTHD chiller requires more oil than the original factory configuration.

a. Add enough Solest 120 (OIL00315/317) to the oil filter (number 7) to fill the filter.

b. Add remaining total Solest 120 (OIL00315/317) charge at the oil sump (number 7).

Important: Be sure to either run the evaporator and condenser pumps when adding refrigerant to prevent freezing or verify that the water has been drained to prevent freezing tubes.

17. Compare amount of refrigerant removed in previous step to the nameplate charge. Charge appropriately at evaporator (number 25) according to the table for units with an AFD. Add refrigerant as needed to ensure the unit is fully charged.

Important: Oil charges shown in [Table 6](#) are for new RTHD chillers with AFD; when retrofitting existing RTHD chillers with AFD, increase oil charge shown in [Table 6](#) proportionately based on how much oil was extracted during oil removal process.

18. At the oil sump, apply provided oil label sticker listing the new oil, OIL00315.

Table 6. Oil type and oil charge for RTHD chillers with AFD

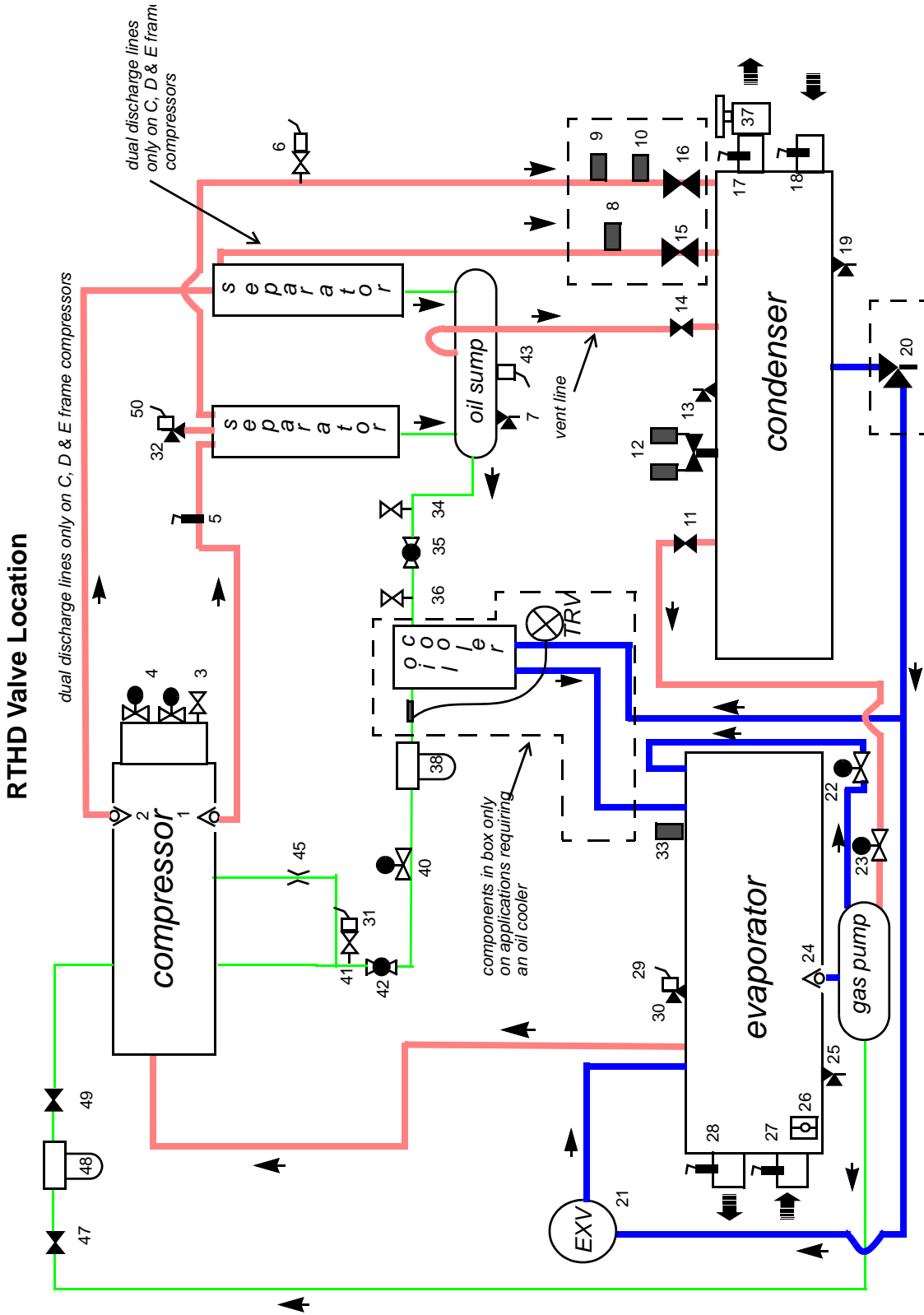
Unit Configuration ^(a)	B1B1B1	B1C1D1	B2B2B2	B2C2D2	C1D5E4	C1D6E5	C1E1F1	C2D3E3
Oil Type	Solest 120 (OIL00315/317)							
Oil Charge, gal	7.5	7.5	7.5	7.5	10	10	11	10
Oil Charge, L	28.5	28.5	28.5	28.5	38	38	42	38

Unit Configuration ^(a)	C2D4E4	C2F2F3	D1D1E1	D1F1F2	D1G1G1	D1G2G2	D2D2E2	D2F2F3
Oil Type	Solest 120 (OIL00315/317)							
Oil Charge, gal	10	12	9.5	11	13.5	13.5	9.5	11
Oil Charge, L	38	45.5	36	42	51	51	36	42

Unit Configuration ^(a)	D2G2G1	D2G3G3	D3D2E2	D3F2F3	D3G2G1	E3D2E2	E3F2F3	E3G2G1
Oil Type	Solest 120 (OIL00315/317)							
Oil Charge, gal	13.5	13.5	9.5	11	13.5	9.5	11	13.5
Oil Charge, L	51	51	36	42	51	36	42	51

(a) Unit configuration digits 1, 2 = compressor code (also shown in unit model number digits 6, 7); digits 3, 4 = evaporator code (unit model number digits 14, 15); digits 5, 6 = condenser code (unit model number digits 21, 22).

Figure 26. Component locations



Installation

⚠ 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.

Shut Down Power

1. Using lockout/tagout safety procedures, shut down the chiller's main power.
2. Open all starter and control panel disconnect switches and secure them in the open position.
3. Confirm that the power is off to the control panel of the chiller.

Vibration Mitigation - Line Weights Kit for Oil Separator Discharge Lines

The addition of an Adjustable Frequency Drive (AFD) on RTHD chillers may result in vibration resonance at low frequencies on the oil separator discharge line(s). Line weights are added to mitigate this vibration.

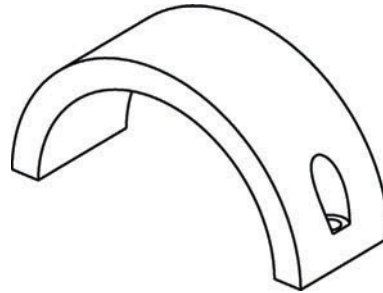
RTHD ADF Line Weight Kit

Table 7. Line weight kit 017500010100

Component	Mnemonic Number	Description	Quantity
Clamp	CMP01430	Clamp, Line Weight	4
Screw	SCR02687	M6 x 30MM, SCH CAP	4

Each line weight is comprised of two individual clamps.

Figure 27. Individual clamp (two required for each line weight)



Installation Instructions

Chillers with B-Frame Compressor Size

- Number of oil separator discharge lines: 1
- Number of kits required: 1

Install 2 weights (4 clamps) on the single oil separator discharge line as shown in figure below.

- Install on the **candy cane** line between the oil separator and the condenser.
- Mount just below the weld or on any smooth surface in that area.

Figure 28. Line weight installation location – B-frame compressors

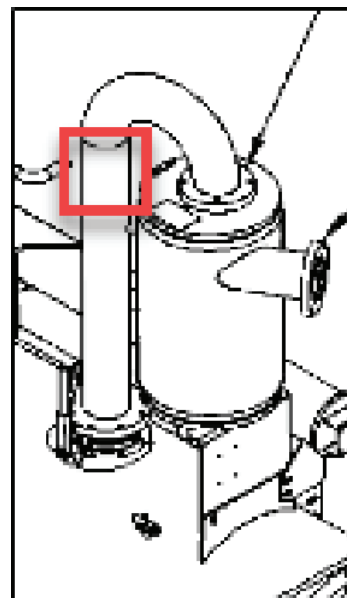


Figure 29. Line weight installation location – B-frame compressors



Chillers with C, D, or E-Frame Compressor Size

- Number of oil separator discharge lines: 2
- Number of kits required: 2

Install 2 weights (4 clamps) on EACH of the two oil separator discharge lines as shown in figure below.

- Install on the **candy cane** line between the oil separator and the condenser.
- Mount just below the weld or on any smooth surface in that area.

Figure 30. Line weight installation location – C, D, or E-frame compressors

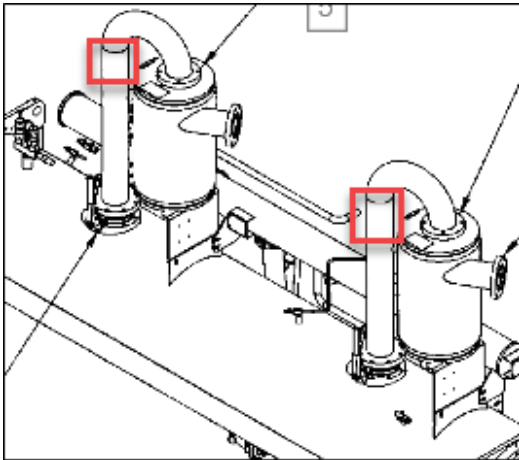
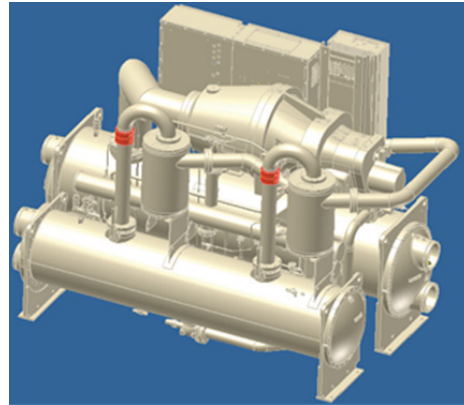


Figure 31. Line weight installed on C, D, or E-frame compressors



RTHD Tracer[®] AdaptiView[™] UC800 Controls Upgrade

If there is an existing CH530 controller, the Tracer AdaptiView RTHD rotary chiller display upgrade kit (RCDA) must be installed. Refer to RCDA - Tracer AdaptiView[™] Display Upgrade Kit RTHD Rotary Chiller Installation Instructions (SO-SVN030*-EN) before installing the AFDR drive.

If the RTHD to be retrofitted to AFD already has a UC800 Tracer AdaptiView controller, that can be reused.

Important: Regardless if it is new or existing, the UC800 must have a software upgrade to support the AFDR. For more information, refer to “UC800 Software Installation and Configuration,” p. 50.

AFDR Kit Identification

- Close Mount Kit 1 has two power wire harnesses
- Close Mount Kit 2 has four power wire harnesses
- Remote Mount Kit 3 has NO power wire harnesses or Modbus[®] cables

Note: The Modbus wiring for the remote mount option must be purchased separately; refer to “Required Parts – NOT Supplied,” p. 24 for part numbers to determine the lengths needed. Purchase appropriate lengths for the distance required to wire to the AFD.

Panel Component Removal

⚠ WARNING

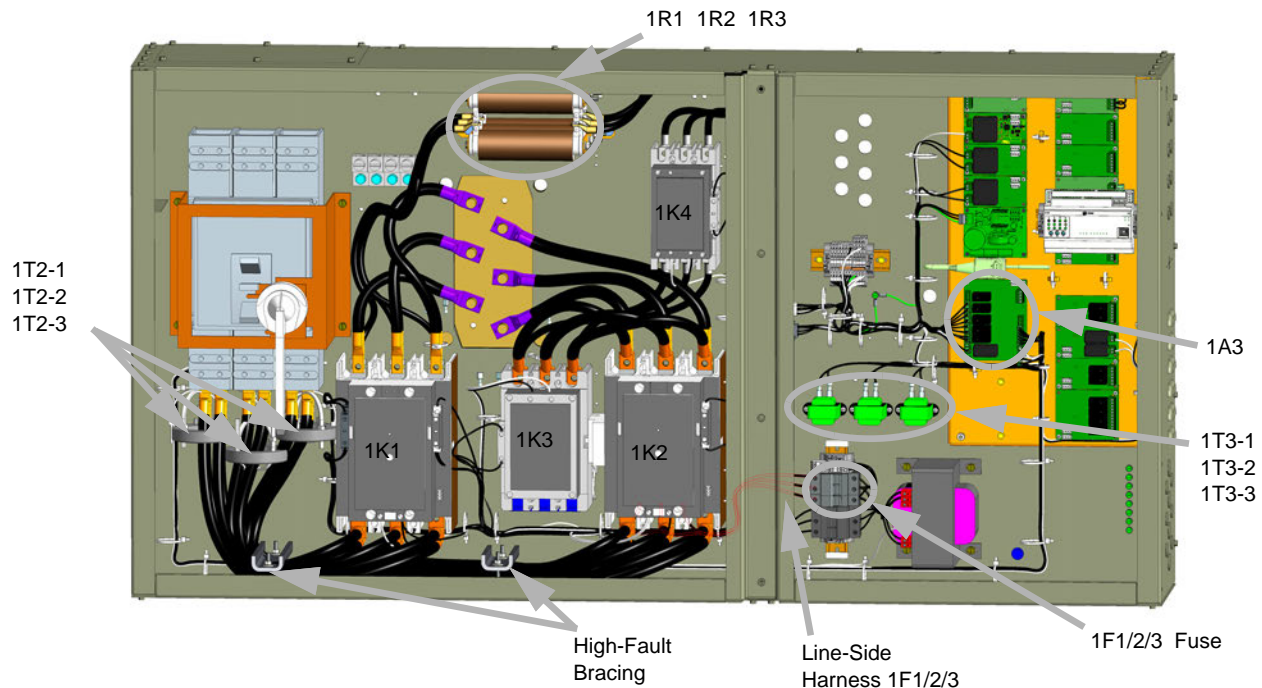
Hazardous Voltage w/Capacitors!

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.

Wye-Delta Panel

Note: For solid state starter panels, see ["Solid State Starter Panel," p. 35.](#)

Figure 32. Wye-delta component locations



1. Remove and discard high-fault bracing.

⚠ WARNING

Backup Wrench Required!

Failure to follow instructions below could result in death or serious injury. Use backup wrench to prevent twisting/stress on motor terminals when installing and removing wire or buss bars from terminals and inspect terminals to ensure that they are not damaged. Motor terminals are ceramic and, if cracked, could create an electrical hazard when power is restored.

2. Remove and discard power wire from breaker/terminal, contactors, and motor terminals.
Note: Be sure to save motor terminal nuts for installation.

