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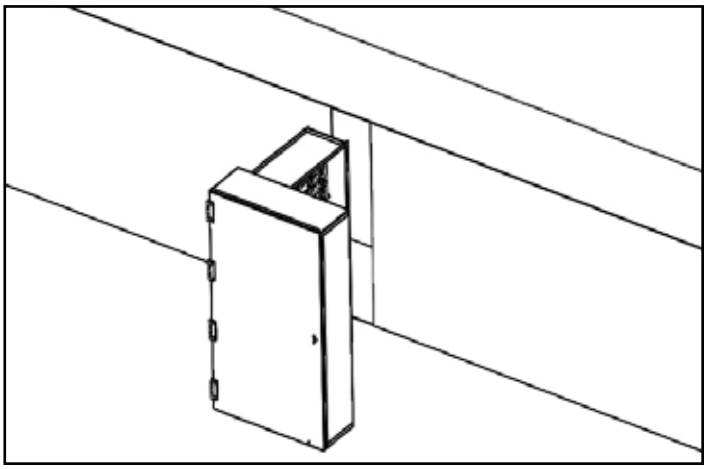
Flip-able Slip-in Duct Heaters



General inspections, all models:

1. Before Installation, inspect the heater for possible shipping or handling damage.
2. Check all electrical insulators and inspect heater element wire(s) for any damage.
3. Make sure all fasteners are tight.
4. Check that all electrical connections are tight.

Operating requirements

Note: UL Listing and Product Warranty are voided if the following installation requirements are not met.

EDH & RHE Models
Minimum Air Velocity: See Fig 5 & 6
Maximum Inlet Air Temp: 110 Deg. F
Maximum Heater KW: 30 KW per sq ft of duct cross section

EVH & ERH Models
Minimum Air Velocity: See Fig 5 & 6
Maximum Inlet Air Temp: 100°F
Maximum Heater KW: 16.5 KW per sq ft of duct cross section

*Note: Minimum air flow or greater must be uniformly maintained over the heating elements. The velocity of air should NEVER be lower than
the specified minimum. If air flow is lower than the minimum, the KW must be reduced in order to avoid heater element overshoot failures.

*Note: It is recommended to observe at least one heating cycle to ensure normal operation of the heater and safety limit controls.

Heater installation & preparations

1. Inspect the duct work to make sure the area is free of obstacles and wiring before cutting the mounting hole.
2. To install, cut an appropriate sized opening in the duct to allow the heater to tightly slip in.
3. Insert the heater and use the heater box as a template for the mounting screw locations.
4. Remove heater and drill mounting holes.
5. Re-insert the heater and mount to the duct using sheet metal screws.
6. For safety, use hangers on larger heaters.
7. While power is disconnected, terminate all high and low voltage supply lines.
8. RHE Models require matched point to point connections.
9. For EDH & RHE Flange mount models insert the heater between two sections of flanged duct and bolt into place. For additional strength, the duct flange(s) should be doubled as shown in Fig. 2 for EVH Models.
10. For all models with an optional diffusor/radiant screen, the screen must be mounted on the air inlet air side of the heater, flipped or rotated as shown in figure 1 & 4.
11. All duct heaters should be installed in accordance with the ***Standards of the National Fire Protection Agency*** for the Installation of Air Conditioning and Ventilating Systems (Pamphlet No. 90A) and Warm Air Heating and Air Conditioning Systems (Pamphlet No. 90B).
12. Do not “Bank” heaters (side by side). If greater capacity is required, use multiple smaller duct heaters in separate runouts.
13. All heater control boxes must be completely accessible and ventilated at all times. Do not block control panel venting.

*Note: Maintaining a proper mounting and sealing of the heater and duct surface is important.

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Electrical Requirements

1. Disconnect all electrical power before servicing.
2. Refer to the wiring diagram on inside of cover of the heater control box.
3. When servicing the heater, make sure all components are repositioned in the proper location and reconnect per the wiring diagram.
4. Make sure line and control voltage of system matches that noted on wiring diagram.
5. Wire in accordance with N.E.C. and any existing local codes.
6. Check tightness of all factory and field electrical connections.
7. If the heater does not have an air flow switch, please make sure a fan interlock is wired.
8. Use minimum 90°C (194 deg. F) copper wire.
9. Control must be wired for N.E.C. Class 1 unless otherwise specified.
10. If the heater has an integral transformer for control voltage to a thermostat, use a thermostat with isolating contacts to prevent interconnection of class 2 outputs.
11. Replacement parts must be identical to the original components.
12. Contact factory for all replacement parts.

*Note: As with all electrical connections, safety precautions must be taken to avoid injury or electrocution. Please be safe!

Installation of EDH & RHE heaters

For EDH & RHE Model Heaters that are installed horizontally or vertically in duct spaces, the following instructions must be followed for safe and optimal performance.

