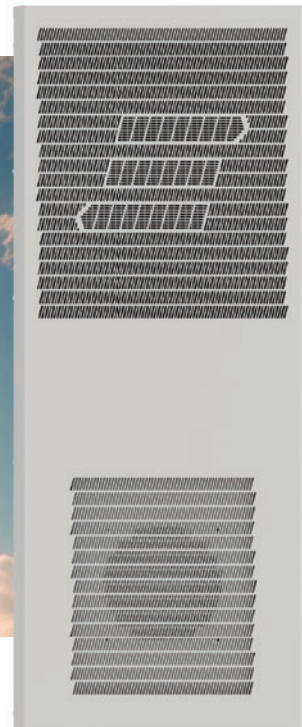


DANTHERM

COOLING

ThermoFlow® Series

Product User Manual



INTRODUCTION

This is the service manual for Dantherm ThermoFlow Series units. Please see the table of contents below for further information about the sections of this manual.

TARGET GROUP

The target group for this service manual are the technicians who install and maintain the ThermoFlow Series units, as well as users of the unit.

COPYRIGHT

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RESERVATIONS

Dantherm reserves the right to make changes and improvements to the product and the service manual at any time without prior notice or obligation.

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UNPACKING, HANDLING, AND INSPECTION

Thank you for purchasing a Dantherm ThermoFlow unit. Please carefully review all handling and installation instructions.

- The unit should be inspected on initial delivery and any damage to packaging should be noted.
- Special consideration should be given to correctness of external packing damage or abrasion, loose components and surface marks.
- Any damage should be added to the freight bill and immediately notify the freight company for filing a freight claim.
- All packing materials should be retained for inspection.

Do not attempt to operate the unit if it appears to be damaged.

GENERAL SAFETY

Certain parts of electrical systems are inevitably live or have a high operating temperature. Observe caution at all times.

- Failure to observe these conditions and installation instructions can cause injury and damage.
- The system is to be installed and maintained only by trained and qualified personnel.
- Do not apply power until all ground connections have been made.
- The unit is fitted with pressed and folded metal parts, which could have sheared metal edges. Be cautious handling the unit, especially when working in poorly accessible places.
- Check that no tools, test equipment, torches etc. have been left in or on the equipment on completion of work.
- Ensure the cover(s) and all mounting hardware are firmly secured before leaving installation.
- All cable and connectors must conform to UL standards

- The unit is UL recognized and tested to UL1995. It will comply where necessary with the safety requirements as defined in UL1995.

WARNINGS

INTRODUCTION: This installation manual and the product uses various displays and labels to ensure safe use. Ignoring these displays and labels and incorrectly using the product could have results as classified below. Please read the following warning symbol information before reading the rest of this section, and be sure to strictly observe all instructions.

GENERAL PRECAUTION: This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance. If the power cord is damaged, it must be replaced by the manufacturer, a service agent, or a similar qualified person in order to avoid a hazard.

⚠ WARNING: Not following these instructions could result in death or serious injury.

⚠ CAUTION: Not following these instructions could result in injury or property damage.

⚠ This symbol will show for something that should NOT be done.

Project safety is your responsibility! Follow the instructions in this manual regarding the installation method and installation orientation. Not following these instructions could result in injury, death, or damage to equipment. All work should be performed by qualified personnel using safe work practices. All proper protective equipment should be used. PPE required may include, but is not limited to: Safety glasses | Hard hat | Safety shoe | Hearing protection | Cut resistant gloves | Face shield | Proper work attire (long sleeve shirt and long pants)

MODEL IDENTIFICATION

TF-120-48-03

CAPACITY

120 - 120 WATTS/°F
175 - 175 WATTS/°F
230 - 230 WATTS/°F

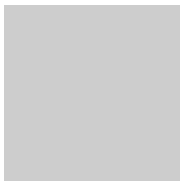
VOLTAGE

115 - 115 VAC
230 - 230 VAC
48 - 48 VDC

COLOR

03 - P03 GREY
04 - P04 BEIGE
20 - P20 WHITE
00 - CUSTOM

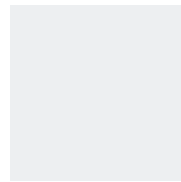
Color Options



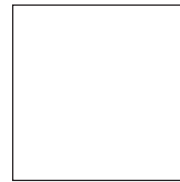
03 - P03 Grey



04 - P04 Beige



20 - P20 White



00 - Custom

MODEL OVERVIEW					
TF	COOLING CAPACITY W/°F	INPUT VOLTAGE	FULL LOAD AMPS (A) (WITH HEATER)	MIN BREAKER FUSE (A)	WEIGHT [KG]
TF-120-48	120	48 VDC	15.0	15.0	90
TF-175-48	175	48 VDC	15.0	15.0	100
TF-230-48	230	48 VDC	20.0	20.0	110

OPTIONS

Standard Control: The standard operation will turn on the fans as soon as power is applied. The control is handled by the supplied power.