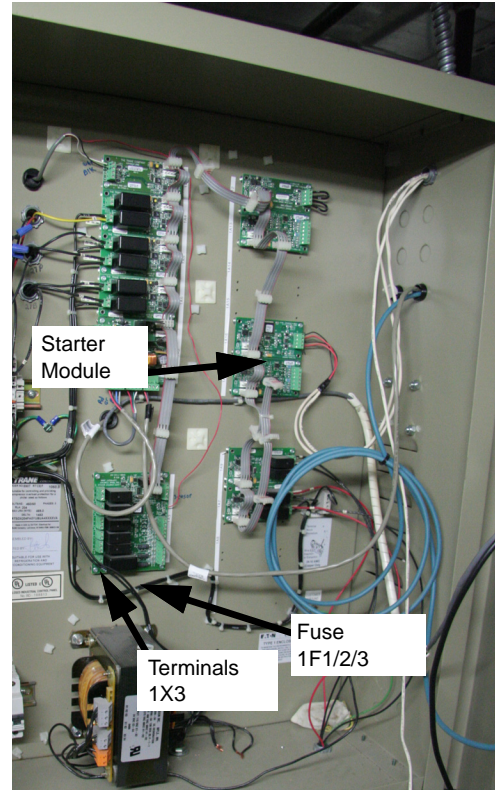
Figure 33. Use backup wrench when removing wire or buss bars from motor terminals



3. Remove and discard 1F1/2/3 line side harness.
4. Remove and discard contactors: 1K1, 1K2, 1K3, and 1K4.
5. Remove and discard resistors: 1R1, 1R2, and 1R3.
6. Remove and discard current transformers: 1T2-1, 1T2-2, and 1T-31.
7. Remove and discard (if applicable) under/over voltage transformers: T3-1, 1T3-2, and 1T3-1.
8. Remove and discard terminals 1X3.
9. Remove and save Fuse 1F1/2/3 for later use; refer to [Figure 34](#) and [Figure 38](#).
Note: This fuse will be rated at 5 amps (380 to 415 volts) and 4 amps (460 volts).
10. Remove starter module 1A3.

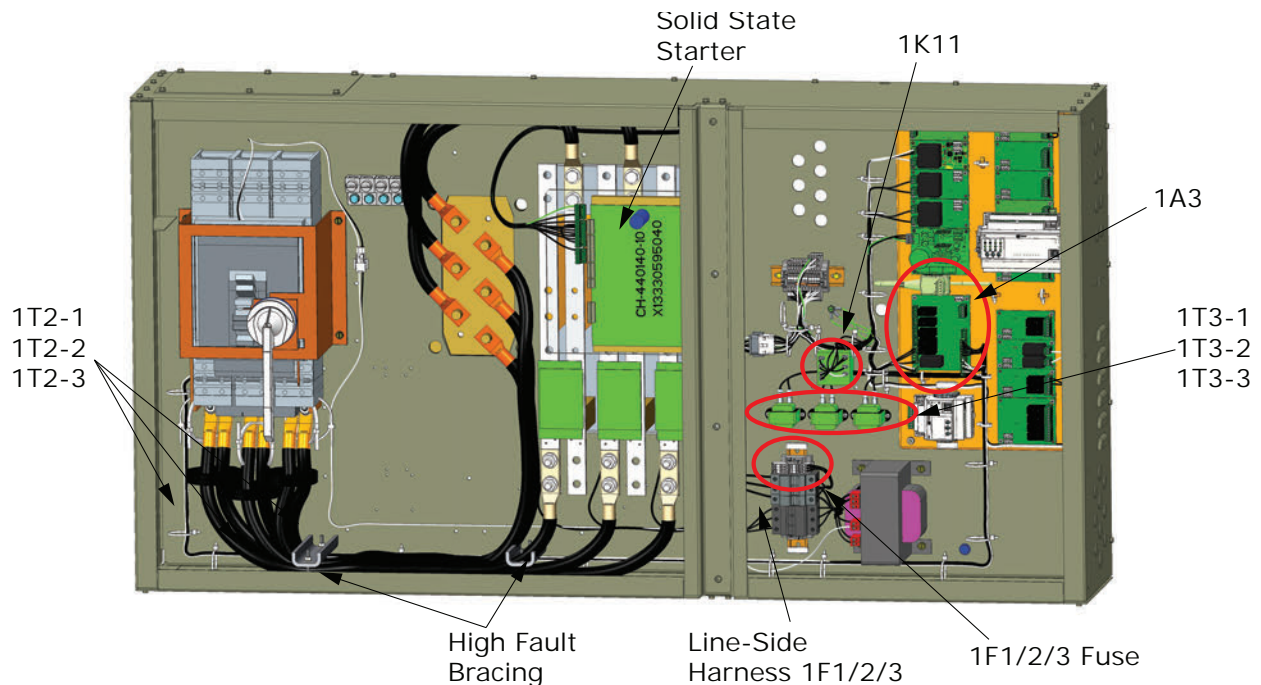
Note: The liquid level red power wire (64A) is connected to J3 Pin 1 of the starter module. This will be connected to the power supply 1A2. Refer to "Panel Control Wiring," p. 47.

Figure 34. Starter module location



Solid State Starter Panel

Figure 35. Solid state starter component locations



1. Remove and discard high-fault bracing.

⚠ WARNING

Connection Leaks!

Failure to follow instructions below could result in damage to the coil header and cause connection leaks. Use a backup wrench when attaching piping to coils with copper headers. Do not use brass connectors because they distort easily.

2. Remove and discard power wire from breaker/terminal, contactors, and motor terminals. See [Figure 33, p. 34](#) for use of backup wrench.

Note: Be sure to save motor terminal nuts for installation.
3. Remove and discard 1F1/2/3 line side harness.
4. Remove relay 1K11.
5. Remove and discard current transformers: 1T2-1, 1T2-2, and 1T3-1.
6. Remove and discard (if applicable) under/over voltage transformers: T3-1, 1T3-2, and 1T3-1.
7. Remove and discard terminals 1x3.
8. Remove and save Fuse 1F1/2/3 for later use.

Note: This fuse will be rated at 5 amps (380 to 415 volts) and 4 amps (460 volts).
9. Remove starter module 1A3.

Note: The liquid level red power wire (64A) is connected to J3 Pin 1 of the starter module. This will be connected to the power supply 1A2. Refer to [“Panel Control Wiring,” p. 47.](#)

10. Remove solid state starter module. See [Figure 34, p. 34.](#)

Panel Preparation – Close Mount (Kit 1 – 2 conduit)

If using a remote mount or wall mount option with field-provided power wire and conduit, skip to [“Panel Component Installation \(All Kits\),” p. 37.](#)

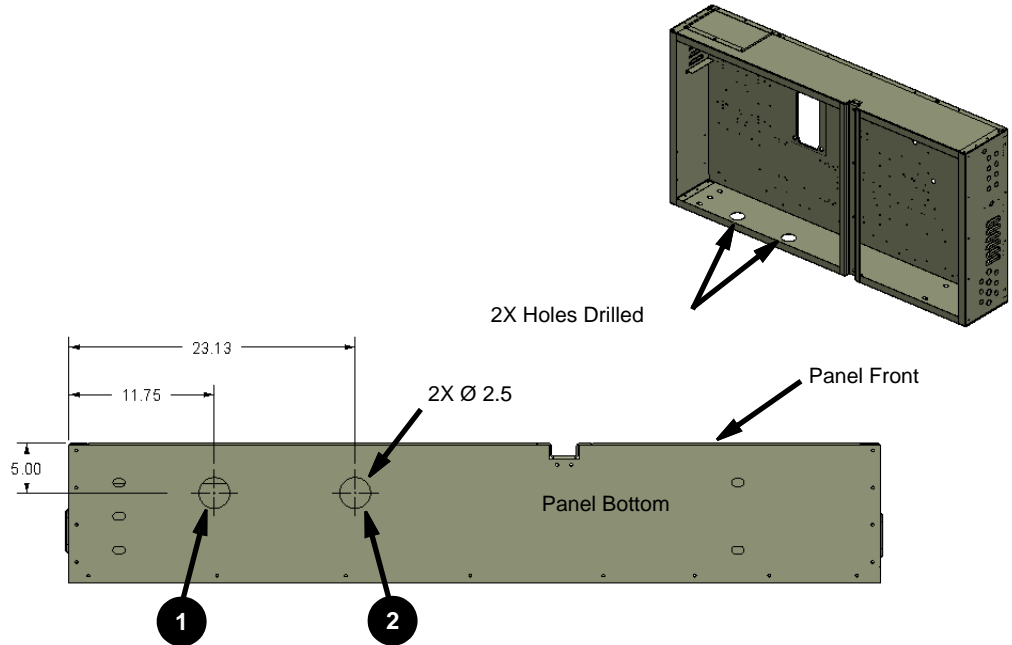
Refer to [Figure 36](#) during the following procedure.

1. Drill two 2.5-inch diameter holes at Location 2 and Location 4, as shown in [Figure 36](#). These holes will be used to route the power wire which connects the unit to the AFD.

Notes:

- Test-fit the 2.5-inch conduit fittings at the locations to ensure the conduit and or fitting will not interfere with the unit evaporator and or panel before drilling holes.
- Depending on the unit's evaporator size the holes may be located further inward than specified without interference between conduit and evaporator. Locating the holes further inward will aid in harness installation later. Before drilling, make sure conduit and fittings will not interfere with evaporator or panel door.

Figure 36. Conduit hole locations



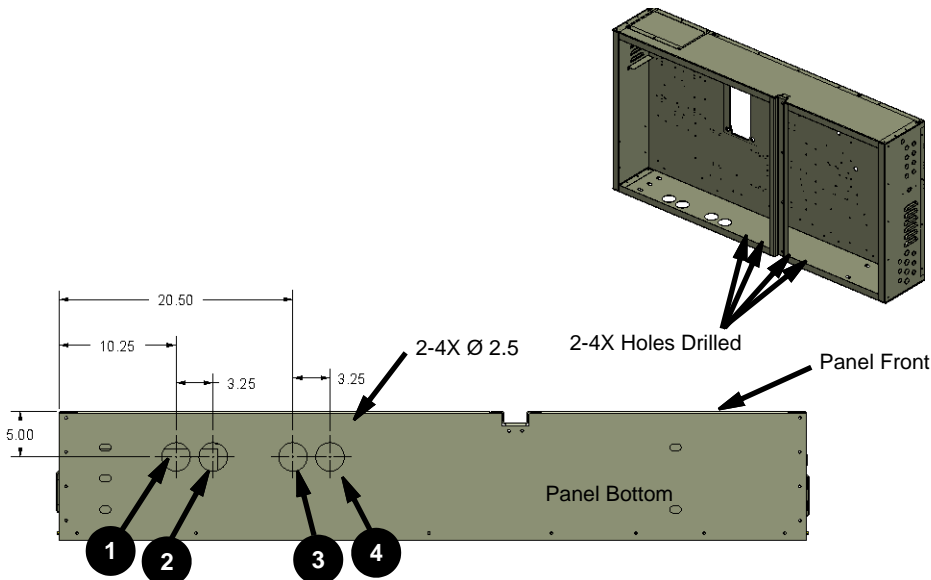
Note: See “Dimensions,” p. 9 for conduit location dimensions.

Panel Preparation – Close Mount (Kit 2 – 4 conduit)

Refer to Figure 37 during the following procedure.

2. Drill four 2.5-inch diameter holes at Locations 1– 4, as shown in Figure 37. These holes will be used to route the power wire which connects the unit to the AFD.

Figure 37. Power conduit hole locations



Notes:

- Test-fit the 2.5-inch conduit fittings at the locations to ensure the conduit and or fitting will not interfere with the unit evaporator and or panel before drilling holes.
- Depending on the unit’s evaporator size the holes may be located further inward than specified without interference between conduit and evaporator. Locating the holes further inward will aid in harness installation later. Before drilling, make sure conduit and fittings will not interfere with evaporator or panel door.

Note: See “Dimensions,” p. 9 for conduit location dimensions.

Panel Component Installation (All Kits)

Install the following components listed in [Table 8](#) at the approximate locations as shown in [Figure 38](#).

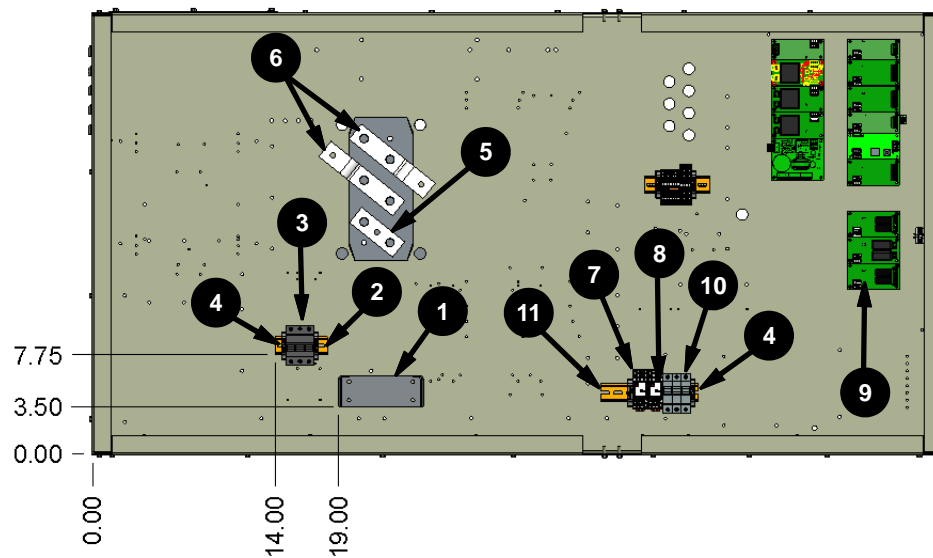
Table 8. AFD panel component installation

Index	Description	Qty
1	SUPPORT, CHOKE CORE	1
2	DIN RAIL, 4 in.	1
3	FUSE HOLDER, 1F1-1F3 – REUSE (4 to 5 amp)	1
4	DIN RAIL END-STOP	4
5	BUSS BAR, STRAIGHT	1
6	BUSS BAR, FORMED	2
7	RELAY SOCKET, 4PDT (for relays 1K14 and 1K15)	2
8	RELAY, 4PDT, 8A (relays 1K14 and 1K15)	2
9	Dual Relay Output 1A8	1
10	FUSE HOLDER, 1F4-1F6 – REUSE (6 to 10 amp)	1
11	DIN RAIL, 7.5 in. REUSE	1

43

Note: Items 3, 10, and 11 already exist and are re-used.

Figure 38. Panel component installation locations



Installation

1. Install choke core support bracket (1) using 6 mm thread rolling screws (13) so that is centered between the motor terminals.

Figure 39. Choke core support bracket



2. Install 4-inch din rail (2) using 6 mm thread rolling screws (13).
3. Locate the 1F-1F3 fuse (3) (refer to [Figure 34](#) and [Figure 38](#)), and install on 4-inch din rail (2).
4. Install din rail end-stops (4) on din rail (2).

Figure 40. Din rail/1F1-1F3 fuse install



⚠ WARNING

Backup Wrench Required!

Failure to follow instructions below could result in death or serious injury. Use backup wrench when installing and removing wire or buss bars from motor terminals and inspect terminals to ensure that they are not damaged. Motor terminals are ceramic and, if cracked, could create an electrical hazard when power is restored.

5. Install motor terminal buss bars (5/6). Torque to 40 ft.-lb.

Note: Motor terminal buss bars must be flush on motor terminal connection points; refer to [Figure 41](#).

