

# TUTCO Inc. "E" Series Electric Single Duct VAV / Duct Heater

## Installation Instructions Heater Models EVH, ERH, EDH & RHE

### General for All Models

Inspect heater for any possible damage. Check all insulators for breakage and inspect heater element wire(s) for any deformation or damage that could cause a short circuit to ground. Make sure all fasteners are tight. Electrical connections such as pressure terminals should be checked for tightness.

### For EDH & RHE Models

For EDH & RHE Models Heaters which may be installed in horizontal or vertical ducts, 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.

\* Refer to Electrical Requirements section and General Operating Requirements section for additional requirements.

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

For EDH & RHE slip in model Duct Heaters for horizontal and vertical applications the following instructions must be followed for safe and optimal performance.

To install cut an opening in the duct of the appropriate size to allow the heater to slip in while maintaining a proper mounting and sealing surface. Insert the heater and use the heater box as a template for the mounting screw locations. Remove heater and drill mounting holes. Mount unit to duct using sheet metal screws. Large heaters may require hangers. Connect high and low voltage supplies as required.

**Note: RHE Models Require Matched Point to point connections between the Required Remote Panel and Heater Assembly. See Panel instructions for Additional Wiring details.**

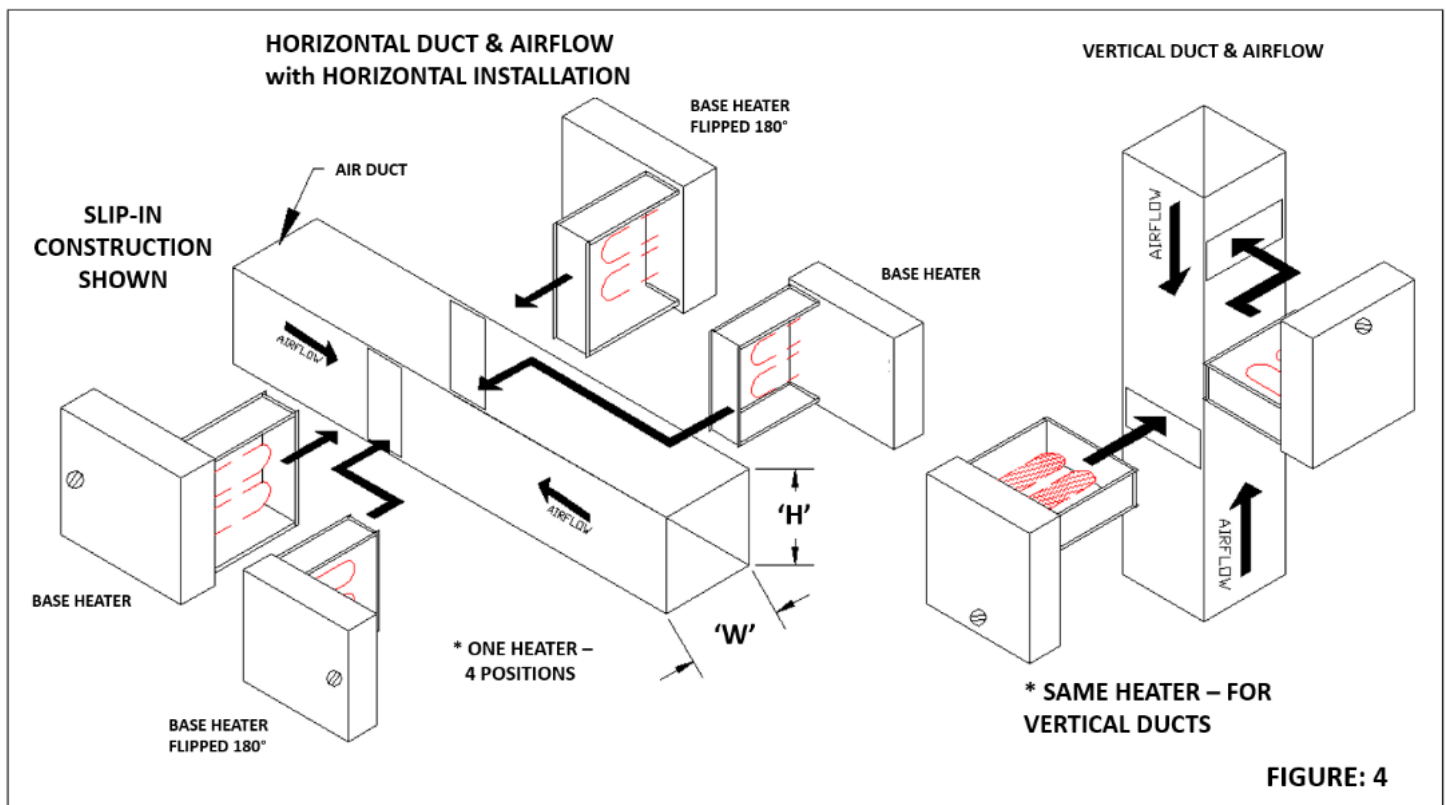
For EDH & RHE Flange mount models insert the heater between two sections of flanged duct and bolt into place. For additional strength the duct flange(s) should be doubled as shown in Fig. 2 for EVH Models. Large heaters may require hangers. Connect high and low voltage supplies as required.