Speed Control: The controller is designed to slow down the speed of the internal and external fans at a lower temperature to reduce noise and energy consumption. It will also supply either a normally closed (NC) or normally open (NO) alarm signal for fan fault, or high temperature

PROUCT DESCRIPTION

The Thermoflow series is designed to control the internal temperature of an enclosure. By removing dissipated heat from inside the structure and is designed to maintain accurate temperatures for electronic equipment.

IMPORTANT

Dantherm Cooling Inc. recommends that the cooling system should run continuously.

FUNCTIONALITY

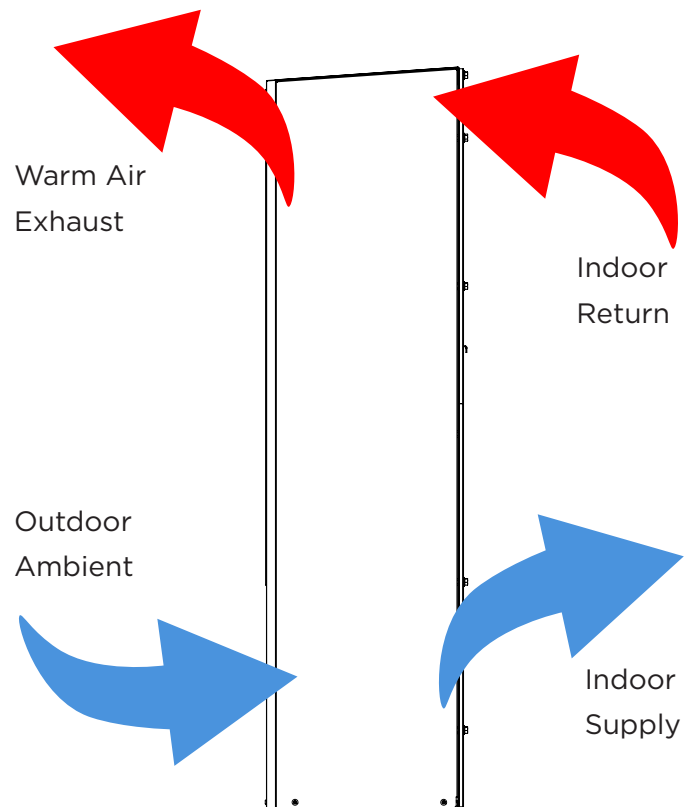
The illustration to the right shows the airflow of the THERMOFLOW. The two air flows (internal/external) operate separately. External air is only used to cool down the condenser which dissipates the heat absorbed by the indoor evaporator. The air flows are not mixed.

INTERNAL AIR FLOW

Warm, internal air is drawn into the unit by the internal fan. The air is then pushed through the evaporator, and then released into the enclosure through the evaporator opening.

EXTERNAL AIR FLOW

Cold, external air is drawn into the unit by the external fan, and then routed through the condenser, where it cooled. After passing through the condenser, the warm air is returned to the external environment.



INSTALLATION

Please strictly observe the following:

Special skills are required to install Dantherm products. Non-qualified personnel should not attempt any of the actions shown in this installation guide. Dantherm shall not be responsible for improper installation or any accidents, damages, or injury resulting from improper installation.

These units are designed to be mounted outdoor, flush to the wall. Any other installation method is not recommended.

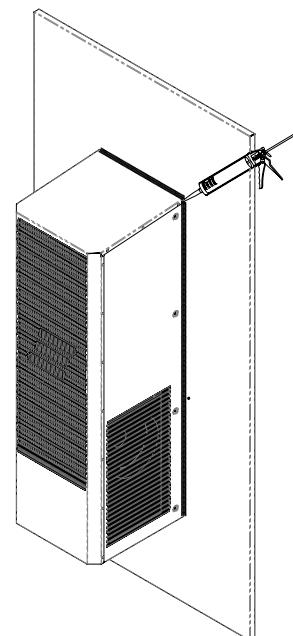
! WARNING

Never carry out any installation, maintenance or service, without disconnecting the power supply.

INSTALLATION PLACEMENT

Any installation should allow good air flow inside the enclosure.

- The enclosure shall be checked for correctness of cutouts, mounting holes and electrical supply.
- The Mounting Hook is preset to match the recommended cutout openings. If an adjustment other than factory setting of the hook needs to be made, do so prior to fixing the gasket to the heat hanger.
- Install the gaskets as shown in section 5.1. A gasket kit is provided with each unit. not apply power until all ground connections have been made.
- Remove the outer cover of the Thermoflow unit by removing the screws from either the side or bottom of unit. Depending on options selected, use a #25 Security Torx Driver or #30 Security Torx with Pin Driver. All screw threads are M6.
- Utilize an appropriate and safe lifting device.
- Mount the Thermoflow to the cabinet by using the mounting hook, which supports the weight of the unit. The hook grabs the cutout opening on the cabinet panel.
- Install the mounting hardware as supplied with the unit (M6x25 SCKT HD cap screws & washers). The fixings are installed from inside the cabinet into the threaded inserts located in the unit. Use 4mm allen wrench/ driver.
- Connect the ThermoFlow power lead to the main supply located in the cabinet/ enclosure. Refer to product label on the bottom right hand side panel of unit for the proper voltage/amp requirement.
- Make sure a properly grounded power supply is used. All installations are to be completed in accordance with local NEC codes and guidelines.
- The electrical circuit should be protected by a slow blow breaker or fuse. Refer to the model overview in this manual for fuse/breaker rating.
- After final installation and power supply connection, the unit should be powered and checked for correct airflow.
- For models containing speed control option, push and hold test button located on control board for five seconds to activate the self-test.
- Check to correct airflow and fan speeds.
- Please contact Dantherm for more information if required.