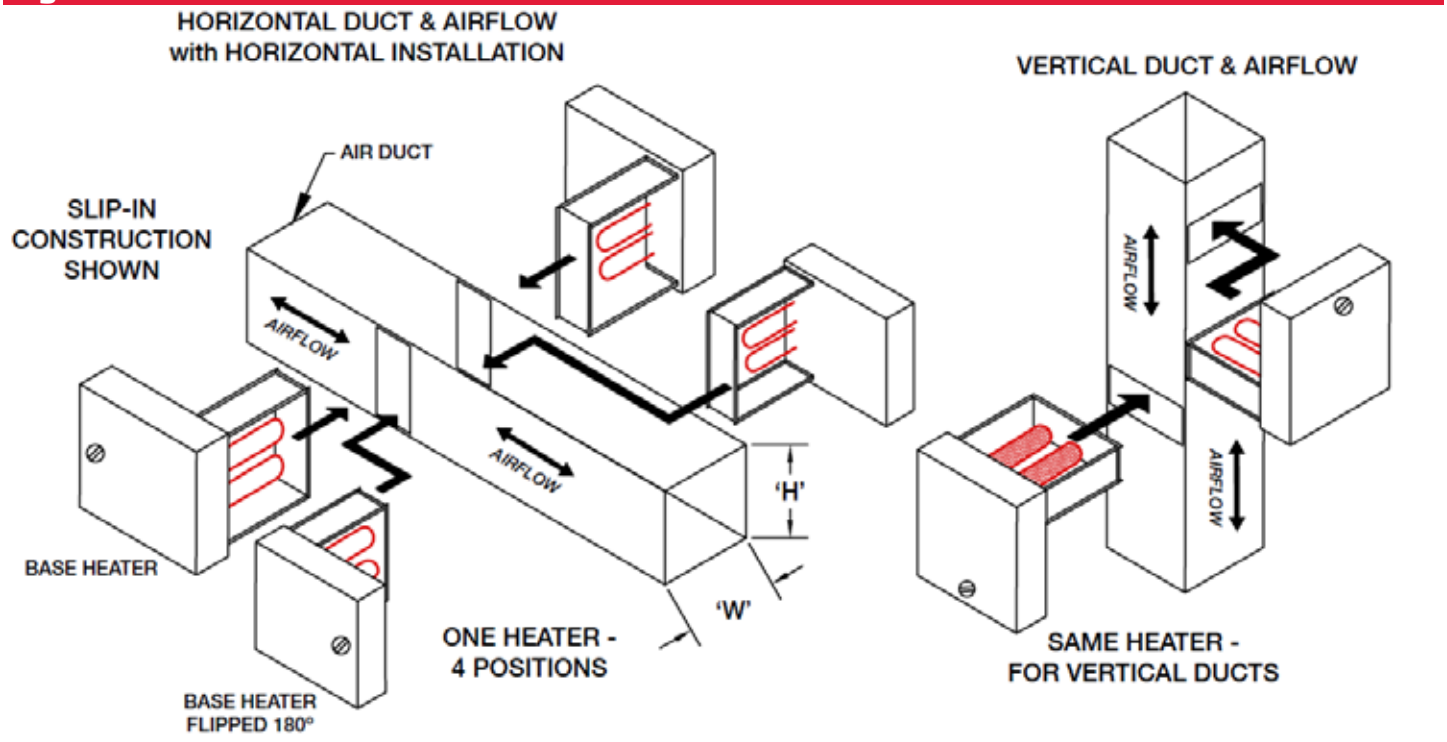
1. Install heater a minimum of (4) feet from heat pumps or central air conditioners.
2. Install at least (4) feet downstream from an air handler.
3. Install at least (2) feet either side from an elbow or turn.
4. Install at least (4) feet from any canvas duct connector or transition section for change in duct size.
5. Install at least (4) feet downstream from an air filter.
6. Install at least (4) feet upstream from a humidifier.

* Note: Refer to Electrical Requirements section and Operating Requirements section for additional requirements.

*Note: RHE Models Require TUTCO Listed Remote Panels (RMC or RPE)

*Note: All Models may be flipped and rotated as long as the diffusor/radiant screen is moved to the inlet air side when applicable. Refer to figure 1 & 4 for flip-able possibilities.

