Installation Manual

Rental Services

Electric Heaters

⚠ 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.

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TRANE TECHNOLOGIES

Introduction

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-including industry replacements for CFCs and HCFCs such as saturated or unsaturated HFCs and HCFCs.

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 electrical codes. Failure to follow code could result in death or serious injury.

⚠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.**

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Revision History

Updated for Trane Technologies.

Table of Contents

Electric Heater Overview

Introduction

This installation manual covers the 50 kW and 150 kW electric heaters available to rent from Trane Rental Services for temporary heating solutions. It includes heater technical information, start-up information and unit maintenance. The information contained in this bulletin is provided to ensure the safe installation and operation of the equipment and its surroundings.

The information provided in this Installation Manual is to be used as a reference for each heater, to aid in determining unit size, power requirements or lifting requirements. If additional information regarding a particular unit is required, please contact Trane Rental Services.

Also, contact Trane Rental Services Marketing for availability of equipment (including ancillary items: electrical cable, flexible duct, etc.) prior to proceeding with securing the rental equipment. Equipment is available on a first-come, first-serve basis, but can be reserved with a signed rental agreement.

Call Rental Services 24/7 at 1-800-755-5115 for specific questions.

Units Affected

RSEH0050F0XX – 50 kW electric heater

RSEH0150F0XX – 150 kW electric heater

RSEH0150F1XX – 150 kW electric heater (narrow width)

Note: *Where xx represents the unique inventory number.*

⚠WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be 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. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

⚠WARNING

Failure to follow state/local codes could result in death or serious injuries!

All electric heating units should be installed per the National Electric Code (NEC) and/or applicable state/local codes.

Note: *All information contained in this document is for reference only.*

General Information

The Trane Rental Services electric heaters provide clean electric heat that is free from the moisture and fumes that are associated with other types of heating. The electric heaters can be used in free blow or ducted applications. The hot air is discharged horizontally. When used in free blow applications, the supply ducting on the front of the unit must be removed. Flexible duct is available upon request.

Electric Heater Overview

Table 1.

Model		50 kW	150 kW (F0)	150 kW (F1)
Manufacturer		United Cool Air	United Cool Air	OnSite Manufacturing
Airflow	Orientation	Horizontal	Horizontal	Horizontal
	Nominal Airflow	2300 cfm	9,000 cfm	5,000 cfm
	Blower RPM	1,725	3,450	1770
	Max Static Discharge Pressure	1.0 in. ESP	3.0 in. ESP	3.0 in. ESP
Supply Air Connection(s)	Type	Duct	Duct	Duct
	Quantity	1	1	1
	Size	19 in.	19 in.	19 in.
Return Air Connection(s)	Type	Duct	Duct	Duct
	Quantity	1	1	1
	Size	19 in.	19 in.	19 in.
Filter	Type	Permanent Cleanable	Permanent Cleanable	N/A
	Quantity	1	4	N/A
	Dimensions	19.4 in. x 21.4 in.	23.0 in. x 24.0 in.	N/A
Insurance Value		$10,000	$38,000	$38,000

Heating Capacity (Btu)

Table 2.

Model	Temperature Rise @ Max cfm (°F)	Maximum Leaving Air Temperature (°F)	Number of Heat Stages	Total Capacity (Btu)
50 kW	50	160	2	170,600
150 kW (F0)	50	160	4	512,000
150 kW (F1)*	50	300	2	512,000

*The 150 kW (F1) heater has two stages of heat and can be used as a 75 kW heater. BTU capacity in this scenario is 296,000 Btu.

Note: Capacities are gross values and are not adjusted for motor heat.

Weights and Dimensions

Table 3.