ELECTRICAL REQUIREMENTS

Please incorporate the following imperative requirements when installing the electrical connections:

WARNING

Any installation should always be in accordance with national wiring regulations, DC/AC external supply should be protected, with an external disconnecting device that has a contact separation of at least 3 mm. This external DC/AC supply must also be over current protected. These disconnecting devices, must always be labeled, with rated voltage as well as rated current.

- The units earth connections must always be connected to the enclosures ground.
- All cables, in a permanent installation, are imperative to install and secure properly to prevent any damage to equipment and/or humans. Secure all cables with cable ties or appropriate cable fasteners, made for this purpose.

ELECTRICAL CONNECTIONS

After successful unit installation, the electrical connections will be completed, after following the below requirements:

WARNING

1. The power and/or additional connections need to be routed, secured and connected to appropriate sources. The ThermoFlow unit is either delivered with:
 - 10ft. cable with stripped wires are to be connected inside a distribution board. Refer to wiring diagrams for connections.
 - Unit types with extension “-L” on the label are delivered with a factory fitted plug, that should be connected to the fused power.
 - -48 DCV units are supplied with a harness that should be connected to the fused power.
2. Connect the ThermoFlow units ground terminal to enclosure grounding.
3. All power supply connections are to be secured with an external disconnection device, as well as over current protected.
4. Connect any needed accessories.

ELECTRONIC CONTROL DESCRIPTION

This section describes key features of the HX-2 controller, and how it operates.

WARNING

Never carry out any installation, maintenance or service, without disconnecting the power supply.

EMBEDDED CONTROLLER

The built in all in one controller, controls the unit in the most efficient way. Parameters are factory set.

TEST BUTTON

A test button is on board the controller to allow the user to initiate the following test sequence:

STEP	INT. FAN	EXT. FAN	ALARM	LED	DURATION
1	0%	0%	Activated	Solid	30 sec.
2	50%	0%	Activated	Flashing	30 sec.
3	50%	50%	Activated	Flashing	30 sec.
4	100%	50%	Activated	Flashing	30 sec.
5	100%	100%	Activated	Flashing	30 sec.
6	0%	0%	Normal	Flashing	15 sec.

CONTROL STRATEGY

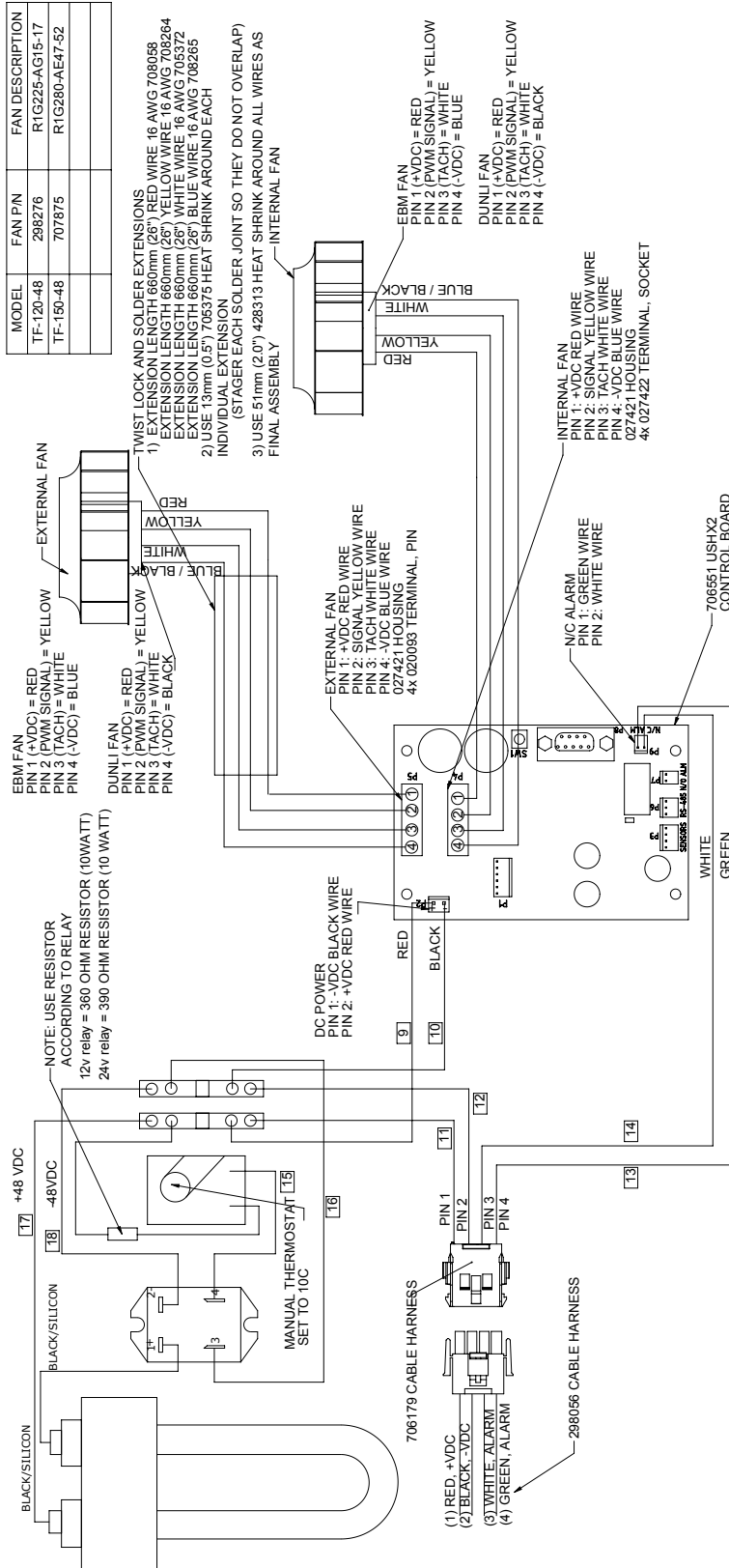
The controller regulates the fans and cooling based on desired set points.