Figure 1



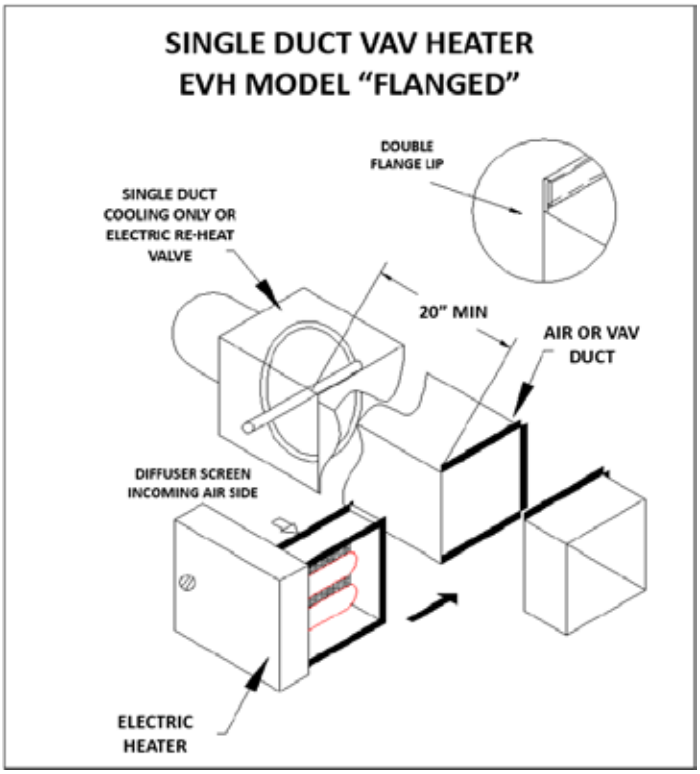
Installation of EVH heaters

The following instructions must be followed for safe and optimal performance of single duct VAV re-heat and cooling only valves for EVH slip-in and flanged horizontal applications.

For re-heat valves, the heater should be installed to meet the minimum distance requirement of 20" from valve actuator to heater inlet face with the air diffusor/radiant screen mounted on the inlet air side.

For cooling only valves, be sure to meet the 20" to actuator minimum distance and follow all heater installation and preparations recommended.

Figure 2



Installation of ERH heaters

For horizontal applications using ERH slip in and flanged heaters, the following instructions must be followed for safe and optimal performance.

*Note: The duct outlet to duct inlet ratio cannot exceed 4:1.

For ERH slip in models, cut an appropriate sized opening in the duct meeting the 20" inlet discharge minimum.

For ERH flanged heaters, it is recommended to double the duct flanges for additional strength.

Follow all other instructions noted in the installation and preparation and operating requirement sections of this manual.