Model	Length	Width	Height	Weight
50 kW	4 ft, 7 in	2 ft, 10 in	3 ft, 11 in	575 lb
150 kW (F0)	7 ft, 6 in	4 ft, 1 in	4 ft, 4 in	1,385 lb
150 kW (F1)	6 ft, 9 in	2 ft, 9 in	4 ft, 0 in	1,480 lb

Rigging Guidelines

The 50kW and 150kW (F1) units conveniently fit through a standard doorway. The 50kW and 150kW heaters include a rugged, weatherproof enclosure for reliable outdoor operations. The 50 kW electric heaters are equipped with lockable caster wheels and handles on each end of the unit to allow the unit to be maneuvered into position. The 150 kW (F1) electric heaters are equipped with casters and fork pockets on one side. The 150 kW (F0) electric heater has forklift pockets on two sides only and lifting rings at the top corners of the unit.

⚠WARNING

Heavy Objects!

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

Figure 1. 50 kW Electric Heater

Figure 2. 150 kW (F0) Electric Heater

Figure 3. 150 kW (F1) Electric Heater

Electrical Information

The 50 kW, 150 kW (F0) and 150 kW (F1) have color-coded cam-type electrical connections for connecting our temporary electrical cable to the unit. The 50 kW electric heaters are equipped with two sets of color coded cam-type electrical connections to allow you to connect multiple units in series. Ensure that the electrical cable that is utilized is adequately sized to handle the additional load for powering multiple units.

Table 4.

Model	50 kW	150 kW (F0)	150 kW (F1)*
VFD	No	Yes	Yes
Fan Motor HP	2	15	3
Unit Power	460V, 3-phase	460V, 3-phase	460V, 3-phase
Unit MCA	74.4	248.3	235
Motor FLA	3	18	7.6
Unit FLA	56.6	187.5	190
MOP	75	250	250

* The 150 kW (F1) heater has two stages of heat and can be used as a 75 kW heater. In this scenario, the unit FLA is 92 amps and MOP is 150 amps.

Unit Controls

50 kW and 150 kW (F0) Electric Heater

The 50 kW electric heater is a constant volume unit. The 150 kW (F0) electric heater contains a variable frequency drive (VFD) to control the supply fan. The VFD on the 150 kW (F0) electric heater is controlled using the potentiometer dial labeled “Fan Speed” located behind the metal door on the side of the unit. The 50 kW and 150 kW (F0) units are also equipped with an emergency stop button and a fan switch to provide on-off fan control.

The 50 kW and 150 kW (F0) units are manufactured with internal time delays to protect the system from overloading the supply power with a large inrush at the same time. The 50 kW and 150 kW (F0) heaters are supplied with discharge air thermostats. The discharge air thermostat is located internal to the unit control box directly behind the unit's main thermostat and system ON/OFF switch. This thermostat prevents the discharge air temperature from exceeding 160°F which prevents internal damage to the unit. These units also have high limit switches that are designed to shut the heaters down if the discharge air temperatures exceed 180°F.

Note: *At least one section of duct must be connected to the supply or return of the 50 kW electric heater to prevent the fan breaker from tripping due to excessive fan speed.*

Figure 4. 50 kW Control Panel

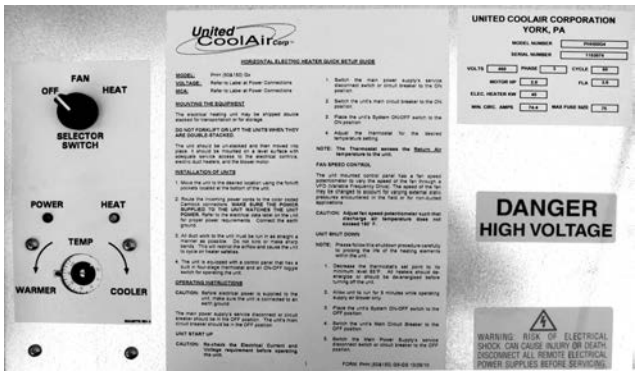
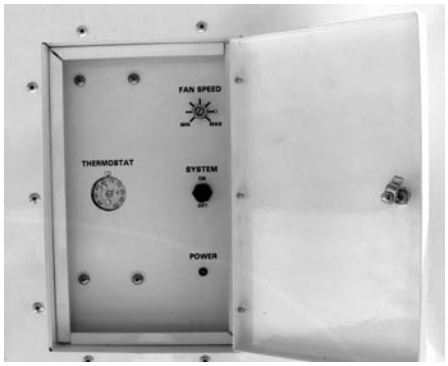


Figure 5. 150 kW (F0) Control Panel



150 kW (F1) Electric Heater

The 150kW (F1) electric heaters contain a 3 hp blower with variable speed drive allows for precise air flow control. The NEMA 4 control panel includes main disconnect, high limit controller and an industrial three-pole shutdown contactor for each heating circuit. The unit includes an emergency shutdown button and indicator lamps for Power On, Heat On, Low Air Flow and Over Temperature. Also included is a process controller with remote setpoint capacity, digital communications and 4-20 mA analog output.

The 150 kW (F1) heater is a portable assembly capable of operating at either a 75 kW or 150 kW heating capacity. The fan speed is controlled with a variable frequency drive to change air flow volume and is adjusted by the "Variable Speed Control" dial. The output temperature is controlled with Chromalox® Temperature Controller with a thermocouple mounted in the output air stream. The heater has two modes of operation – LOCAL and REMOTE.

Local operation relies on the thermocouple located in the heater outlet air flow only and connected to the Chromalox® Temperature Controller. The default temperature setting is 300°F. The controller will maintain this output air flow temperature. The controller temperature level can be adjusted to a lower temperature based on the ambient conditions and operator discretion. The temperature cannot be adjusted higher than 300°F.

Remote operation relies on the thermostat located in the remote controller panel, as well as the thermocouple located on the heater outlet. The heater will produce 300°F outlet temperature. Once the remote thermostat is satisfied, the heater will cycle to maintain the remote thermostat setting.

The operator can vary both the output temperature setting and fan speed to achieve desired results. There are two ON/OFF switches on the control panel. The large rotary switch on the left of the control panel energizes control power. The smaller ON/OFF selector switch starts the heater. There are three main fault indicators on the front panel. Any of these faults will shut down the heater.

- High Limit Fault – indicates heater element temperature has exceeded 1000°F. Probes are located in each of the 75 kW heater element assemblies.
- Air Limit Fault – indicates insufficient air flow over the heater elements. Check for obstructions to inlet air and fouling of the draft tube.
- VFD Fault – indicates internal problem on VFD. Refer to manufacture's manual for troubleshooting procedures. (NOTE: Pushing the Emergency Stop Button will shut down the VFD and indicate VFD FAULT. 480V power must be removed to reset this fault.)

Fan Curves

Figure 6. 50 kW Fan Curve

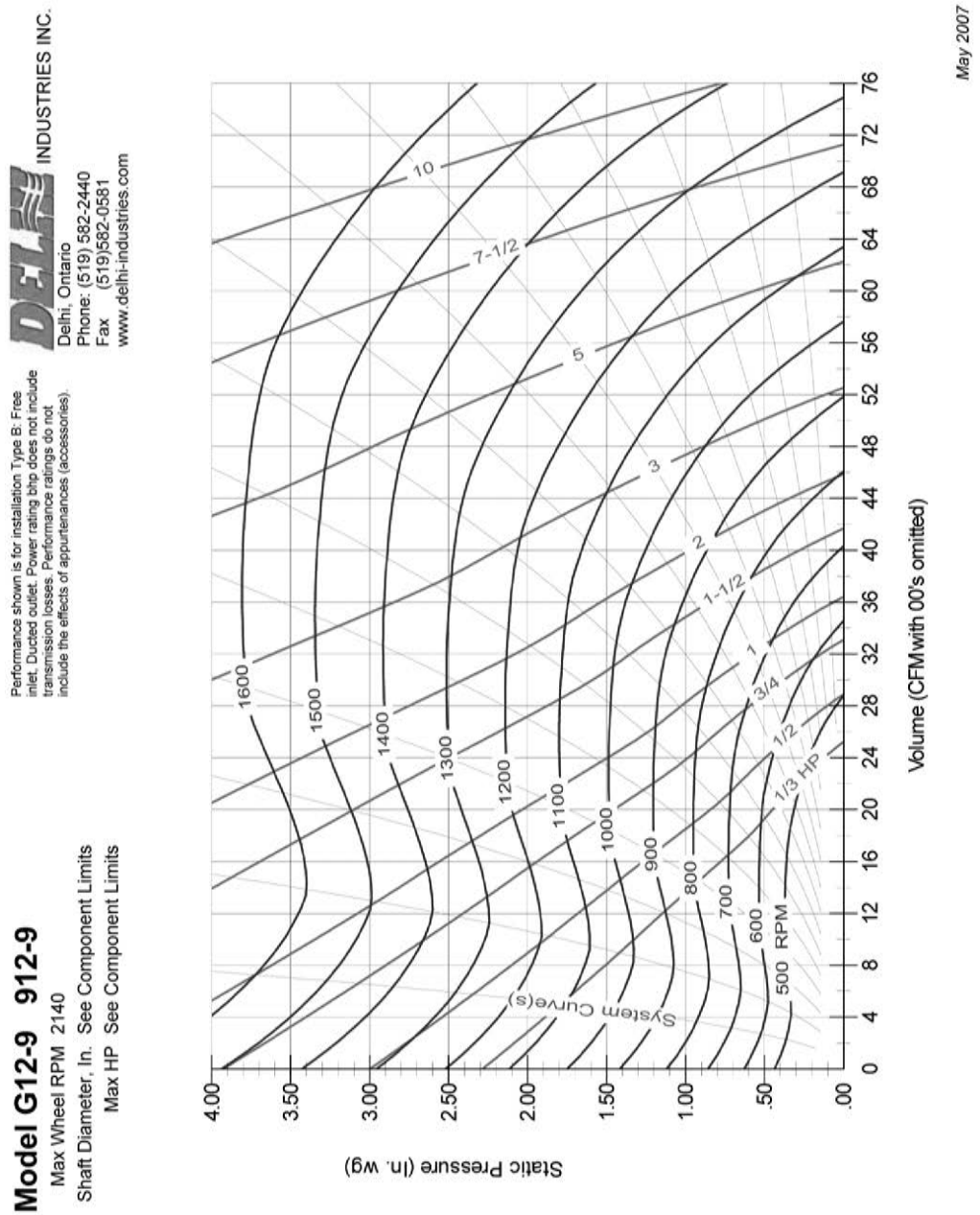


Figure 7. 150 kW (F0) Fan Curve

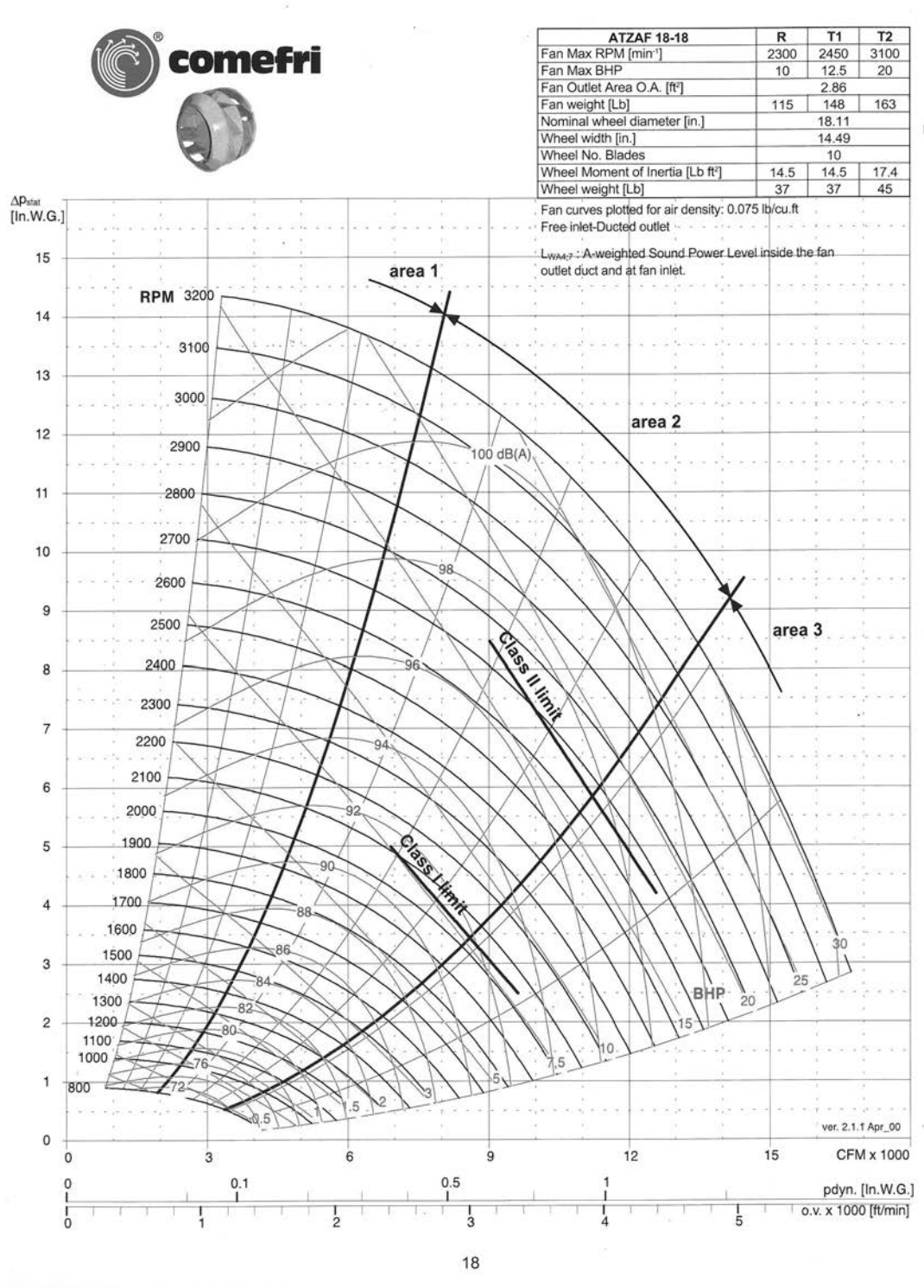
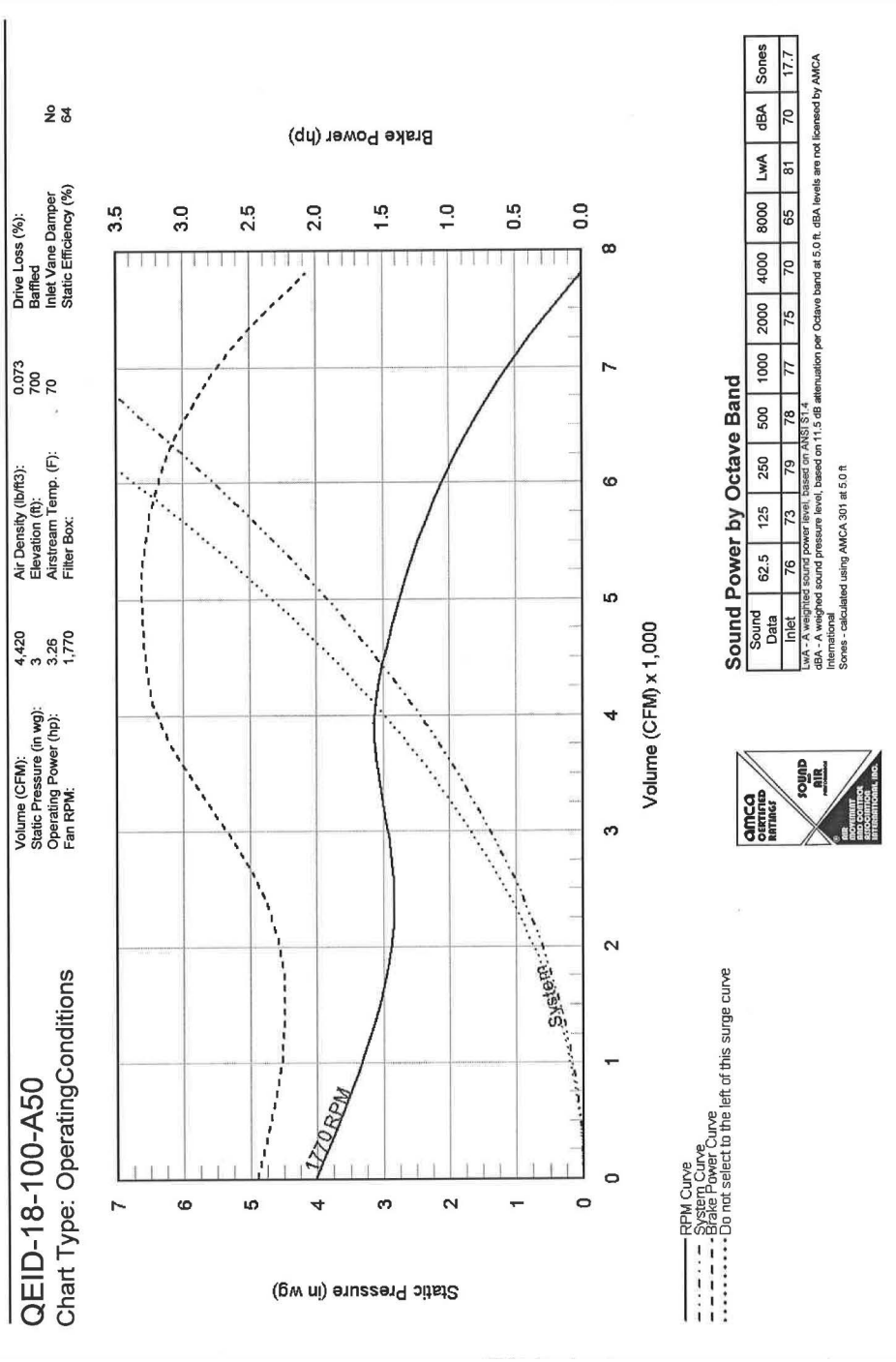


Figure 8. 150 kW (F1) Fan Curve



Installation/Start-up Guidelines

Installation

- Confirm unit is properly leveled.
- Verify air inlet and heater outlet are clear of any debris or obstructions.
- Connect power cable from unit to the power source and confirm that the wires are properly phased, connected and locked securely to panel.
- For ducted applications:
  - Install the supply and return air ducts on the duct adapters on the front of the unit. Ensure as straight a run of duct as possible. Excessive bends or kinks may cause the heaters to short cycle.
- For free blow applications:
  - No duct installation required.
- For 150 kW (F0) only:
  - Turn the Fan Speed potentiometer to its minimum setting – full counterclockwise position (See Figure 3 for reference).
- For 150 kW (F1) only:
  - Verify air flow draft (Pitot) tube is clear and clean. Draft tube is located behind outlet grill.
  - Verify heater temperature probe is clear and clean. Probe is located behind outlet grill, next to draft tube.
  - If using Remote Control Panel, verify cable remote thermostat is properly seated and locked into control panel. (If used – otherwise place switch in Local mode).
  - Adjust variable speed dial to full clockwise position.

Start-up Guidelines

50 kW and 150 kW (F0) Units

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

- Verify that the unit disconnect (toggle switch) is in the "OFF" position on the unit.
- Energize the source power to the electric heater.
- Switch the unit disconnect (toggle switch) to the "ON" position to supply power to the unit.

Note: *If the Power LED is illuminated, the unit is ready for operation. If not, check the unit supply voltage at the main power source. Disconnect (turn off) the unit's circuit breaker and the main power at the power source when checking voltage.*

Figure 9. 50 kW and 150 kW (F0) Main Unit Disconnect

- Verify proper sequencing of the input power by looking at the phase indicating light. If the light is lit, change any two of the conductors (excluding the ground wire) at the power source. Do not change wiring internal to the unit!
- For 50 kW:
  - Turn Selector Switch to "Heat"

  For 150 kW (F0):
  - Turn the system switch to the "ON" position and adjust the air flow using a flat head screwdriver on the "Fan Speed" dial.
  - Turn the "Fan Speed"dial counter-clockwise to decrease the blower motor speed. Turn the "Fan Speed" dial clockwise to increase the blower motor speed. Set the blower speed as appropriate.

Note: *When the speed of the motor decreases below a preset frequency of 45 Hz three stages of heating will automatically shut down to prevent the heaters from overheating.*

- Use the thermostat dial to adjust discharge temperature.

150 kW (F1) Unit

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

- Verify E-Stop is not engaged (Pull button out).
- Rotate disconnect to the "ON" Position. (Note: This energizes control power and allows the user to adjust the Chromalox® temperature controller, but will not start the heater.)
- Set the outlet temperature on the Chromalox® using the "Up" and "Down" arrows.
- If you are using the remote thermostat, you will place the LOCAL/REMOTE button to REMOTE.
- Set key switch position to available feeder circuit breaker.
  - 75 kW operation (key switch position #1) – 150 amp feeder circuit breaker required
  - 150 kW operation (key switch position #2) – 250 amp feeder circuit breaker required
- Rotate "ON/OFF" switch to "ON" position to commence heater operation. Heater will start, and the operator can observe the output temperature increase to programmed set point.

Note: *Hi limit fault and air limit fault lights will operate until the air flow is sufficient to remove the faults – these faults will turn off within 2-3 seconds after fan operates!*

- Push each fault light button to verify all fault lights function correctly.

- Adjust outlet temperature and fan speed to obtain desired heating performance (Do not attempt to set outlet temperature above 300°F).
- Close all covers (local and remote panels) and secure.

Shut Down Guidelines

50 kW and 150 kW (F0) Units

- To Power off the unit:
  - For 50 kW: Turn Selector Switch to the "OFF" position
  - For 150 kW (F0): Turn the system switch to the "OFF" position
- Switch the unit disconnect (toggle switch) to the "OFF" position to remove power from the unit.
- De-energize the source power to the electric heater.

150 kW (F1) Unit

- Turn ON/OFF selector switch on control panel to “OFF” position. Heater will then commence an automatic 3 minute cool down cycle, then automatically shut down.

⚠CAUTION

The heater cool down cycle is needed to safely shut down the system. Do not disconnect or shut power off to the unit until the cool down cycle is complete!

- Rotate disconnect to the "OFF" position
- Close all covers (local and remote panels) and secure.

Maintenance Guidelines

The motor and blower bearings are permanently lubricated and require no maintenance. The unit fan is belt driven. The drive belts should be examined periodically for wear and correct tension.

Each unit is provided with cleanable filters that are installed in the evaporator return air section. The return air grill must be removed to gain access to the filters. Check filters periodically to verify that they are clean. The filters can be cleaned by rinsing them with water.

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

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