



## Installation Instructions

# AFDH D-Frame Upgrade Adaptive Frequency™ Drive

## Tracer® AdaptiView™ Symbio™ Centrifugal Chiller Controllers



Direct Mount



Transition Mount



Remote Mount

**Model Numbers:** CVHE, CVHF, CVHG  
**Design sequence:** F0

This document applies to service offering applications only.

### **⚠ SAFETY WARNING**

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



# Introduction

Read this manual thoroughly before operating or servicing this unit.

## Warnings, Cautions, and Notices

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

The three types of advisories are defined as follows:

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

## Important Environmental Concerns

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

## Important Responsible Refrigerant Practices

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

**⚠ WARNING**

### Proper Field Wiring and Grounding Required!

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

**⚠ WARNING**

### Personal Protective Equipment (PPE) Required!

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

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

**⚠ WARNING****Follow EHS Policies!**

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

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

**⚠ WARNING****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.

**⚠ WARNING****Heavy Objects!**

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage.

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.

**⚠ 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. An AFDH cabinet assembly is top heavy.

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.

**⚠ 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.

**NOTICE****Use Copper Conductors Only!**

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

**NOTICE****Stand-Mounted AFDH Supported by Equipment Room Floor!**

Trane assumes no responsibility for equipment damage caused by the installation of an AFDH drive version that is specified as being incorrect for the application. A stand-mounted version of an AFDH drive is designed to be rigidly supported by the equipment room floor. Therefore, a stand-mounted AFDH drive is not recommended for use with a chiller that is equipped with spring-type vibration or seismic isolators. Trane recommends using a remote floor-mounted AFDH drive in this application.



**NOTICE**

**Excessive Cable Lengths Between AFDH 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.

- Updated wiring connections to 2X1 terminal strip in AFDH figure in Installation chapter.

**NOTICE**

**Route Incoming Power Conduit to the Roof of the AFDH Cabinet!**

Routing the incoming power conduit into the AFDH cabinet anywhere other than through the specified location on the cabinet roof, will be considered an unsupported field modification to the cabinet design. The air-cooled AFDH drive is designed to have the incoming power conduit routed vertically into the unit through the removable conduit connection cover located on the left-hand rear corner of the cabinet roof. If the starter that is being replaced by the AFDH drive has the incoming power conduit routed horizontally across the top of the starter, or connected to the side or to the bottom of the starter cabinet, an electrician will be required to reconfigure the conduit and wiring.

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## Revision History

- Updated unit-mounted AFDH drives topic in the Pre-Installation chapter.
- Added connector; plug/screw information in the Tracer AdaptiView miscellaneous hardware contents parts list table in AFDH Drive Package Specifications chapter.
- Updated D-Frame AFDH UC800/Tracer® AdaptiView™ ancillary control components figure in the AFDH Drive Package Specifications chapter.



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# Model Number Description

## Unit Model Number

For service purposes, Trane Model AFDH Air-Cooled drive upgrade packages are assigned a multiple character alphanumeric model number to 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 — Air Cooled Adaptive Frequency Drive

AFD = Air Cooled Adaptive Frequency Drive

### Digit 4 — Development Sequence

H

### Digit 5, 6, 7, 8 — Starter Size (Performance RLA rating)

Performance RLA = Performance RLA

### Digit 9 — Chiller Voltage

- D = 380V 60 Hz 3 Phase
- E = 440V 60 Hz 3 Phase
- F = 460V 60 Hz 3 Phase
- G = 480V 60 Hz 3 Phase
- H = 575V 60 Hz 3 Phase
- J = 600V 60 Hz 3 Phase
- R = 380V 50 Hz 3 Phase
- T = 400V 50 Hz 3 Phase
- U = 415V 50 Hz 3 Phase

### Digit 10, 11 — Design Sequence

\*\* = Factory assigned

### Digit 12 — New Short Circuit Rating

- C = 35K Short Circuit Rating
- A = 65K Short Circuit Rating
- B = 100K Short Circuit Rating

### Digit 13,14 — Maximum RLA

- 1B = 190 Maximum RLA - 60 Hz (460/480V)
- 1C = 240 Maximum RLA - 60 Hz (460/480V)
- 0C = 302 Maximum RLA 60 Hz (460/480V)
- 0D = 361 Maximum RLA 60 Hz (460/480V)
- 0E = 443 Maximum RLA 60 Hz (460/480V)
- 1A = 535 Maximum RLA 60 Hz (460/480V)
- 0H = 590 Maximum RLA 60Hz (460/480V)
- 0J = 678 Maximum RLA 60Hz (460/480V)
- 0K = 730 Maximum RLA 60Hz (460/480V)
- 0I = 780 Maximum RLA 60Hz (460/480V)
- 02 = 890 Maximum RLA 60Hz (460/480V)
- 1D = 131 Maximum RLA 60 Hz (575/600V)
- 1E = 155 Maximum RLA 60 Hz (575/600V)
- 1F = 192 Maximum RLA 60 Hz (575/600V)
- 0L = 242 Maximum RLA 60 Hz (575/600V)
- 0M = 290 Maximum RLA 60 Hz (575/600V)
- 0N = 344 Maximum RLA 60 Hz (575/600V)
- 0P = 400 Maximum RLA 60 Hz (575/600V)
- 0R = 450 Maximum RLA 60 Hz (575/600V)
- 0T = 500 Maximum RLA 60 Hz (575/600V)
- 0U = 570 Maximum RLA 60 Hz (575/600V)
- 0V = 630 Maximum RLA 60 Hz (575/600V)
- 03 = 729 Maximum RLA 60 Hz (575/600V)
- 04 = 850 Maximum RLA 60 Hz (575/600V)
- 1G = 212 Maximum RLA 50 Hz (380/400V)
- 1H = 260 Maximum RLA 50Hz (380/400V)
- 0W = 315 Maximum RLA 50 Hz (380/400V)
- 0X = 395 Maximum RLA 50 Hz (380/400V)
- 0Y = 480 Maximum RLA 50 Hz (380/400V)
- 0Z = 588 Maximum RLA 50 Hz (380/400V)
- 05 = 658 Maximum RLA 50 Hz (380/400V)
- 06 = 745 Maximum RLA 50 Hz (380/400V)
- 07 = 800 Maximum RLA - 50 Hz (380/400V)
- 08 = 880 Maximum RLA - 50 Hz (380/400V)

- 09 = 990 Maximum RLA 50 Hz (380/400V)

### Digit 15 — Chiller Control Type

- 3 = AdaptiView™ Controls only
- 4 = Symbio™

### Digit 16 — Agency Listing

- 1 = UL Listing (includes Canada and California)
- 0 = No Listing

### Digit 17 — AFD Type

- C = NEMA 1 Upgrade Enclosure

### Digit 18 — Mounting Type

- C = Remote Mount
- A = Transition Mount
- L = LiquiFlo Mount
- p = Direct Mount 440E, 5000, 5800 Frame
- T = Direct Mount 400 Frame

### Digit 19 — AFD to Motor Transition

- 0 = No Motor Transition
- A = 6 in. Sheetmetal Transition
- B = 18 in. Sheetmetal Transition
- C = 12 in. Sheetmetal Transition

### Digit 20 — Frame Size

- D = D - Frame
- E = E - Frame

### Digit 21 — Evaporator Shell Size

- 0 = For Transition, LiquiFlo, or Remote
- 5 = 050S (Short) Evaporator Shell
- 6 = 050L (Long) Evaporator Shell
- 7 = 080S (Short) Evaporator Shell
- 8 = 080L (Long) Evaporator Shell
- A = 142E (Extended) Evaporator Shell
- B = 142M (Medium) Evaporator Shell
- C = 142L (Long) Evaporator Shell
- E = 210L (Long) Evaporator Shell

### Digit 22 — Replacement Bracket for LF1.0/LF1.5

- 0 = No Bracket Needed
- 1 = Replacement Bracket Kit Needed

### Digit 23 — Not Used

0

### Digit 24 — Lug Size

- 0 = All Applicable Lugs
- N = Two Wire 3/0 - 250 KCmil
- B = Two Wire 400 - 500 KCmil
- C = Four Wire 4/0 - 400 KCmil
- D = Three Wire 4/0 - 400 KCmil
- E = Three Wire 500 - 750 KCmil
- F = Two Wire 2/0 - 250 KCmil
- G = One Wire 2/0 - 500 KCmil
- H = Three Wire 3/0 400 KCmil
- J = Two Wire 500 - 750 KCmil
- K = One Wire 200 - 500 KCmil
- L = Two Wire 3/0 - 350 KCmil
- M = Two Wire 2AWG - 500 KCmil
- P = Three Wire 4/0 - 500 KCmil
- Q = Four Wire 4/0 - 500 KCmil
- R = Four Wire 3/0 - 400 KCmil



**Digit 25 — Jumper Size**

- 0 = No Jumper Bars Required
- A = Bar Kit 1 (distance between holes 5.385 and dia. 0.812)
- B = Bar Kit 2 (distance between holes 5.831 and dia. 0.812)
- C = Bar Kit 3 (distance between holes 6.103 and dia. 0.812)
- D = Bar Kit 4 (distance between holes 6.103 and dia. 1.187)
- E = All Bars Included

**Digit 26, 27 — Design Specials**

- 00 = No Design Special

**Digit 28, 29 — Harmonic Attenuation**

- 00 = No Attenuation
- 0A = Line/Load Reactor, 0.125mH, 320 amps, NEMA1
- 0B = Line/Load Reactor, 0.105mH, 400 amps, NEMA1
- 0C = Line/Load Reactor, 0.085mH, 500 amps, NEMA1
- 0D = Line/load Reactor, 0.065mH, 600 amps, NEMA1
- 0E = Line/load Reactor, 0.048mH, 750 amps, NEMA1
- 0F = Line/load Reactor, 0.042mH, 850 amps, NEMA1
- 0G = Line/load Reactor, 0.04mH, 900 amps, NEMA1
- 0H = Line/load Reactor, 0.0038mH, 1000 amps, NEMA1
- 1A = Advanced Filter - 208 amps free standing harmonic filter
- 1B = Advanced Filter - 240 amps free standing harmonic filter
- 1C = Advanced Filter - 320 amps free standing harmonic filter
- 1D = Advanced Filter - 403 amps free standing harmonic filter
- 1E = Advanced Filter - 482 amps free standing harmonic filter
- 1F = Advanced Filter - 636 amps free standing harmonic filter
- 1G = Advanced Filter - 786 amps free standing harmonic filter
- 1H = Advanced Filter - 850 amps free standing harmonic filter
- 1J = Advanced Filter - 1000 amps free standing harmonic filter
- 1K = Advanced Filter -1200 Amp free standing harmonic filter
- 1L = Advanced Filter -208 Amp free standing harmonic filter
- 1M = Advanced Filter -208 Amp free standing harmonic filter
- 1N = Advanced Filter -208 Amp free standing harmonic filter
- 1P = Advanced Filter -208 Amp free standing harmonic filter
- 1Q = Advanced Filter -208 Amp free standing harmonic filter



## Nameplates

A nameplate is installed on each AFDH Air-Cooled Drive unit. Provide the model number and serial number printed on the nameplate when making warranty inquiries, ordering parts, or ordering literature for the unit.





## General Information

The step-by-step instructions outlined in this manual describe the procedures required to successfully install an AFDH Upgrade Air-Cooled Adaptive Frequency™ Drive (AFD) package in place of an existing starter on a Trane CVHE, CVHF or CVHG model centrifugal chiller. This only applies to chillers having a Tracer® AdaptiView™ Controller.

D-Frame size AFDH drive packages can be ordered in a unit-mounted or remote floor-mounted cabinet configuration. Voltage options include 380/400 volts, 460/480 volts, and 575/600 volts.

D-Frame size AFDH drive packages can be equipped with drive rating:

- 212 amps, 260 amps, 315 amps, 395 amps, 480 amps, or 588 amps for 380 V/400 V.
- 190 amps, 240 amps, 302 amps, 361 amps, 443 amps, or 535 amps for 460 V/480 V.
- 131 amps, 155 amps, 192 amps, 242 amps, 290 amps, 344 amps, or 400 amps for 575 V/600 V.

**Important:** *The transition-mounted versions of AFDH Upgrade Air-Cooled Adaptive Frequency Drive packages are not suitable for installation on chillers having direct-mount starters. To determine if a specific unit-mounted starter is in fact a direct mount starter, please refer to [Figure 1, p. 10](#).*

### Notes:

- *The factory installed Tracer CH530 chiller controller system will not support an AFDH Air-Cooled Adaptive Frequency Drive. The controller system must first be upgraded to Tracer AdaptiView before an AFDH upgrade package can be installed.*
- *The AFDH series of upgrade air-cooled Adaptive Frequency Drive packages are only intended for installation on existing Trane chillers with CVHE, CVHF or CVHG model centrifugal compressors. Trane makes no claim of suitability or performance regarding retrofit AFDH drives on older Trane centrifugal compressor models or on chillers made by other manufacturers. There may be successful drive retrofits to these units, but users are cautioned that Trane has not evaluated these installations. Trane cannot verify performance, reliability or suitability of upgrade AFDH installations outside of Trane model CVHE, CVHF, and CVHG compressors.*

## Other Literature Required Before Ordering or Installing an AFDH Upgrade

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

- *TR200 - Programming Guide (BAS-SVP04\*-EN).*
- *Tracer® TU Service Tool for Water-Cooled CenTraVac™ Chillers with Tracer AdaptiView™ Control - Programming Guide - (CTV-SVP02\*-EN).*
- *Tracer TU Service Tool For Water-Cooled CenTraVac Chillers with Symbio™ Controls - Programming Guide - (CTV-SVP004\*-EN).*
- *HUB Document DOC-155220-MCT 10 Installation Instructions.docx (Danfoss VLT Motion Control Tools MCT 10 Set-up Software manual).*
- *HUB Document DOC-179427-Creating a Project, a Master File, and Configuration for AFDH D and E\_Frame Drive.docx (AFDH D and E-Frame Drive Configuration Instructions Using MCT 10 Tool).*

# Pre-Installation

## Installation Considerations

This chapter details potential interference fit problems, mechanical incompatibility situations, electrical code stipulations, and electrical conduit and wiring issues that can prevent successful installation and/or operation of an AFDH upgrade drive package.

### Unit-Mounted AFDH Drives

**Important:**

- Route incoming power conduit to the roof of AFDH cabinet. The air-cooled AFDH drive is designed to have the incoming power conduit routed vertically into the unit through the removable conduit connection cover located on the left-hand rear corner of the cabinet roof. If the starter being replaced by the AFDH drive has the incoming power conduit routed horizontally across the top of the starter, or connected to the side or to the bottom of the starter cabinet, an electrician will be required to reconfigure the conduit and wiring.
- Routing the incoming power conduit into the AFDH cabinet anywhere other than through the specified location on the cabinet roof, will be considered an unsupported field modification to the cabinet design.
- When replacing a wye-delta starter with an AFDH, run conduit between the purge and the drive enclosure.

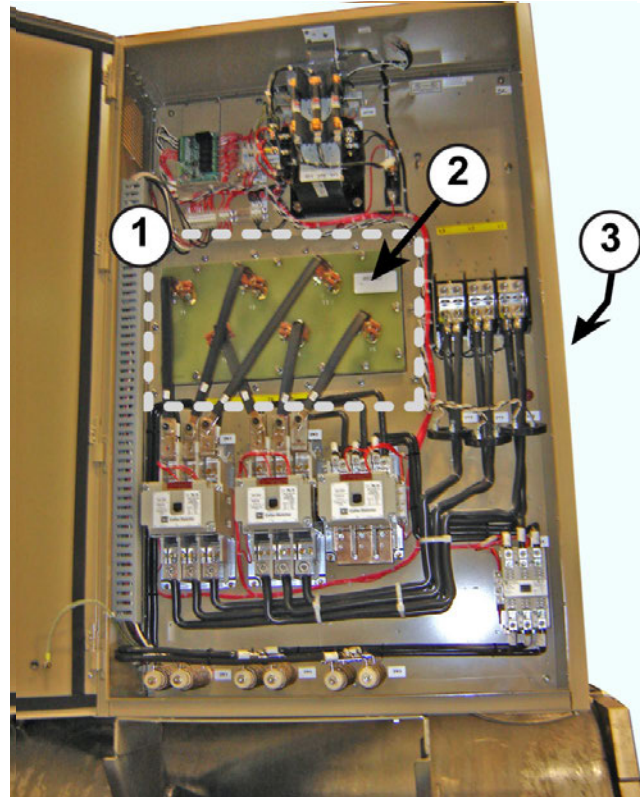
### Upgrading Direct Mount Starter with Direct Mount AFDH Drive

Certain chillers larger than 800 tons in size that were built after 2001, were equipped with direct-mount starters. A direct-mount starter differs from a standard unit-mounted starter in that it is bolted directly to the motor flanges and the motor terminal board is flush with the back of the starter panel box. Refer to [Figure 1](#).