Figure 41. Correct and incorrect motor terminal buss bar installation

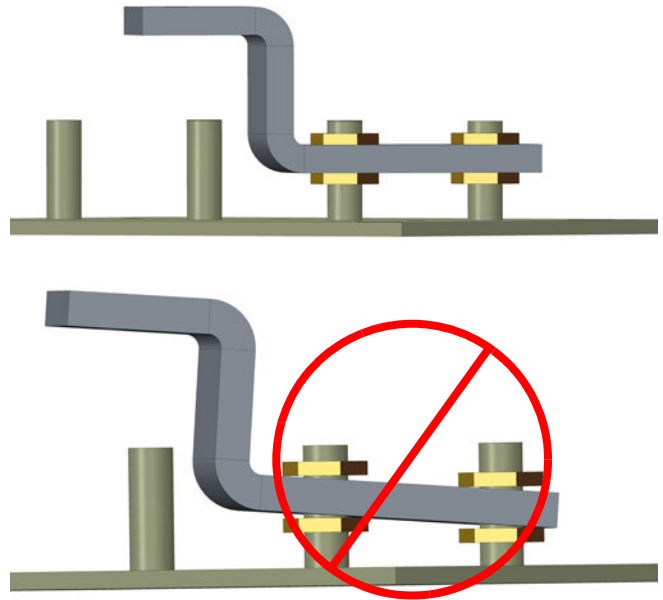
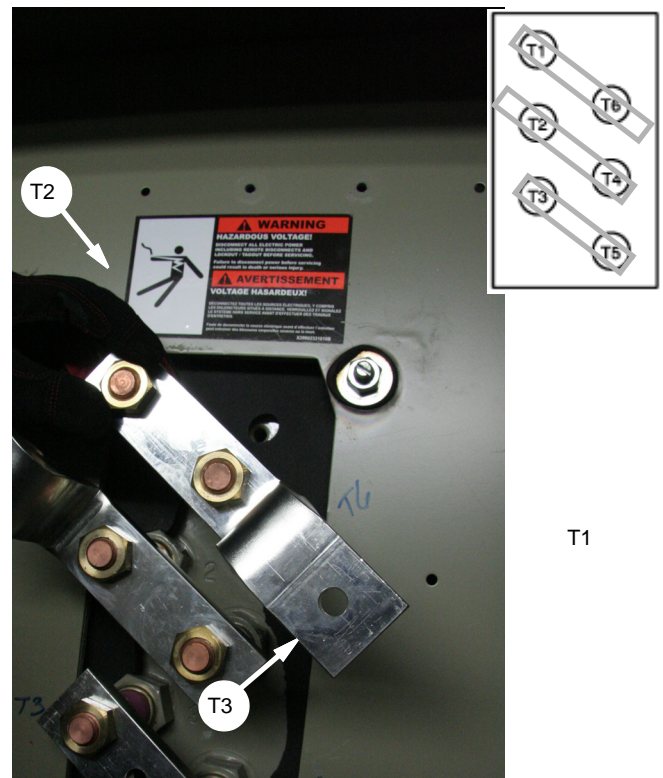


Figure 42. Installed motor terminal buss bars; inset shows buss bars over original terminals



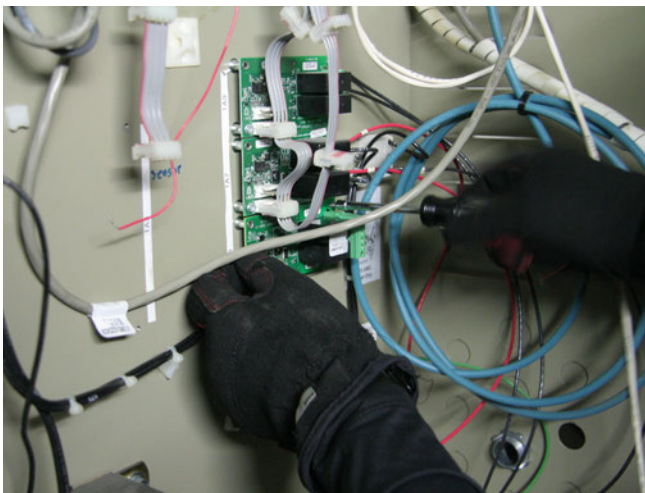
- Install 1K1 and 1K2 relay sockets and relays (8/9) on existing 7.5-inch din rail (10) where Fuse 1F1/2/3 was removed.
- Install din rail end-stops (4) on din-rail (10).

Figure 43. 1K1, 1K2 relay socket



- If not already installed, install dual relay output 1A8 (12).

Figure 44. Dual relay 1A8 install



- Remove all metal chips and shavings from inside the panel, and remove any loose debris, wires, or parts.

Conduit Support and Conduit Installation (Kit 1 and Kit 2)

- Assemble and install the supplied strut channel; refer to [Figure 45](#) and [Figure 46](#).

Note: Make sure the position of the strut channel does not interfere with panel door opening. Strut channel may need to be cut to height (anchor bolts and impact drill for concrete).

Figure 45. Strut channel assembly

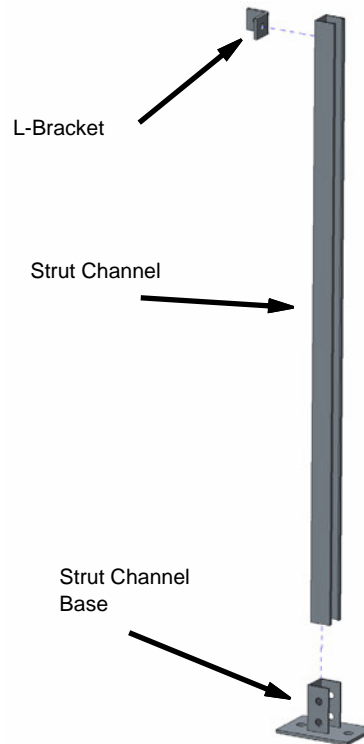
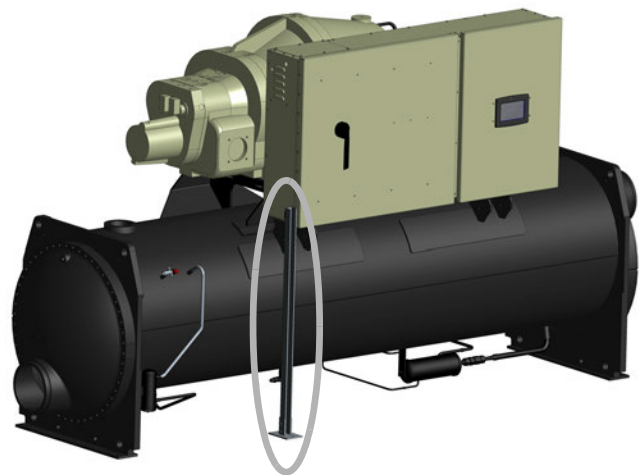


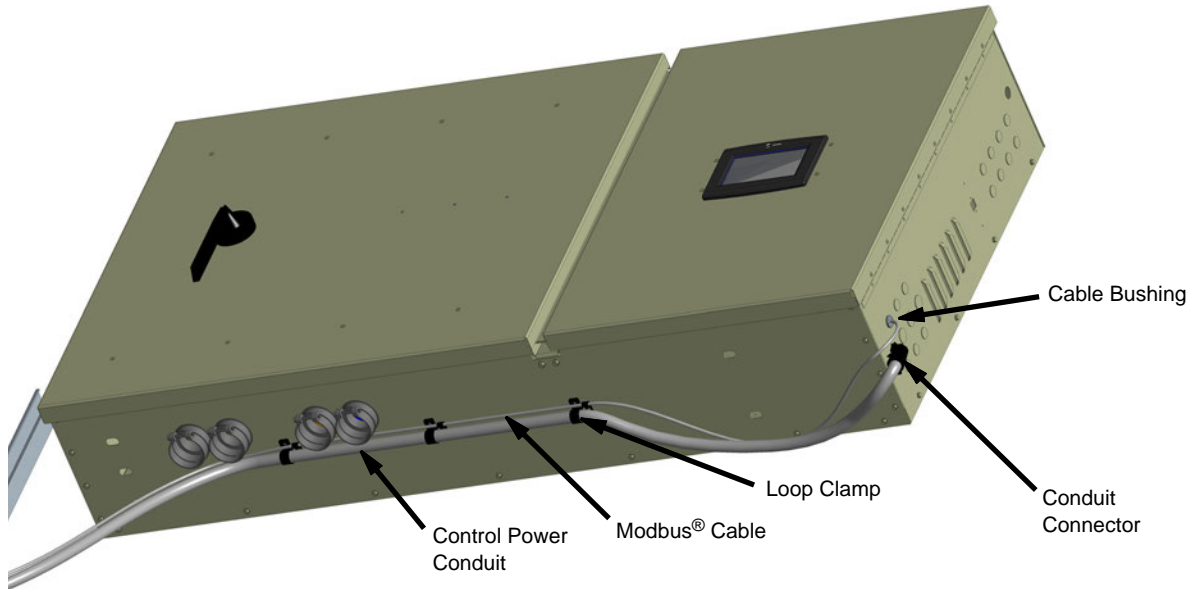
Figure 46. Strut channel installed



- Route control wire and Modbus[®] cable along the bottom side of panel and secure with provided loop-clamps; refer to see [Figure 47](#).

Note: Be sure to leave enough wire length to route wire inside the control panel and the AFD and reach the termination points.

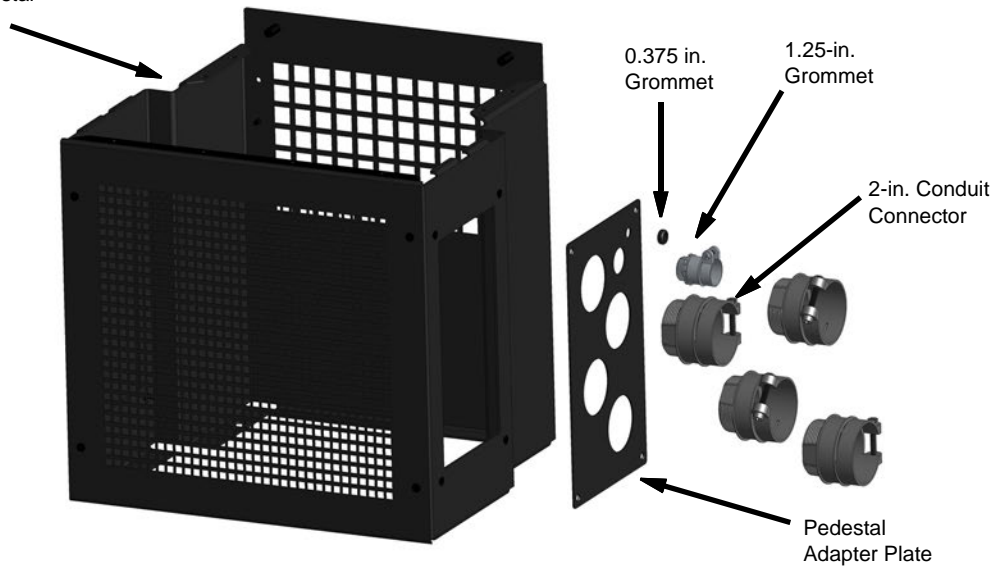
- Cut four 16 AWG wires to the appropriate lengths and route through the 3/4-inch conduit.

Figure 47. Control cable


4. Remove pedestal adapter plate and install 2-inch and 3/4-inch conduit connectors and 3/8-inch grommet; refer to [Figure 48](#).

Figure 48. Pedestal

Drive Pedestal



5. Install power wire conduit into conduit connectors, and secure conduit to strut channel with provided clamps.

Figure 49. Modbus® cable and control power mounting



Figure 51. Adaptor plate assembly



Figure 50. Conduit connector assembly



7. Install the power wire conduits to the strut channel using supplied brackets.

Figure 52. Power wire conduit mounting



6. Install pedestal adaptor plate to the pedestal.

Drive Installation – Pedestal Mount (All Kits)

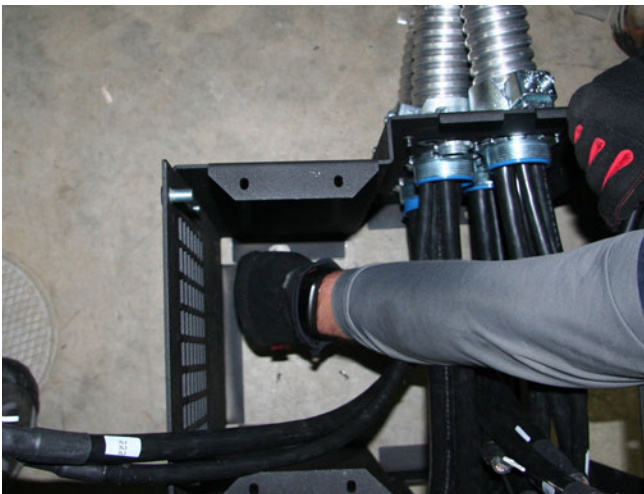
Important:

- For wall mount option, follow instructions for remote wall in TR200 New D-Frame, 110–400kW Operating Instructions (BAS-SVX54*-EN).
 - See “Drive Dimensions,” p. 15 and “Pedestal Drawings,” p. 17 or drive mounting dimensions.
 - See Figure 8, p. 15 or Figure 10, p. 16 for wall mount dimensions.
1. Determine the desired location for the drive and position the pedestal in place.
 2. Temporarily route power wire conduit to desired drive pedestal location to check for any routing issues.

Figure 53.



3. Mark the locations for the anchor bolts using the bottom slots of the pedestal for a template.



4. Drill the four required holes for the anchor bolts and install the 3/8-inch anchor bolts.

Figure 54.



Figure 55.



Figure 56.



Recommended Rigging and Lifting Procedures for AFDR Drive Units

⚠ WARNING

Heavy Objects!

Failure to follow instructions below or properly lift unit could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and equipment or property only damage.

- Equipment is top heavy. Use caution when lifting/moving equipment to prevent unit from tipping.
- Ensure that all the lifting equipment used is properly rated for the weight of the unit being lifted. Each of the cables (chains or slings), hooks, and shackles used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables (chains or slings) may not be of the same length. Adjust as necessary for even unit lift.
- The high center of gravity on this unit requires the use of an anti-rolling cable (chain or sling). To prevent unit from rolling, attach cable (chain or sling) with no tension and minimal slack around compressor suction pipe as shown.
- Do not use forklift to move or lift unit unless unit has lifting base with.

⚠ WARNING

Improper Unit Lift!

Failure to properly lift unit in a LEVEL position could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and equipment or property-only damage.

Test lift unit approximately 24 inches (61 cm) to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level.

Unit Lifting Points – Preferred Lifting Method

- The preferred method for lifting an AFDR drive unit to position it for installation is to use an identical individual hoisting device at each lift point.

Figure 57. Preferred lifting method using two identical individual hoists



Unit Lifting Points – Alternative Lifting Method

- If it is only possible to use a single hoisting device to lift an AFDR drive unit to position it for installation, a spreader bar should be used to allow adjusting the rigging as necessary to balance the unit around its center-of-gravity to ensure full control of the unit during lifting.

Figure 58. Alternative lifting method using a single hoist and spreader bar



Table 9. AFDR unit weights and heat rejection (460V/480V)

460V/480V Catalog Max Amps	158 Catalog/190 Maximum	200 Catalog/240 Maximum	252 Catalog/302 Maximum	301 Catalog/361 Maximum	369 Catalog/443 Maximum	446 Catalog/535 Maximum
Weight (lb)	135	135	135	275	275	275
Heat Rejection (BTU/hr)	7708	9286	12370	12161	15566	19477

Table 10. AFDR unit weights and heat rejection (575V/600V)

575V/600V Catalog Max Amps	109 Catalog/131 Maximum	129 Catalog/155 Maximum	160 Catalog/192 Maximum	202 Catalog/242 Maximum	242 Catalog/290 Maximum	287 Catalog/344 Maximum	333 Catalog/400 Maximum
Weight (lb)	135	135	135	275	275	275	275
Heat Rejection (BTU/hr)	5939	7168	9037	10488	12701	15232	17154

Line Voltage

⚠ 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.

AFD Mounting – Pedestal Installation (All Kits)

1. Remove the front cover of the pedestal base for easy access to power wires. Using safe lifting practices and keeping the wires inside the drive enclosure, carefully lower the drive onto the pedestal base.