Figure 3

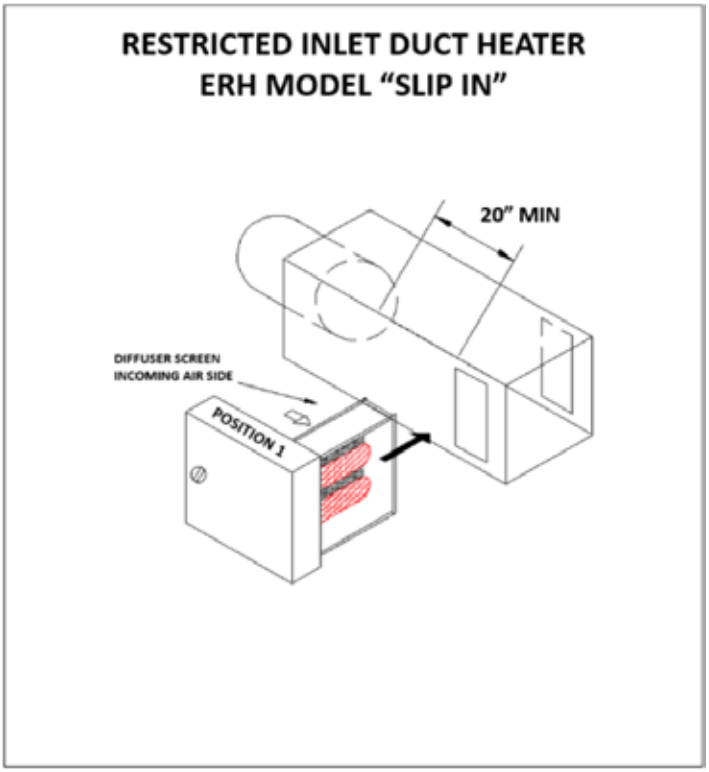


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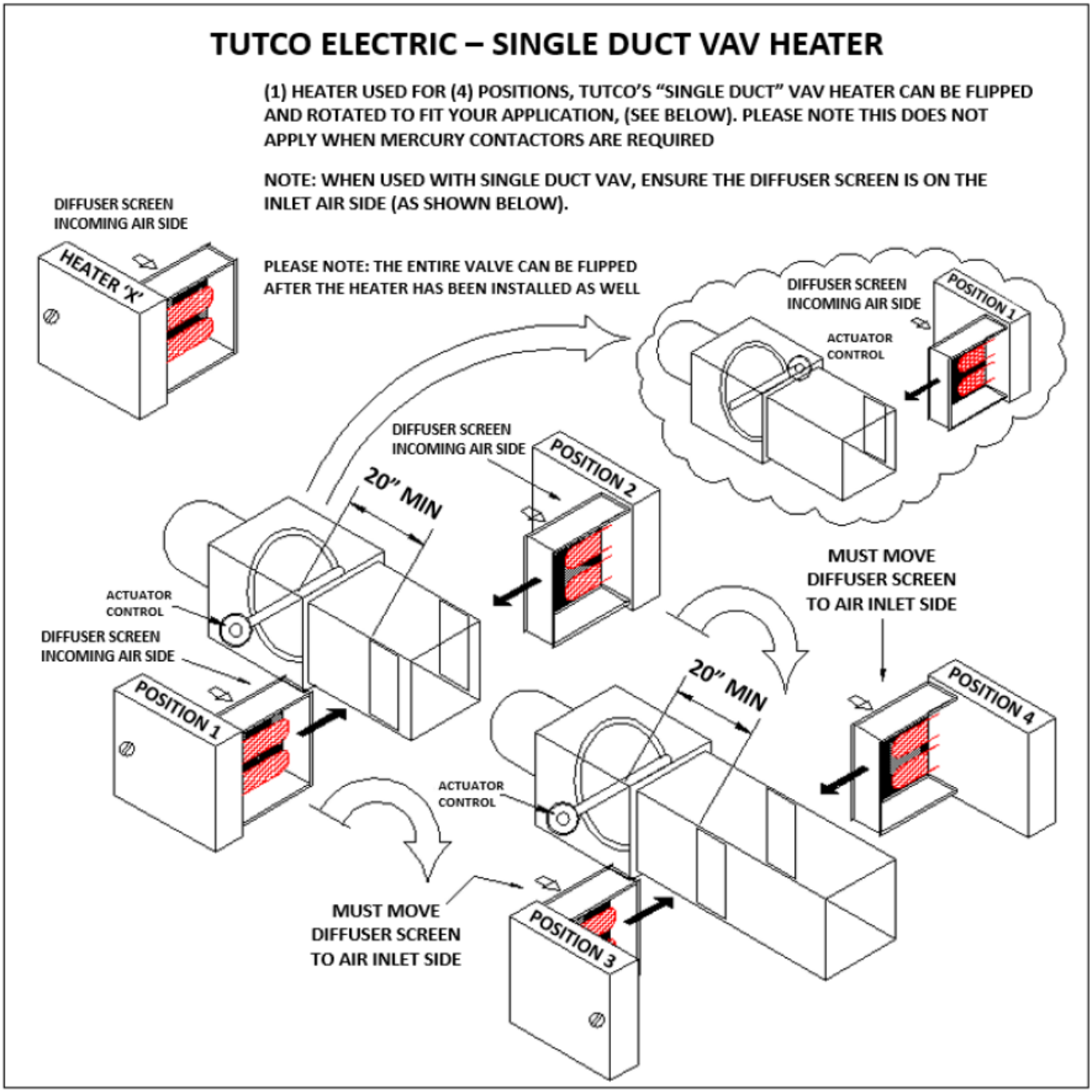
Figure 4



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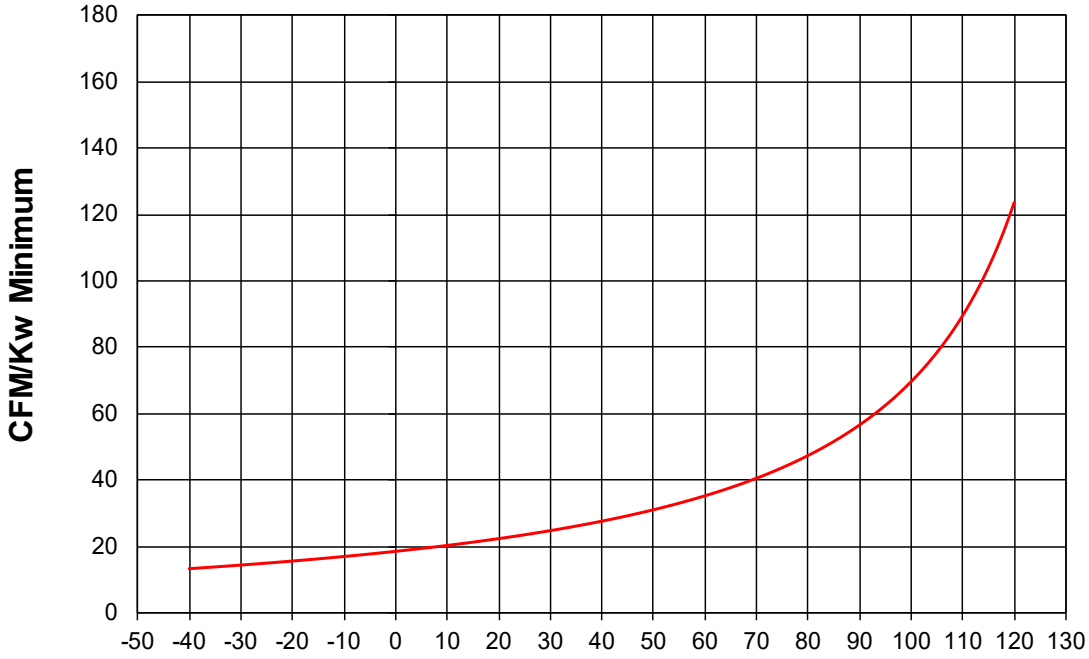
Inlet Air °F vs. CFM/Kw Minimum