A direct-mount starter also lacks the Z-brackets and transition cover that are an integral part of the standard unit-mounted starter and which are also necessary for the correct installation of a unit-mounted AFDH drive.

When a chiller that is equipped with a direct-mount starter is being upgraded with an AFDH upgrade drive, the drive package would be AFDH direct mount drive.

**Figure 1. Example of a direct-mount chiller starter panel**



Callout number	Description
1	Motor terminal access in left-center quadrant of cabinet. Motor terminal access in an AFDH drive cabinet is located to the left in the upper third portion of the cabinet.
2	Compressor motor terminal board. Flush to back of direct-mount starter cabinet.
3	Hidden by direct-mount starter cabinet is the fact that there are no Z-brackets available for mounting an AFDH drive.

## Evaluate Space Available for Rigging/ Installing Unit-mounted AFDH

The D-Frame AFDH unit-mounted upgrade drives are deeper than the typical wye-delta unit-mounted starter they are intended to replace. Any project should start with a careful evaluation on to determine if there is enough space to rig the AFDH into place and confirm existing building piping and conduit will not interfere with its mounting.

### Important:

- NEC codes require that electrical disconnect switches can be no higher than 72-inches above the surface of the operator area floor or platform. Check the potential mounted height of the AFDH disconnect switch, especially if the chiller has large shells or is mounted on structural steel.
- Include clearance distances specified by local electrical codes to successfully install a stand mounted AFDH drive.
- Typical code regulations require an average of 36-inches of clearance from the panel to nonconducting surfaces and 47-inches to a conducting surface.
- Drive clearances, when installed, should conform to all local codes.
- Account for cabinet door swing clearances.

**Note:** Refer to manual section “AFDH Drive Package Specifications,” p. 20 for the dimensions and weights of all models of AFDH drives.

## Installation Considerations for Remote Floor-Mounted AFDH

### NOTICE

#### Excessive Cable Lengths Between AFDH Drive and Compressor Motor!

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. Trane assumes no responsibility for equipment damage caused by use of improper cable lengths.

### Important:

- Other factors that affect the space required to successfully install a remote floor-mounted AFDH drive include the clearance distances specified by the local electrical codes. Typical code regulations require an average of 36-inches of clearance from the panel to nonconducting surfaces and 47-inches to a conducting surface. Check and confirm that when installed, the drive clearances will conform to all local codes. Do not forget to account for cabinet door swing clearances.

- Plan the installation location of a remote floor-mounted AFDH drive to position it in relation to the chiller compressor motor such that the maximum length of the cables connecting the drive to the motor will not exceed 250 feet.

### Notes:

- Conduit connections to the AFDH for the power output wiring can be made either at the back of the cabinet or on the top of the cabinet. Which of these options is chosen shall be at the discretion of the installing electrician.
- Refer to “AFDH Drive Package Specifications,” p. 20 for the dimensions and weights of all models of AFDH drives.

## Confirm Chiller Controller System Compatibility with AFDH Drive

1. Before starting the process of installing the AFDH, confirm the existing chiller controller system has the hardware and/or software components required to make it compatible with an AFDH retrofit.

2. The controller systems that can accept an AFDH retrofit are:

- Tracer® CH531 retrofit control upgrade packages (all models).

**Note:** The factory installed Tracer CH530 chiller controller system will not support an AFDH Air-Cooled Adaptive Frequency™ Drive. The controller system must first be upgraded to Tracer AdaptiView™ before an AFDH retrofit package can be installed.

- Tracer AdaptiView.

**Note:** UC800 controller must be equipped with a Tracer AdaptiView software version released in January 2019 or newer. Upload the correct Tracer AdaptiView software version as required.

## Equipment Room Ambient Temperature Considerations

An air-conditioned equipment room is not a prerequisite for the installation and operation of an AFDH upgrade drive package.

- All models of the AFDH air-cooled drives are not suitable for installation into equipment rooms where the ambient temperature conditions are expected to exceed either 104°F for a continuous 24-hour period, or where the potential maximum ambient temperatures can exceed 113°F.
- If the ambient temperatures exceed either of these conditions, the potential exists to trigger a drive shutdown from an over temperature fault. This will disable the chiller until the drive temperature drops to the factory set, non-



## Pre-Installation

adjustable, safe temperature level that will allow the drive to be restarted.

- If the ambient temperature routinely exceeds either of these conditions, the overall service life of the drive may be compromised. Verify the drive location will meet the environmental conditions specified in the following table.

**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)

## Chiller Upgrades

- The chiller condenser loop setpoint should be set to 72°F to fully exploit the energy savings possible with a retrofit AFDH drive.
- In some climates and applications, it may be beneficial to set the condenser loop setpoint even lower, to 65°F.

**Important:** *Under such low condenser water conditions, use of an oil recovery system is recommended. These systems are found on all Trane chillers built since 1985.*

## Electrical Cable Size Specifications for AFDH Drives

**Table 2. Input/output power wire cable sizes AFDH D-Frame drives (380V/400V)**

65K Short Circuit Withstand Rating Amps	212	260	315	395	480	588
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Standard Lugs will Accept	One wire lugs 200-500KCMIL	Two wire lugs 3/0-250KCMIL	Two wire lugs 3/0-250KCMIL	Two wire lugs 400-500KCMIL	Three wire lugs 3/0-400KCMIL	Four wire lugs 4/0-500KCMIL
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Optional Lugs will Accept	Two wire lugs 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two wire lugs 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two wire lugs 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	NA	Two wire lugs 500-750 KCMIL	Three wire lugs 500-750 KCMIL  Four wire Lugs 3/0-400 KCMIL
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 313 MCM DLO wires
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 444 MCM DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 313 MCM DLO wires
Output power to fuse blocks: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 444 MCM DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Range of Wire Sizes Lugs will Accepts (Remote Mount)	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL
100K Short Circuit Withstand Rating Amps	212	260	315	395	480	588
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Standard Lugs will Accept	One wire lugs 200-500KCMIL	Two wire lugs 3/0-250KCMIL	Two wire lugs 3/0-250KCMIL	Two wire lugs 400-500KCMIL	Four wire lugs 4/0-500KCMIL	Four wire lugs 4/0-500KCMIL
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Optional Lugs will Accept	Two wire lugs 2/0-250 KCMIL  One Wire Lug	Two wire lugs 2/0-250 KCMIL  One Wire Lug	Two wire lugs 2/0-250 KCMIL  One Wire Lug	NA	Three wire lugs 500-750 KCMIL  Four wire Lugs	Three wire lugs 500-750 KCMIL  Four wire Lugs

**Table 2. Input/output power wire cable sizes AFDH D-Frame drives (380V/400V) (continued)**

100K Short Circuit Withstand Rating Amps	212	260	315	395	480	588
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 313 MCM DLO wires
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 444 MCM DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 313 MCM DLO wires
Output power to fuse blocks: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 444 MCM DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Range of Wire Sizes Lugs will Accepts (Remote Mount)	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL

**Table 3. Input/output power wire cable sizes AFDH D-Frame drives (460V/480V)**

65K Short Circuit Withstand Rating Amps	190	240	302	361	443	535
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Standard Lugs will Accept	One wire lugs 200-500KCMIL	Two wire lugs 3/0-250KCMIL	Two wire lugs 3/0-250KCMIL	Two wire lugs 400-500KCMIL	Three wire lugs 3/0-400KCMIL	Four wire lugs 4/0-500KCMIL
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Optional Lugs will Accept	Two Wire Lug 2/0-250 KCMIL One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL One Wire Lug 2/0-500 KCMIL	NA	Two wire lugs 500-750 KCMIL	Three wire lugs 500-750 KCMIL Four wire lugs 3/0-400 KCMIL
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 313 MCM DLO wires
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 444 MCM DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 313 MCM DLO wires
Output power to fuse blocks: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 444 MCM DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Range of Wire Sizes Lugs will Accepts (Remote Mount)	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL



**Pre-Installation**

**Table 3. Input/output power wire cable sizes AFDH D-Frame drives (460V/480V) (continued)**

100K Short Circuit Withstand Rating Amps	190	240	302	361	443	535
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Standard Lugs will Accept	One wire lugs 200-500KCMIL	Two wire lugs 3/0-250KCMIL	Two wire lugs 3/0-250KCMIL	Two wire lugs 400-500KCMIL	Four wire lugs 4/0-500KCMIL	Four wire lugs 4/0-500KCMIL
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Optional Lugs will Accept	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	NA	Three Wire Lugs 500-750 KCMIL  Four Wire Lugs 3/0-400 KCMIL	Three Wire Lugs 500-750 KCMIL  Four Wire Lugs 3/0-400 KCMIL
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 313 MCM DLO wires
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 444 MCM DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 313 MCM DLO wires
Output power to fuse blocks: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires	Two 313 MCM DLO wires	Two 444 MCM DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Range of Wire Sizes Lugs will Accepts (Remote Mount)	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL

**Table 4. Input/output power wire cable sizes AFDH D-Frame drives (575 V/600 V)**

35K Short Circuit Withstand Rating Amps	131	155	192	242	290	344	400
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Standard Lugs will Accept	One wire lugs 200-500 KCMIL	One wire lugs 200-500 KCMIL	One wire lugs 200-500 KCMIL	Two wire lugs 3/0-250 KCMIL	Two wire lugs 3/0-350 KCMIL	Two wire lugs 3/0-350KCMIL	Two wire lugs 3/0-350KCMIL
Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Optional Lugs will Accept	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two wire lugs 450-500 KCMIL	Two wire lugs 450-500 KCMIL	Two wire lugs 450-500 KCMIL
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires
Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires
Output power to compressor motor: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires

**Table 4. Input/output power wire cable sizes AFDH D-Frame drives (575 V/600 V) (continued)**

<b>35K Short Circuit Withstand Rating Amps</b>	<b>131</b>	<b>155</b>	<b>192</b>	<b>242</b>	<b>290</b>	<b>344</b>	<b>400</b>
<b>Output power to fuse blocks: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)</b>	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires
<b>Output power to compressor motor: Number of Wire Cable Per Phase and Range of Wire Sizes Lugs will Accepts (Remote Mount)</b>	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL
<b>65K Short Circuit Withstand Rating Amps</b>	<b>131</b>	<b>155</b>	<b>192</b>	<b>242</b>	<b>290</b>	<b>344</b>	<b>400</b>
<b>Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Standard Lugs will Accept</b>	One wire lugs 200-500 KCMIL	One wire lugs 200-500 KCMIL	One wire lugs 200-500 KCMIL	Two wire lugs 3/0-250 KCMIL	Two wire lugs 2 AWG-500 KCMIL	Two wire lugs 2 AWG-500 KCMIL	Two wire lugs 2 AWG-500 KCMIL
<b>Incoming power to drive circuit breaker: Number of Cable Lugs per Phase and Range of Wire Sizes Optional Lugs will Accept</b>	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL  One Wire Lug 2/0-500 KCMIL	Two Wire Lug 2/0-250 KCMIL	NA	NA	NA
<b>Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)</b>	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires
<b>Phase wire between drive and circuit breaker: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)</b>	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires
<b>Output power to compressor motor: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Unit Mount)</b>	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires
<b>Output power to fuse blocks: Number of Wire Cable Per Phase and Size of Factory Installed Wires (Remote Mount)</b>	Two 1/0 DLO wires	Two 1/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 3/0 DLO wires	Two 4/0 DLO wires
<b>Output power to compressor motor: Number of Wire Cable Per Phase and Range of Wire Sizes Lugs will Accepts (Remote Mount)</b>	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600 KCMIL	Two wire lugs 2/0-600KCMIL	Two wire lugs 2/0-600KCMIL

## Requirements for Installation Technicians

To properly install an AFDH Upgrade Adaptive Frequency™ Drive (AFD) package, the technician must have a good working knowledge of the centrifugal chiller controller system involved in the application. Training is highly recommended before beginning this upgrade.



## Required Tools

Normal tools are required to perform the work. A trained, HVAC service technician with a well stocked tool chest should already have the majority of the normal tools needed for this job.

The following is a partial list of specific field supplied hardware and software components and special tools required to perform the drive upgrade:

- The appropriate lifting device or devices (including all necessary rigging hardware) with the capacity to safely lift up to 1500 lb.
  - Important! A spreader bar will be required if the drive unit will be hoisted into position using a single lifting device that is capable of making only a single-point lift.
- APC or laptop equipped with the correct software tools for the chiller controller involved in the application.
  - Tracer® TU service software version 10.2.174 or newer.

### Notes:

- 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.
- The most current CTV and CVR microprocessor (MP) firmware files are included with the program files for the Tracer TU service software tools.
  - Type A to Type B USB cable to connect the computer to a Tracer UC800 controller.
  - Magnet screwdriver (TOL01343).

## Field-Provided Material

Field provided material will be required to perform the drive retrofit. See the partial list of material here to help the technician to plan ahead and to avoid material shortages at the job site.

- Self-adhesive cable tie mounting bases and cable ties.
  - Used to help clean up wiring runs during the installation process.
- Loctite® 554 thread sealant for refrigerant applications (Trane part number SEL00528).
  - Used in applications where a pressure transducer needs to be installed.
- For direct mount drive install, have a 3-inch x 3-inch slotted shim full assortment kit available.
  - Used to shim between the enclosure and the evaporator attached bracket.

## Recommended Rigging and Lifting Procedures for AFDH Drive Units

### **WARNING**

#### **Heavy Object!**

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage.

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.

### **WARNING**

#### **Improper Unit Lift!**

Failure to 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.

An AFDH cabinet assembly may be top heavy. 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

Figure 2. Unit lifting points and center of gravity (direct mount)

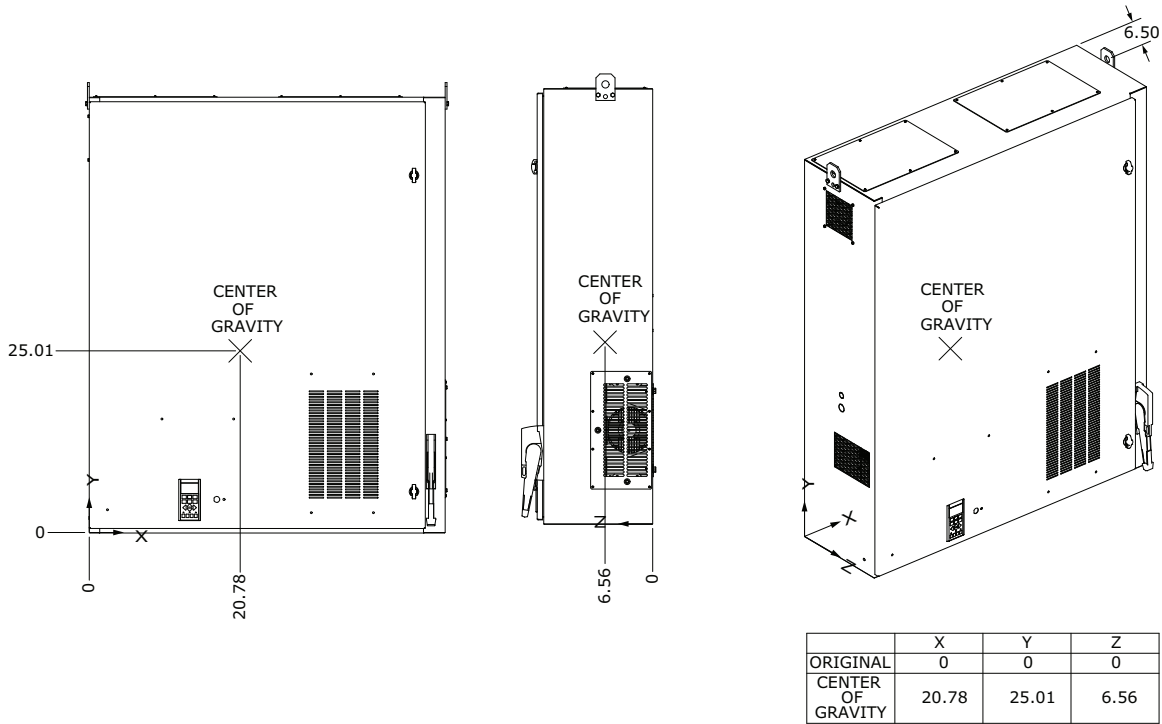


Figure 3. Unit lifting points and center of gravity (transition mount)