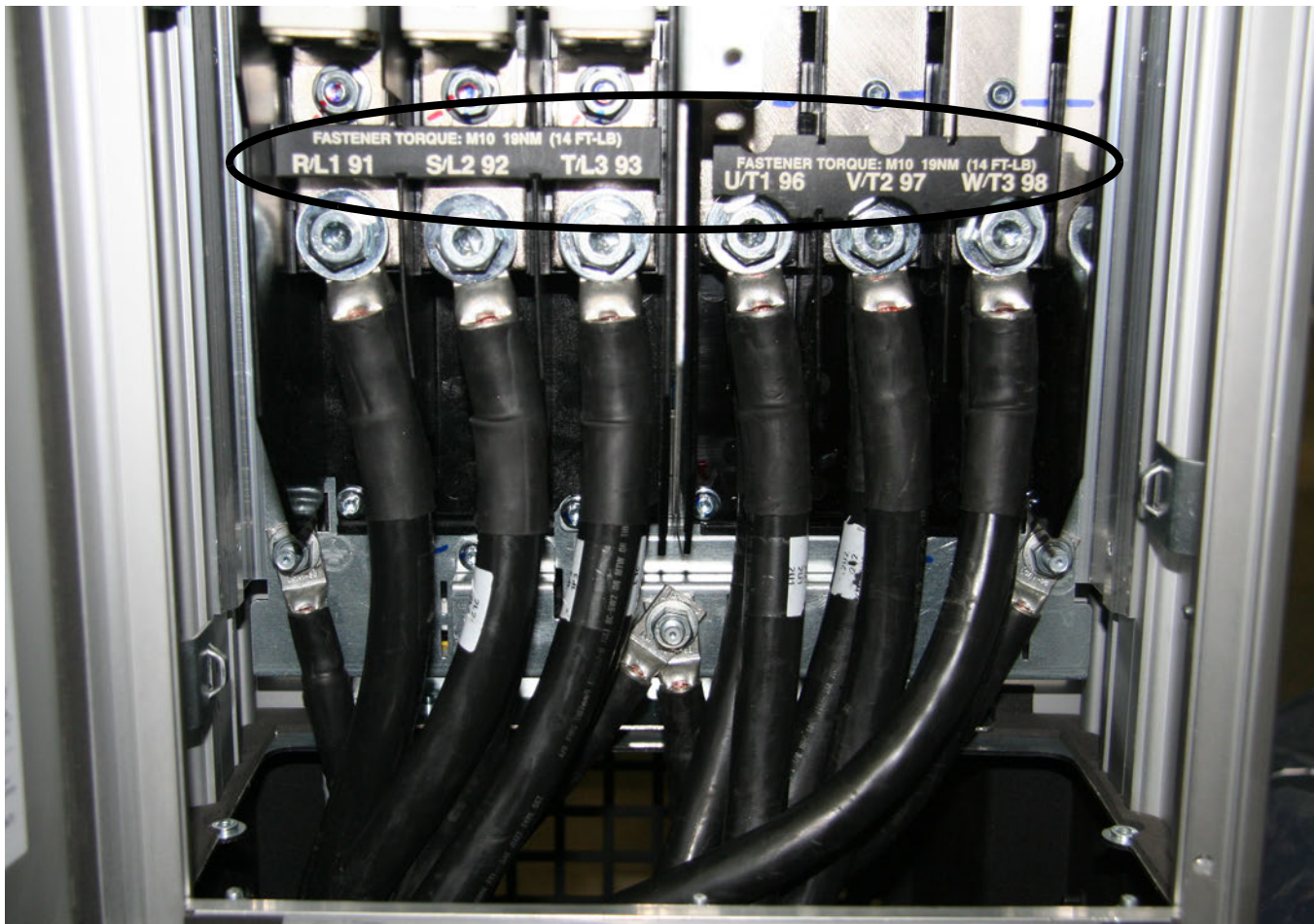
Figure 59.


2. After lowering the drive onto the pedestal, securely fasten the drive to the base at all connection points at the front and back of the base.

Figure 60.


3. Connect all power wire and dedicated ground wire to the drive according to the supplied schematics. AFD termination location allows 2 wires per phase.

Figure 61.



4. Replace the front panel of the pedestal base.

Figure 62.



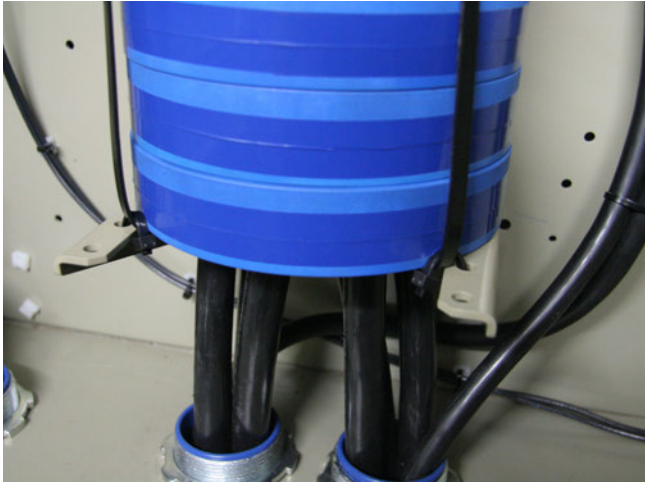
Panel Power Wiring

NOTICE

Compressor Damage!

Before connecting power wire to the motor terminals, with the motor terminal jumpers removed, verify proper phasing between the drive and motor terminals with an Ohmmeter for all connections. Improper phasing occurs between the drive and motor terminals can cause compressor damage.

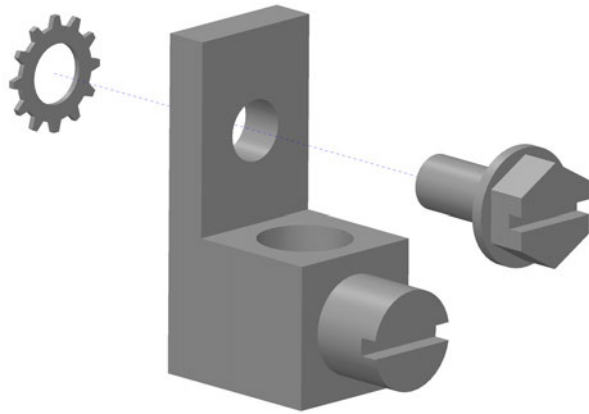
5. After verifying proper phasing between the drive and motor terminals with an Ohmmeter, install power wire at the breaker/terminal according to the provided schematics. Refer to [Figure 42, p. 38](#) to confirm phase designations.
6. Output wire from the drive to the motor terminals needs to be routed through the center of the provided cores. Install power wire at the motor terminals according to the provided schematics.

Figure 63.


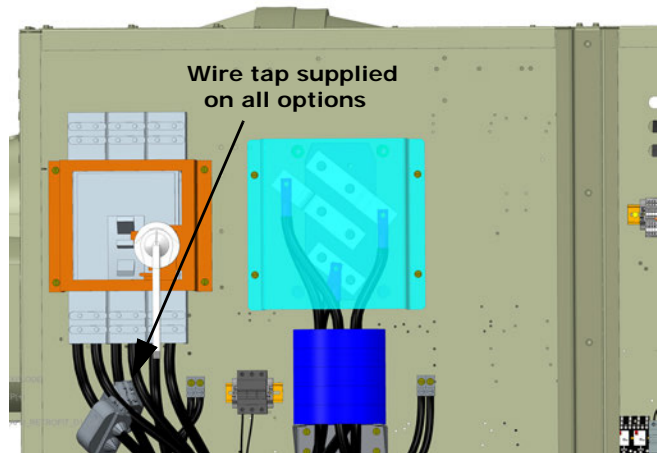
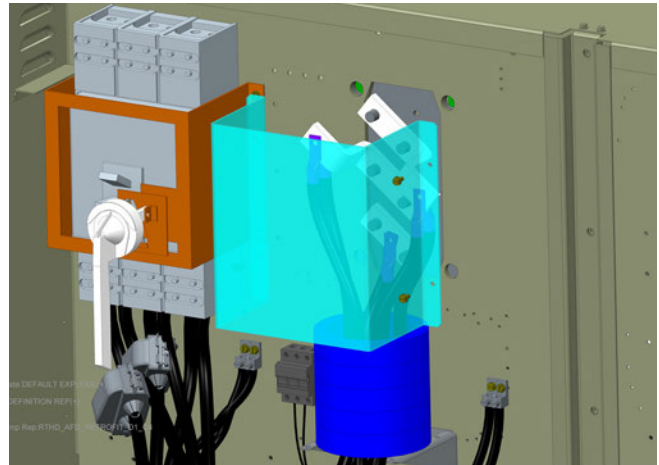
7. Use provided tie wraps to secure the cores to the core bracket and use tie wraps to keep the power wire positioned in the center of the cores.

Figure 64.


8. Install ground terminals in the control panel and connect all ground wires. Drill as needed and use tapping screws and star washers provided. See [Table 67, p. 47](#) for location.

Figure 65.


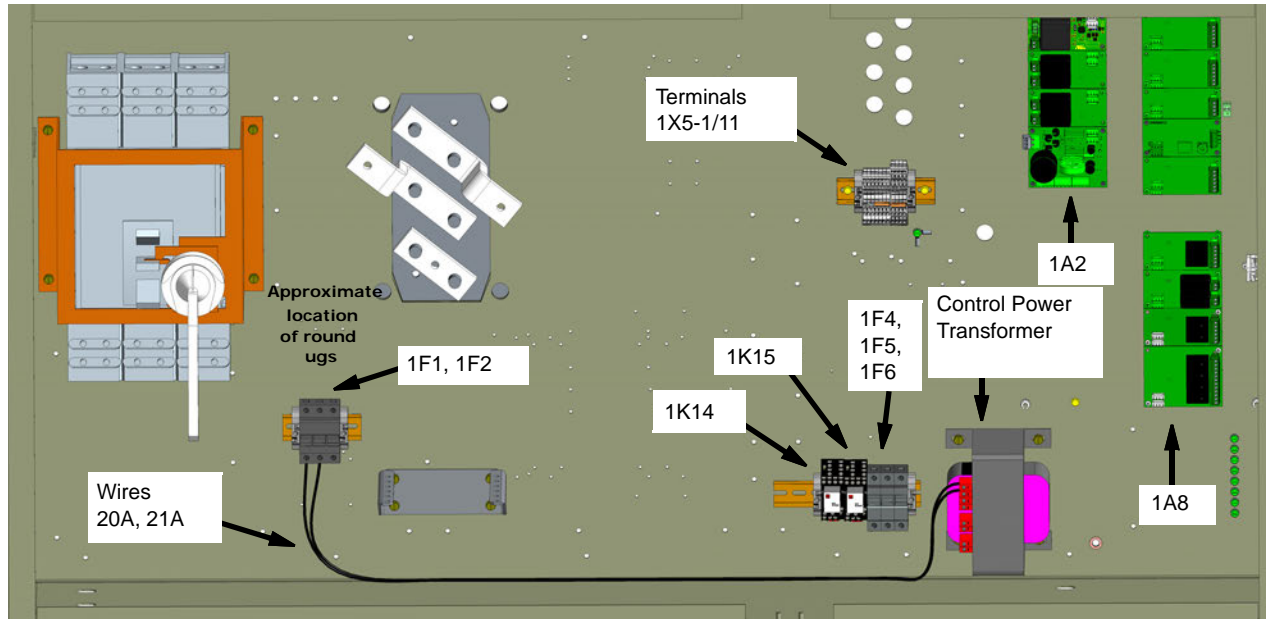
9. Align cover over motor terminals and drill four holes for mounting. Install cover over motor terminals using four screws (provided); refer to [Figure 66](#).

Figure 66. Cover installation


Panel Control Wiring

Refer to schematic 5071-1783 for the following connections.

Figure 67.



- Using the provided 12 AWG, route wires 20A, and 21A from the 1F1 and 1F2 fuse to the control power wire transformer, terminals H1 and H2; refer to [Figure 67](#).

- Strip insulation from Line 1 and Line 2 and install wire taps; refer to [Figure 68](#).

Figure 68. Wire tap installation



- Connect one 12 AWG to the opposite side of each wire tap and route wire to the 1F1 and 1F2 fuse; refer to [Figure 69](#).

Figure 69. 12 AWG wire connections



4. Install wire tap case; refer to [Figure 70](#).

Figure 70. Wire tap case install



Note: The following connections will be connected to some Terminal 1X5. Terminals 1X5-4 through 1X5-7 are electrically tied together and are connected to terminal X1 of the control power transformer (115V hot). Terminals 1X5-8 through 1X5-11 are electrically tied together and connect to terminal X2 of the control power transformer, (115V com); refer to [Figure 71](#).

Figure 71. 1X5 Terminal location

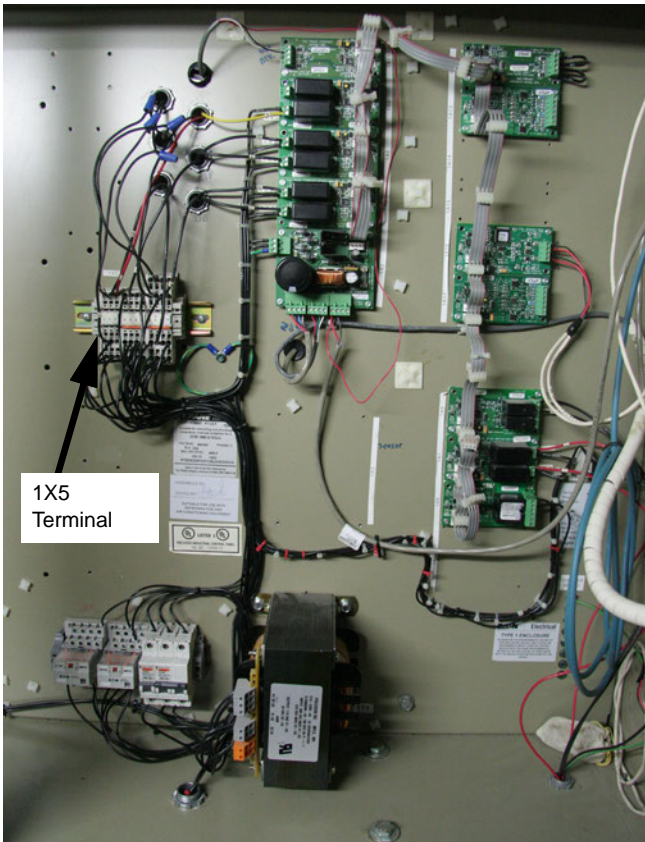
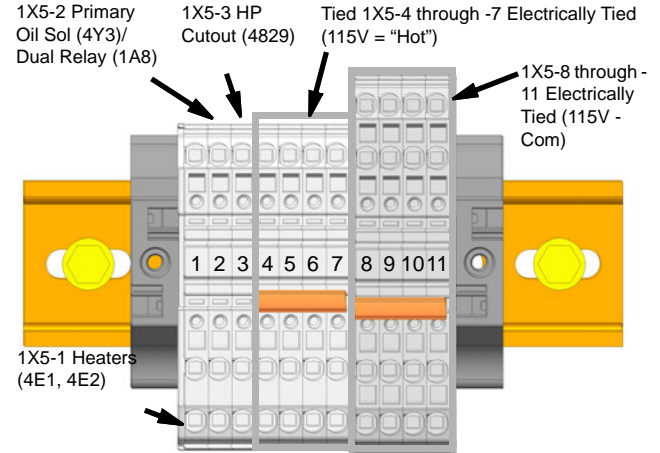


Figure 72. Terminals 1X5-1 through -11



Oil Loss Liquid Level Sensor Connections

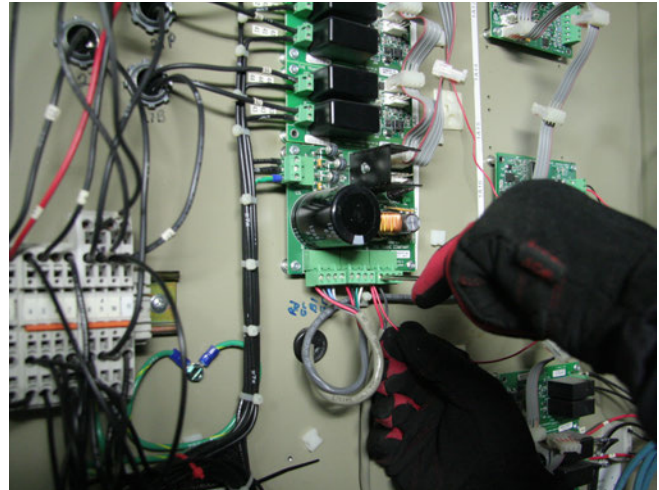
5. Reconnect the oil loss liquid level sensor 24V supply to power supply 1A2 connector J5, Pin 1; this is a red wire (64A) and was previously connected to the starter module J3 Pin 1.