- Install the gaskets as shown in section 5.1. A gasket kit is provided with each unit. not apply power until all ground connections have been made.
- Remove the outer cover of the Thermoflow unit by removing the screws from either the side or bottom of unit. Depending on options selected, use a #25 Security Torx Driver or #30 Security Torx with Pin Driver. All screw threads are M6.
- Utilize an appropriate and safe lifting device.
- Mount the Thermoflow to the cabinet by using the mounting hook, which supports the weight of the unit. The hook grabs the cutout opening on the cabinet panel.

TROUBLE SHOOTING GUIDE

PROBLEM	SOLUTION
<p>DURING INITIAL INSTALLATION, NEITHER FAN TURNS ON AND LEDs AREN'T DISPLAYING</p>	<p>Try reversing the wiring. Reverse protection is provided to prevent damage to the controller. When plugged in "backwards" the controller will not function.</p>
<p>DURING INITIAL INSTALLATION, THE INTERNAL FAN IS ON, BUT EXTERNAL FAN IS NOT</p>	<p>The external fan will not function until the "T1" setting is exceeded. By default, this is 30°C.</p>
<p>FAN DOES NOT GO TO FULL SPEED</p>	<p>Check temperature, check jumper JP1 is selected to 1 and 2.</p>
<p>THE RED LED IS FLASHING</p>	<p>A sensor fault has occurred. The fans should operate at full speed until this is corrected. Check the sensor or cabinet temperature.</p>
<p>THE RED LED IS SOLID</p>	<p>A fan fault has occurred. Check the fan wiring or the fan.</p>

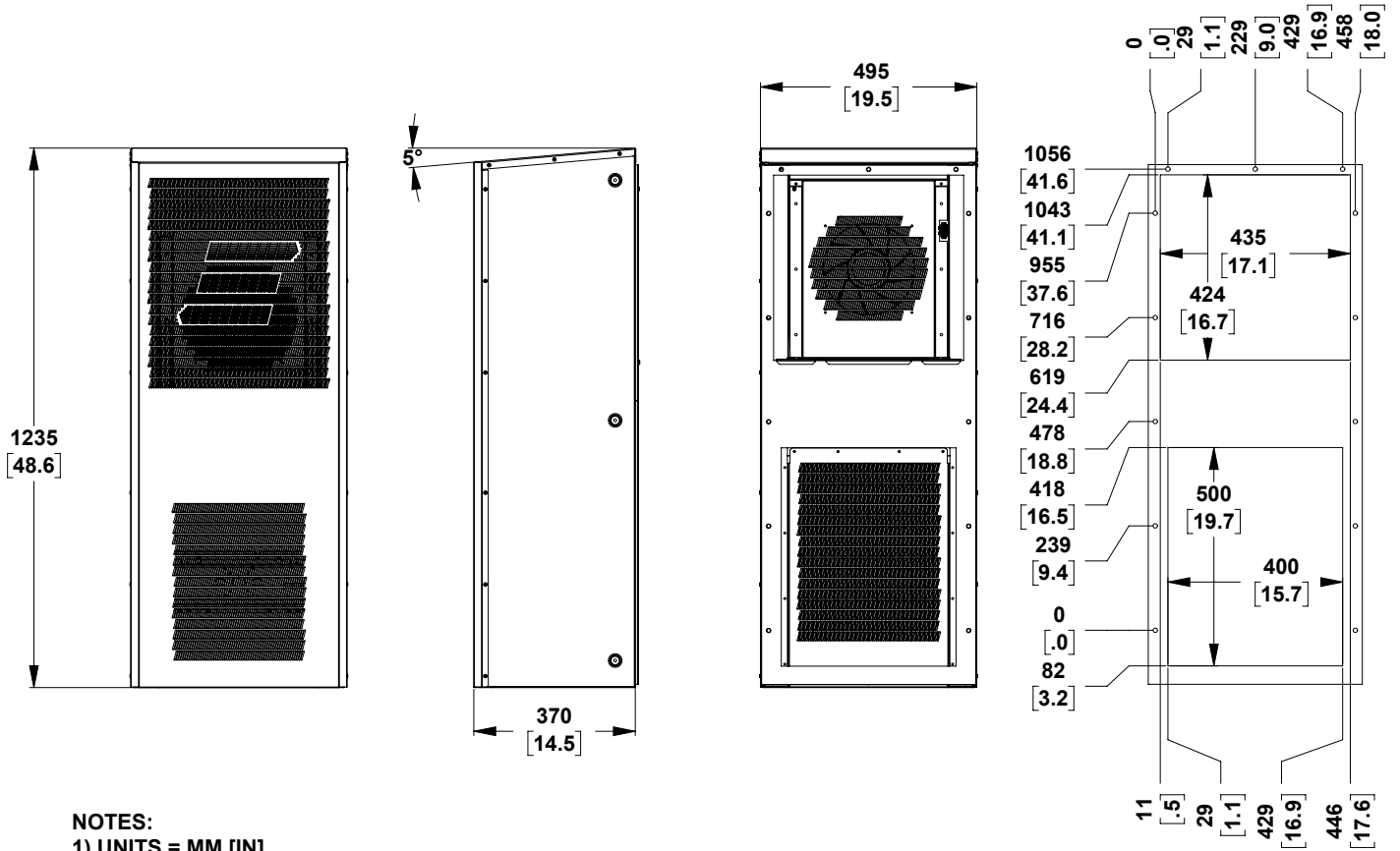
48 DCV



MODEL	FAN P/N	FAN DESCRIPTION
TF-120-48	298276	R1G225-AG15-17
TF-150-48	707875	R1G280-AE47-52

- NOTES:
- DO NOT SCALE DRAWING
 - APPLICABLE TO 48VDC THERMOSIPHON WITH HX2 FAN SPEED CONTROL & HEATER

ThermoFlow® 120



- NOTES:**
 1) UNITS = MM [IN]
 2) STEP FILES AVAILABLE UPON REQUEST

ThermoFlow® 120

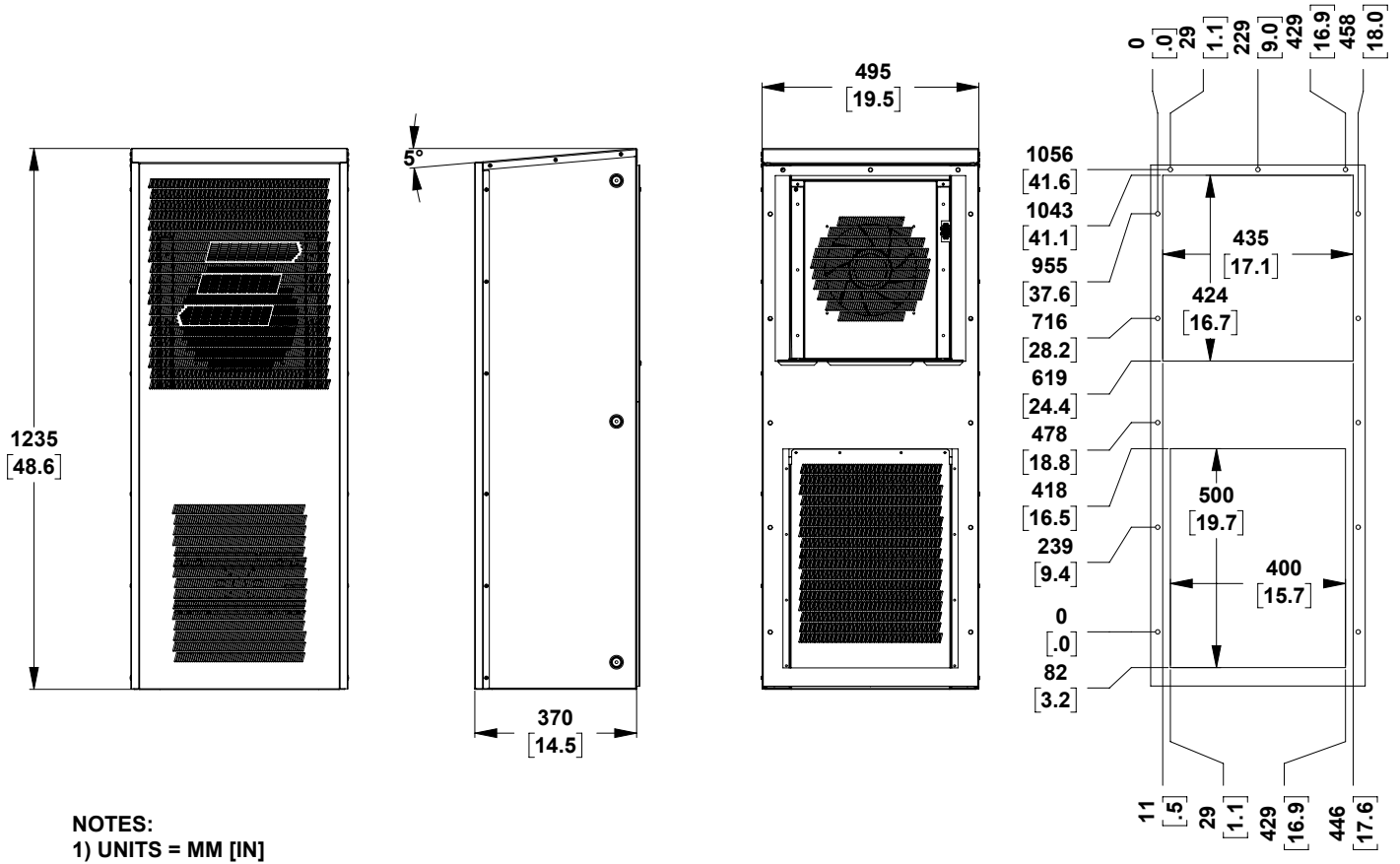
TECHNICAL DATA

These units are designed for high reliability and electrical efficiency.

- Heat Exchange is accomplished through natural convection inside the sealed system.
- Radial Fans with backward curved impellers for higher CFM
- Slim MPE heat exchangers for high performance thus low pressure drop

	UNITS	
MODEL NUMBER	--	TF-120-48
MOUNTING TYPE	--	Outdoor
UNIT DIMENSIONS [HxWxD]	Inches [mm]	48.5x19.5x14.4 [1230x492x367]
WEIGHT	Lbs [kg]	90 [40]
COOLING CAPACITY 131°F INTERNAL / 131°F AMBIENT	W/°F [W/°C]	150 [315]
OPERATIONAL TEMPERATURE RANGE	°F [°C]	-40 to 131 [-40 to 65]
MAXIMUM AIRFLOW	CFM [m3/hr]	710 [1203]
NOISE 1.5M DISTANCE	dB	63
INPUT VOLTAGE	Volts	48 VDC
CURRENT	Amps	5.6
APPROVALS	--	SA12349 (UL)
NEMA	--	3R
CONSTRUCTION	--	Aluzink Steel, Stainless Optional Textured Powder Coat, Color Options Available