For EDH & RHE models with an optional diffuser/radiant screen that must be rotated move the air diffuser/radiant screen to the opposite side such that it is on the inlet air side of the heater as represented in Fig 1 for EVH & ERH Models. For heaters with no diffuser simply flip or rotate as needed as represented in Fig. 4.

For EDH & RHE model Duct Heaters (horizontal or vertical) applications the air duct 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).

Additionally do not "Bank" heaters (side by side). If greater capacity is required, proportion smaller heaters in separate runouts. Heater control boxes must be completely accessible and located to provide ventilation at all times.





**FIGURE: 4**

## **For EVH Models**

For EVH slip in & flanged models for use with Single Duct VAV re-heat and cooling only valves for horizontal applications the following instructions must be followed for safe and optimal performance.

For re-heat valves the heater should be installed in the cut out section provided as long as it meets the minimum distance requirement of 20 inches from valve actuator to Heater inlet face (see Fig. 1 ) with the air diffuser/radiant screen on the inlet air side. If the heater must be rotated move the air diffuser/radiant screen to the opposite side such that it is on the inlet air side of the heater.

For cooling only valves, or instances where no cut out is provided, cut an opening in the duct of the appropriate size that meets the 20" to actuator minimum (see Fig. 1) to allow the heater to slip in while maintaining a proper mounting and sealing surface. If the heater must be rotated move the air diffuser/radiant screen to the opposite side such that it is on the inlet air side of the heater. Insert the heater and use the heater box as a template for the mounting screw locations. Remove Heater and drill mounting holes. Mount unit to duct using sheet metal screws. Large heaters may require hangers. Connect high and low voltage supplies as required.

For EVH Flange mount models insert the heater between two sections of flanged duct insuring that the air diffuser/radiant screen is on the inlet air side and bolt into place. For additional strength the duct flange(s) should be doubled as shown in Fig. 2. Large heaters may require hangers. Connect high and low voltage supplies as required.

## **For ERH Models**

For ERH slip in & flanged models for use in horizontal applications 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 opening in the duct of the appropriate size that meets the 20" from smaller inlet discharge minimum as shown in (see Fig. 3) to allow the heater to slip in while maintaining a proper mounting and sealing surface. If the heater must be rotated move the air diffuser/radiant screen to the opposite side such that it is on the inlet air side of the heater.

Insert the heater and use the heater box as a template for the mounting screw locations. Remove Heater and drill mounting holes. Mount unit to duct using sheet metal screws. Large heaters may require hangers. Connect high and low voltage supplies as required.