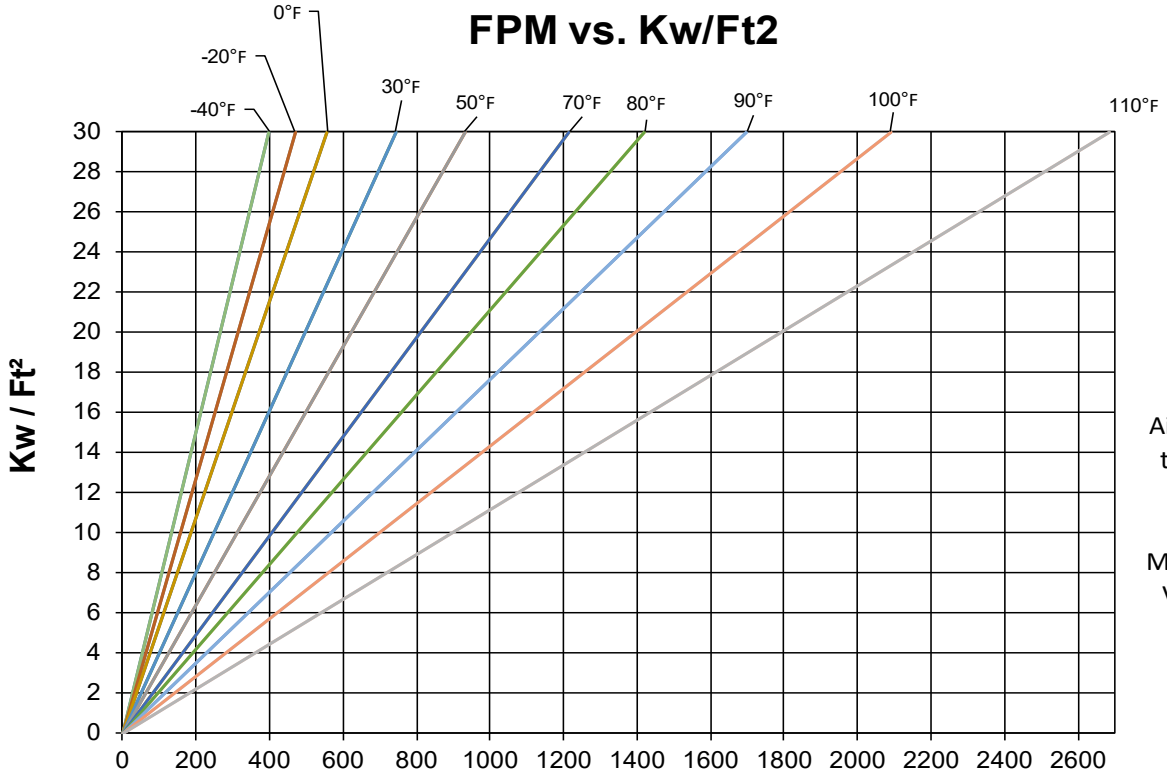


Notes:

Chart is Based on Minimum Airflow and Max Outlet Air Temp of 148°F

Max Recommended Air Velocity is 2000 FPM

FPM vs. Kw/Ft2



Notes:

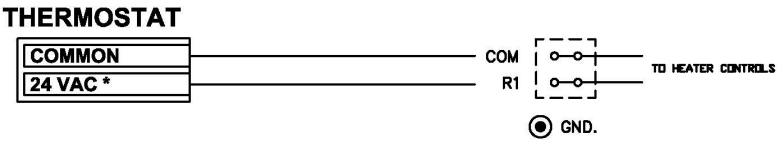
Airflow represented by this chart is based on sea-level elevation

Max Recommended Air Velocity is 2000 FPM

FOR STANDARD NON-SSR HEATERS ONLY!

CONTROL FOR HEATERS WITHOUT INTERNAL TRANSFORMER (REQUIRES 24 VAC)*

THESE HEATERS WILL REQUIRE A THERMOSTAT THAT CAN PROVIDE A 24 VAC* SIGNAL TO CONTROL THE HEATER STAGING.