ThermoFlow® 175



NOTES:
 1) UNITS = MM [IN]
 2) STEP FILES AVAILABLE UPON REQUEST

ThermoFlow® 175

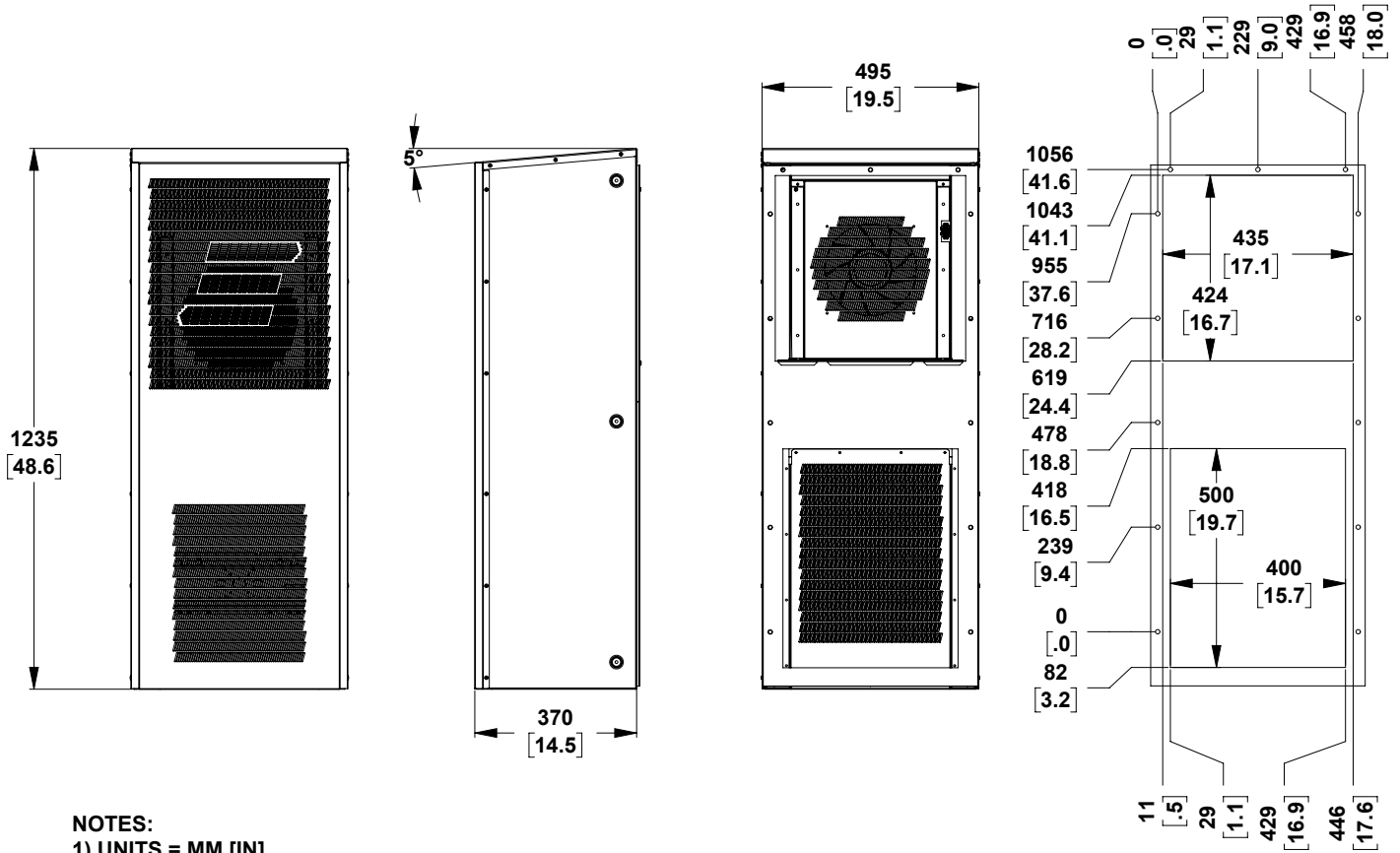
TECHNICAL DATA

These units are designed for high reliability and electrical efficiency.

- Heat Exchange is accomplished through natural convection inside the sealed system.
- Radial Fans with backward curved impellers for higher CFM
- Slim MPE heat exchangers for high performance thus low pressure drop

	UNITS	
MODEL NUMBER	--	TF-175-48
MOUNTING TYPE	--	Outdoor
UNIT DIMENSIONS [HxWxD]	Inches [mm]	48.5x19.5x14.4 [1230x492x367]
WEIGHT	Lbs [kg]	21 [9.5]
COOLING CAPACITY 131°F INTERNAL / 131°F AMBIENT	W/°F [W/°C]	17 [30]
OPERATIONAL TEMPERATURE RANGE	°F [°C]	-40 to 131 [-40 to 65]
MAXIMUM AIRFLOW	CFM [m3/hr]	1150 [1950]
NOISE 1.5M DISTANCE	dB	63
INPUT VOLTAGE	Volts	48 VDC
CURRENT	Amps	4.8
APPROVALS	--	SA12349 (UL)
NEMA	--	3R
CONSTRUCTION	--	Aluzink Steel, Stainless Optional Textured Powder Coat, Color Options Available

ThermoFlow® 230



- NOTES:**
- 1) UNITS = MM [IN]
 - 2) STEP FILES AVAILABLE UPON REQUEST

ThermoFlow® 230

TECHNICAL DATA

These units are designed for high reliability and electrical efficiency.

- Heat Exchange is accomplished through natural convection inside the sealed system.
- Radial Fans with backward curved impellers for higher CFM
- Slim MPE heat exchangers for high performance thus low pressure drop

	UNITS		
MODEL NUMBER	--	TF-230-48	TF-230-480
MOUNTING TYPE	--	Outdoor	
UNIT DIMENSIONS [HxWxD]	Inches [mm]	48.5x19.5x14.4 [1230x492x367]	
WEIGHT	Lbs [kg]	90 [40]	
COOLING CAPACITY 131°F INTERNAL / 131°F AMBIENT	W/°F [W/°C]	230 [414]	
OPERATIONAL TEMPERATURE RANGE	°F [°C]	-40 to 131 [-40 to 65]	
MAXIMUM AIRFLOW	CFM [m3/hr]	1375 [2350]	
NOISE 1.5M DISTANCE	dB	63	
INPUT VOLTAGE	Volts	48 VDC	480 VAC 3Ø
CURRENT	Amps	8.2	1
APPROVALS	--	SA12349 (UL)	In Process
NEMA	--	3R	
CONSTRUCTION	--	Aluzink Steel, Stainless Optional Textured Powder Coat, Color Options Available	

PREVENTATIVE MAINTENANCE

Preventative maintenance must be completed in order to:

- Continue operation in specified range
- Avoid malfunctions
- Avoid inefficient operation
- Maximize the unit's lifetime

The ThermoFlow unit should be examined periodically to determine the required cleaning periods based on the installed environmental conditions. Annual inspections are most typical and will cover the majority of installed locations. The factory warranty is only valid if documented preventative maintenance has been carried out, with a time interval of:

- Maximum six months when unit is located in normal air quality environment.
- Maximum two months when unit is located in bad air quality environment.

A written log at site is adequate documentation for preventative maintenance.

CAUTION

Always disconnect power to the ThermoFlow prior to servicing. Scheduled maintenance includes cleaning of fans and ThermoFlow core as they become contaminated with dust and/or residue.

The fans and ThermoFlow core should be cleaned using a soft bristle brush to remove dust or debris. Water is NOT recommended. Reconnect power after service.

SPARE PARTS

A number of spare and replacement parts are available from Dantherm Cooling. Please contact technical support for more information at: technicalsupport@danthermcooling.com.

WARRANTY:

DANTHERM COOLING, INC., HEAT EXCHANGERS AND AIR CONDITIONING UNITS HAVE LIMITED WARRANTY.

DANTHERM COOLING, INC. (“DANTHERM”) limited warranty extends to the original purchaser only of any DANTHERM heat exchanger and air conditioning unit, and to no other person or entity. DANTHERM warrants that such DANTHERM products will be free from defects in materials and workmanship in normal use for a period of twelve (12) months from the date of the original purchase. Should any part of your DANTHERM product fail because of a manufacturing defect within such twelve (12) month period, DANTHERM terms are set out below.

IMPORTANT

- Using Dantherm nominated service contractors-warranty on product continues
- Using Dantherm non-approved service contractors-warranty on product becomes void.
- Warranty period starts from date of shipment-warranty of replacement parts shall only apply for the remainder of the warranty period of the original product.

Any transportation, related service labor, diagnosis calls, filters, driers, and refrigerant are not included.

In the event all related service labor is performed by DANTHERM nominated service contractors, the replacement part shall be warranted by DANTHERM for the remainder of the warranty period for the original product.

This warranty does not cover damages or repairs caused by improper installation, misuse of the product, negligent servicing, improper applications, unauthorized modifications, improper electrical supply, failure to follow manufacturer’s instructions and rating plate information, accidents, natural disasters, damage in transportation, lack of normal preventive maintenance, or other events beyond DANTHERM’s control.

This warranty is also subject to the following operating conditions:

- 1) Voltage variation not greater than 10%,
- 2) Frequency variation not greater than 3Hz from nameplate rating
- 3) Cooling load is not greater than product label under rated conditions
- 4) Unit is not restarted for a period of five minutes after accidental or intentional shut-off
- 5) Operation is not subject to abnormal conditions or customer, user misapplication
- 6) Customer or user does not modify, abuse, or neglect the product
- 7) Refrigerant specified on nameplate is only refrigerant used
- 8) Customer or user complies with all other installation, maintenance, and operating instructions. Cost of repair or replacement of consumable parts is not covered under the terms of this warranty.

THIS WARRANTY CONSTITUTES THE EXCLUSIVE REMEDY OF ANY PURCHASER OF A DANTHERM HEAT EXCHANGER, AIR CONDITIONING UNIT AND IS IN LIEU OF ALL OTHER WARRANTIES. THIS ALSO INCLUDES, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE, OR FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE, OR FOR A PARTICULAR PURPOSE EXCEED THE TERMS OF THE APPLICABLE WARRANTY STATED ABOVE, AND DANTHERM SHALL HAVE NO OTHER OBLIGATION OR LIABILITY, EXPRESS OR IMPLIED. IN NO EVENT SHALL DANTHERM BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. SOME STATES DO NOT ALLOW LIMITATIONS OR EXCLUSIONS, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY TO YOU.

RETURN MATERIAL AUTHORIZATION PROCEDURE

In the unlikely event of unit failure, the following return procedure shall be adopted:

- All product returns require a Return Material Authorization number regardless of reason.
- The customer is required to contact the Quality Department at Dantherm Cooling, Inc. in Spartanburg, SC at +1-864-595-9800 to obtain an RMA number.

The following information must be provided prior to a RMA number being issued:

- Dantherm Cooling, Inc. part number(s) of product to be returned
- Dantherm Cooling, Inc. serial number(s) of product to be returned.
- Number of units requested to be returned. Reason for return.
- Contact name, phone and fax number. Date of product receipt.
- Invoice number and purchase order number covering the unit(s).

The customer is responsible for suitably packaging the unit(s) securely, ideally in the original packaging, marking all cartons with the RMA number and shipping them prepaid to the designated site specified by Dantherm Cooling, Inc.

IN NO EVENT SHALL DANTHERM COOLING, INC. ACCEPT ANY SHIPMENT WHICH DOES NOT COMPLY WITH THE ABOVE PROCEDURES.

REMOVE THE CONDENSATE HOSE AND ADAPTER FROM THE BOTTOM OF THE UNITS PRIOR TO DISMANTLING THE AIR CONDITIONER AND RESTING IT ON THE GROUND.

DECLARATION OF CONFORMITY

Dantherm Cooling Inc., Spartanburg, SC hereby declare that the units PrecisionAir 50/60Hz are in conformity with the following directives:

- UL 60335-1 Fifth Edition
 - UL 60335-2-40 First Edition
 - CAN/CSA-C22.2 No. 60335-1-11 First Edition
 - CAN/CSA-C22.2 No. 60335-2-40 .. First Edition
- Spartanburg, SC – September.20.2018

Recycling: The unit should be recycled according to national rules and procedures to protect the environment. Please consult your local authorities for further information.

DANTHERM COOLING

DANTHERMCOOLING.COM

TECHSUPPORT@DANTHERMCOOLING.COM | 864-595-9800

671 SPRINGFIELD ROAD | SPARTANBURG, SOUTH CAROLINA 29303