For ERH Flanged Models, insert the heater between two sections of flanged duct insuring that the air diffuser/radiant screen is on the inlet air side and bolt into place. For additional strength the duct flange(s) should be doubled as shown in Fig. 2. Large heaters may require hangers. Connect high and low voltage supplies as required.

**NOTE: For EVH & ERH refer to Electrical & General Operating Requirements sections for additional requirements.**



## TUTCO ELECTRIC – SINGLE DUCT VAV HEATER

(1) HEATER USED FOR (4) POSITIONS, TUTCO'S "SINGLE DUCT" VAV HEATER CAN BE FLIPPED AND ROTATED TO FIT YOUR APPLICATION, (SEE BELOW). PLEASE NOTE THIS DOES NOT APPLY WHEN MERCURY CONTACTORS ARE REQUIRED

NOTE: WHEN USED WITH SINGLE DUCT VAV, ENSURE THE DIFFUSER SCREEN IS ON THE INLET AIR SIDE (AS SHOWN BELOW).

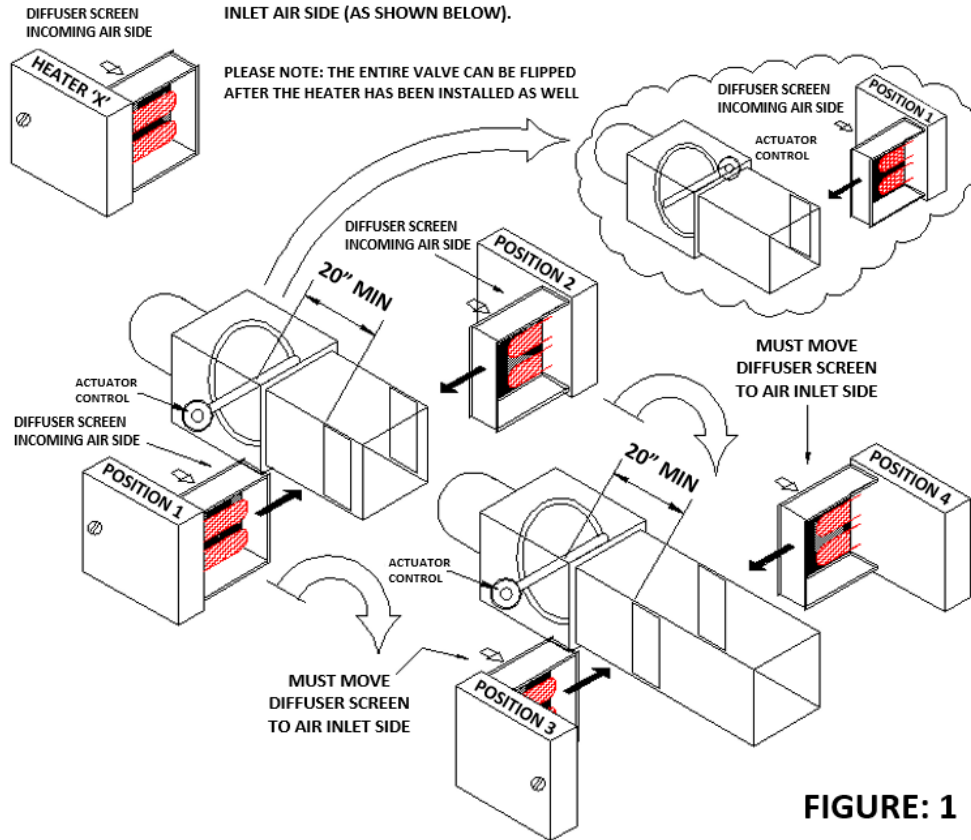


FIGURE: 1

### SINGLE DUCT VAV HEATER EVH MODEL "FLANGED"

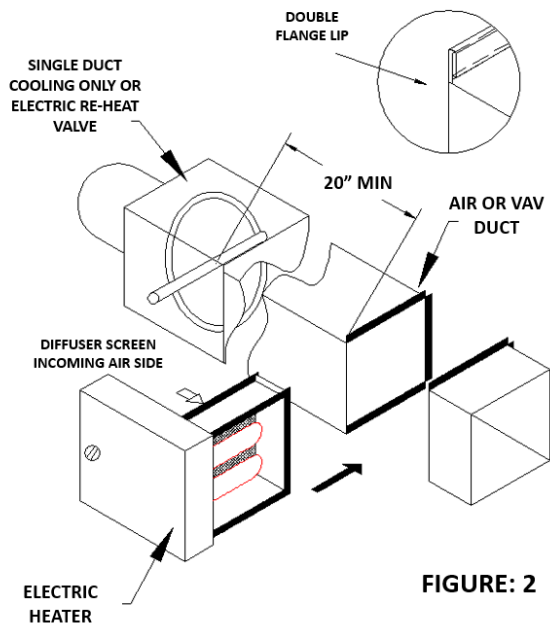


FIGURE: 2

### RESTRICTED INLET DUCT HEATER ERH MODEL "SLIP IN"

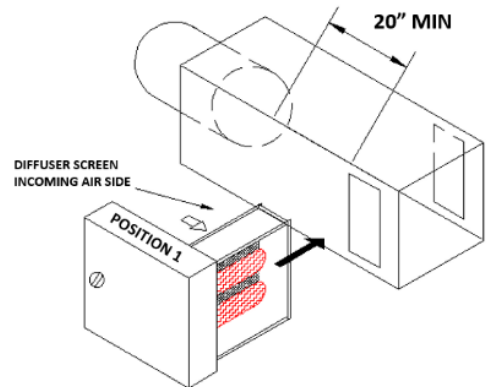


FIGURE: 3



## **ELECTRICAL REQUIREMENTS**

Refer to attached wiring diagram and wiring diagram on inside of cover. Make sure line and control voltage of system matches that noted on wiring diagram.

Wire in accordance with N.E.C. and any existing local codes.  
Check tightness of all factory and field electrical connections.  
Make sure fan interlock is wired in if the Heater does not have an air flow switch.  
Use 90 deg. C (194 deg. F) copper wire.  
Control must be wired for N.E.C. Class 1 unless otherwise specified.

When Heater has integral transformer for control voltage to thermostat, use thermostat with isolating contacts to prevent interconnection of class 2 outputs.

Disconnect all electrical power before servicing. When servicing heater, make sure all components are repositioned in the proper location and reconnect per wiring diagram.

Replacement parts must be identical to the original components.

Contact factory for replacement parts.

## **GENERAL OPERATING REQUIREMENTS**

### **For EVH & ERH Models**

Minimum Air Velocity: See Fig 5 & 6  
Maximum Inlet Air Temp: 100 Deg. F  
Maximum Heater KW: 16.5 KW per Square Foot of Duct cross Section

### **For EDH & RHE Models**

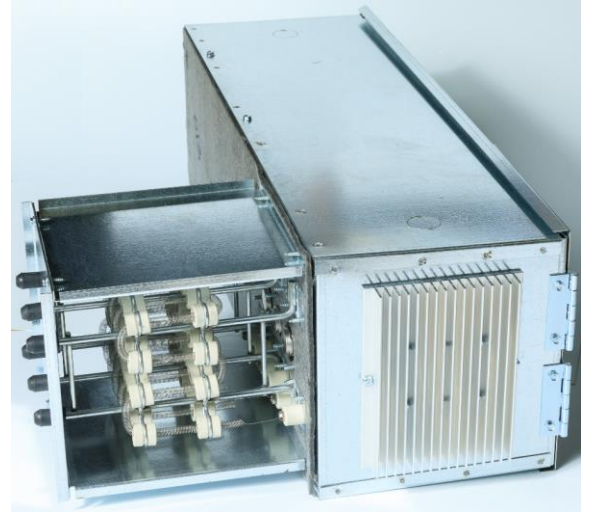
Minimum Air Velocity: See Fig 5 & 6  
Maximum Inlet Air Temp: 110 Deg. F  
Maximum Heater KW: 30 KW per Square Foot of Duct cross Section

All Models may be flipped and rotated as long as the diffuser/radiant screen is moved to the inlet air side where applicable except when mercury contactor option is used.

**NOTE: All Models must be installed at least (4) feet from any type of equipment or canvas duct and at least (2) feet on either side from an elbow or turn with the exception of a VAV valve or inlet restriction as described for EVH & ERH Models.**

**NOTE: Minimum air flow or greater must be maintained uniformly over the entire face of the heater. The velocity of air should NEVER be lower than the specified minimum. In cases where this is not true the KW must be reduced or the velocity of air increased.**

**NOTE: Observe at least one Heating cycle to insure that cycling of safety limit controls does not occur under normal operating conditions before leaving the installation.**



## **Technical Support**

Contact Tutco for any questions that you may have concerning this product.

Phone: (931) 432-4141

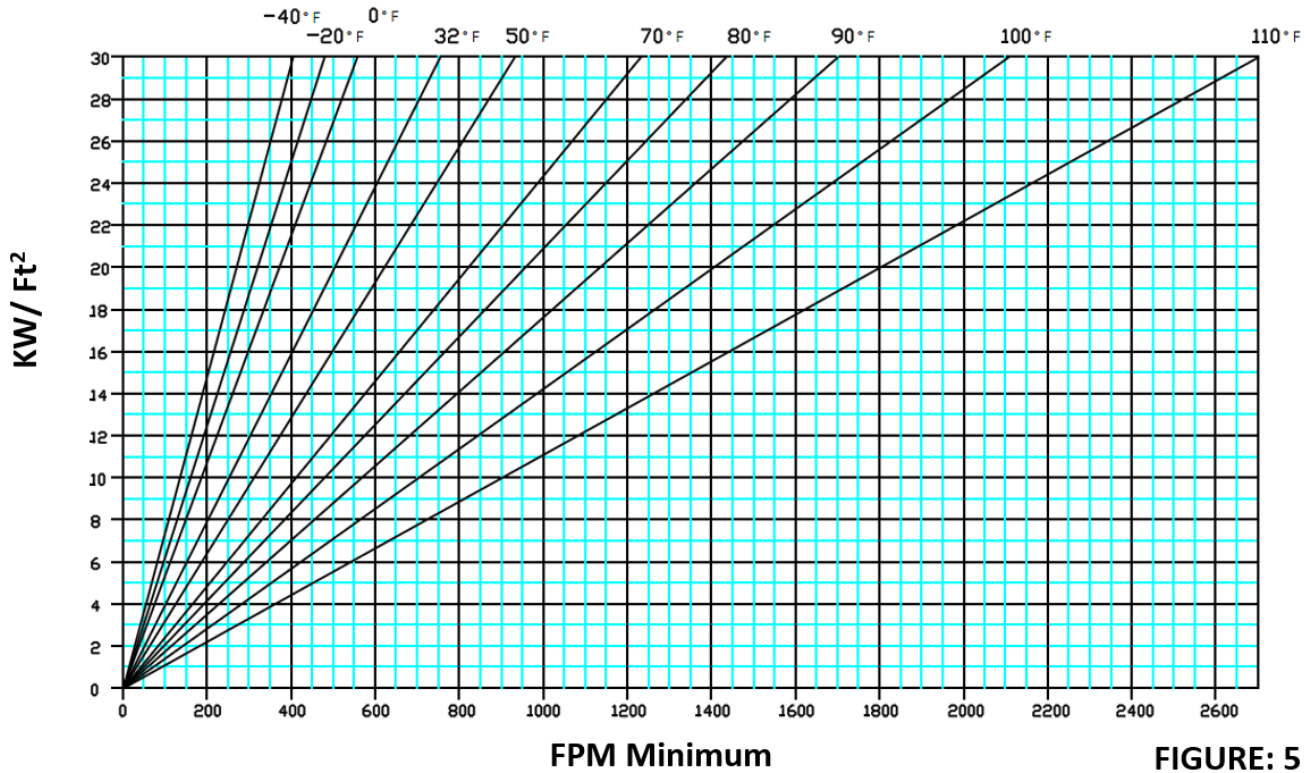
Fax: (931) 432-4140

<http://www.tutco.com/>



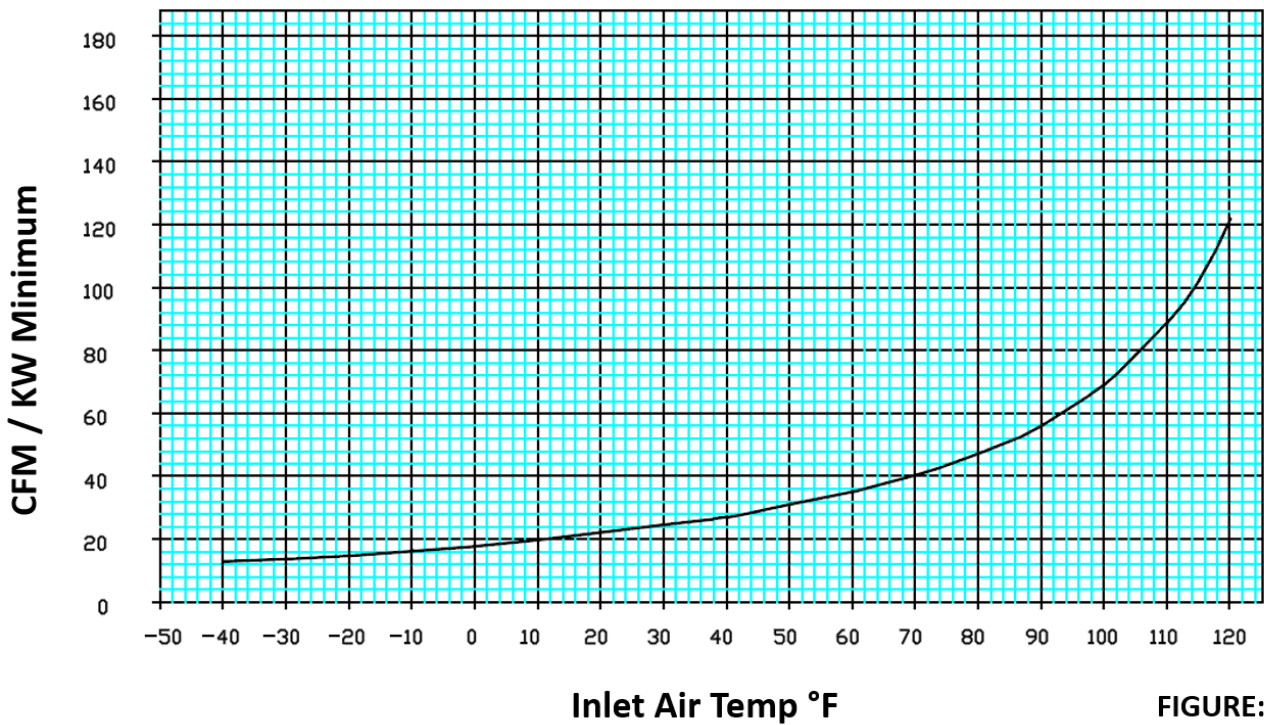
**TUTCO "E" Series  
Air Flow Requirements**

**FPM Chart vs. KW/ Ft<sup>2</sup>**



**FIGURE: 5**

**Inlet Air °F vs CFM / KW Minimum \***



**FIGURE: 6**



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

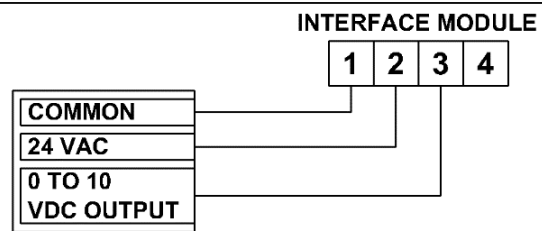
THIS HEATER IS DESIGNED TO ACCEPT  
AN ANALOG CONTROL SIGNAL. THE  
HEATER WILL NEED TO BE SUPPLIED  
WITH EITHER A 0(2) TO 10 VDC OR A  
4 TO 20 mA SIGNAL.

**THIS HEATER WILL NOT  
OPERATE WITH A  
STANDARD 24 VAC  
CONTROL SIGNAL.**

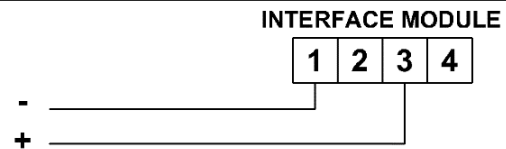
**DO NOT ADJUST ANY DIP  
SWITCHES ON THE  
CONTROLS WITHIN THE  
HEATER!**

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

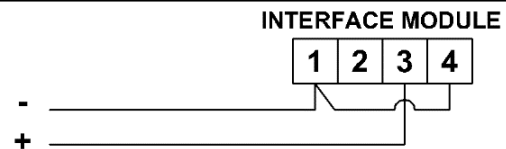
## INTERFACE MODULE CONTROL SIGNAL WIRING CONNECTION DIAGRAM



2 TO 10 VDC  
STAND ALONE THERMOSTAT

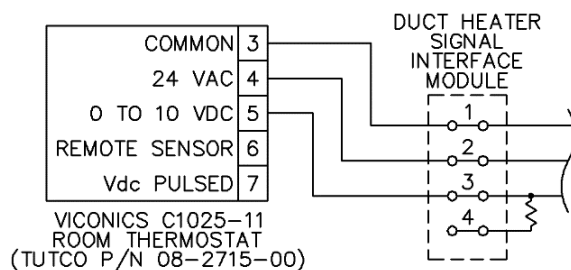


2 TO 10 VDC FROM  
D.D.C. BUILDING AUTOMATION SYSTEM

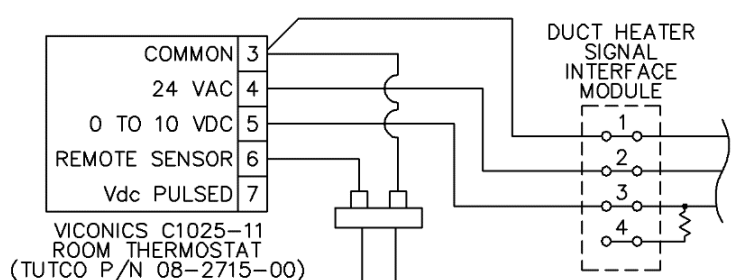


4 TO 20 mA FROM D.D.C.  
BUILDING AUTOMATION SYSTEM

## INTERCONNECTION OF A VICONICS C1025 STAND ALONE THERMOSTAT AND A TUTCO DUCT HEATER WITH ELECTRONIC STEP CONTROLLER OR SSR CONTROL



NOTE: DO NOT ADJUST DIP SWITCHES ON THERMOSTAT  
WITHOUT REMOTE SENSOR



| ROOM THERMOSTAT<br>DIP SWITCH SETTINGS |    |    |
|--|----|----|
| SWITCH                                 | S1 | S2 |
| SETTING                                | 1  | 0  |

VICONICS S61  
REMOTE SENSOR  
(TUTCO P/N 08-2716-00)

WITH REMOTE SENSOR



500 GOULD DRIVE  
COOKEVILLE, TN 38506  
PHONE (931)432-4141  
WWW.TUTCO.COM

06-6603-00 REV. -  
PRODUCTION RELEASE  
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