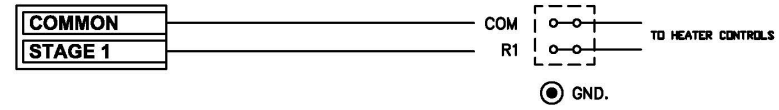


CONTROL FOR HEATERS WITH INTERNAL TRANSFORMER *

THE HEATER'S TRANSFORMER CAN POWER ALL OF ITS OWN CONTROLS. A DRY CONTACT THAT CONNECTS COMMON TO R1, R2, ETC. IS ALL THAT IS REQUIRED TO TURN THIS TYPE OF HEATER ON/OFF.

INTERNAL TRANSFORMER CAN BE USED TO POWER THE THERMOSTAT IF NEEDED

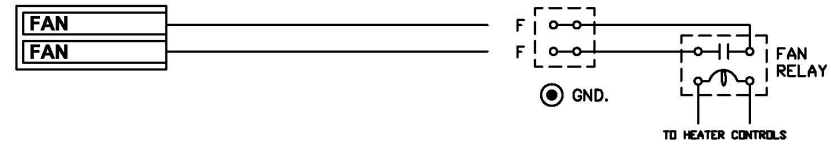
NOTE: BE CAREFUL NOT TO OVERLOAD TRANSFORMER WITH THINGS SUCH AS EXTERNAL LOADS, EXTRA LONG CONTROL WIRES, ETC.. AN EXTERNAL TRANSFORMER MAY BE REQUIRED IN THESE SCENARIOS.



OPTIONAL FAN INTERLOCK ACCESSORY

THE TYPICAL FAN INTERLOCK IS A SET OF DRY CONTACTS TO OPERATE A FAN OR OTHER EXTERNAL DEVICE FOR HEATER OPERATION "CONTACTS CLOSE WHEN HEATER IS ACTIVE"

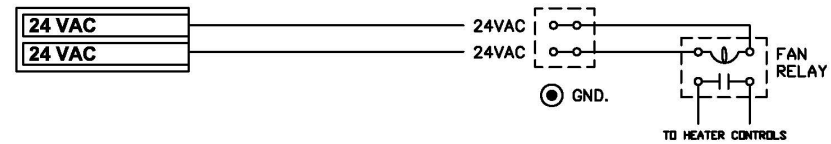
NOTE: OTHER FUNCTIONS ARE AVAILABLE UPON REQUEST.



OPTIONAL FAN INTERLOCK EM STYLE

THE FAN INTERLOCK "EM" STYLE REQUIRES 24 VAC* FROM A FAN MOTOR (OR EQUIVALENT) TO ENABLE HEATER OPERATION. "APPLY VOLTAGE TO ENABLE HEATER, REMOVE VOLTAGE TO DISABLE HEATER"

NOTE: OTHER FUNCTIONS ARE AVAILABLE UPON REQUEST.



* 24VAC CONTROL VOLTAGE IS STANDARD UNLESS ALTERNATE IS CHOSEN (120VAC, 277VAC, ETC...)

Intertek

LISTED

FOR HEATERS EQUIPPED WITH SSR'S ONLY!

INSTALLATION DETAILS FOR ELECTRIC DUCT HEATERS EQUIPPED WITH SSR'S OR ELECTRONIC STEP CONTROLLERS (INCLUDING SSR VERNIER CONTROL)

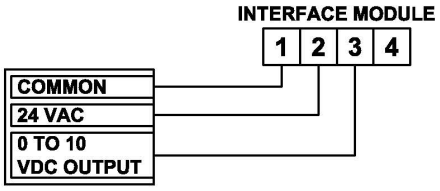
SSR HEATERS ARE DESIGNED TO ACCEPT AN ANALOG CONTROL SIGNAL. THE HEATER WILL NEED TO BE SUPPLIED WITH EITHER A 0(2)-10 VDC OR A 4-20 mA SIGNAL.

SSR HEATERS WILL NOT OPERATE WITH A STANDARD 24 VAC CONTROL SIGNAL.

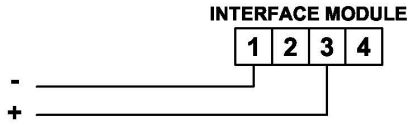
DO NOT ADJUST ANY DIP SWITCHES ON THE CONTROLS WITHIN THE HEATER!

THEY ARE FACTORY SET-CONTROL SIGNAL IS DETERMINED BY INTERFACE MODULE CONNECTION.