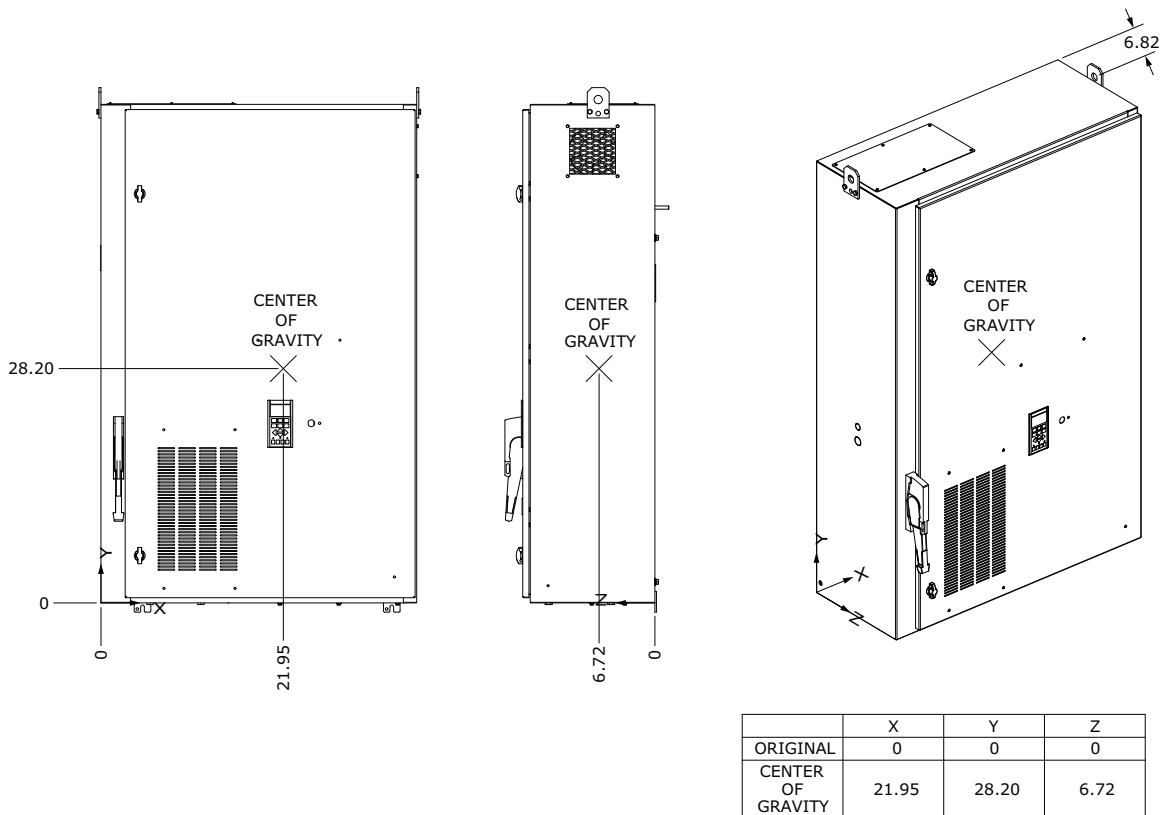
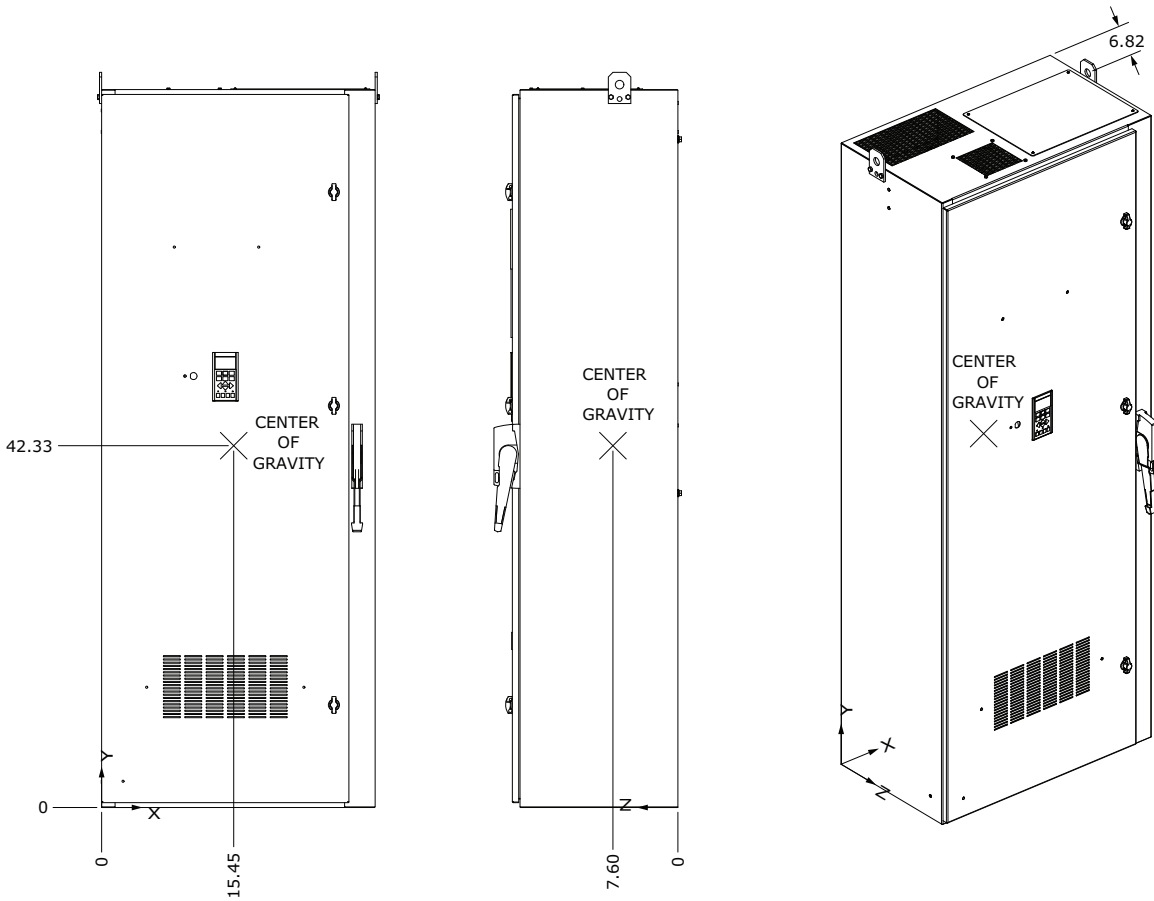


Figure 4. Unit lifting points and center of gravity (remote mount)



	X	Y	Z
ORIGINAL	0	0	0
CENTER OF GRAVITY	15.45	42.33	7.60

## Preferred Lifting Method

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

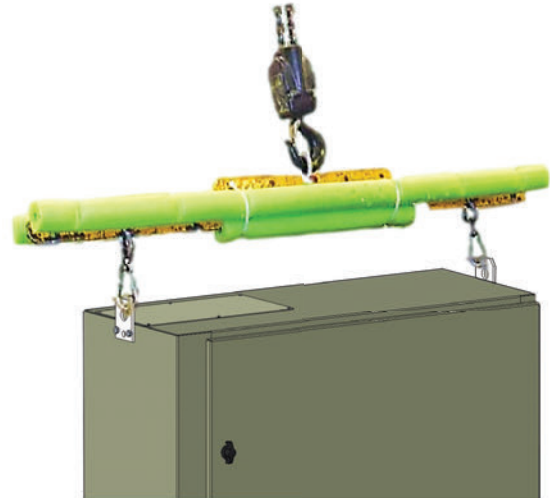
**Figure 5. Preferred lifting method using two identical individual hoists**



## Alternative Lifting Method

Lift is only possible to use a single hoisting device to lift an AFDH 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.

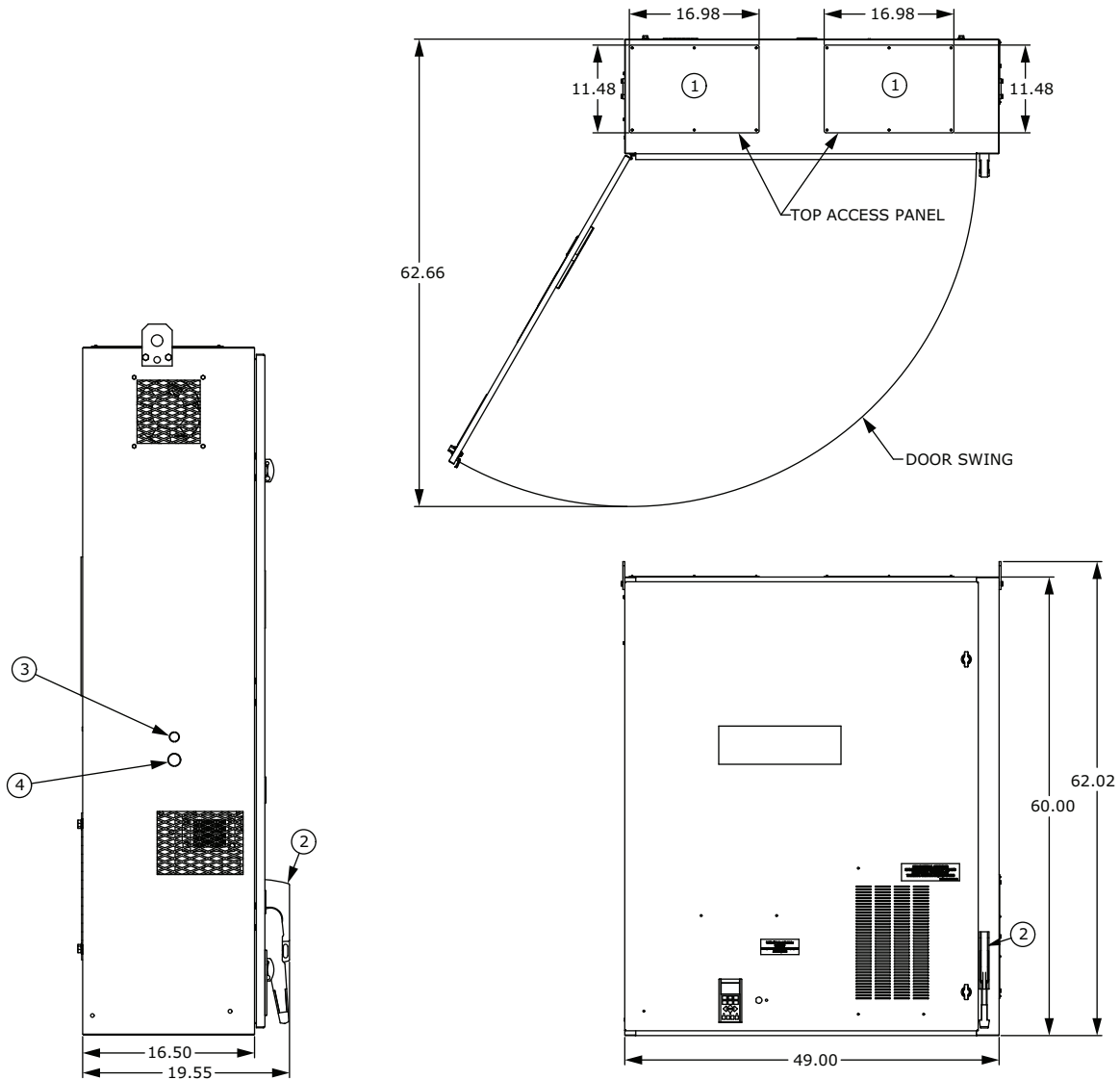
**Figure 6. Alternative lifting method using a single hoist and spreader bar**



# AFDH Drive Package Specifications

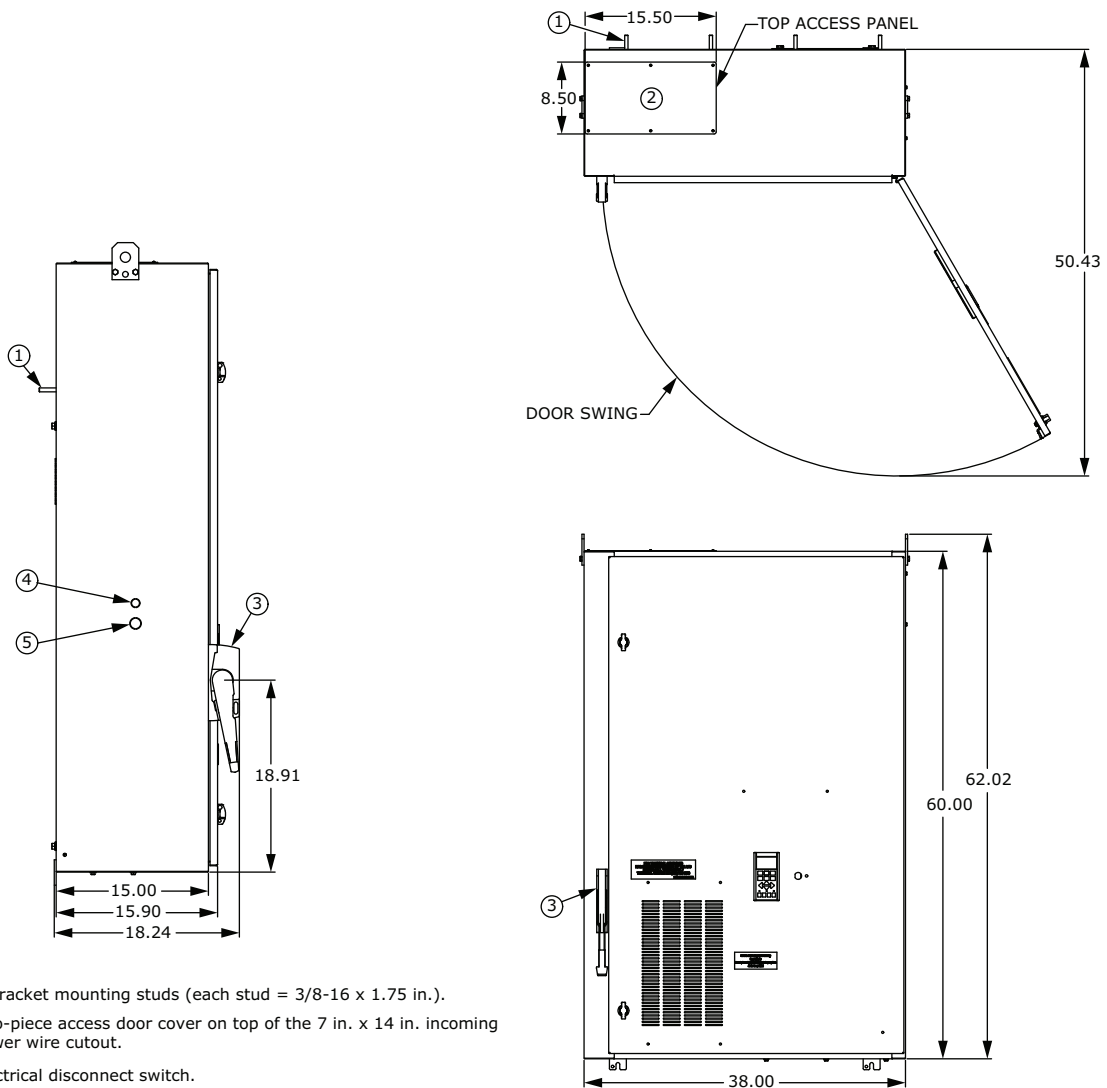
## AFDH D-Frame Dimensions

Figure 7. Top, front, and side view of D-Frame AFDH cabinet with dimensions (direct mount)



1. Two-piece access door cover on top of the 10 in. x 15.5 in. incoming power wire cutout.
2. Electrical disconnect switch.
3. 0.88 in. diameter cutout for 0.50 in. electrical conduit.
4. 1.13 in. diameter cutout for 0.75 in. electrical conduit.