Note: J3 or J4 Pin 1 on power supply 1A2 may also be used for oil loss liquid level sensor connection.

Table 11. Pin-out, oil loss liquid level sensor (4B2)

Wire	Description	Mating Connection	Description
64A (Red)	Sensor 24v+ in	J5, Pin 1, Power Supply (1A2)	24V+ out

Figure 73. Oil loss liquid level sensor connection



1K15 Relay Connections

6. Using 16 AWG wire, make the following connections listed in [Table 12](#).

Table 12. Pin-out, relay 1K15

Terminal—Relay 1K15	Description	Mating Connection	Description
10	N/C contact	1X5-4 thru 7	115V "hot"
11	N/O contact	1X5-4 thru 7	115V "hot"
2	N/C contact	1X5-1	Heaters - 4E1, 4E2, Wires: 28A and 28B
7	N/O contact	1X5-2	Primary Oil Solenoid 4Y3 - Wire: 29B
A2	Coil - com	1X5-8 thru 11	115V "common"
A1	Coil - "hot"	Pin 5 - AFD Drive	Running Relay

Dual Relay Output 1A8 Connections

- Using 16 AWG wire, make the following connections listed in [Table 13](#).

Table 13. Pin-out, dual relay output (1A8)

Terminals—1A8	Description	Mating Connection	Description
J11 Pins 1–4	PWR/Com	WB2	LLID communication/power bus
J2 Pin 6	Relay 115V in	1X5-4/7	To 115V "hot"
J2 Pin 4	Relay N/O	1X5-2	To Primary Oil Solenoid 4Y3 - Wire: (29B)

AFD Control Wire Connections

- Using 16 AWG wire make the following connections to the AFD listed in [Table 14](#).

Important:

- Remove and discard white wire connecting Pin 12 and Pin 37 on the AFD drive.
- The red wire needs to be removed from the connector on the UC800 end.



- The red wire on the Modbus® cable is NOT connected to the AFD.

Table 14. Pin-out, AFD

Terminal—AFD	Description	Mating Connection	Description
Pin 61	Modbus® (RS485) Com (BK)	PIN 2 (IMC) UC800 1A1	Modbus (RS485) Com (BK)
Pin 68	Modbus (RS485) + (BLU)	PIN 3 (IMC) UC800 1A1	Modbus (RS485) + (BLU)
Pin 69	Modbus (RS485) - (GY)	PIN 4 (IMC) UC800 1A1	Modbus (RS485) - (GY)
Pin 4	Running Relay	1X5-4/7	115V "hot"
Pin 5	Running Relay	1K15, pin A1	Coil - "hot"
Pin 37	Safe Stop	1K14, pin 9	N/O contact
Pin 12	24V out	1K14, pin 5	N/O contact

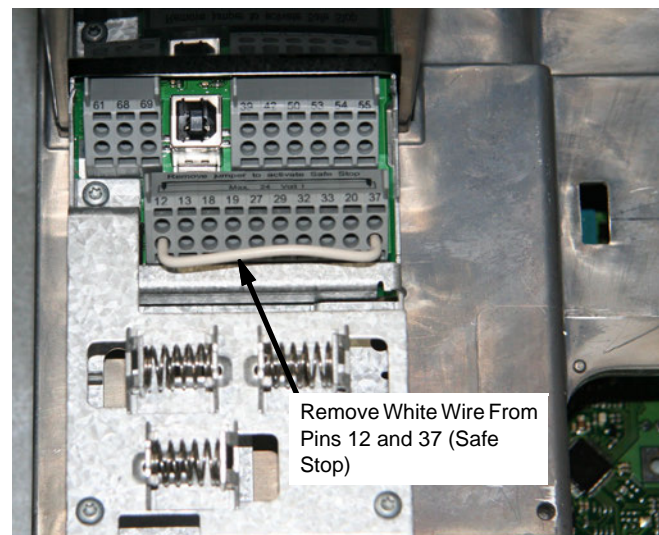
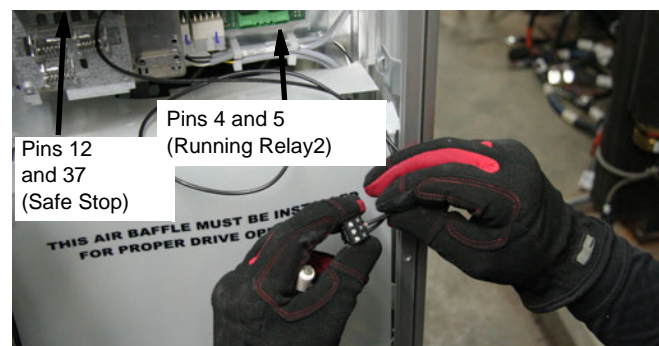
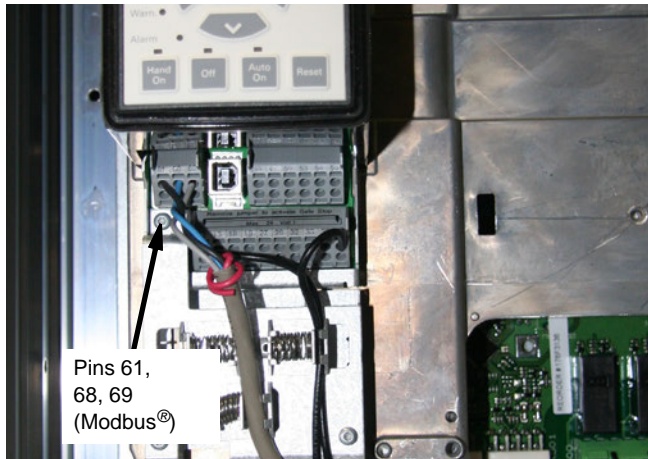
Figure 74. AFD—Remove white wire (safe stop)

Figure 75. AFD—Pin location safe stop and running relay


Figure 76. AFD pin location – Modbus®



1K14 Relay Connections

- Using 16 AWG, make the following connections to relay 1K14 listed in Table 15.

Table 15. Pin-out, relay 1K14

Terminal – Relay 1K14	Description	Mating Connection	Description
A1	Coil, 115V “hot”	1X5-3	To High Pressure Cutout, NC (RED Wire)
A2	Coil, 115V com	1X5-8 thru 11	To 115V common
9	N/O contact	Pin 37 AFD Drive	Safe Stop
5	N/O contact	Pin 12 AFD Drive	24V out

NOTICE

Compressor Damage!

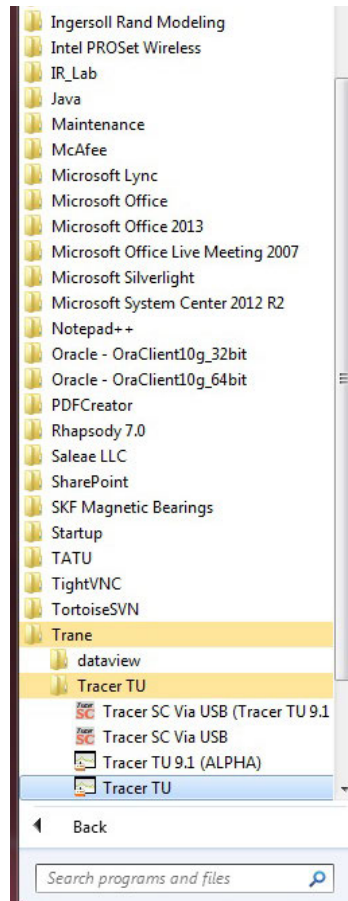
Before connecting power wire to the motor terminals, with the motor terminal jumpers removed, verify proper phasing between the drive and motor terminals with an ohmmeter for all connections. Improper phasing occurs between the drive and motor terminals can cause compressor damage.

UC800 Software Installation and Configuration

Note: The software upgrade process requires that the UC800 ether have no application code already installed, or if an application is existing, that the controller be in the Stop mode and that the compressor and the pumps have been shut off. TU will enforce this requirement with pop-up messages at the appropriate step in the process, but it is best to Stop the chiller before the software upgrade process begins.

- Connect the service laptop computer to the target RTHD UC800 using an A/B type USB cable. Launch Tracer® TU service tool software in the service computer. If no shortcut exists, the program can be found in **Programs > Trane > Tracer TU**.

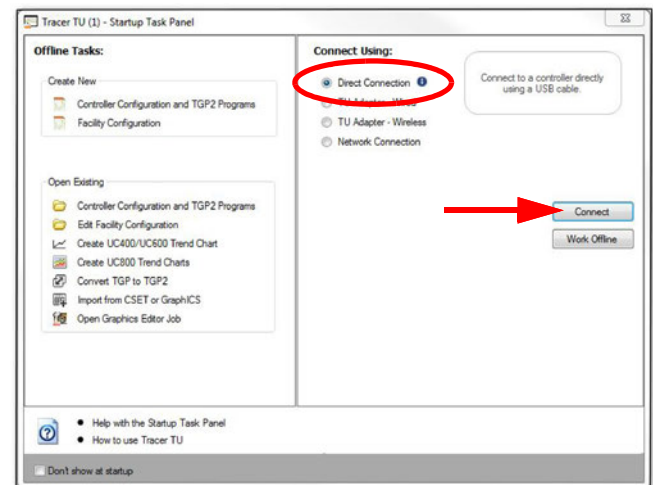
Figure 77.



- After Tracer TU is launched, the Startup Task Panel dialog box appears; refer to Figure 78. Select **Direct Connection** and then click **Connect** button.

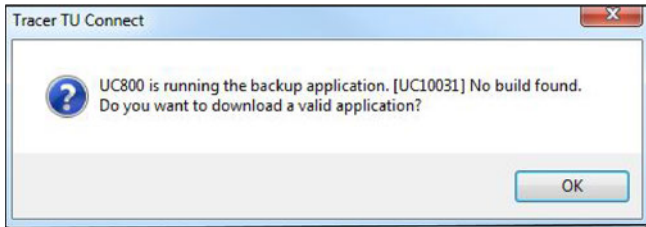
Important: Tracer TU version 9.0.322 is required. If that version or newer is not already installed, refer to “Pre-Installation,” p. 18 for details on how to obtain and upgrade Tracer TU.

Figure 78.



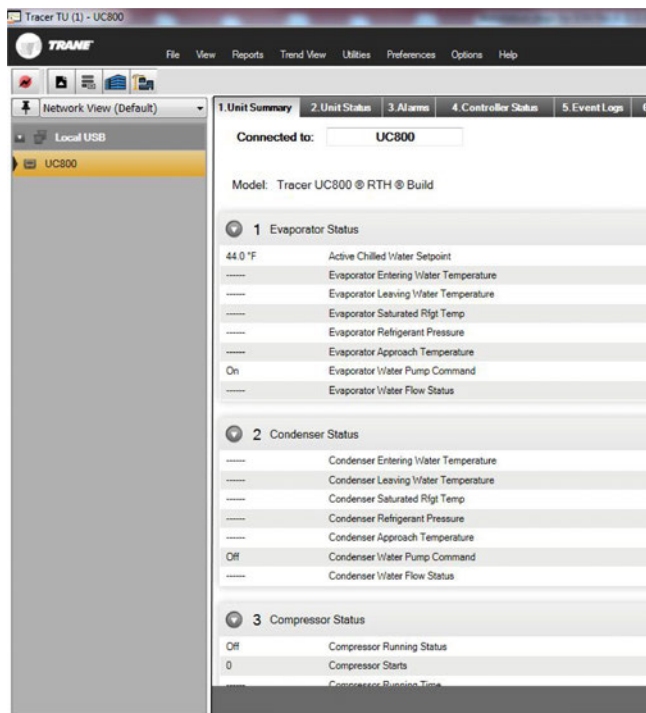
- a. If the UC800 target controller has no application already installed, the Tracer TU Connect dialog box appears; refer to Figure 79. Click **OK** and proceed to Step 3, p. 51.

Figure 79.



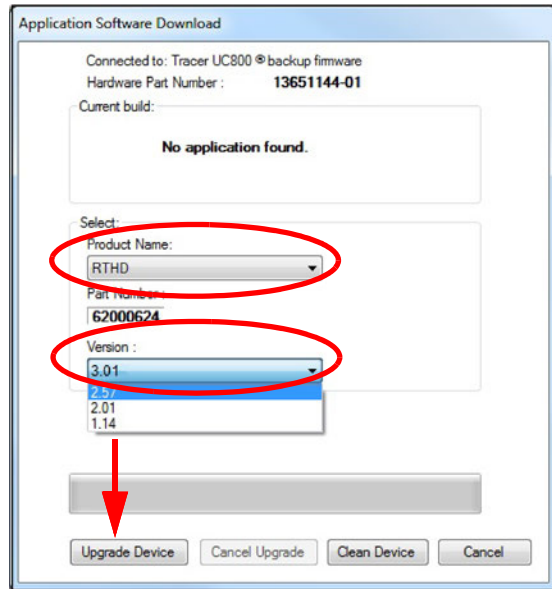
- b. If the UC800 target controller has an application already installed, Tracer TU's **Unit Summary** tab appears; refer to Figure 80. Skip to "Existing UC800 with Software Already Installed," p. 55.

Figure 80.



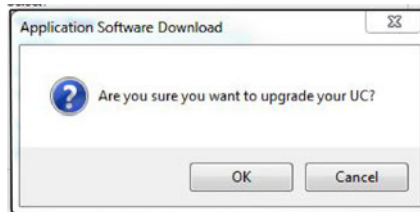
- 3. The Application Software Download dialog box appears, allowing selection of chiller products. For **Product Name**, select **RTHD**, and for **Version**, select **3.03** (or newer). Then click **Upgrade Device**.

Figure 81.



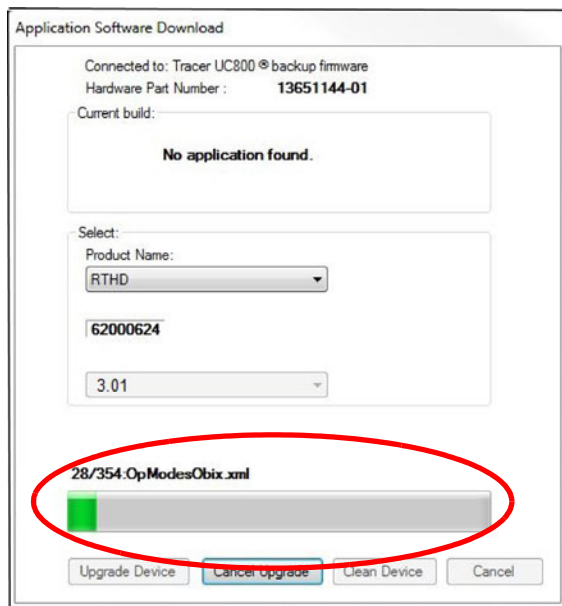
- 4. A confirmation dialog box appears. Click **OK** to continue.

Figure 82.



- 5. The download's progress is indicated by a bar at the bottom of the Application Software Download dialog box.

Figure 83.



- After the download is complete, two confirmation dialog boxes appear. Click **OK** in each dialog box.

Figure 84.

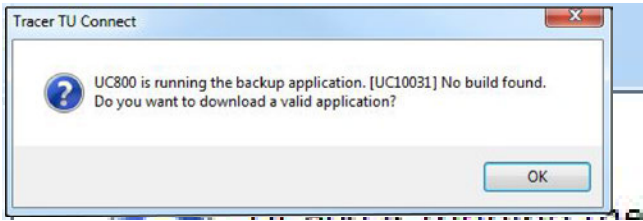
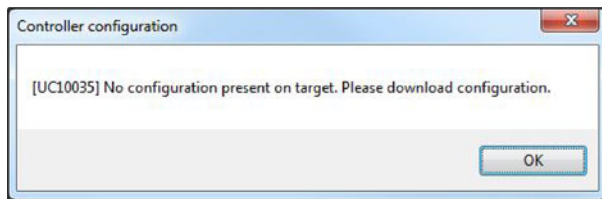
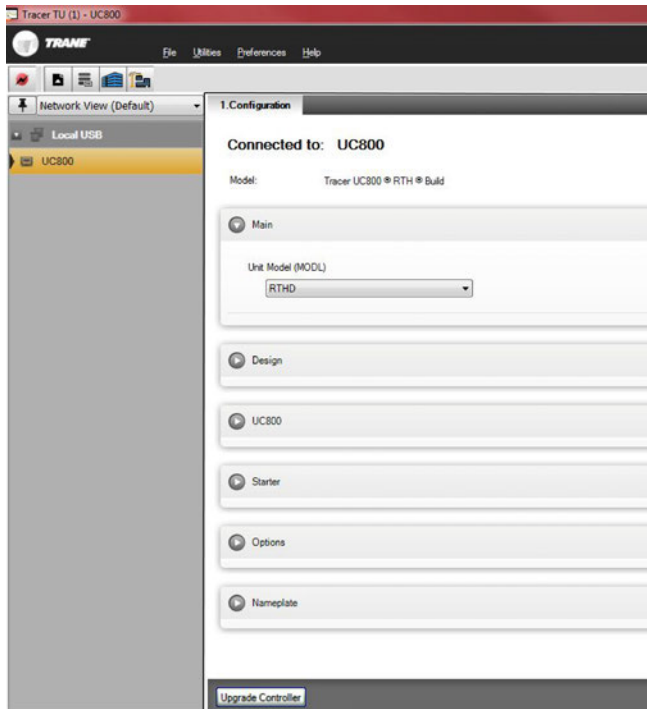


Figure 85.



- Tracer TU's **Configuration** tab appears; refer to [Figure 86](#).

Figure 86.

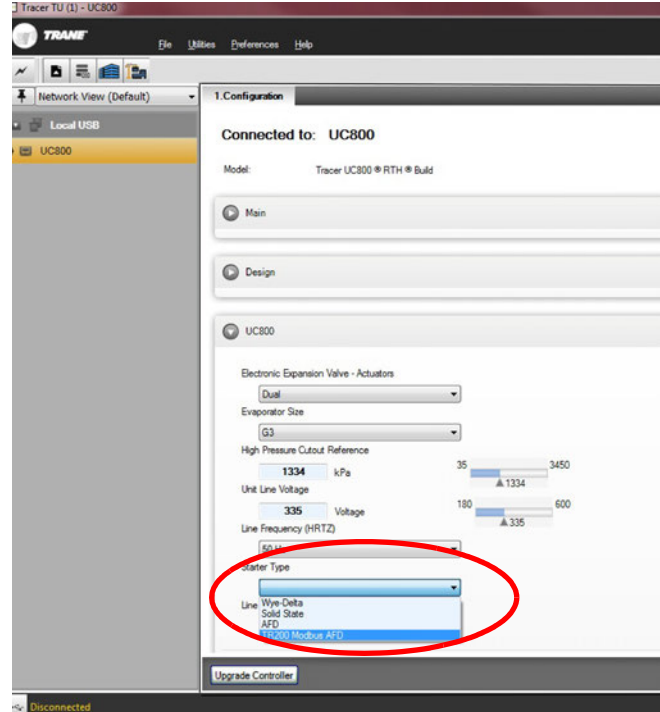


Important: Trane recommends configuring the unit manually rather than browsing to an existing Chiller Service Report electronically.

- Because the new AFD is being retrofit with Modbus® client communications, reference the Chiller Service Report in PDF or XML to configure the unit for best results.

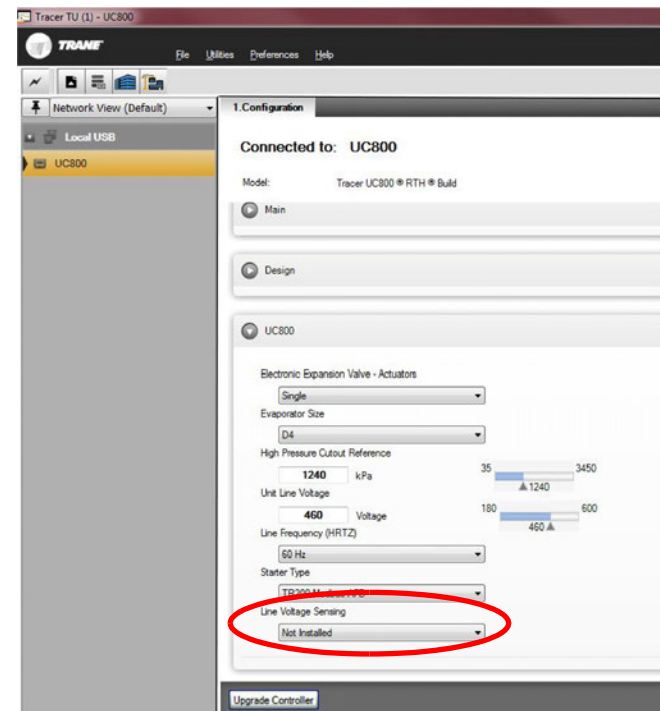
- For **Starter Type** (located in the **UC800** section or in the **Starter** section, depending on actual software version used), select **TR200 Modbus® AFD**; refer to [Figure 87](#).

Figure 87.



- For **Line Voltage Sensing**, select **Not Installed**; refer to [Figure 88](#).

Figure 88.



- c. For **Compressor Rated Load Amps**, enter the value noted as the Trane Motor Controller nameplate's **Output Current**; refer to [Figure 89](#) and [Figure 90](#).

Notes:

- The **Compressor Rated Load Amps** need to be increased over the previously set RLA current as this value now refers to the currents occurring between the drive and the motor, which are slightly higher (at full load rating point) than for a Wye Delta Starter Type.
- The new **Compressor Rated Load Amps** are used to “calibrate” the UC800 controller so it can provide a current limit function at the correct current level. Motor protection becomes a function of the AFD and its settings.
- Current flowing into the unit (into the drive) remains at or below the previous RLA stamped on the original shipped RTHD nameplate; thus, there is no need to increase the upstream branch wiring or circuit protection.

Figure 89.

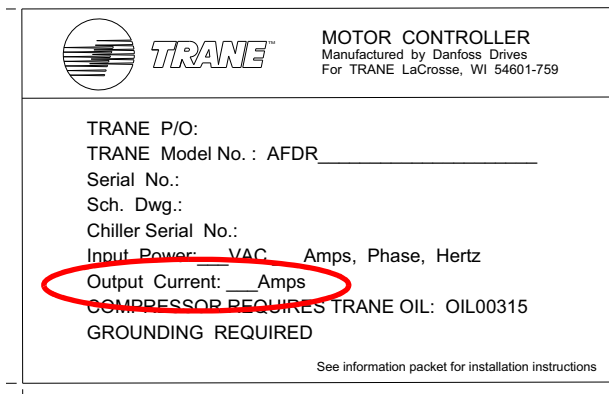
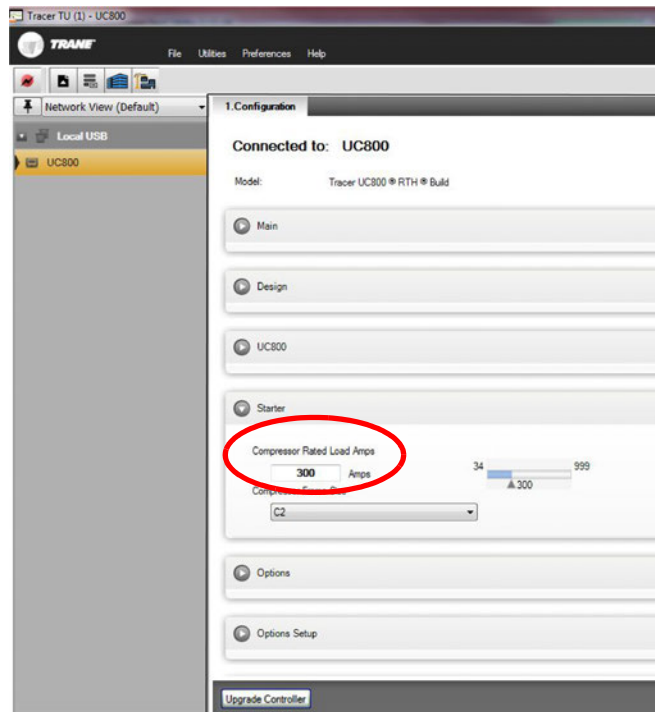
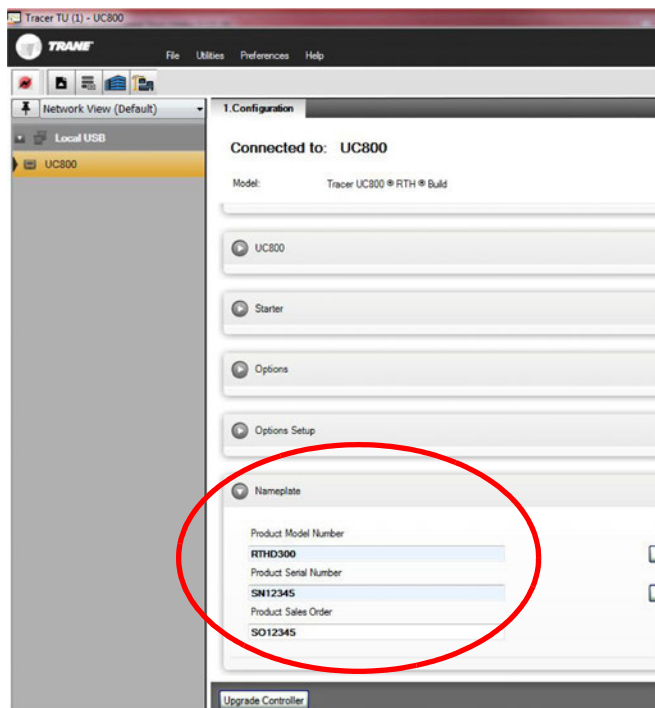


Figure 90.



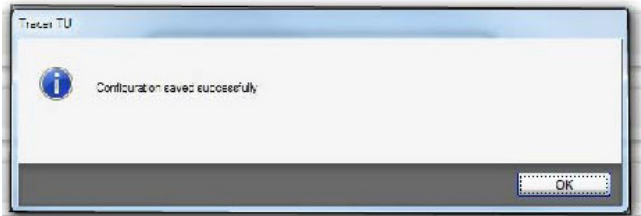
Important: Nameplate values, including **Product Model Number**, **Product Serial Number**, and **Product Sales Order** must be set for the unit as well; refer to [Figure 91](#).

Figure 91.



- Verify all configuration settings and then click the **Save**. Tracer TU downloads the configuration settings to the target UC800 controller. A progress dialog box appears, followed by a resetting target dialog box. After the configuration has been stored successfully, click **OK** to close the dialog box.

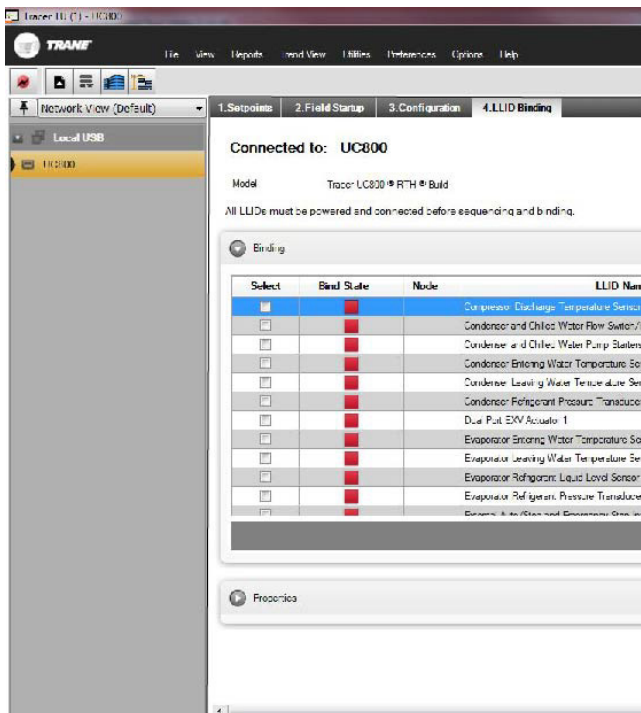
Figure 92.



- Tracer TU automatically displays its **Binding** tab. At this time, all new LLIDs must be bound. If there is a mix of existing and new LLIDs, Trane recommends that all existing LLIDs be unbound; then, rebind existing LLIDs and bind new LLIDs.

Important: For more information about binding LLIDs, refer to *RCDA - Tracer AdaptiView™ Display Upgrade Kit RTHD Rotary Chiller Installation Instructions (SO-SVN030*-EN)*.

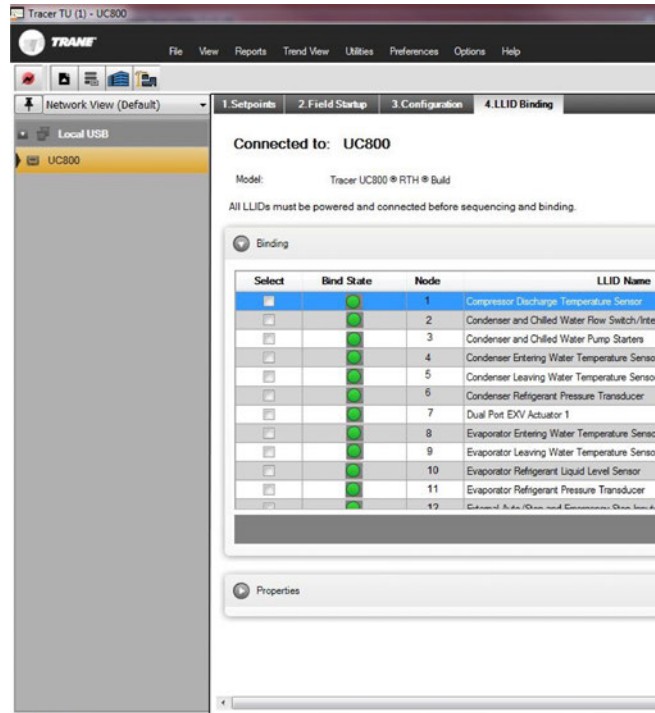
Figure 93.



Note: Because the AFDR does not use the IPC link, it will not appear on the binding list. Instead, the AFDR uses the new Modbus® client Communication port (labeled IMC on the UC800). Drive parameters must be set independently and manually. For more information about AFDR TR200 setup, refer to *“Drive Settings,”* p. 57.

- After all LLIDs have been properly bound (refer to [Figure 94](#)), navigate to Tracer TU's **Setpoints** tab to check and adjust settings accordingly. Refer to the existing Chiller Service Report for customer settings such as **Low Refrigerant Temperature Cutout**, **Low Water Temperature Cutout**, **Chilled Water Setpoints**, etc.

Figure 94.



- Navigate to Tracer TU's **Field Startup** tab and verify the following settings for the Modbus® AFD:
 - For firmware versions 3.03 and newer, use the following settings:
 - Current Limit Proportional Gain = 8.0
 - Current Limit Integral Time = 60 sec
 - RLA State Feedback for Water Control = 4.0
 - For earlier firmware versions, use the following settings:
 - Current Limit Proportional Gain = 2.0
 - Current Limit Integral Time = 6 sec
 - RLA State Feedback for Water Control = 1.0

Figure 95.

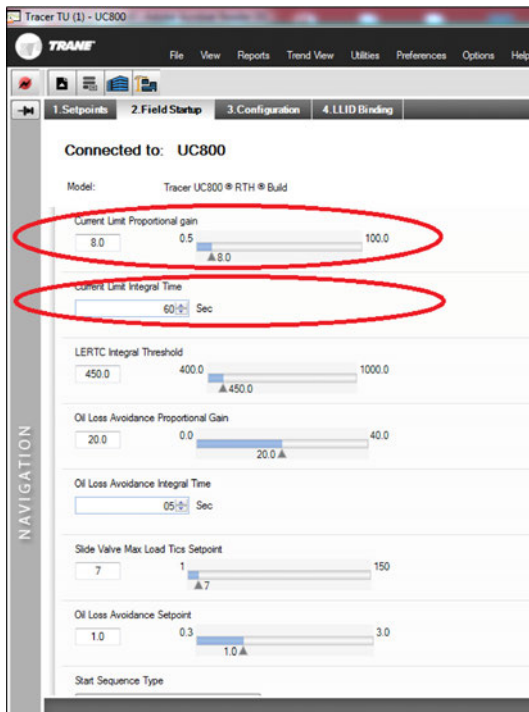
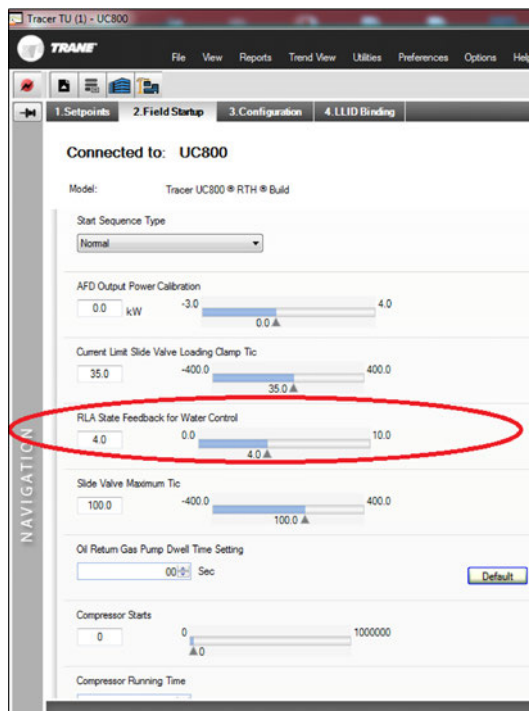


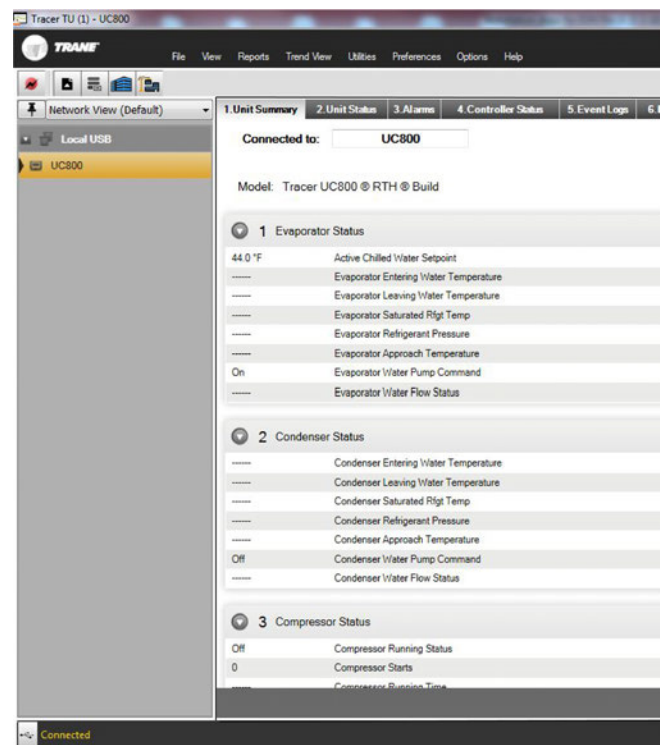
Figure 96.



Existing UC800 with Software Already Installed

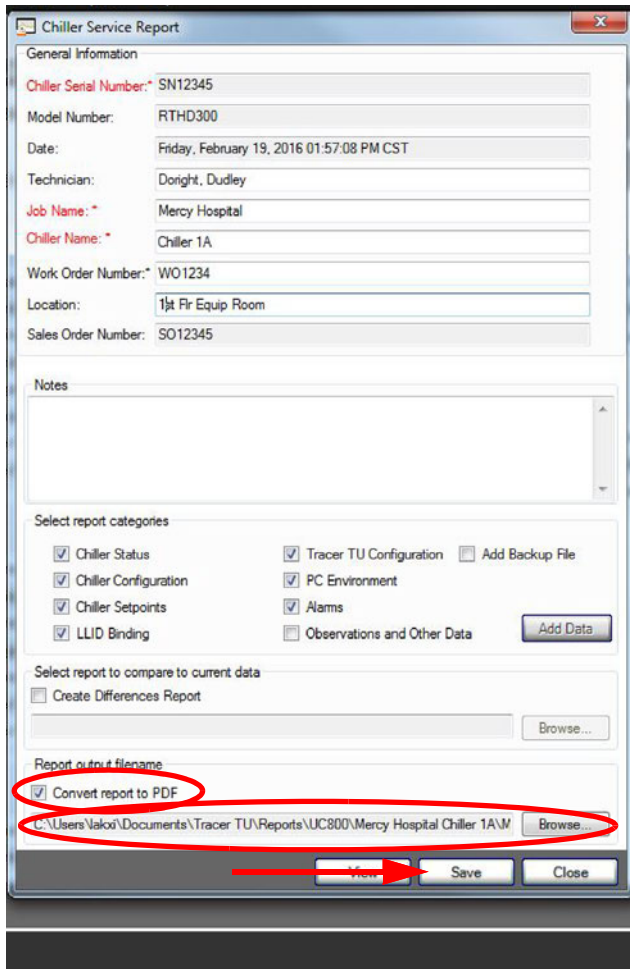
1. If an AFDR retrofit is installed on an RTHD chiller with an existing UC800 controller/Tracer AdaptiView™ display, the software installation will be slightly different than in “UC800 Software Installation and Configuration,” p. 50. Because the UC800 already has code and configurations installed, when Tracer® TU is launched on the service laptop with a direct USB connection to the controller, Tracer TU displays its **Unit Summary** tab; refer to Figure 97.

Figure 97.



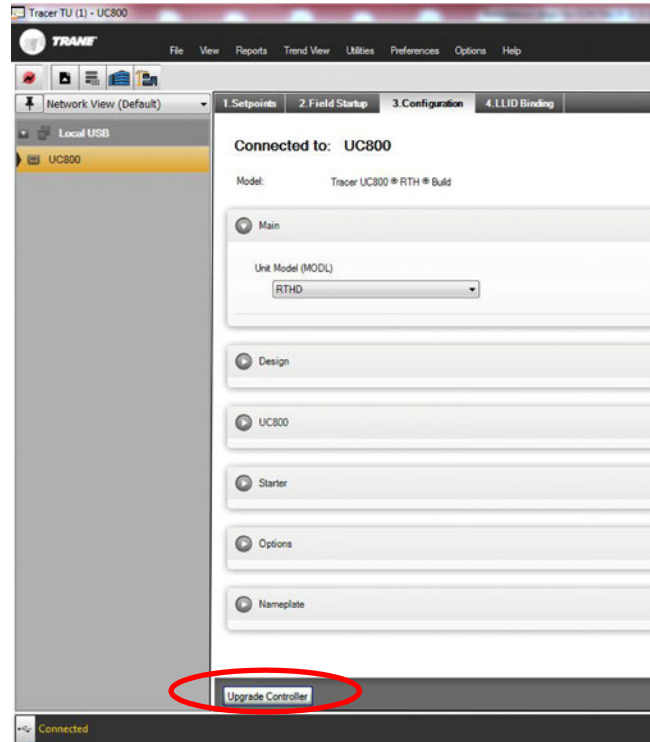
2. If a Chiller Service Report has not already been generated, Trane recommends creating one at this time. Select **Reports > Chiller Service** to open the Chiller Service Report dialog box, and save the report both as XML and PDF (check **Convert Report to PDF**). Be sure to note the location where the files will be stored, or use **Browse** to specify a different location. Click **Save**.

Figure 98.



3. Navigate to the **Configuration** tab (**Utilities > Equipment > Configuration**, or double-click the wrench icon on the right-hand side of Tracer TU and then click the **Configuration** tab). Click the **Upgrade Controller** button.

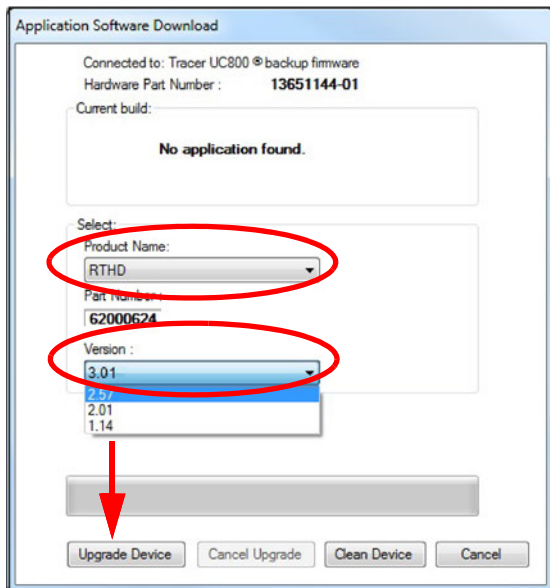
Figure 99.



4. The Application Software Download dialog box appears, allowing selection of chiller products. For **Product Name**, select **RTHD**, and for **Version**, select **3.03** (or newer). Then click **Upgrade Device**.

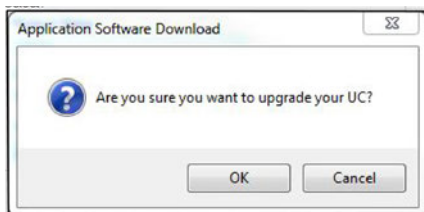
Note: If version 3.03 (or newer) does not appear for selection, obtain that or a newer version and install it into Tracer TU on the service computer. Refer to [“Preparing Tracer® TU on the Service Computer,” p. 25.](#)

Figure 100.



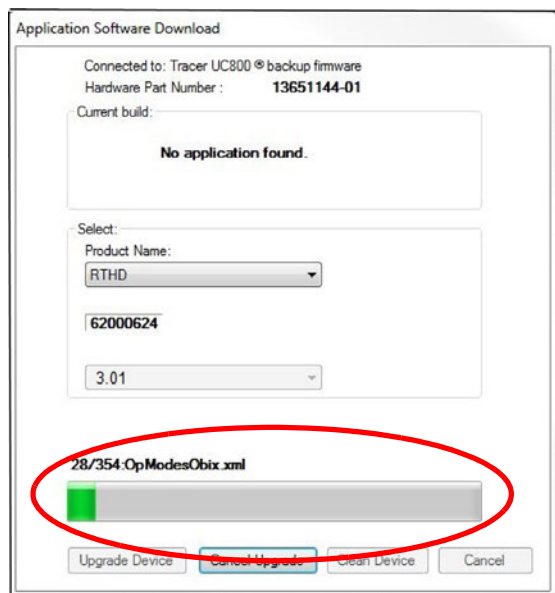
5. A confirmation dialog box appears. Click **OK** to continue.

Figure 101.



6. The download's progress is indicated by a bar at the bottom of the Application Software Download dialog box.

Figure 102.



The remainder of the software installation process is very similar to the procedure included in “UC800 Software Installation and Configuration,” p. 50, except that most of the configuration and settings are carried through in this application. Proceed with [Step 8, p. 52](#) (included in the procedure “UC800 Software Installation and Configuration,” p. 50).

Drive Settings

Important: Any AFDR drive module menu parameter numbers not listed in this manual are non-Trane specific program parameter values have been set by the manufacturer before shipment, to provide optimum drive performance. Under no circumstances should any of the pre-set values in these menu parameters be changed unless specifically directed to do so by a factory engineer or a factory technical support person.

Note: Refer to TR200 Programming Guide (BAS-SVP04*-EN), for full program parameter details and descriptions, and the instructions necessary to operate the Local Control Panel (LCP) and program the necessary drive parameters.

Refer to [Table 16, p. 58](#) for a list of items that need to be set in the frequency drive at startup. For additional information, refer to the programming manual that is shipped with the drive. The programming manual includes a detailed section that discusses accessing the parameters in the drive.

This process is summarized briefly below:

1. To access the parameters, press the **Main Menu** key.
2. If required, enter the password (**999**).
3. To select a parameter group, use the up/down arrow keys to highlight the parameter group, and then press the **Enter** key to access that group.
4. Use the up/down arrow keys to access the parameter number, and then press the **OK** key.
5. Use the up/down arrow keys to change the parameter, and then press the **OK** key to change the setting.

Retrofit Air-Cooled RTHD Adaptive Frequency Drive Model AFDR (TR200)

NOTICE

Compressor Damage!

Improper drive parameter settings could cause compressor damage or failure. Verify drive parameters are set correctly prior to unit operation.



Installation

Installation and Startup

Most of the drive parameters are already set up when the drive is shipped except for a short list of unit specific parameters obtained from the unit and motor nameplates that need to be field programmed.

Important: *When confirming these parameters it is important that [0-03 Regional settings] be left in the “North American” category. Do NOT change this default setting.*

Table 16. Compressor specific parameters (motor frame/voltage/Hertz)

ID	Description	B1/B2		C1/C2		D1/D2/D3	
		460V/60 Hz	575V/60 Hz	460V/60 Hz	575V/60Hz	460V/60Hz	575V/60Hz
1-21	Motor Power	233HP	233HP	334HP	334HP	441HP	441HP
1-22	Motor Voltage	460V	575V	460V	575V	460V	575V
1-23	Motor Frequency	60Hz	60Hz	60Hz	60Hz	60Hz	60Hz
1-24	Motor Current	Output Amps value from new AFDR nameplate sticker; refer to Figure 88, p. 52 .					
1-25	Motor Nom Speed	3512RPM	3512RPM	3531RPM	3531RPM	3535RPM	3535RPM
1-30	Stator Resistance	0.0303 Ω	0.0430 Ω	0.0201 Ω	0.0308 Ω	0.0122 Ω	0.0197 Ω
1-31	Rotor Resistance	0.0257 Ω	0.0365 Ω	0.0146 Ω	0.0227 Ω	0.0091 Ω	0.0144 Ω
1-35	Main Reactance	5.3684 Ω	8.0570 Ω	3.0050 Ω	4.8857 Ω	2.8882 Ω	4.8553 Ω
1-36	Fe Loss Resistance	188.388 Ω	280.730 Ω	152.612 Ω	243.610 Ω	125.549 Ω	193.850 Ω
3-03	Max Reference	60Hz	60Hz	60Hz	60Hz	60Hz	60Hz
4-14	Mtr Spd High Lim.	60Hz	60Hz	60Hz	60Hz	60Hz	60Hz
14-11	Volt at Mains Fault	391V	489V	391V	489V	391V	489V

Refer to [Table 17](#) for a list of items that are programmed in the drive at the factory for use with Trane chillers. In the event that the drive needs to be reset, these parameters need to be reprogrammed into the drive.

To reset the drive to the Danfoss defaults, perform the following procedure.

1. Disconnect power to the drive, and wait for the display to shut down.
2. While powering up the drive, press and hold the following keys: **Status**, **Main**, and **OK**.
3. After 5 seconds, release the keys.

After the drive is reset, reprogram the items listed in [Table 17](#).

Important: *These parameters are supposed to have been set at the factory to the Trane-specific values shown here in [Table 17](#). Always confirm before actual drive start up that this is so and correct any one of the parameter settings as necessary.*

Table 17. Non-compressor specific parameters

ID	Description	Values
0-03	Region Settings	[1] North American
0-20	Display Line 1.1 Small	[1612] Motor Voltage
0-24	Display Line 3 Large	[1617] Speed [RPM]
0-40	[Hand on] Key on LCP	[0] Disabled
0-41	[Off] Key on LCP	[0] Disabled
0-60	Main Menu Password	999
0-61	Access to Main Menu w/o Password	[1] LCP: Read Only
1-03	Torque Characteristics	[0] Compressor Torque
1-71	Start Delay	2s
1-73	Flying Start	[0] Disabled
1-78	Compressor Start Max Speed [Hz]	20Hz
1-79	Compressor Start Max Time to Trip	10s
1-87	Trip Speed Low [Hz]	25Hz
3-02	Min Reference	30Hz
3-13	Reference Site	[1] Remote
3-15	Reference 1 Source	[0] No Function
3-41	Ramp 1 Ramp Up Time	10s
3-42	Ramp 1 Ramp Down Time	10s
4-10	Motor Speed Direction	[0] Clockwise
4-12	Motor Speed Low Limit [Hz]	30Hz
4-18	Current Limit	107%
8-01	Control Site	[2] Controlword only
8-03	Control Timeout Time	15s
8-04	Control Timeout Function	[2] Stop
8-30	Protocol	[2] Modbus® RTU
8-31	Address	3
8-82	Baud Rate	[7] 115200 Baud
14-00	Switching Pattern	[1] SFAVM
14-03	Overmodulation	[0] Off
14-10	Mains Failure	[4] Kinetic Back-up
14-12	Function at Mains Imbalance	[3] Derate
14-21	Automatic Restart Time	8s
14-50	RFI Filter	[0] Off
14-51	DC Link Compensation	[1] On
14-60	Function at Over Temperature	[1] Derate
14-61	Function at Inverter Overload	[1] Derate
14-62	Inv. Overload Derate Current	75%



Start-Up Test Log

Note: For start-up procedure, see *Optimus™ Water-Cooled Chillers, Model RTHD Installation, Operation, and Maintenance (RTHD-SVX01*-EN)*.

Chiller Settings

Settings	
Settings Tab	
Chiller	
Front Panel Chilled Water Setpt (°F)	
Front Panel Current Limit Setpt (RLA)	
Differential to Start (°F)	
Differential to Stop (°F)	
Setpoint Source	
Feature Settings	
Chilled Water Reset	
Return Reset Ratio	
Return Start Reset	
Return Maximum Reset	
Outdoor Reset Ratio	
Outdoor Start Reset	
Outdoor Maximum Reset	
Mode Overrides	
Evap Water Pump	
Cond Water Pump	
Expansion Valve Control	
Slide Valve Control	
Service Pumpdown	
Display Settings	
Date Format	
Date	
Time Format	
Time of Day	
Keypad/Display Lockout	
Display Units	
Pressure Units	
Language Selection	

Operator Log

Chiller Log			
Main Tab	Run Time		
	15 min	30 min	1 hr
Chiller Mode			
Evap Ent/Lvg Water Temp			
Cond Ent/Lvg Water Temp			
Active Chilled Water Setpoint (°F)			
Average Line Current (%RLA)			
Active Current Limit Setpoint (%RLA)			
Software Type			
Software Version			
Reports Tab			
Evaporator			
Evap Entering Water Temperature (°F)			
Evap Leaving Water Temperature (°F)			
Evap Sat Rfgt Temp (°F)			
Evap Rfgt Pressure (psia)			
Evap Approach Temp (°F)			
Evap Water Flow Switch Status			
Expansion Valve Position (%)			
Expansion Valve Position Steps			
Evap Rfgt Liquid Level (in.)			
Condenser			
Cond Entering Water Temperature (°F)			
Cond Leaving Water Temperature (°F)			
Cond Sat Rfgt Temp (°F)			
Cond Rfgt Pressure (psia)			
Cond Approach Temp (°F)			
Cond Water Flow Switch Status			
Cond Head Pressure Ctrl Command (%)			
Compressor			
Compressor Starts			
Compressor Run Time			
System Rfgt Diff Pressure (psid)			
Oil Pressure (psia)			
Compressor rfgt Discharge Temp (°F)			
Discharge Superheat (°F)			
% RLA L1 L2 L3 (%)			
Amps L1 L2 L3 (Amps)			
Volts AB BC CA			



Troubleshooting

The drive displays three types of faults:

- **Warning**
A warning or alarm is signaled by the LEDs on the front of the AFD by a code on the LCP.
A warning indicates a condition that may require attention or a trend that may eventually require attention, and will remain active until the cause is no longer present. Under some circumstances, motor operation may continue.
- **Trip**
A trip is the action when an alarm has appeared. The trip removes power to the motor and, after the condition has been cleared, can be reset by pressing the **Reset** button. The event that caused an alarm cannot damage the AFD or cause a dangerous condition.
After its cause has been rectified, an alarm must be reset to restart operation.
- **Trip Lock**
A trip lock is an action when an alarm occurs that may cause damage to the AFD or equipment. Power is removed from the motor, and a trip lock can only be reset after the condition is cleared by cycling power.
Once the problem has been rectified, only the alarm continues flashing until the AFD is reset.

2. **Collect Chiller Information.**
 - a. Note the following chiller information:
 - Operating mode and any sub-mode (i.e., 100% or 75% load etc.)
 - Number of chiller starts, and hours of operation.
 - Time since last diagnostic shutdown (<1 minute, <1 hour, >1 hour, etc.)
 - b. What was the chiller state at the time of the failure? (Chiller starting? Running low load? Running full load? etc.)
 - c. Record the chiller's sales order and serial numbers, and the drive's serial and model numbers.
3. **Troubleshooting**
 - a. Measure and record the DC bus (via the Local Control Panel [LCP]).
 - b. Check ALL wiring (tightness, ribbon cables fully seated, proper phasing, etc.)
 - c. Refer to the Danfoss manuals for further troubleshooting information.

⚠ 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.

1. **CH531/Tracer® AdaptiView™ only:** Collect alarm and parameter information.
 - a. DO NOT cycle unit power or reset the controls. Leave the AFD and the UC800 in their present states.
 - b. Record all UC800 active and historic alarms. Make a full chiller service report.
 - c. Document and check all applicable parameter settings. This information can be verified off of the chiller nameplate, and by referring to this manual.
 - d. In the Binding view of the Tracer TU service tool, verify there is a green face indicating that the Starter LLID is bound.
 - e. Record any drive diagnostics found.



Recommended Periodic Maintenance and Inspection

Visual Inspection – Power Removed

⚠ WARNING

Hazardous Voltage with 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.

1. Ensure the door interlocks are present and working.
2. Verify the safety ground connections to the door panels are securely connected.
3. Inspect power wire cables and devices to assure no abrasion is occurring from vibrations against chassis of cabinets, or other edges.
4. Ensure the drive interior and exterior is clear of any dust or debris. Fans, circuit boards, vents, etc. must be clean. Only use a vacuum for cleaning. Do NOT use compressed air.
5. Inspect the interior of the drive for any signs of moisture entry or leakage.
6. Visually inspect all drive components and wiring. Look for signs of heat or failure (look for swelled or leaking capacitors, discolored reactors or inductors, broken pre-charge resistors, smoke or arc trails on MOVs and capacitors, etc.)
7. Closely inspect the motor terminal board for any signs of leakage, arcing, etc.
8. Check ALL cable/lug/terminal connections inside the drive enclosure. Ensure all are clean and tight, and not rubbing against each other anywhere.

Operational Inspection – Power Applied

⚠ 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.

1. Verify the drive cabinet cooling fans are operating. This should be done from outside the enclosure, by looking into the cabinet at door and cabinet vents, to avoid electrical hazards.
Note: *The power module fan comes on with power. Other fans cycle with drive operation.*
2. Check historic fault codes using LCP connected to the AFD.
3. Check configuration settings and confirm all proper settings are still present in the controls.
4. Review the diagnostic history.
5. Make Chiller Service report to document all setpoints.
6. Check the UC800 alarm histories for any indications of operational problems.

Do this every 1 to 12 months depending on operating environment.

To properly diagnose service issues for Adaptive Frequency Drives for centrifugal chillers equipped with AFDR starters, all UC800 chillers will be equipped with the LCP as standard on the drive power module. This is for service only and NEVER for machine operation.



Wiring Information

Wiring Diagram Matrix

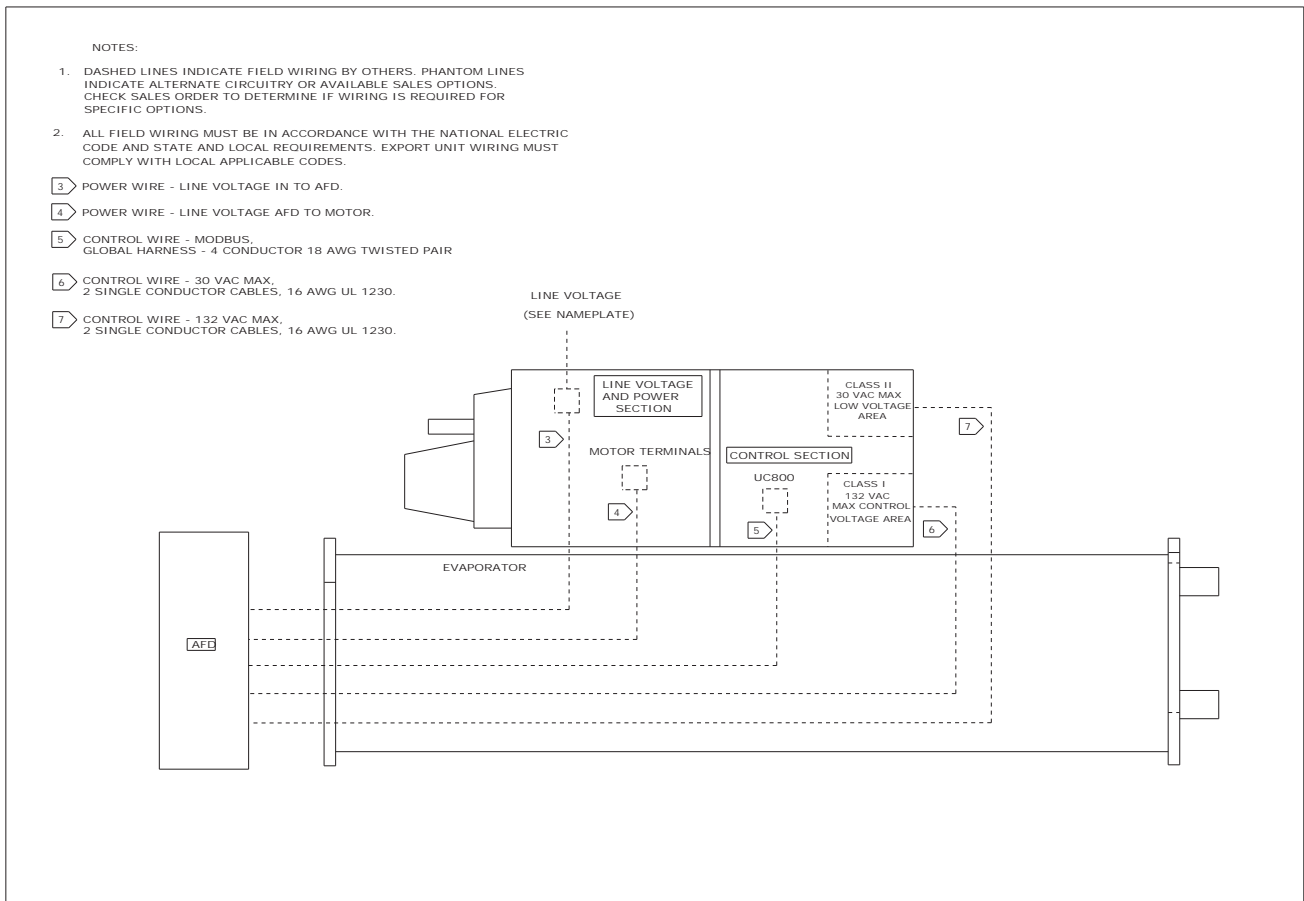
Table 18.

Wiring Diagram Number	Description
5071-1783	RTHD AFD, RETROFIT SCHEMATIC

Note: Wiring diagrams are available via e-Library.

Field Wiring

Figure 103. Field wiring connections^(a)

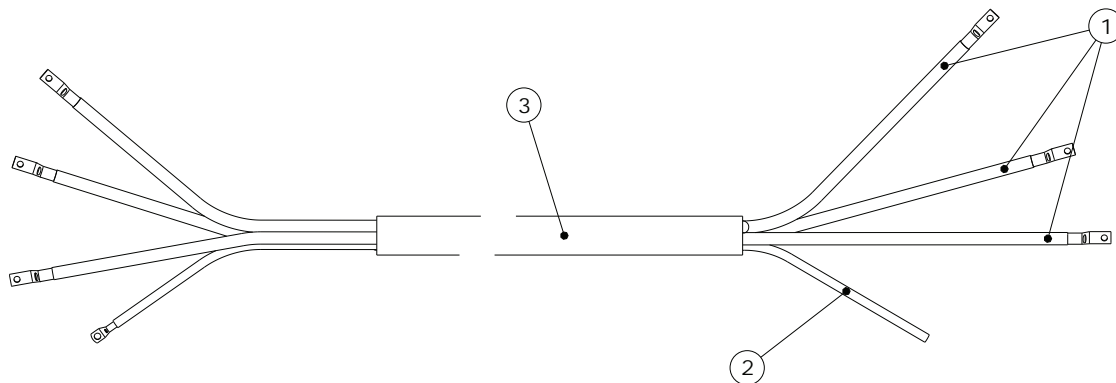


(a) See Table 14, p. 49 for connections. See tables in section "Parts," p. 18 for harness part numbers.

Wire Harness Details

Figure 104. Wire harness details

HARNESS P/N	INDEX	WIRE NO. / DESCRIPTION	GAUGE / SIZE	LENGTH (IN)
50711800	1	PWR - 1-L1, 1-L2, 1-L3	4/O	100
	2	GND	1 AWG	94
	3	FLEXIBLE CONDUIT	2.5 INCH	54.75
50711801	1	PWR - 2L-1, 2L2, 2L3	4/O	108
	2	GND	1 AWG	103
	3	FLEXIBLE CONDUIT	2.5 INCH	59.25
50711802	1	PWR - 1T-1, 1T-2, 1T-3	4/O	124
	2	GND	1 AWG	117
	3	FLEXIBLE CONDUIT	2.5 INCH	69.25
50711803	1	PWR - 2T-1, 2T-2, 2T-3	4/O	130
	2	GND	1 AWG	124
	3	FLEXIBLE CONDUIT	2.5 INCH	74.5
50711804	1	PWR - 1L-1, 1L-2, 1L-3	4/O	105
	2	GND	1 AWG	99
	3	FLEXIBLE CONDUIT	2.5 INCH	54.75
50711805	1	PWR - 2L-1, 2L-2, 2L3	4/O	113
	2	GND	1 AWG	108
	3	FLEXIBLE CONDUIT	2.5 INCH	59.25
50711806	1	PWR - 1T-1, 1T-2, 1T-3	4/O	129
	2	GND	1 AWG	122
	3	FLEXIBLE CONDUIT	2.5 INCH	69.25
50711807	1	PWR - 2T-1, 2T-2, 2T-3	4/O	135
	2	GND	1 AWG	129
	3	FLEXIBLE CONDUIT	2.5 INCH	74.5





Notes

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