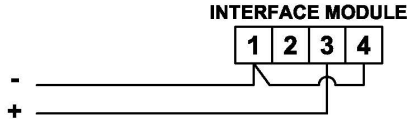
INTERFACE MODULE CONTROL SIGNAL WIRING CONNECTION DIAGRAM



2 TO 10 VDC
STAND ALONE THERMOSTAT



2 TO 10 VDC FROM
D.D.C. BUILDING AUTOMATION SYSTEM



4 TO 20 mA FROM D.D.C.
BUILDING AUTOMATION SYSTEM

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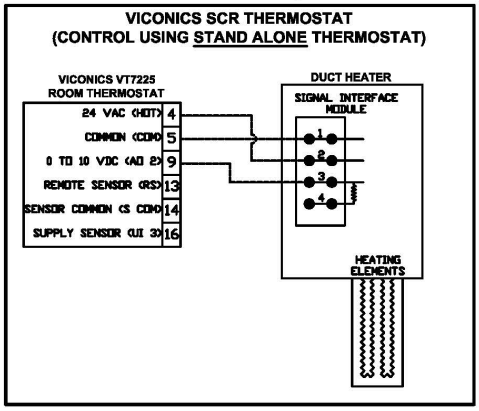
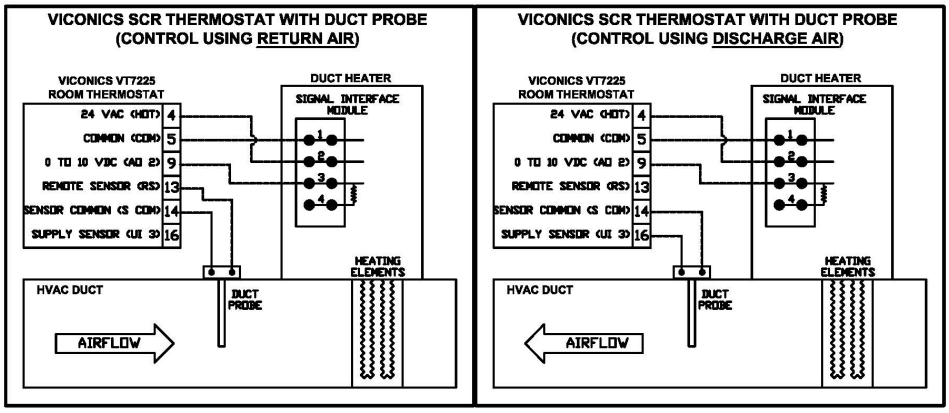
THERMOSTAT CONNECTION INFORMATION

SCR HEATER HOOKUP

VT7225



----------VT7225----------



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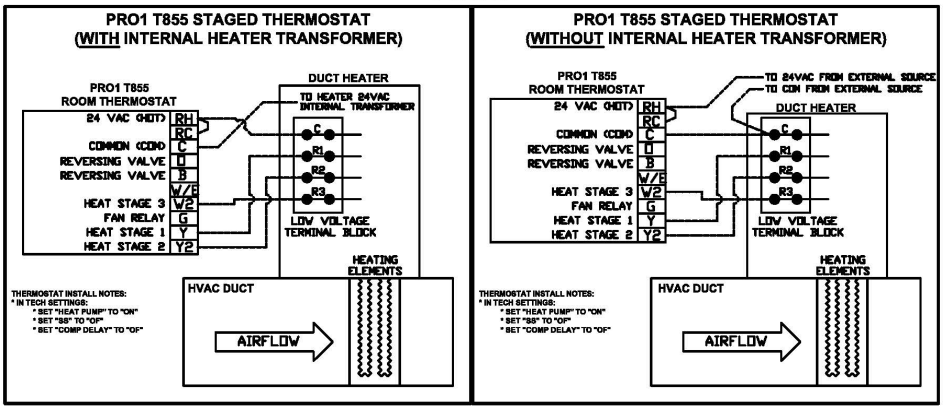
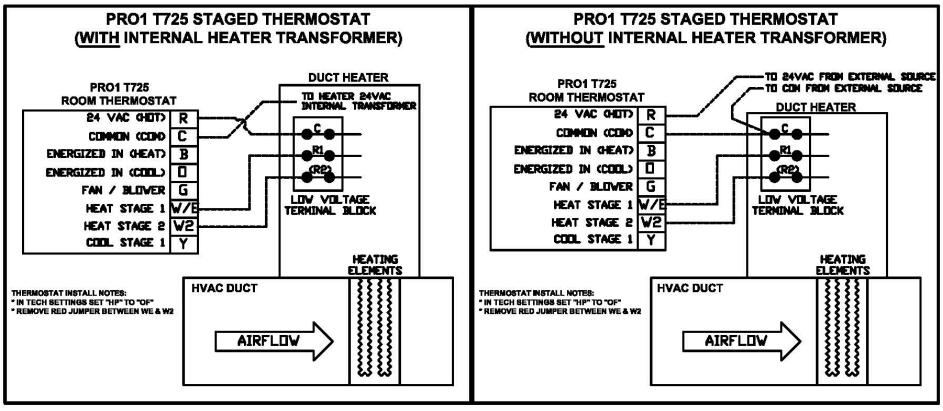
THERMOSTAT CONNECTION INFORMATION
STAGED HEATER HOOKUP