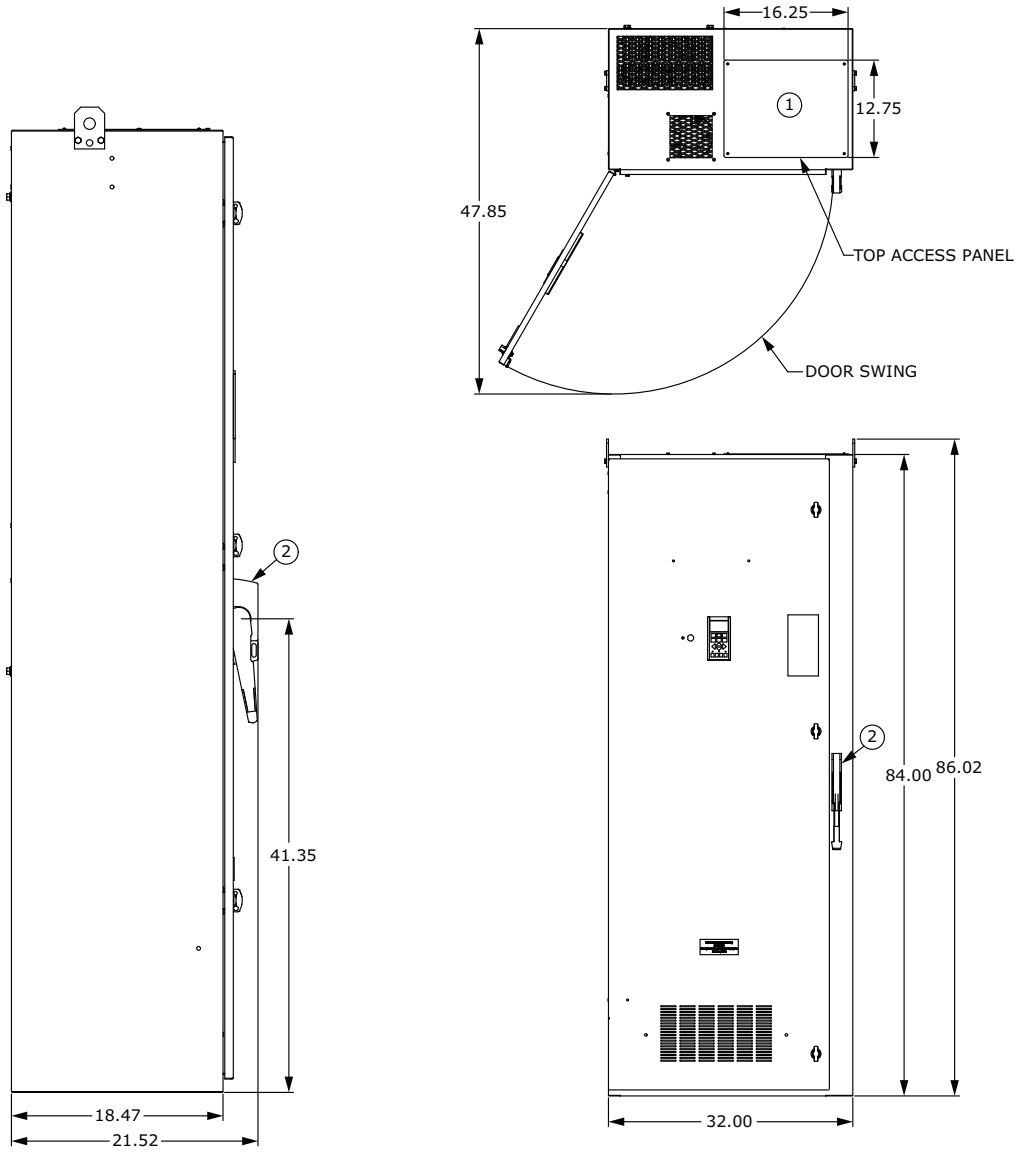
Figure 8. Top, front, and side view of D-Frame AFDH cabinet with dimensions (transition mount)



1. Z-bracket mounting studs (each stud = 3/8-16 x 1.75 in.).
2. Two-piece access door cover on top of the 7 in. x 14 in. incoming power wire cutout.
3. Electrical disconnect switch.
4. 0.88 in. diameter cutout for 0.50 in. electrical conduit.
5. 1.13 in. diameter cutout for 0.75 in. electrical conduit.

## AFDH Drive Package Specifications

Figure 9. Top, front, and side view of D-Frame AFDH cabinet with dimensions (remote mount)

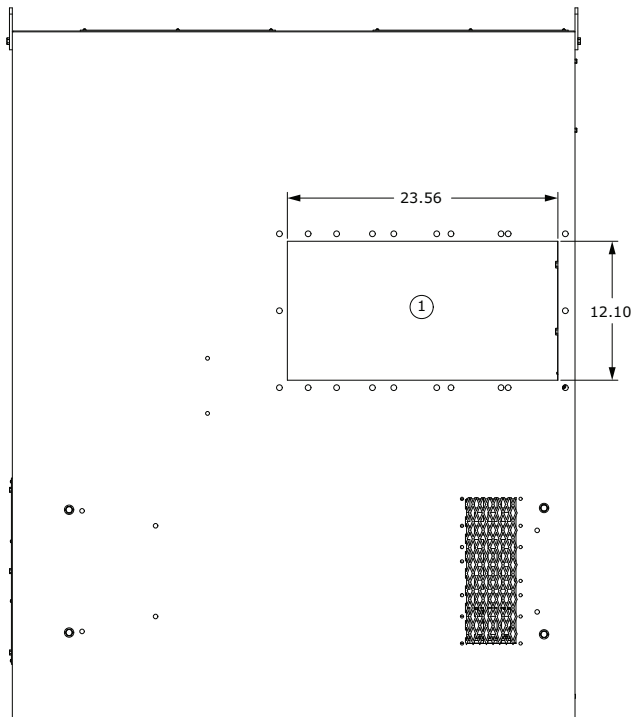


1. Two-piece access door cover on top of the 11 in. x 14.5 in. incoming power wire cutout.

2. Electrical disconnect switch.

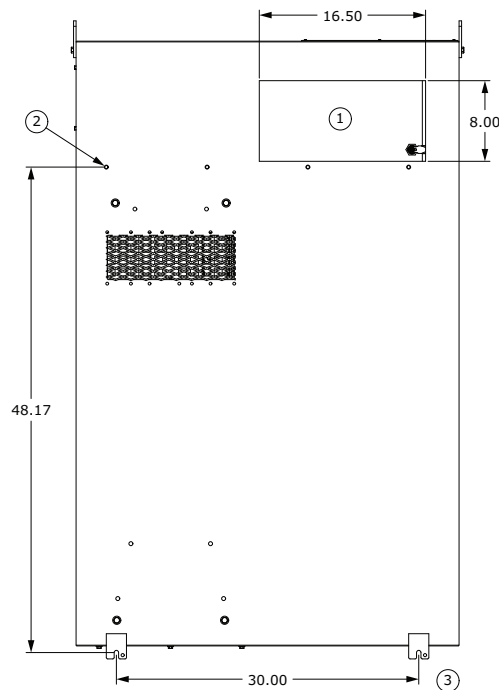


Figure 10. Rear view of D-Frame AFDH cabinet with dimensions (direct mount)



1. Motor terminal access cover. Size of cutout is 12.1 in. x 23.56 in.

Figure 11. Rear view of D-Frame AFDH cabinet with dimensions (transition mount)



1. Motor terminal access cover. Size of cutout is 8 in. x 16.5 in.
2. Centerline of Z-bracket mounting studs.
3. Center-to-center spacing of the mounting notches for the angle iron bracket clips that will be removed from the unit mounted starter being replaced and reused.



## AFDH Drive Package Specifications

# Drive Unit Weights and Heat Rejection

**Table 5. AFDH D-Frame unit weights (380 V/400 V)**

380V/400V D-Frame AFDH Maximum Amps	212			260			315		
Enclosure Type	Direct	Transitional	Remote	Direct	Transitional	Remote	Direct	Transitional	Remote
Unit Weight	725 Lb	675 Lb	675 Lb	725 Lb	675 Lb	675 Lb	725 Lb	675 Lb	675 Lb
Heat Rejection	10076 Btu/h			11420 Btu/h			14300 Btu/h		

380V/400V D-Frame AFDH Maximum Amps	395			480			588		
Enclosure Type	Direct	Transitional	Remote	Direct	Transitional	Remote	Direct	Transitional	Remote
Unit Weight	750 Lb	700Lb	700Lb	825 Lb	775Lb	775Lb	1150 Lb	1100Lb	1100Lb
Heat Rejection	16380 Btu/h			19800 Btu/h			24450 Btu/h		

**Table 6. AFDH D-Frame unit weights (460 V/480 V)**

460V/480V D-Frame AFDH Maximum Amps	190			240			302		
Enclosure Type	Direct	Transitional	Remote	Direct	Transitional	Remote	Direct	Transitional	Remote
Unit Weight	725 Lb	675 Lb	675 Lb	725 Lb	675 Lb	675 Lb	725 Lb	675 Lb	675 Lb
Heat Rejection	10083 Btu/h			10635 Btu/h			14300 Btu/h		

460V/480V D-Frame AFDH Maximum Amps	361			443			535		
Enclosure Type	Direct	Transitional	Remote	Direct	Transitional	Remote	Direct	Transitional	Remote
Unit Weight	750 Lb	700 Lb	700 Lb	825 Lb	775 Lb	775 Lb	1150 Lb	1100 Lb	1100 Lb
Heat Rejection	16380 Btu/h			19800 Btu/h			24450 Btu/h		

**Table 7. AFDH D-Frame unit weights (575 V/600 V)**

575V/600V D-Frame AFDH Maximum Amps	131			155			192			242		
Enclosure Type	Direct	Transitional	Remote	Direct	Transitional	Remote	Direct	Transitional	Remote	Direct	Transitional	Remote
Unit Weight	725 Lb	675 Lb	675 Lb	725 Lb	675 Lb	675 Lb	725 Lb	675 Lb	675 Lb	750 Lb	700 Lb	700 Lb
Heat Rejection	7294 Btu/h			8522 Btu/h			11262 Btu/h			14300 Btu/h		

575V/600V D-Frame AFDH Maximum Amps	290			344			400		
Enclosure Type	Direct	Transitional	Remote	Direct	Transitional	Remote	Direct	Transitional	Remote
Unit Weight	825 Lb	775 Lb	775 Lb	1150 Lb	1100 Lb	1100 Lb	1150 Lb	1100 Lb	1100 Lb
Heat Rejection	16380 Btu/h			19800 Btu/h			24450 Btu/h		

## D-Frame Drive Unit Components

### Drive Unit Component Parts Housed within the Custom Enclosure

Figure 12. Mounting location of D and E-Frame custom enclosure parts

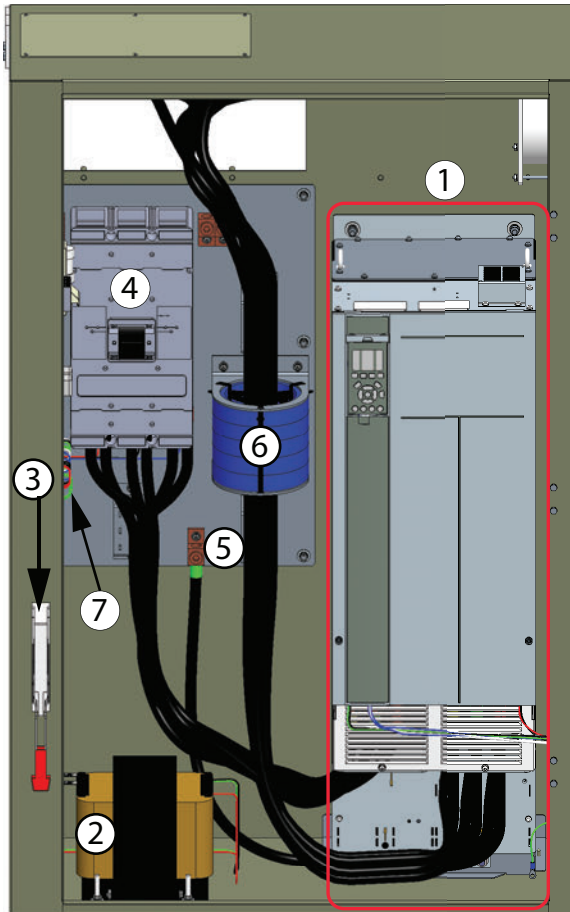
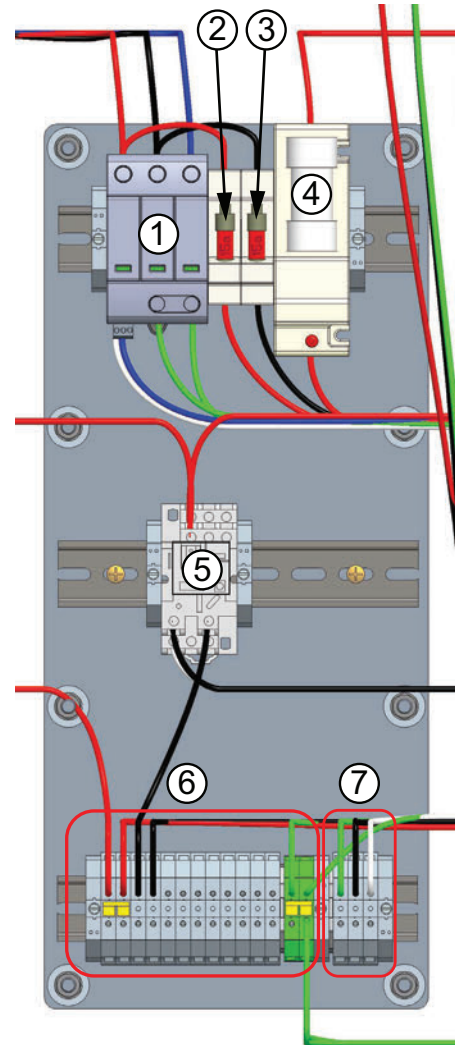


Figure 13. D-Frame AFDH UC800/Tracer® AdaptiView™ ancillary control components



Callout number	Description
1	Right-hand houses the TR200 drive module for the unit. For the part numbers of the components housed within the left-hand custom enclosure section of the unit by drive model size, refer to the following tables.
2	Transformer (4 KVA)
3	Circuit breaker handle
4	Circuit breaker
5	Ground lug
6	Choke
7	To view the components attached to the left interior wall of the enclosure, see <a href="#">Figure 13, p. 25</a> .

Callout number	Description
1	MOV (2F5)
2	Control power primary fusing (2F1)
3	Control power primary fusing (2F2)
4	Control power secondary fusing (2F4)
5	Oil pump interlock relay (2K11)
6	Terminal blocks (2X1)
7	Terminal blocks (2X2)



## AFDH Drive Package Specifications

**Table 8. Custom enclosure parts: D-Frame 212 amps model drives (380V/400V)**

Trane Assembly Part Numbers for all Optional Model Versions of 380V/400V D-Frame 212 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171879020	136U2154	1
2	4 KVA Transformer	X13550916020		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050916010	HKD3300F	1
	Circuit breaker (Opt)	X13050919010	KDC3300F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 9. Custom enclosure parts: D-Frame 260 amps model drives (380V/400V)**

Trane Assembly Part Numbers for all Optional Model Versions of 380V/400V D-Frame 260 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171880020	136U2155	1
2	4 KVA Transformer	X13550916020		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050889010	HKD3400F	1
	Circuit breaker (Opt)	X13050891010	KDC3400F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 10. Custom enclosure parts: D-Frame 315 amps model drives (380V/400V)**

Trane Assembly Part Numbers for all Optional Model Versions of 380V/400V D-Frame 315 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171863020	136U2157	1
2	4 KVA Transformer	X13550916020		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050889010	HKD3400F	1
	Circuit breaker (Opt)	X13050891010	KDC3400F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 11. Custom enclosure parts: D-Frame 395 amps model drives (380V/400V)**

Trane Assembly Part Numbers for all Optional Model Versions of 380V/400V D-Frame 395 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171864020	136U2159	1
2	4 KVA Transformer	X13550916020		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050925010	HLD3600F	1
	Circuit breaker (Opt)	X13050927010	LDC3600F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 12. Custom enclosure parts: D-Frame 480 amps model drives (380V/400V)**

Trane Assembly Part Numbers for all Optional Model Versions of 380V/400V D-Frame 480 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171865020	136U2161	1
2	4 KVA Transformer	X13550916020		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050885010	HMDL3800F	1
	Circuit breaker (Opt)	X13050893010	NGC308033E	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 13. Custom enclosure parts: D-Frame 588 amps model drives (380V/400V)**

Trane Assembly Part Numbers for all Optional Model Versions of 380V/400V D-Frame 588 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171866020	136U2163	1
2	4 KVA Transformer	X13550916020		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050904010	NGH312033E	1
	Circuit breaker (Opt)	X13050905010	NGC312033E	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.



## AFDH Drive Package Specifications

**Table 14. Custom enclosure parts: D-Frame 190 amp model drives (460V/480V)**

Trane Assembly Part Numbers for all Optional Model Versions of 460V/480V D-Frame 190 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171879020	136U2154	1
2	4 KVA Transformer	X13550916030		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050916010	HKD3300F	1
	Circuit breaker (Opt)	X13050919010	KDC3300F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 15. Custom enclosure parts: D-Frame 240 amp model drives (460V/480V)**

Trane Assembly Part Numbers for all Optional Model Versions of 460V/480V D-Frame 240 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171880020	136U2155	1
2	4 KVA Transformer	X13550916030		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050889010	HKD3400F	1
	Circuit breaker (Opt)	X13050891010	KDC3400F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 16. Custom enclosure parts: D-Frame 302 amp model drives (460V/480V)**

Trane Assembly Part Numbers for all Optional Model Versions of 460V/480V D-Frame 302 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171863020	136U2157	1
2	4 KVA Transformer	X13550916030		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050889010	HKD3400F	1
	Circuit breaker (Opt)	X13050891010	KDC3400F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 17. Custom enclosure parts: D-Frame 361 amp model drives (460V/480V)**

Trane Assembly Part Numbers for all Optional Model Versions of 460V/480V D-Frame 361 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171864020	136U2159	1
2	4 KVA Transformer	X13550916030		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050925010	HLD3600F	1
	Circuit breaker (Opt)	X13050927010	LDC3600F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 18. Custom enclosure parts: D-Frame 443 amp model drives (460V/480V)**

Trane Assembly Part Numbers for all Optional Model Versions of 460V/480V D-Frame 443 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171865020	136U2161	1
2	4 KVA Transformer	X13550916030		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050885010	HMDL3800F	1
	Circuit breaker (Opt)	X13050893010	NGC308033E	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 19. Custom enclosure parts: D-Frame 535 amp model drives (460V/480V)**

Trane Assembly Part Numbers for all Optional Model Versions of 460V/480V D-Frame 535 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171866020	136U2163	1
2	4 KVA Transformer	X13550916030		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050904010	NGH312033E	1
	Circuit breaker (Opt)	X13050905010	NGC312033E	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.





## AFDH Drive Package Specifications

**Table 20. Custom enclosure parts: D-Frame 131 amp model drives (575V/600V)**

Trane Assembly Part Numbers for all Optional Model Versions of 575V/600V D-Frame 131 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171879030	136U2378	1
2	4 KVA Transformer	X13550916040		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050916010	HKD3300F	1
	Circuit breaker (Opt)	X13050919010	KDC3300F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 21. Custom enclosure parts: D-Frame 155 amp model drives (575V/600V)**

Trane Assembly Part Numbers for all Optional Model Versions of 575V/600V D-Frame 155 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171880030	136U2379	1
2	4 KVA Transformer	X13550916040		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050916010	HKD3300F	1
	Circuit breaker (Opt)	X13050919010	KDC3300F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 22. Custom enclosure parts: D-Frame 192 amp model drives (575V/600V)**

Trane Assembly Part Numbers for all Optional Model Versions of 575V/600V D-Frame 192 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171863030	136U2585	1
2	4 KVA Transformer	X13550916040		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050916010	HKD3300F	1
	Circuit breaker (Opt)	X13050919010	KDC3300F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 23. Custom enclosure parts: D-Frame 242 amp model drives (575V/600V)**

Trane Assembly Part Numbers for all Optional Model Versions of 575V/600V D-Frame 242 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171864030	136U2586	1
2	4 KVA Transformer	X13550916040		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050889010	HKD3400F	1
	Circuit breaker (Opt)	X13050891010	KDC3400F	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 24. Custom enclosure parts: D-Frame 290 amp model drives (575V/600V)**

Trane Assembly Part Numbers for all Optional Model Versions of 575V/600V D-Frame 290 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171865030	136U2588	1
2	4 KVA Transformer	X13550916040		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050925010	HLD3600F	1
	Circuit breaker (Opt)	X13050920010	LGU3500FAG	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 25. Custom enclosure parts: D-Frame 344 amp model drives (575V/600V)**

Trane Assembly Part Numbers for all Optional Model Versions of 575V/600V D-Frame 344 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171866030	136U2589	1
2	4 KVA Transformer	X13550916040		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050925010	HLD3600F	1
	Circuit breaker (Opt)	X13050921010	LGU3600FAG	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.



## AFDH Drive Package Specifications

**Table 26. Custom enclosure parts: D-Frame 400 amp model drives (575V/600V)**

Trane Assembly Part Numbers for all Optional Model Versions of 575V/600V D-Frame 400 Amp AFDH				
Figure 12 Callout	Part Description	Trane X-Code Part Number	Supplier Part Number	Quantity
1	Compressor drive	X13171862010	136N4744	1
2	4 KVA Transformer	X13550916040		1
3	Circuit breaker handle	X32070781010		1
4	Circuit breaker	X13050925010	HLD3600F	1
	Circuit breaker (Opt)	X13050921010	LGU3600FAG	1
5	Ground lug	X19150083010		4
6	Choke	X13640734010	M-116	5
	Choke (Opt) <sup>(a)</sup>	X13640735010	M-117	4

(a) For remote mount drive starters only.

**Table 27. Custom enclosure parts: D-Frame AFDH UC800/Tracer® AdaptiView™ ancillary control components**

Trane Assembly Part Numbers for Controls Parts AFDH					
Figure 13 Callout	Part Description	Trane X-Code Part Number	Trane Mnemonic number	Supplier Part Number	Quantity
1	Arrester; 3-Pole MOV, 600V WYE	X13641454001		BSPM3600WYGR	1
2	Fuse holder; 30A, 600V, 2P	X13111193010			1
	Fuse 15A, 600V	X13110683300			2
3	Fuse holder; 30A, 600V, 2P	X13111193010			1
	Fuse 15A, 600V	X13110683300			2
4	Fuse holder; 60A, 600V, 1P	X13111194010			1
	Fuse 40A, 600V	X13110755020			1
5	Socket; Relay		RLY03796		1
	Relay; Contact Capacity 120Vac/15A	X13260712010			1
6	Socket; Relay		RLY03796		1
	Relay; Contact Capacity 120Vac/15A	X13260712010			1
7	Terminal Block; 50A, 600V AC/DC, 22-8 AWG	X13491367010			1
8	Terminal Block; 50A, 600V AC/DC, 22-8 AWG	X13491367010			1

### Additional Hardware Shipped with Tracer® AdaptiView™ AFDH Packages

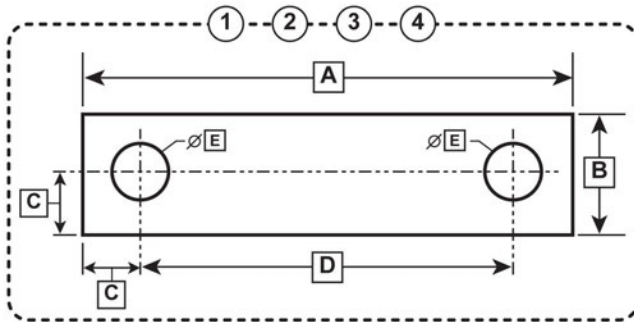
**Table 28. Tracer AdaptiView miscellaneous hardware contents parts list**

Part Description	Quantity	Trane X-Code Part Number	Mnemonic Number
Low pressure transducer; 0–70 PSIA, IPC3 output, 24 VDC, 0-70 PSIA, 0.25 - 18 NPTF	1	X13790362090	TDR00733
Branching cable; Male to two Female, 39.37 inches long	1	X19051622020	CAB01147
Extension cable; Male to Female, 39.37 inches long	1	X19051623010	CAB01149
Executive Beige Paint; 10 oz. aerosol can	1	X35020476020	PAI00297
TR200 Programming Guide	1		BAS-SVP04*-EN
UC800 to Drive Modbus® Cable	1		50712390
Schematics	1		50712127
AFDH E-Frame Upgrade Adaptive Frequency Drive Installation manual	1		AFDH-SVN005*-EN
Connector; Plug/Screw, 3	1	X19220085020	CON00430

**Note:** Shorting buss bars that could be required for a upgrade AFDH drive installation are not included within the Tracer® AdaptiView™ miscellaneous hardware package kit. Use the buss bars that best match the

spacing and size of the compressor motor terminal lugs on the specific chiller receiving the drive upgrade.

**Figure 14. Buss bars specifications; CH531/Tracer AdaptiView hardware packages**



1. Example of shorting buss bars contained in kit BAR0177.
2. Example of shorting buss bars contained in kit BAR0163.
3. Example of shorting buss bars contained in kit BAR00176.
4. Example of shorting buss bars contained in kit BAR00165.

BAR KIT	A	B	C	D	E
①	7.0 in.	1.62 in.	0.81 in.	5.385 in.	0.812 in.
②	7.46 in.	1.62 in.	0.81 in.	5.831 in.	0.812 in.
③	7.73 in.	1.62 in.	0.81 in.	6.103 in.	0.812 in.
④	8.29 in.	2.18 in.	1.09 in.	6.103 in.	1.187 in.

## Other AFDH Drive Package Accessories

### Motor panel transition covers

- It is possible to order a complete new motor panel transition cover assembly if one is needed, either as part of the drive package order or separately if necessary.
- The transition cover assembly when properly installed, prevents direct access to the output motor lead sections that emerge from the access cutout at the back of a unit-mounted or stand-mounted AFDH drive, and connect to the compressor motor terminal board.

**Table 29. Part numbers for motor panel transition covers**

Part Description	Trane Part #	Mnemonic #
6-inch motor panel transition cover assembly	506820000100	COV02946
12-inch motor panel transition cover assembly	506859440100	COV03203
18-inch motor panel transition cover assembly	506819750100	COV02945



# Installation

## Removal of Electrical Connections to the Existing Starter

### **⚠ 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. Turn off the main power disconnect to the chiller and follow the correct lockout/tagout safety procedures to CONFIRM main power to the machine cannot be inadvertently restored.
  - a. For additional safety, open all starter and control panel disconnect switches and secure them in the open position.
  - b. Depending upon the starter type, verify no electrical power exists at either the starter breaker, starter disconnect switch, starter terminal block, and other starter components before removing wiring.
2. Note the orientation of the power cable connections to the starter breaker, or starter disconnect switch, or starter terminal block.
  - a. Identify and clearly label the L1, L2, L3, and ground wiring cables before they are disconnected.
3. Identify and clearly label the power wiring cables at the compressor motor terminal lugs T1, T2, T3, T4, T5, and T6 and disconnect them.
  - a. Disconnect the cables from their connection points on the starter.
  - b. Remove them from the cabinet area to prevent them from getting in the way during the rest of the starter removal process.
  - c. Keep the motor terminal lugs. They will be reused later in the installation.
4. At the starter cabinet, identify and clearly label the control and communication wiring running to the starter panel.
  - a. Identify and record the termination point of each wire at the terminal block and then disconnect them.

- b. Remove and save the conduit fittings from the line, load, and control power entrances and exits on the starter cabinet.
- c. Remove and save the conduit top plate for possible reuse later in the installation.

## Mechanical Removal of the Existing Unit-Mounted Starter

### **⚠ WARNING**

#### **Heavy Objects!**

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage. 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.

### **⚠ 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.

1. Depending on the model type, a unit-mounted starter can weigh up to 750 pounds.
  - a. Verify the intended lifting device and rigging has the capacity to safely handle the load before hooking up to the designated lifting points on the starter unit.

**Note:** On some existing starters, lifting tabs are spot-welded to the enclosure. These welds can break if not lifted straight up. For a safe lift, Trane recommends drilling a hole and bolting the tabs to the enclosure to ensure a safe lift.
2. Using safe lifting practices, slowly begin taking up the slack in the rigging.

Tension the rigging only to the point necessary to take up enough of the weight of the starter panel to enable loosening the bolts connecting the panel to the Z-bracket on the motor flange.
3. While steadying the starter panel to prevent it from tipping forward, carefully begin removing the retaining bolts.

**Note:** The existing Z-bracket and transition cover will be reused and do not need to be removed unless greater access is required to the motor terminals during drive installation.

4. Remove the bolts securing the bottom of the starter to the brackets on the evaporator.
5. Carefully remove the starter panel from the chiller and set it down in a safe location.

**Important:**

- Do not cut off the starter panel brackets that are welded to the evaporator shell as they will be reused.
- Do not discard any of the nuts, bolts, washers, or the angle-iron clips that were used to attach the starter panel tabs to the evaporator bracket as they will all be reused.

## Mechanical Removal of the Existing Remote-Mounted Starter

### ⚠ WARNING

#### Heavy Objects!

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage. 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.

### ⚠ 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. An AFDH cabinet assembly is top heavy. 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.

**Notes:**

- Due to the number of starter model types that can exist, the possible remote-mounting configurations (i.e. wall mounted, stand mounted, floor mounted, etc.) and the number of possible variations of each mounting configuration, it is not possible to provide specific detailed instructions for the correct mechanical removal of any one particular type of remote-starter. For each facility that has a remote-mounted starter to remove, it is the responsibility of the technicians assigned to perform this task to determine the tools and equipment needed, and to identify

the correct procedures to follow to safely remove the starter.

- On some existing starters, lifting tabs are spot-welded to the enclosure. These welds can break if not lifted straight up. For a safe lift, Trane recommends drilling a hole and bolting the tabs to the enclosure to ensure a safe lift.

## Mechanical Removal of the Existing Unit-Mounted LiquiFlo 1.0/1.5 Adaptive Frequency Drive

### ⚠ WARNING

#### Heavy Objects!

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage. 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.

### ⚠ 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.

1. Isolate the LiquiFlo drive water-side with isolation valves.
2. Cut and cap the LiquiFlo drive water-side connections.
3. Depending upon model type, a LiquiFlo drive can weigh up to 970 pounds.
  - a. Verify that the intended lifting device and rigging has the capacity to safely handle the load before hooking up to the designated lifting points on the LiquiFlo drive.

**Note:** On some existing LiquiFlo drives, lifting tabs are spot-welded to the enclosure. These welds can break if not lifted straight up. To ensure a safe lift, Trane recommends drilling a hole and bolting the tabs to the enclosure to ensure a safe lift.
4. Using safe lifting practices, slowly begin taking up the slack in the rigging.
  - a. Tension the rigging only to the point that is necessary to take up enough of the weight of the starter panel to enable loosening the bolts connecting the panel to the Z-bracket on the motor flange.



## Installation

5. While steadying the starter panel to prevent it from tipping forward, carefully begin removing the retaining bolts that connect it to the Z-bracket.

**Note:** *The existing Z-bracket and transition cover will be reused and do not need to be removed unless greater access is required to the motor terminals during drive installation.*

6. Remove the bolts securing the bottom of the LiquiFlo drive to the brackets on the evaporator.
7. Carefully remove the starter panel from the chiller and set it down in a safe location.

**Important:**

- *Do not cut off the starter panel brackets that are welded to the evaporator shell as they will be reused.*
- *Do not discard any of the nuts, bolts, washers, or the angle-iron clips that were used to attach the starter panel tabs to the evaporator bracket as they will all be reused.*

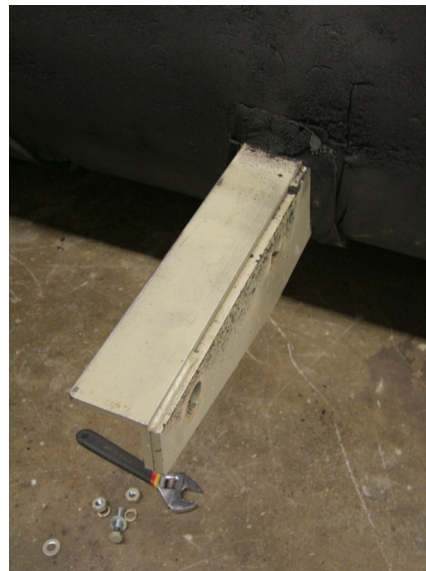
### NOTICE

#### Remove Panel Bracket For Proper Airflow!

Failure to remove panel bracket could result in equipment damage as there is a minimum airflow required to properly cool the AFD.

8. Remove the bottom panel bracket from the starter panel brackets as shown in [Figure 15](#). If panel brackets are not removed, the AFDH cooling airflow will be blocked.

**Figure 15. Removing bottom panel bracket from starter panel brackets**





## Mechanical Installation of a Unit Mounted D-Frame AFDH (For LiquiFlo Drive Replacement)

### ⚠ 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. An AFDH cabinet assembly is top heavy.

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.

### NOTICE

#### Improper Unit Lowering!

Do not drop the drive cabinet assembly onto the evaporator mounting brackets when setting it into position! Dropping the cabinet onto the brackets could result in damage to the drive cabinet, the brackets, and/or the evaporator shell.

1. Use a saw-zaw to remove the right tab (when facing the back of the AFDH panel). The left tab will be used to mount the drive to the brackets and must not be removed.

Figure 16. Removing the right tab



2. Inspect the Z-bracket on the chiller motor flange. If the Z-bracket is equipped with weldment nuts, these nuts must either be ground off or drilled out to allow the 3/8-inch studs on the back of the new drive cabinet assembly to slide into the bracket at these locations.
3. Prepare lifting equipment and rigging.
  - a. Depending upon the model type, a unit-mounted AFDH can weigh up to 1400 pounds. Confirm the weight of the AFDH unit to be installed. For D-Frame units, refer to [Table 5, p. 24](#).
  - b. Verify that the intended lifting device and rigging has the capacity to safely handle the load before hooking up to the two factory provided lifting points on top of the cabinet assembly.
  - c. Use the appropriate rigging techniques to ensure that the cabinet assembly will be balanced about its center of gravity during lifting. Refer to ["Recommended Rigging and Lifting Procedures for AFDH Drive Units," p. 16](#).

## Installation

- Attach adapter bracket to the bottom of the AFDH panel using the 3/8-16 x 1 in. bolt and washer at the bottom right corner (when facing the back of the panel).

**Figure 17. Attaching the adapter bracket to the bottom of the AFDH panel**



- Attach other end of adapter bracket to the bottom of the AFDH panel using the remaining tab on the bottom left of the panel (when facing the back of the panel) and the 3/8-16 x 2 in. bolt, nut, and washer.

**Figure 18. Attaching the other end of the adapter bracket**



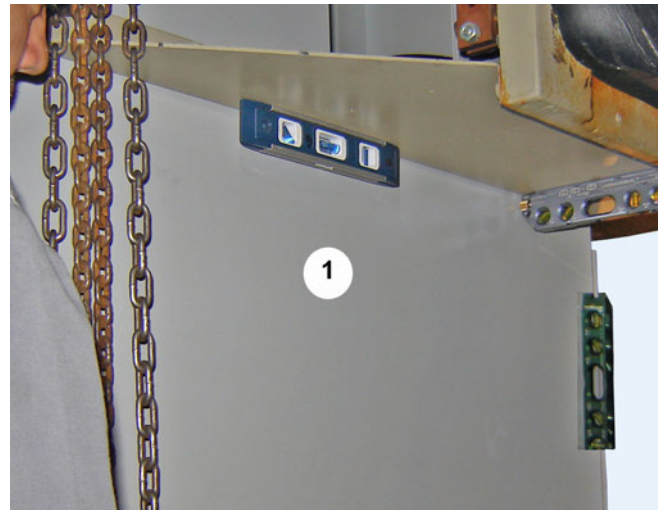
- Using safe lifting practices, carefully lift the cabinet and position it over the mounting brackets on the evaporator. Slowly lower the cabinet until the panel and adaptor bracket makes contact with the evaporator brackets and rests flush on the brackets, and NOT resting on hardware located on the bottom of the cabinet. The adapter bracket is slotted if the AFDH needs to be moved to avoid interference. Do NOT place the full weight of the cabinet onto the brackets at this time. Keep tension on the lift rigging to support the weight of the cabinet.

**Figure 19. Slots in adapter bracket, for use if the AFDH needs to be moved to avoid interference**



- Keep the upper part of the AFDH panel flush with the Z-bracket face. Keep tension on the lift rigging to hold the AFDH panel in position.
- Verify that the Z-bracket is flush against the AFDH panel.

**Figure 20. Leveling the AFDH drive cabinet against the Z-bracket**



Callout number	Description
1	Adjust position of angle iron clips on evaporator brackets to bring the drive cabinet back level vertically against the Z-bracket flange.

- Attach the Z-bracket at the top of the panel making sure that the AFDH panel is level.

**Figure 21. Attaching the Z-bracket at the top of the panel**



10. Once the upper Z-bracket is secured, leave the lift rigging in place and attach a C-clamp to the adapter bracket and panel supports to hold the adapter bracket in place.

**Figure 22. Attaching C-clamp to the adapter bracket**



11. Use a lubricated 3/8-inch drill bit and drill through the mounting brackets on the evaporator at both of the slots located on the adapter bracket.



**Figure 23. Drilling through mounting brackets on the evaporator**



12. Bolt adapter bracket to the evaporator support brackets with 3/8-16 x 2 in. bolts, nuts, and washers (washer on top and bottom).

**Figure 24. Attaching C-clamp to the adapter bracket**



## Mechanical Installation of a Transition-Mounted D-Frame AFDH

### **⚠ WARNING**

#### **Heavy Objects!**

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage.

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.

### **⚠ 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. An AFDH cabinet assembly is top heavy.

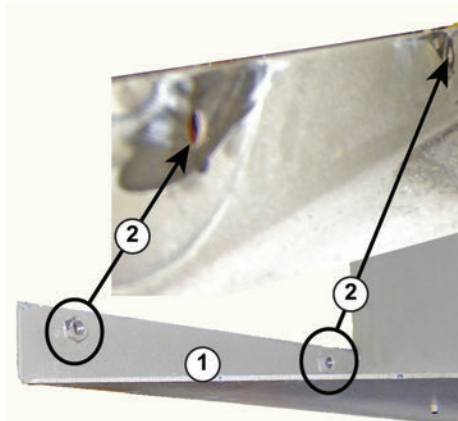
Test lift unit approximately 24 inches (61 cm) to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level.

### NOTICE

#### Improper Unit Lowering!

**Do not drop the drive cabinet assembly onto the evaporator mounting brackets when setting it into position! Dropping the cabinet onto the brackets could result in damage to the drive cabinet, the brackets, and/or the evaporator shell.**

**Figure 25. Removal of Z-bracket weldment nuts**

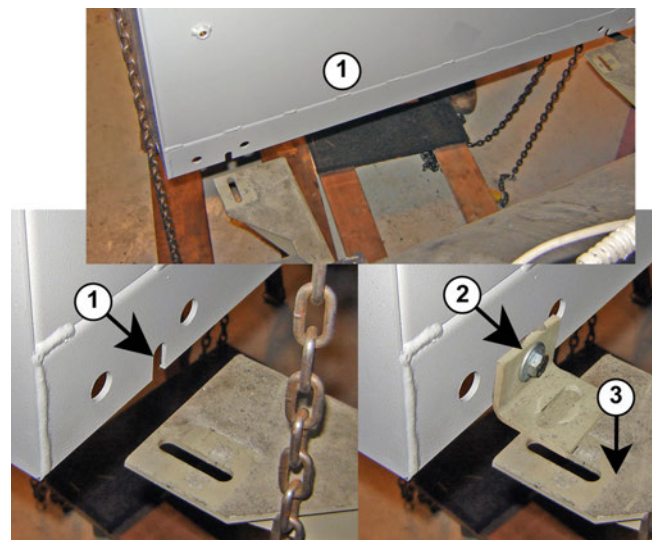


Callout number	Description
1	Z-bracket.
2	Weldment nuts (4 total on bracket, only 2 shown) drill out or grind off flush.

1. Inspect the Z-bracket on the chiller motor flange. If the Z-bracket is equipped with weldment nuts, these nuts must either be ground off or drilled out to allow the 3/8-inch studs on the back of the new drive cabinet assembly to slide into the bracket at these locations.
2. Prepare lifting equipment and rigging.
  - a. Depending upon the model type, a unit-mounted AFDH can weigh up to 1400 pounds. Confirm the weight of the AFDH unit to be installed. For D-Frame units refer to [Table 5, p. 24](#).
  - b. Verify that the intended lifting device and rigging has the capacity to safely handle the load before hooking up to the two factory provided lifting points on top of the cabinet assembly.
  - c. Use the appropriate rigging techniques to confirm the cabinet assembly will be balanced about its center of gravity during lifting. Refer to [“Recommended Rigging and Lifting Procedures for AFDH Drive Units,” p. 16](#).
3. Using safe lifting practices, carefully lift the cabinet and position it over the brackets on the evaporator.
  - a. Bolt the angle iron clips removed from the old starter to the slots on the bottom of the drive.

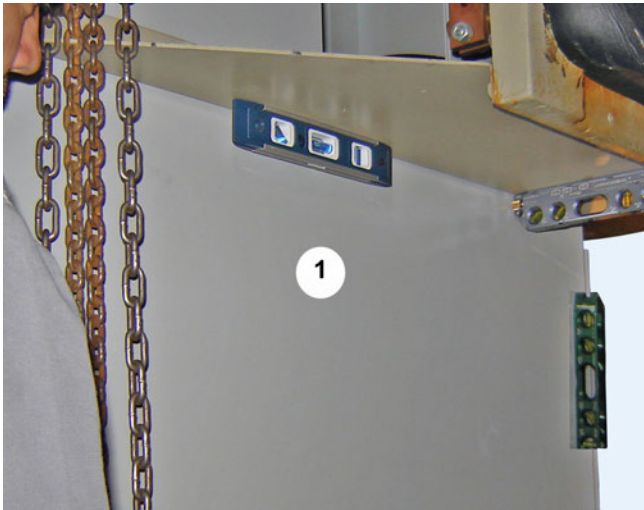
4. Slowly lower the cabinet until the clips make contact with the evaporator brackets but do not place the full weight of the cabinet onto the brackets at this time. Keep tension on the lift rigging to support the weight of the cabinet.
  - a. Adjust the angle iron clips as necessary at the base of the cabinet until the back of the cabinet is level and lined up against the Z-bracket, then attach the cabinet to the bracket using the kit hardware provided.
  - b. Secure the angle iron clips to the evaporator brackets with the bolts previously used to secure the old starter panel to them.
  - c. Verify all nuts are properly tightened at all cabinet mounting points.
5. Confirm that the drive is firmly attached to all brackets and is stable before slowly lowering the lifting device to slacken the rigging and remove it from the lifting points.

**Figure 26. Position cabinet base over evaporator brackets and install clips**



Callout number	Description
1	Lining up slots in drive cabinet base with slots in evaporator brackets.
2	Bolt an angle iron clip (that was removed from the old unit-mount starter) to each slot in the cabinet base.
3	Lower drive unit until clips come in contact with bracket surface.

Figure 27. Leveling the AFDH drive cabinet against the Z-bracket



Callout number	Description
1	Adjust position of angle iron clips on evaporator brackets to bring the drive cabinet back level vertically against the Z-bracket flange.

## Mechanical Installation of a Direct-Mounted D-Frame AFDH

### ⚠ WARNING

#### Heavy Objects!

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage.

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.

### ⚠ 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. An AFDH cabinet assembly is top heavy.

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.

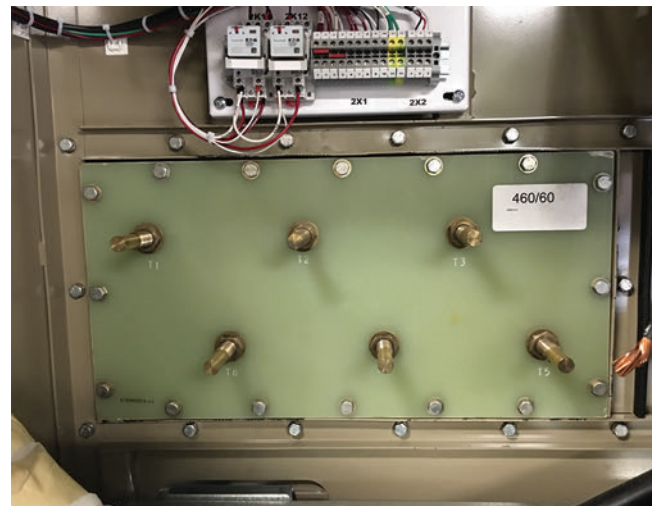
### NOTICE

#### Improper Unit Lowering!

Do not drop the drive cabinet assembly onto the evaporator mounting brackets when setting it into position! Dropping the cabinet onto the brackets could result in damage to the drive cabinet, the brackets, and/or the evaporator shell.

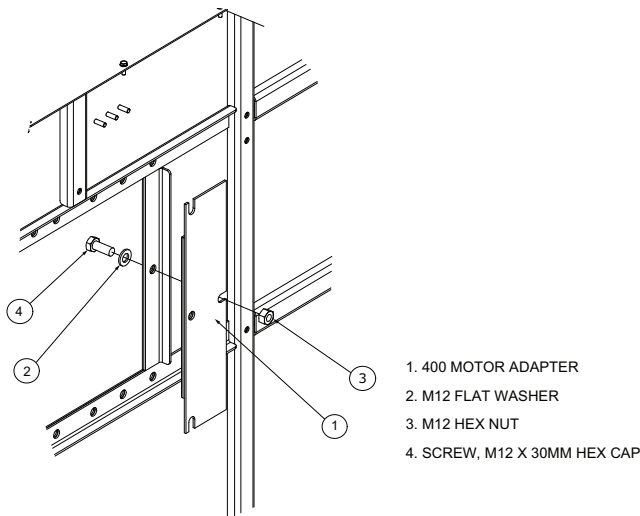
- Prepare lifting equipment and rigging.
  - Depending upon the model type, a unit-mounted AFDH can weigh up to 1400 pounds. Confirm the weight of the AFDH drive. See [Table 5](#), [Table 6](#), and [Table 7](#).
  - Verify that the intended lifting device and rigging has the capacity to safely handle the load before hooking up to the two factory provided lifting points on top of the cabinet assembly.
  - Use the appropriate rigging techniques to verify the cabinet assembly will be balanced about its center of gravity during lifting. Refer to [“Recommended Rigging and Lifting Procedures for AFDH Drive Units,”](#) p. 16.
- Implement safe lifting practices and carefully lift the cabinet to position it over the mounting brackets on the evaporator. Slowly lower the cabinet until the AFDH panel flush and lineup with the motor terminal access bolt pattern.
- Reuse the motor terminal access bolts and bolt the cabinet to the motor at the motor terminal.

**Important:** Do not place the full weight of the cabinet onto the brackets. Keep tension on the lift rigging to support the weight of the cabinet.

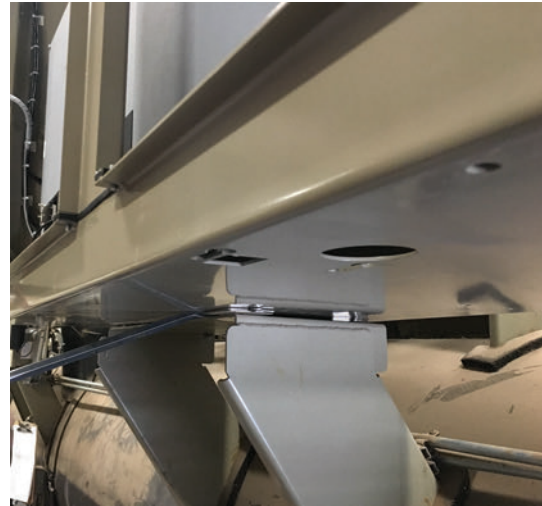


- The 400 frame motor requires an adapter plate to cover the excess gap at the AFDH drive motor terminal access opening.





5. Confirm the cabinet is level and bolt the cabinet to the evaporator support brackets with the provided bolts, nuts, and washers.
6. Shim the space between the cabinet and the evaporator support brackets with a 3-inch x 3-inch slotted shims. Place the shims slots around the bolts. Ease the tension on the lifting rigging, confirm the shims are snug, and tighten the bolts to secure the cabinet on top of the evaporator support brackets.



## Mechanical Installation of Remote-Mounted D-Frame AFDH and Harmonic Filter



### **⚠ WARNING**

#### **Heavy Objects!**

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage.

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.

### **⚠ 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. An AFDH cabinet assembly is top heavy.

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.

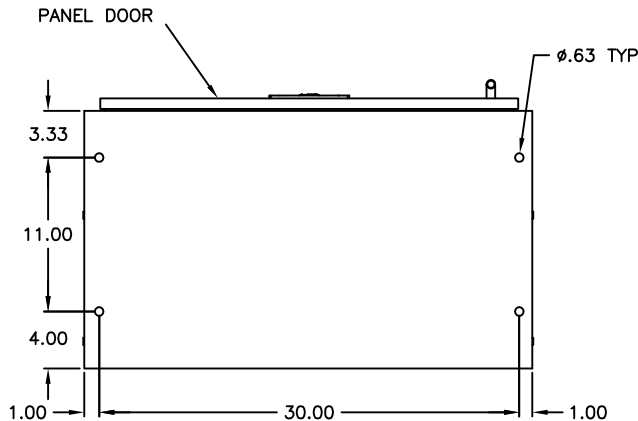
### **NOTICE**

#### **Improper Unit Lowering!**

Do not drop the drive cabinet assembly onto the evaporator mounting brackets when setting it into position! Dropping the cabinet onto the brackets could result in damage to the drive cabinet, the brackets, and/or the evaporator shell.

1. The remote-mounted AFDH and harmonic filters are designed to bolt in place on the floor using the hole pattern on the bottom of the drive (see the following figure).

**Figure 28. Bolt placement for remote-mounted AFDH and harmonic filters**



2. Prepare lifting equipment and rigging.
  - a. Depending upon the model type, a unit-mounted AFDH can weigh up to 1400 pounds. Confirm the weight of the AFDH unit to be installed. For D-Frame units refer to [Table 5, p. 24](#).
  - b. Verify that the intended lifting device and rigging has the capacity to safely handle the load before hooking up to the two factory provided lifting points on top of the cabinet assembly.
  - c. Use the appropriate rigging techniques to ensure that the cabinet assembly will be balanced about its center of gravity during lifting. Refer to ["Recommended Rigging and Lifting Procedures for AFDH Drive Units," p. 16](#).
3. Slowly lower the cabinet into place and secure the drive to the floor at the bottom of the cabinet.

## Electrical Installation (All AFDH Models)

### **⚠ 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.

### **⚠ 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.

### **NOTICE**

#### **Use Copper Conductors Only!**

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

**Important:** *Route Incoming Power Conduit to the Roof of AFDH Cabinet! The air-cooled AFDH drive is designed to have the incoming power conduit routed vertically into the unit through the removable conduit connection cover located on the left-hand rear corner of the cabinet roof. If the starter that is being replaced by the AFDH drive has the incoming power conduit routed horizontally across the top of the starter, or connected to the side or to the bottom of the starter cabinet, an electrician will be required to reconfigure the conduit and wiring. Routing the incoming power conduit into the AFDH cabinet anywhere other than through the specified location on the cabinet roof, will be considered an unsupported field modification to the cabinet design.*

### **NOTICE**

#### **Keep Dirt, Debris, or Metal Filings From Entering the Drive Cabinet!**

Failure to observe the appropriate precautions could result in damage to the electrical components when they are energized for the first time. Take all precautions necessary to prevent any dirt, debris, or metal filings from entering into the drive cabinet during the installation process.

#### **Install Shorting Buss Bars (Unit Mount Only)**

**Note:** *Shorting buss bars must be installed since the AFDH is a three-lead device while the starter was a six-lead device.*

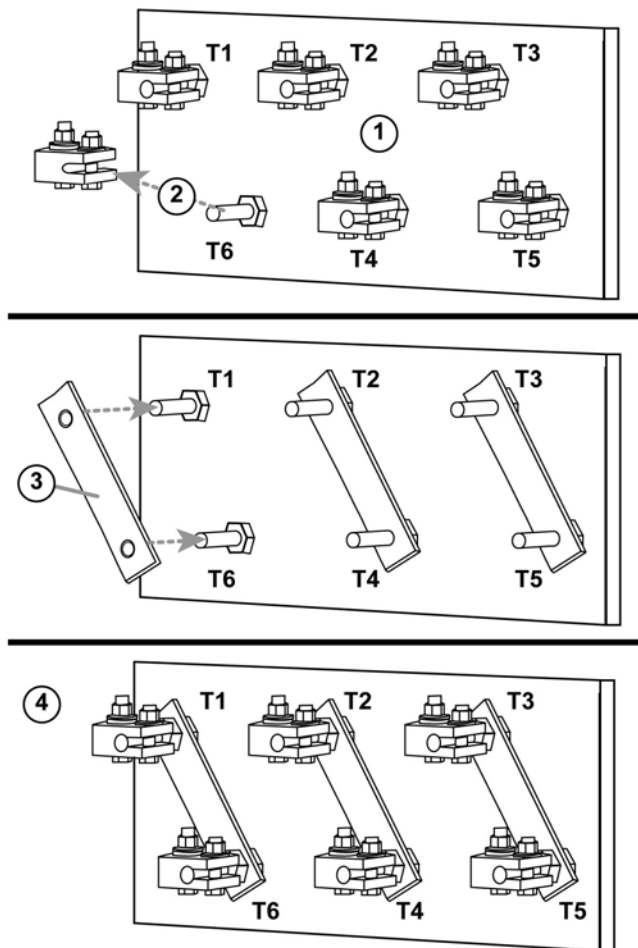
1. Remove the motor terminal lug from all six terminals on the compressor motor terminal board.
2. Install the three buss bars provided, one each between the following motor terminal pairs.



- T1 - T6
- T2 - T4
- T3 - T5

3. Reinstall all of the motor terminal lugs.

**Figure 29. Buss bar installation on compressor motor terminal board**



Callout number	Description
1	Compressor motor terminal board.
2	Remove motor terminal lugs (from all 6 terminals).
3	Install shorting buss bars across the motor terminal pairs as shown.
4	Motor terminal lugs reinstalled.

### Input Power Wire Installation

**Note:** The L1, L2, and L3 input power leads for this unit will be connected to a factory installed input disconnect circuit breaker inside of the drive cabinet.

1. *D-Frame Only:* Remove the conduit shroud from the cabinet to fully expose the two-piece incoming wire access door on the top of the cabinet.

2. Remove the access door pieces and take them to another location for marking and drilling the required wire routing holes for the input wire leads.

**Notes:**

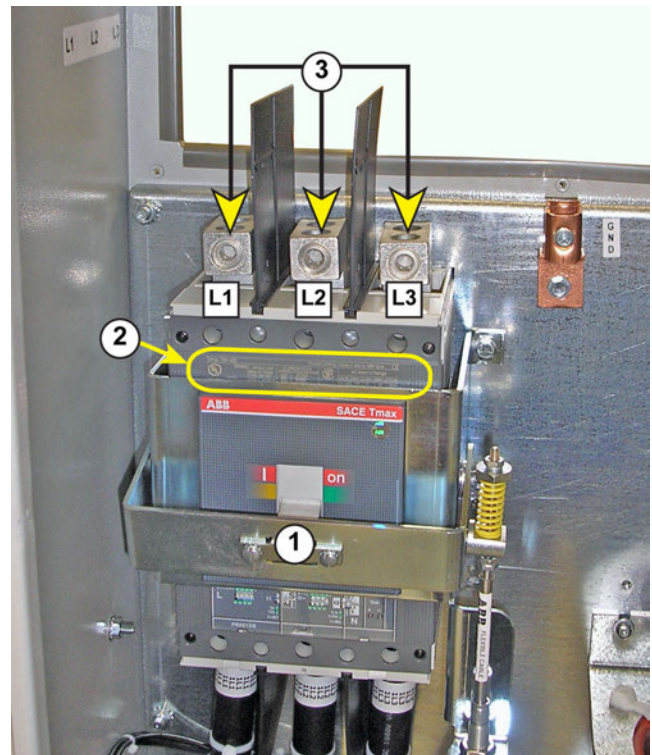
- These wire routing holes are the only entry points that should be used for bringing input power wiring into the drive cabinet.
- In some cases, the top plate with conduit hubs from the original starter may be reused and installed over the incoming wire access cut-out on the top of the cabinet, in place of the two-piece access covers.

**Important:** Install the appropriate conduit hubs before reinstalling the access door pieces on top of the cabinet.

3. Route the input wire leads into the cabinet and connect them to circuit breaker terminals L1, L2, and L3.

- The torque specification for these terminal connections is 31 ft·lb.

**Figure 30. Factory installed input disconnect circuit breaker**



Callout number	Description
1	Input disconnect circuit breaker.
2	Nameplate.
3	Input power terminals. Terminal connections should be torqued to 31 ft·lb.

### Remote Mount

Shorting buss bars are not required for remote mount units. Terminals are interconnected at the remote mount panel.

### Grounding AFDH Cabinet

**⚠ 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.

**NOTICE**

**Use Copper Conductors Only!**

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

1. Run a suitable, unbroken, grounding conductor from the drive cabinet ground connection terminal to the motor ground terminal, and then on to earth ground.

Figure 31. Location of AFDH cabinet ground terminal

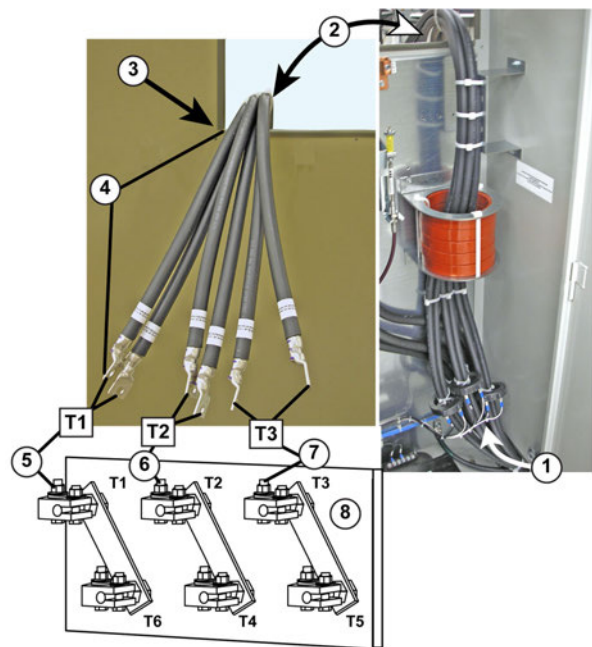


Callout number	Description
1	Cabinet ground connection terminal.

### Output Wiring from the AFDH to the CTV Motor

1. Remove the cover plate from the motor terminal access cutout on the back of the drive cabinet.
  2. Feed the six motor leads through the back of the drive cabinet to the compressor motor terminal board.
  3. Attach the leads in pairs to the correct motor terminals (both T1 leads to the T1 terminal, both T2 leads to the T2 terminal, and both T3 leads to the T3 terminal).
    - Torque indented below the "t" in terminal. Torque the 3/8-in. bolts at each terminal connection to 44 ft·lb.
- Note:** Power connections should be re-torqued to 44 ft·lb after the first three to six months of operation and then annually.
4. Put the transition cover back in place and reseal it when finished.

Figure 32. Output wiring from AFDH to CTV motor



Callout number	Description
1	Output motor leads coming in from the right hand cabinet compartment (drive module) and routed up to the motor terminal access cutout.
2	Motor leads routed through cabinet motor terminal access cutout.
3	Transition cover removed and Z-bracket blanked out of photo for clarity.
4	Factory installed motor leads are long enough to extend approximately 18 in. out from the access cutout.
5	Attach both T1 motor leads to compressor motor terminal T1.
6	Attach both T2 motor leads to compressor motor terminal T2.
7	Attach both T3 motor leads to compressor motor terminal T3.
8	Compressor motor terminal board.

## Harmonic Filter

### Unit Description

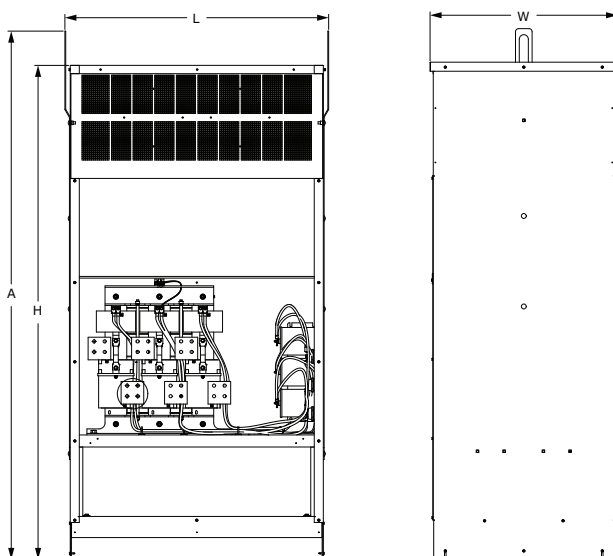
Optionally, the AFDH may be ordered with a passive harmonic filter. While the filter is passive, it adapts to various loads in order to optimally reduce current distortion (THID). The filter maintains a THID performance of 8% MAX at 30% load and 5% MAX at full load. The filter will also help to meet IEEE-519 Requirements (5% THID) when used at lighter loads.

The amp rating of the ordered filter must be paired with the drive. Filters are available in the following maximum amp ratings: 208 A, 240 A, 320 A, 403 A, 482 A, 636 A.

### About the Cabinet

The filter enclosure is designed to be mounted remotely from the chiller. Refer to “[Environmental Conditions and Location](#),” p. 47 when selecting a location to mount the filter.

**Figure 33. Filter enclosure**



**Table 30. Harmonic filter for D-frame**

Trane PN	RLA (A)	Filter Enclosure Dimension (inch)			
		L	W	H	A
022264170100	208	27.69	24.90	47	51.30
022264180100	240	27.69	24.90	47	51.30
022264190100	320	27.69	24.90	72	76.00
022264200100	403	27.69	24.90	72	76.00
022264210100	482	43.69	31.06	82	87.56
022264220100	636	43.69	31.06	82	87.56

## Environmental Conditions and Location

**Important:** *Location of the harmonic filter 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 harmonic filter over 1000 meters (3300 feet) above sea level without derating output power. For every 160 meters (528 feet) over 1000 meters (3300 feet) above sea level, derate the output current 1 percent.
- Ideally, the filter should be installed as close to the AFD as possible. Recommended maximum cable distance between the filter and drive is 100 feet.
- Line voltage is 480 Vac  $\pm$ 10%, 60 + 0.75 Hz, 3 phase.
- Verify that the drive location will meet the environmental conditions specified in [Table 31, p. 47](#).

**Table 31. Environmental conditions**

Condition	Specification
Operating Temperature (inside NEMA 1 enclosure)	-40°C to + 50°C (-40°F to 122°F)
Ambient Temperature (outside NEMA 1 enclosure)	-40°C to + 40°C (-40°F to 104°F)
Storage Temperature (Ambient)	-40°C to 70°C (40°F to 158°F)
Humidity	0% to 95% (non-condensing)

## Installation Guidelines

Lift the filter into position on existing or new concrete pad. Care should be used to prevent damage due to dropping or jolting when moving the filter. A fork lift truck or similar means of lifting and transporting may be used. Sling in a manner that will equalize the load at the pickup points. Use a spreader bar if the angle of the sling is less than 45° relative to horizontal. Do not jolt while lifting.

### ⚠ WARNING

#### Heavy Objects!

Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage.

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.

1. Mark hole location on floor for anchor bolts.
2. Remove filter cabinet.
3. Drill holes for anchor bolts.
4. Reset filter cabinet over holes.
5. Install field-provided anchor bolts.

Use the following steps to connect power wiring to the filter:

1. Wire size should be based on nameplate amps and local code requirements (NEC). Use metallic conduit/shielded cable in accordance with local codes. If cable runs near other circuitry wire, it is recommended to run cable perpendicular to other wire(s). Use only copper conductors for the input power leads.
2. There are no knockouts in the cabinet. Entry/exit openings must be made in the field. Recommended entry/exit openings are through the top. Avoid getting any enclosure shavings on the filter components. A punch out is recommended to make hole.
3. Install the appropriate conduit hubs in the filter enclosure.
4. Wire termination devices on the primary and secondary of the filter must be field furnished and installed. Ring-type compression terminal devices are suggested.
5. Install the appropriate conduit hubs.
6. There are no knockouts in the drive cabinet. Entry/exit openings must be made in the field. Avoid getting any enclosure shavings on the drive components. A punch out is recommended to make hole.
7. Install the appropriate conduit hubs in the drive enclosure.
8. Remove the bus bars connecting the circuit breaker to the drive.
9. Connect the power leads between the filter and the drive components. Connections are listed in the following table.

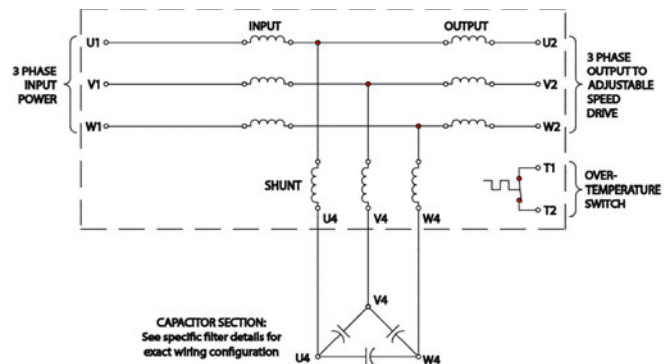
#### Notes:

- The field will have to provide the properly sized ground wire based on NEC to bond the filter enclosure.
- Power connections should be re-torqued after the first three to six months of operation and on an annual basis thereafter.

Filter Terminals	Drive Terminals
U1	2Q1
V1	2Q1
W1	2Q1
U2	AFD-91
V2	AFD-92
W2	AFD-93
GND	GND

In addition to power wiring, the harmonic filter has an internal over temperature switch. This switch must be wired in series with the high pressure cutout switch. This will prevent overheating and equipment failure. Refer to the following figure.

Figure 34. Filter wiring diagram



## Routing of Control Wiring to AFDH Cabinet

### NOTICE

#### Route Incoming Power Conduit to the Roof of the AFDH Cabinet!

Routing the incoming power conduit into the AFDH cabinet anywhere other than through the specified location on the cabinet roof, will be considered an unsupported field modification to the cabinet design. The air-cooled AFDH drive is designed to have the incoming power conduit routed vertically into the unit through the removable conduit connection cover located on the left-hand rear corner of the cabinet roof. If the starter that is being replaced by the AFDH drive has the incoming power conduit routed horizontally across the top of the starter, or connected to the side or to the bottom of the starter cabinet, an electrician will be required to reconfigure the conduit and wiring.



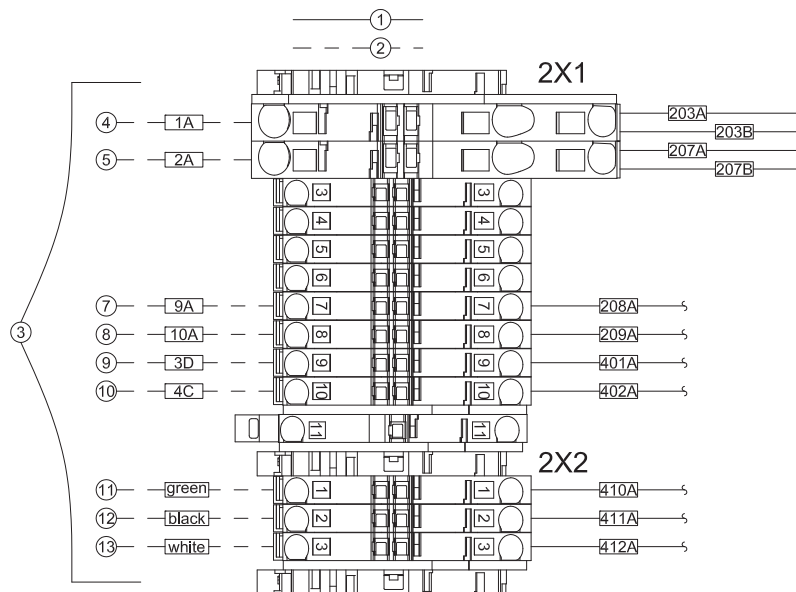
**NOTICE**

**Keep Dirt, Debris, or Metal Filings From Entering the Drive Cabinet!**

Failure to observe the appropriate precautions could result in damage to the electrical components when they are energized for the first time. Take all precautions necessary to prevent any dirt, debris, or metal filings from entering into the drive cabinet during the installation process.

**Control Wiring Connections  
(Tracer® AdaptiView™ Model  
AFDH Only)**

Figure 35. Wiring connections to 2X1 terminal strip in AFDH



Item	Description
1	Factory installed wiring.
2	Field installed wiring.
3	Actual wire designators may vary depending upon the specific model/version of chiller control that the AFDH drive is being linked with. Please refer to the original chiller control wiring diagrams and the wire descriptions listed in Figure Callouts 4 to 11 if an actual wire designator does not match the one shown in this graphic.
4	115VAC feed to chiller control panel.
5	Neutral feed to chiller control panel.
7	From 1A7 J2-4 oil pump LLID.
8	From 1A7 J2-2 oil LLID or could come from the 1X1 terminal block.
9, 10	Normal closed terminal on HPC switch (3S1) for original chiller with comm. Drive terminals 9 and 10 are 24VDC only. <i>Note: For original chillers with a communicating drive, high pressure cutout wiring is 24V.</i>
11, 12, 13	From UC800 IMC Modbus link.

**Important:** *If the chiller does not already have a condenser pressure transducer. Do not forget to install the condenser pressure transducer provided in the Tracer® AdaptiView™ Miscellaneous Hardware Package. The accurate pressure readings required by the chiller controls to enable the most efficient operation of the chiller with the upgraded AFDH drive can only be effectively measured with a pressure transducer.*



## Required Reprogramming of Tracer AdaptiView Controls

### Reprogramming Factory Installed Tracer AdaptiView Controls (CTV Simplex Firmware)

**Important:** Make sure your laptop is loaded with the most current version of Tracer TU tool software so that you have the most up-to-date version of CTV MP firmware available to install into the UC800.

**Note:** CTV MP firmware is always used in factory installed Tracer AdaptiView control systems or in Tracer AdaptiView display upgrades to factory installed CH530 control systems.

**Table 32. UC800/Tracer® AdaptiView™ CTV parameter values with upgrade AFDH**

Tracer TU Service Setpoints View: Adjustable Frequency Drive Setpoints	Range	Default Setting	Recommended Setting
AF Control	Auto, Fixed	Auto	Auto
ReOptimization Sensitivity	0 to 100%	20	20
Tracer TU Field Start-up View: Adjustable Frequency Drive	Range	Default Setting	Recommended Setting
AFD Temperature Limit Setpoint	0.0 to 360.0	180	212.0
Surge Speed Increase	0 to 2 Hertz	1	1
Tracer TU Configuration View: Main	Range	Default Setting	Recommended Setting
Unit Type (MODL)	CVHE, CVHF, CVHG, CVGF	CVHE	Enter Chiller Model from Unit Nameplate (Note: only CVHE or CVHF apply)
Tracer TU Configuration View: UC800	Range	Default Setting	Recommended Setting
Starter Type	Not Applicable	Unit Mount Wye-Delta	TR200 Modbus® AFD
Impeller Diameter (CPIM)	50 to 345	275	Enter CPIM from Unit Nameplate
Tracer TU Configuration View: Starter	Range	Default Setting	Recommended Setting
Unit Line Voltage	180 to 15000 Volts	460	Enter from Unit Nameplate
Motor NP Power	4000 kW	400	Enter from Unit Nameplate
Motor Temperature Protection Type	75 Ohm@75F, 100 Ohm@ 0C	75 ohm	75 ohm



# AFDH Start-Up Procedure

Follow the procedure below when starting the water chiller and drive.

1. The CenTraVac™ chiller control starts, stops, and monitors all unit and AFDH run functions.

Complete all items on the commissioning checklist and in the start-up procedures for the CVHE and CVHF as defined in the operation maintenance manual or other applicable manual.

## ⚠ WARNING

### Hazardous Voltage w/Capacitors!

Failure to follow these instructions could result in death or serious injury. Disconnect all electric power, including remote disconnects and discharge all motor start/run and AFD (Adaptive Frequency™ Drive) 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 an appropriate voltmeter that all capacitors have discharged.
- DC bus capacitors retain hazardous voltages after input power has been disconnected. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. After disconnecting input power, wait five (5) minutes for the DC capacitors to discharge, then check the voltage with a voltmeter. Make sure DC bus capacitors are discharged (0 VDC) before touching any internal components.

2. Check the following on the drive:
  - a. Verify input wire sizing to the drive is sized correctly based on unit nameplate voltage, and connected as noted in this manual.
  - b. Check the drive ground connection, and cabinet wire routing and grounding.
3. Check all drive wiring and connections in the drive to confirm they are tight and free of any shipping damage.
4. AFDH control checkout:
  - a. Chiller setpoints: With any new chiller, check out all setpoints for the chiller.
  - b. AFD setpoints: Check all AFD setpoints (refer to "Drive Settings," p. 51).
  - c. AFD configuration: Verify the **sales order** specific setpoints in the **Starter Configurations for AFD Starters**. These settings are specific to unit/motor combination in the drive. All remaining settings are factory-determined default setpoints that are the same on all AFDH air-cooled drives.

**Note:** If the set values do not match, contact the local Trane Service agency first, or the Global Parts Technical Service Department. The correct values are listed on the unit nameplate shipped with each unit.

5. When ready, start the drive from the chiller display.
6. Document all information on the start-up log.

## Drive Settings

### Important:

- Any AFDH drive module menu parameter numbers not listed in this manual are non-Trane specific program parameters.
- All 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 the TR200 - Programming Guide (BAS-SVP04\*-EN), or the most recent version, for full program parameter details and descriptions, and the instructions necessary to operate the Local Control Panel (LCP) and program the necessary drive parameters.

For additional information, refer to the programming manual shipped with the drive. The programming manual includes a detailed section for 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.



## AFDH Start-Up Procedure

### TR200 Drive Configuration

**Note:** Technician may elect to configure the drive by using Danfoss VLT Motion Control tool MCT10. See the following Steps:

1. If the TDU Drive Utility Program is installed on your laptop: Uninstall the TDU Drive Utility to install the MCT 10 software.
2. Install MCT 10 toll: HUB Document DOC-155220: MCT 10 Installation Instructions.docx (Danfoss VLT Motion Control Tools MCT 10 Set-up Software manual).
3. Configure the TR200 drive using MCT 10 tool: HUB Document DOC-179427: Creating a Project a Master File and Configuration for AFDH D and E\_Frame Drive.docx (AFDH D and E-Frame Drive Configuration Instructions Using MCT 10 Tool).

To manually configuring the drive, confirm the drive is at the default settings by performing the following procedures to reset the drive:

1. Disconnect power to the drive, and wait for the display to shutdown.
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 the below tables.

**Table 33. Job specific settings**

Group	Parameter	Description	Settings (UC800 and Symbio™ 800)
0	32	Customer Readout Max Value	Nameplate NMRA
1	20	Motor kW	Set to nameplate NMKW
1	24	Motor Current	Set to nameplate NMRA
1	25	Motor Nominal speed	Set to nameplate TRPM
4	16	Torque limit mode	Set to maximum
4	18	Current limit	Set to maximum

**Table 34. Trane default settings**

Group	Parameter	Description	Setting (UC800)	Setting (Symbio™ 800)
0	20	Display line 1.1 small	DC link voltage (1630)	DC link voltage (1630)
0	21	Display line 1.2 small	Motor Current (1614)	Motor Current (1614)
0	22	Display line 1.3 small	Heat sink temp (1634)	Heat sink temp (1634)
0	23	Display line 2 large	Input Power Kw (1610)	Input Power Kw (1610)
0	24	Display line 3 large	Freq Hz (1613)	Freq Hz (1613)
0	40	Hand on key	Disabled (0)	Disabled (0)
0	41	Off key	Disabled (0)	Disabled (0)
0	60	Main Menu password	999	999
0	61	Access to main menu w/o password	LCP; Read only (1)	LCP; Read only (1)
1	03	Torque characteristics	Variable torque (1)	Variable torque (1)
1	22	Motor voltage	Nameplate voltage	Nameplate voltage
1	23	Motor frequency	60 Hz	60 Hz
1	39	Motor poles	Poles (2)	Poles (2)
3	02	Minimum Reference	30 Hz	30 Hz
3	03	Maximum Reference	60 Hz	65 Hz
3	15	Reference 1 Source	No Function	No Function
3	16	Reference 2 Source	No Function	No Function
3	41	Ramp 1 ramp up time	10 sec	10 sec
3	42	Ramp 1 ramp down time	20 sec	20 sec
4	12	Motor speed low limit	38 Hz	38 Hz
4	14	Motor speed high limit	60 Hz	60 Hz
5	12	Terminal 27 Digital Input	No operation (0)	No operation (0)
5	40.1	Function Relay	Running	Running
8	01	Control Site	Controlword only (2)	Controlword only (2)
8	03	Control Timeout Time	15 sec	15 sec
8	04	Control Timeout Function	Stop	Stop
8	30	Protocol	Modbus® RTU	Modbus RTU
8	31	Address	3	3
8	32	Baud Rate	38400 Baud	38400 Baud



**Table 34. Trane default settings (continued)**

<b>Group</b>	<b>Parameter</b>	<b>Description</b>	<b>Setting (UC800)</b>	<b>Setting (Symbio™ 800)</b>
8	33	Parity/Stop Bits	No Parity, 1 Stop bit [2]	Even, 1 Stop bit [0]
8	36	Maximum Response Delay	100	100
14	21	Automatic Restart Time	10 sec	10 sec

After all settings are made save a copy chiller service report for future use. Trane Techs should load to ComfortSite by chiller serial number.

# 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.

- 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 sales order and serial numbers, and the drive's serial and model numbers.
3. Troubleshooting
    - a. Measure and record the DC bus (Local Control Panel-LCP).
    - b. Check all wiring (tightness, ribbon cables fully seated, proper phasing, etc.).
    - c. Refer to the Danfoss manuals for additional 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. Tracer<sup>®</sup> AdaptiView<sup>™</sup> 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.
2. Collect chiller information.
  - a. Note the following chiller information:
    - Operating mode and any sub-mode (100 percent or 75 percent load).



# Start-Up Test Log

## Water-Cooled CenTraVac™ Chiller with Tracer® AdapTiView™ Control and Adjustable Frequency Drive (AFD) Starter

Job Name
Job Location
Sales Order Number
Chiller Serial Number
Chiller Model Number
Starter Date:
Manufacture
Type
Vender ID
Model Number
Volts and Hz
Amps

AFD Serial Number		
AFD Model Number		
Ship Date		
Start Date		
Tracer TU: Service Setpoints View: AFD	Default	Setting
AFD Control	Auto	
Re-Optimization Sensitivity	20%	
UC800 Starter Type: Unit Mount AFD	Trane Default	Setting
Tracer TU: Configuration View: Starter		
Unit Line Voltage	460	
Motor NP Power	400	
Motor Temperature Protection Type	75 ohm @ 75F	
Test Log Date:	Log 1	Log 2
AFD Output Power (KW)		
Speed		
Frequency		
Tracer TU Field Start-up View: AFD		
Maximum Frequency	60	
Minimum Frequency	38	
AFD Surge Capacity Increase	1	
Tracer TU Status View: Motor		
Average Line Current		
Motor Winding 1 temp		
Motor Winding 2 temp		
Motor Winding 3 temp		



# Recommended Periodic Maintenance and Inspection

## Inspection Frequency

Perform inspections outlined below every 1 to 12 months, depending on operating environment.

## Visual Inspection - Power Removed

⚠ WARNING
<p><b>Hazardous Voltage w/Capacitors!</b></p> <p>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.</p>

1. Confirm 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 confirm no abrasion is occurring from vibrations against chassis of cabinets, or other edges.
4. Verify 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. Review actual operation environment against specs if any concern.
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. Confirm all are clean and tight, and not rubbing against the other.

## Operational Inspection - Power Applied

⚠ WARNING
<p><b>Live Electrical Components!</b></p> <p>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.</p>

1. Verify the drive cabinet cooling fans are operating.
  - While outside the enclosure, look in the cabinet at the 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 Local Control Panel (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.

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

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

## Air Filter

Clean or replace filter every 1 to 12 months, depending on operating environment.

Filter Description	Part Number
Direct Mount Drive Air Filter	FLR08814
Transition Mount Drive Air Filter	FLR08814
LiquiFlo 1.0/1.5 Drive Air Filter	FLR08814
Remote Mount Drive Air Filter	FLR08814



# Wiring Diagram Matrix

Wiring Diagram Number	Description
50712127	CenTraVac™ Wiring Diagram with Danfoss Adaptive Frequency Drive™.

**Note:** Wiring diagrams are available via e-Library.



## Notes

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