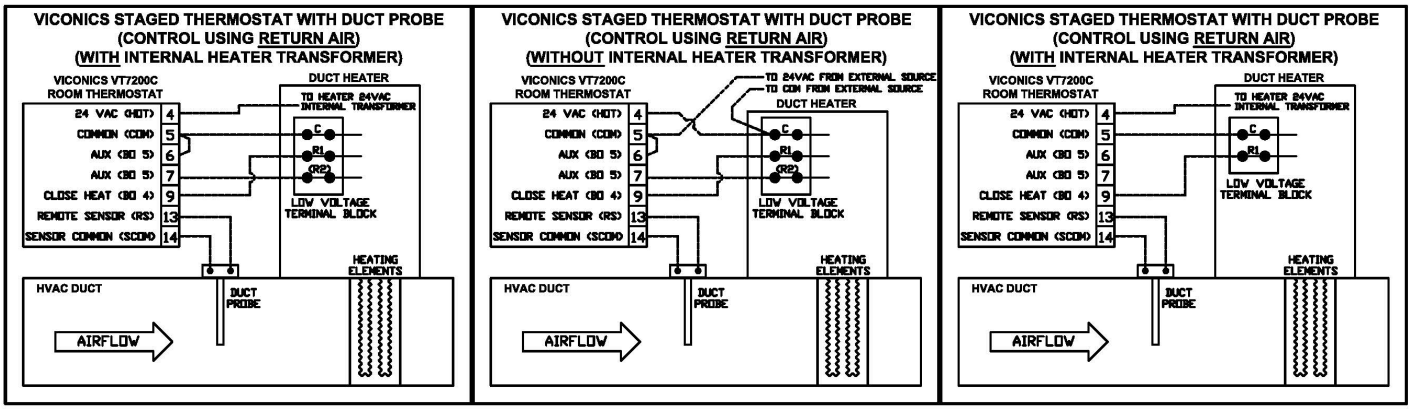
T855



T725



VT7200C



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customerservice@tutco.com 931-432-4141 www.tutco.com

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Standard Warranty

1. These warranty terms apply to Seller's stand-alone Duct Heaters and the individual components therein ("Product").

2. Seller warrants to the first purchaser of the Product listed on the purchase order ("Buyer") and does not extend to any subsequent purchaser of the Product when installed correctly according to instructions/requirements provided by Seller, and when properly maintained, will be free from defects in workmanship and materials for two (2) years after date of manufacture ("Warranty").

3. This warranty does not apply to defects caused by Buyer's faulty installation, misuse, accident, alteration, improper care after installation, or chemical, electrical or physical abuse of the Product.

4. If the Product is found not to comply with the above Warranty, the defective Product shall be promptly returned, freight prepaid, to Seller's factory for examination. Seller reserves the right to determine its obligation under this Warranty by testing the Product and/or components at Seller's manufacturing facility for any for alleged defect. Return transportation of Product shall be prepaid by Buyer, and Seller will issue a credit to Buyer for the return transportation if it is determined by Seller that the Product is defective.

5. The obligation of Seller for defective Product is limited to making repairs at Seller's facility or replacing the Product or individual components therein. If the failure is due to Seller's workmanship or an individual component or components fail in the Product, Seller will repair, or at its option replace the component(s) found to be defective at no charge and issue a credit to Buyer for the return transportation.

6. This Warranty does not include labor which may be required to diagnose the trouble, remove or install the Product or any replacement components at Buyer's location where the Product is installed, nor does it include any transportation expenses for Seller's employees to diagnose the trouble, remove or install the Product or any replacement components at the Buyer's location where the Product is installed. Seller reserves the right to inspect installation of Product in person or hire a third party approved by Seller to inspect installation of the Product.

7. The foregoing is Seller's sole warranty and the Buyer's exclusive remedy.

8. Any modifications made to the Product without specific prior written authorization from Seller will void Seller's Warranty.

9. Warranty claims will be processed via Seller's Return Material Authorization procedure. To obtain Warranty services and/or component replacement, Buyer must notify Seller's customer service of an alleged defect within the applicable Warranty period.

THE ABOVE WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, STATUTORY OR OTHERWISE, EXPRESS OR IMPLIED. ALL OTHER REPRESENTATIONS TO THE BUYER, AND ALL OTHER OBLIGATIONS OR LIABILITIES WITH RESPECT TO ANY PRODUCT PURCHASED HEREBY, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND SELLERS OBLIGATION UNDER ALL SUCH WARRANTIES SHALL NOT EXCEED THOSE SET FORTH ABOVE. NO OTHER WARRANTY OR REPRESENTATION WHATSOEVER, EXPRESS OR IMPLIED, HAS BEEN MADE BY SELLER WHICH HAS BEEN RELIED ON BY THE BUYER. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT OR INDIRECT DAMAGES OTHER THAN AS SET FORTH ABOVE OR FOR LOSS OF PROFITS OR OTHER INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES.