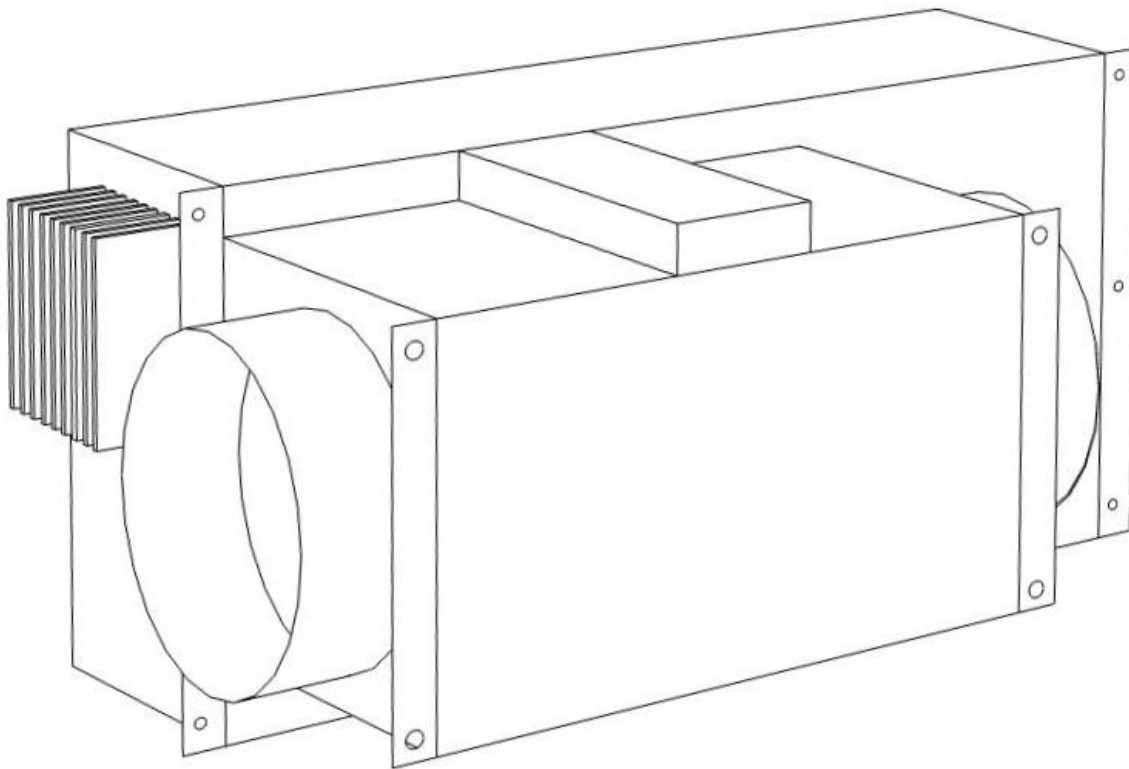


always the
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zehnder

Zehnder ComfoInline Heater

Specifications and Installation Guidelines



This unit complies
With CSA and UL
standards

SDHR5-1.5K120V1P-CIRO17-OTDD-OEMZ

SDHR6-2.5K220V1P-CIRO17-OTDD-OEMZ

SDHR7-3.5K220V1P-CIRO17-OTDD-OEMZ

Store a copy of this document in plain sight in the vicinity of the installed heater.

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- Before installing or using this product, you must read and understand these instructions and keep them for future reference. The manufacturer cannot be held responsible for anything and the warranty will be invalid if the installer and the user do not meet these guidelines.
- This product must be installed by a qualified person and connected by a licensed electrician in accordance with the electrical codes and building codes in your area.
- Failure to follow these guidelines could result in personal injury, property damage, serious injury, and potentially fatal electric shocks.
- Protect the unit using the appropriate breakers or fuses, by referring to the information on the nameplate.
- Make sure the supply voltage (volts) corresponds to that indicated on the nameplate.
- This unit must be grounded.
- Turn off power to the unit at the circuit breaker/fuse before proceeding with the installation, repair, and cleaning.
- Make sure the device is designed for the intended application (if necessary, consult the product catalog or a representative).
- If the power of the unit is insufficient for the intended purpose, it will operate continuously; therefore the product will age prematurely.
- Follow the distances and positions indicated in the installation section of this guide.
- If the installer or the user changed the unit in any way whatsoever, they will be liable for any damages resulting from this modification and the UL certification could be canceled.
- This product should not come into contact with a water source and must be protected from splashes. Do not use the unit if any part has been submerged. Also, do not activate or disable the unit when you have your feet in water or wet hands.
- Since this unit runs hot, there are risks even when the unit is functioning normally. Use caution, judgment, and diligence when using it. To avoid burns, do not let bare skin touch hot surfaces. Allow the unit to cool before handling (it stays warm for a while after functioning).
- Never block the air inlets and outlets of the unit. This obstruction could lead to overheating, which could cause a fire.
- Do not insert foreign objects into the air inlets and outlets of the unit, as this may cause damage and lead to electrical shock or fire.
- The unit includes hot working components that can produce electrical arcing (sparks). It is not designed to be used or stored in a wet location, or a location containing flammable liquids, combustible, corrosive, abrasive, chemical materials or explosives such as, but not limited to, paint, gasoline, chlorine, and cleaning products.
- Some areas are dustier than others. It is therefore the responsibility of the user to evaluate whether to change the filter according to the amount of dirt accumulated on it. There is a risk of fire if the product is not installed and maintained in accordance with these guidelines.
- Activation of the thermal protection indicates that the unit has been subjected to abnormal operating conditions. If it remains activated or turned on and off repeatedly, it is recommended to have the unit inspected by a qualified electrician or a certified repair center to ensure that it is not damaged (refer to the limited warranty mentioned previously).
- If the unit is damaged or defective, cut off its power at the breaker/fuse and contact your dealer for service.
- Identify the wiring before disconnecting the unit, so as to make sure you can reconnect the unit later on. Incorrect connections may cause a malfunction and pose a danger.

Follow Applicable Codes

Instructions provided in these specifications and guidelines are not to supersede local codes. Follow all local codes during installation and consult with local officials about any apparent conflicting information.

Reception and Handling of the Heater

- Handle with care and store the heater in its protective packaging until ready for installation.
- Upon opening the packaging, verify the condition of the elements, ceramics, and components and notify Zehnder America immediately if the duct heater has been damaged.

Intended Uses and Basic Operating Principle

CAUTION: NEVER USE A STANDARD DUCT HEATER FOR AN APPLICATION WITH A RISK OF EXPLOSION. Where the duct heater is installed, the air flowing through must not contain any combustible and/or flammable material.

The Zehnder ComfoInline Heater has ONLY two intended uses:

Pre-Heater Operation

As a pre-heater the ComfoInline Heater is installed in-line with the Outside Air duct upstream from the HRV/ERV. It is intended to ensure continuous, frost-free operation of the system when the Outside Air temperature is low enough to risk freezing conditions inside the HRV/ERV. The temperature control on the heater is set to the temperature required to prevent frost from forming inside the HRV/ERV (see SETTING THE CONTROLS section). The appropriate ComfoInline Heater should be selected from the GENERAL SPECIFICATIONS AND SYSTEM APPLICATIONS chart based on the HRV/ERV model and the required minimum operating temperature.

Post-Heater Operation

As a post-heater, the ComfoInline Heater is installed in-line with the Supply Air duct downstream from the HRV/ERV to provide additional comfort.

There are two control options for post-heater set-up:

1. Regulating supply air temperature
Set a consistent minimum comfort temperature for the supply air, regardless of the room temperature. The temperature is set on the heater box (see SETTING THE CONTROLS section).
2. Regulating room air temperature
Use a wall-mounted thermostat in the living space to control the operation of the post-heater. As long as the temperature measured at the thermostat is lower than the set temperature the post-heater will remain on. When the set temperature is reached, the post-heater will turn off. (See SETTING THE CONTROLS section for details.)

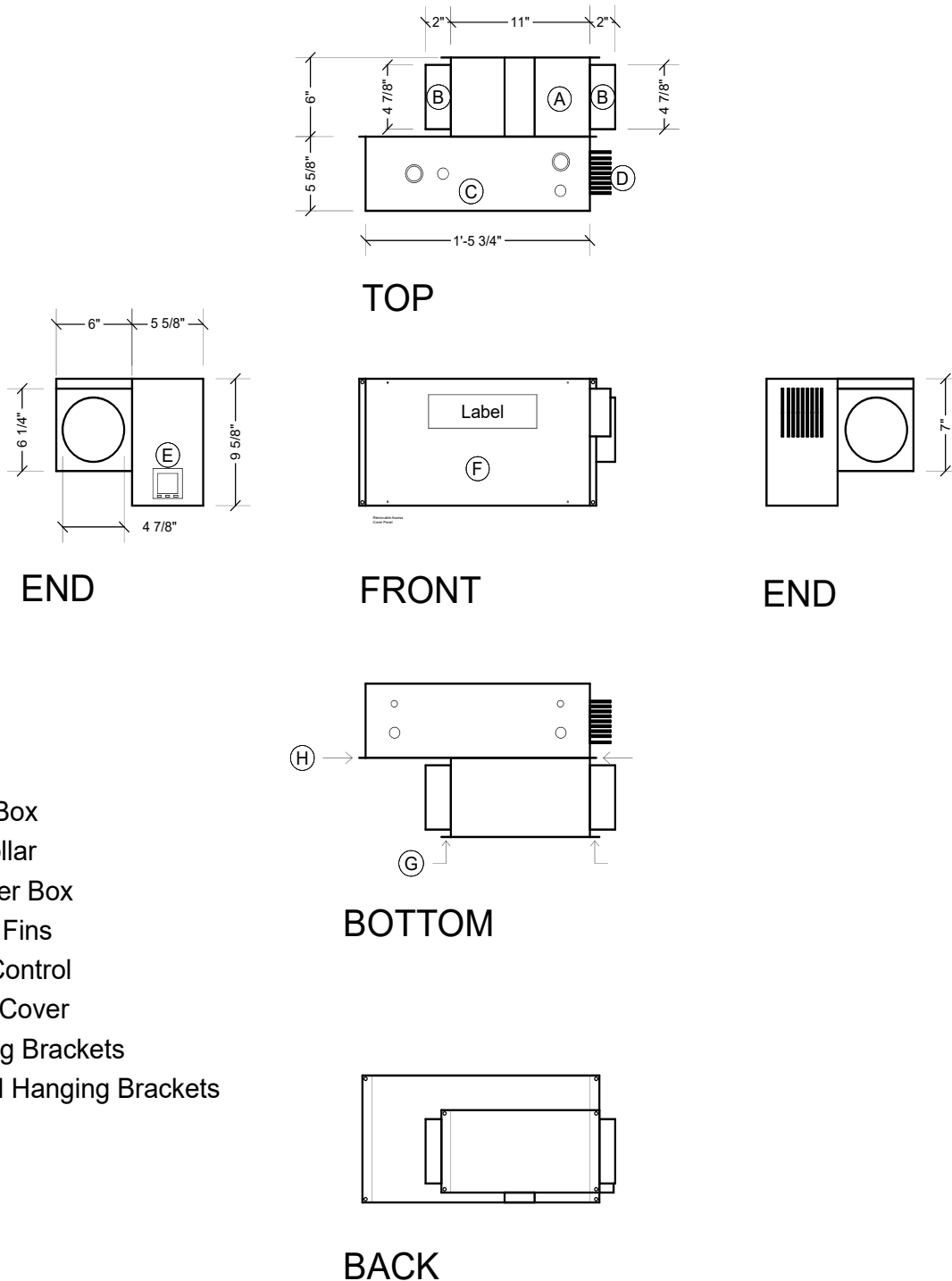
The appropriate ComfoInline Heater for post-heater use should be selected from the GENERAL SPECIFICATIONS AND SYSTEM APPLICATIONS chart based on the HRV/ERV model and the desired duct size.

General Specifications and System Applications

ComfoInline Heater model #	Zehnder America Article #	V	kW	Heater Duct Dia.	Zehnder HRV/ERV Model #	Minimum Operating Temp. for Pre-heaters*
SDHR5-1.5K120V1P- CIRO17-OTDD-OEMZ	9614-00	120	1.5	5"	ComfoAir 160	-40F/-40C
SDHR6-2.5K220V1P- CIRO17-OTDD-OEMZ	9613-00	220	2.5	6"	ComfoAir 200 ComfoAir 350 Focus 200** Novus 300	-40F/-40C -30F/-34C -40F/-40C -30F/-34C
SDHR7-3.5K220V1P- CIRO17-OTDD-OEMZ	9612-00	220	3.5	7"	ComfoAir 350** ComfoAir 550 Novus 300**	-40F/-40C -40F/-40C -40F/-40C

* The selected heater will maintain continuous, frost-free operation to the temperature indicated when installed as a pre-heater with the listed Zehnder HRV/ERV. (POST-heaters should be selected according to the duct size.)

** Reducers will be required on these heaters to match HRV/ERV duct diameter.

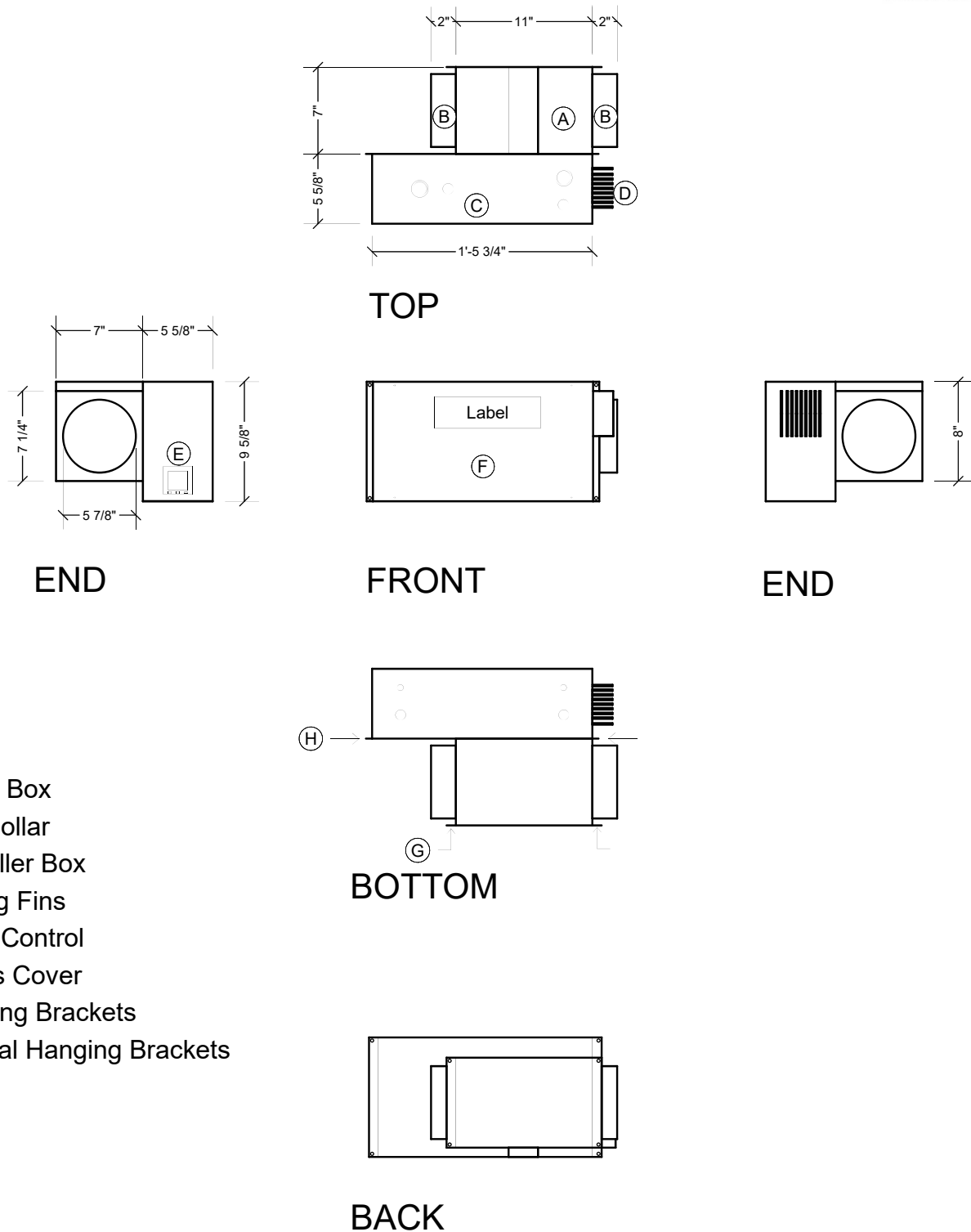


- Ⓐ Heater Box
- Ⓑ Duct Collar
- Ⓒ Controller Box
- Ⓓ Cooling Fins
- Ⓔ Digital Control
- Ⓕ Access Cover
- Ⓖ Mounting Brackets
- Ⓗ Optional Hanging Brackets

Comfolnline Heater 1.5kW 120V 5"

SDHR5-1.5K120V1P-CIR017-OTDD-OEMZ

Zehnder America article #9614-00

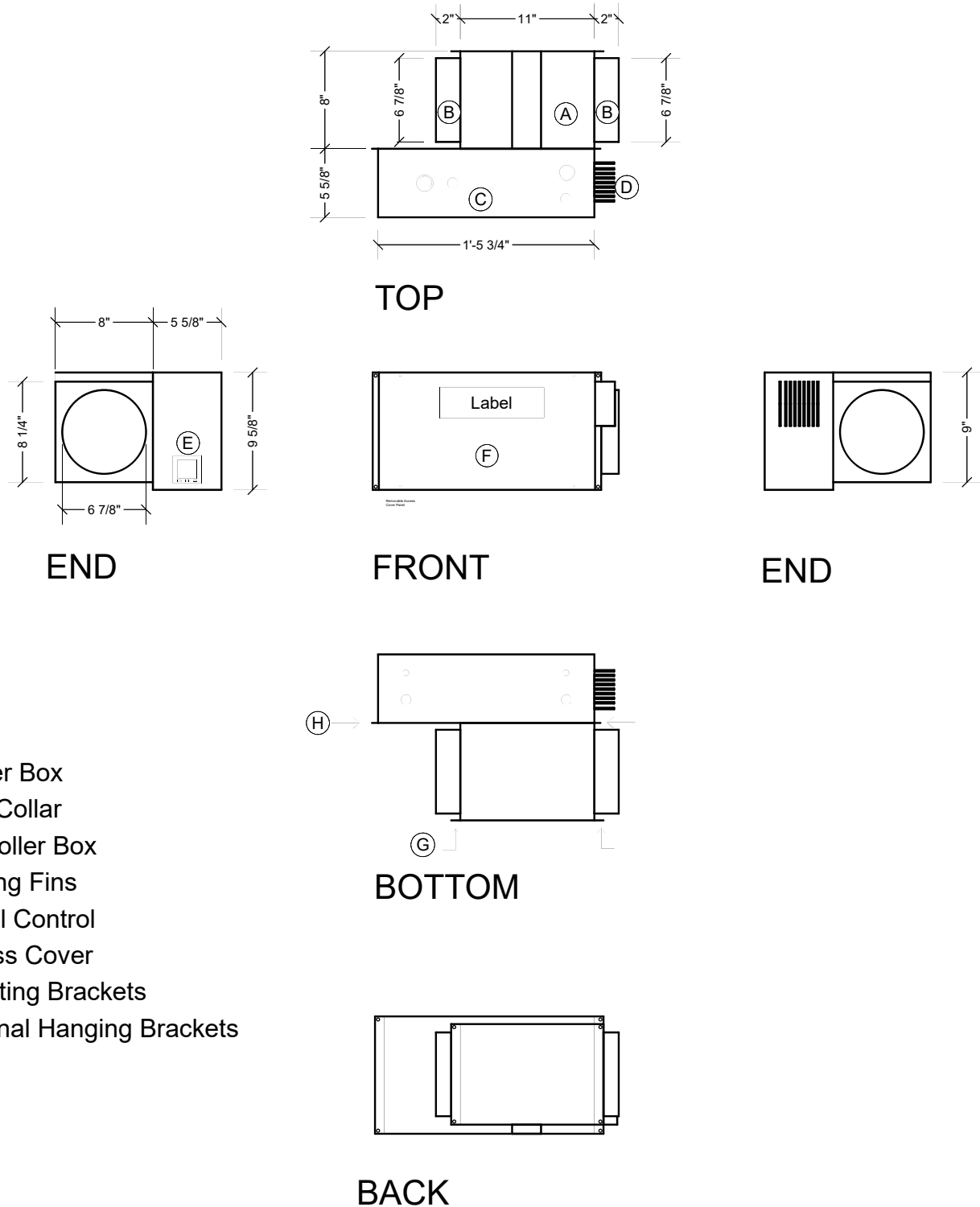


- Ⓐ Heater Box
- Ⓑ Duct Collar
- Ⓒ Controller Box
- Ⓓ Cooling Fins
- Ⓔ Digital Control
- Ⓕ Access Cover
- Ⓖ Mounting Brackets
- Ⓗ Optional Hanging Brackets

Comfolnline Heater 2.5kW 220V 6"

SDHR6-2.5K220V1P-CIR017-OTDD-OEMZ

Zehnder America article #9613-00



ComfoInline Heater 3.5kW 220V 7"

SDHR7-3.5K220V1P-CIR017-OTDD-OEMZ

Zehnder America article #9612-00

Installing Duct Extensions and Sensors

ComfoInline Heaters are equipped with two sensors (Air Flow Sensor and Temperature Sensor) that **MUST** be installed for safe and effective function, whether using as a pre-heater or as a post-heater. Duct extensions must be installed on the heater to enable proper mounting distance of the sensors from the heater box.

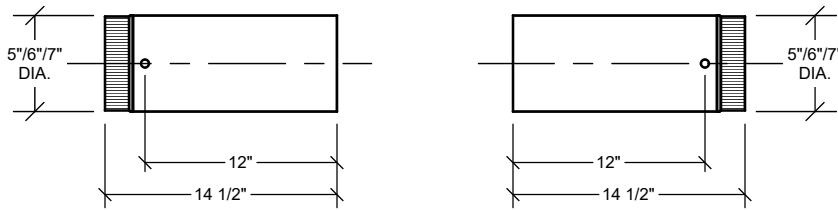
Required Parts for Duct Extensions

Qty.	Description
2	Round, galvanized duct (5"/6"/7" dia. depending on heater size) 14-1/2" long
6	#7 x 1/2 in. Steel Hex-Head Slotted Self-Piercing Sheet Metal Screws (for 3-point fastening of each duct to heater)
4	#7 x 1/2 in. Steel Hex-Head Slotted Self-Piercing Sheet Metal Screws (for fastening each sensor to the duct wall)
2	Insulation sleeves (5"/6"/7" dia. depending on heater size) 20" long, minimum R-6, with metalized polyester jacket or similar vapor barrier (UL-rated)
4	Cable ties, UL 181B-C rated for use with ducts (for securing insulation/vapor barrier sleeves) (ensure suitable length for circumference of duct, or use multiple ties together for each closure)
(as req'd)	Tape, UL 181A-P rated OR Duct Sealant/Mastic, UL 181A-M rated (for making air-tight seal at all duct joints and seams)
(as req'd)	Tape, UL 181B-FX rated OR Duct Sealant/Mastic, UL 181A-M rated (for making air-tight seal of insulation vapor barrier)

Preparation of Duct Extensions

1. Assemble ducts, if necessary, and seal seams/joints.
2. Cut to length (minimum 14-1/2") and crimp one end, if necessary.
3. Drill or punch a 1/2" dia. hole in each duct, minimum 12" from non-crimped end.

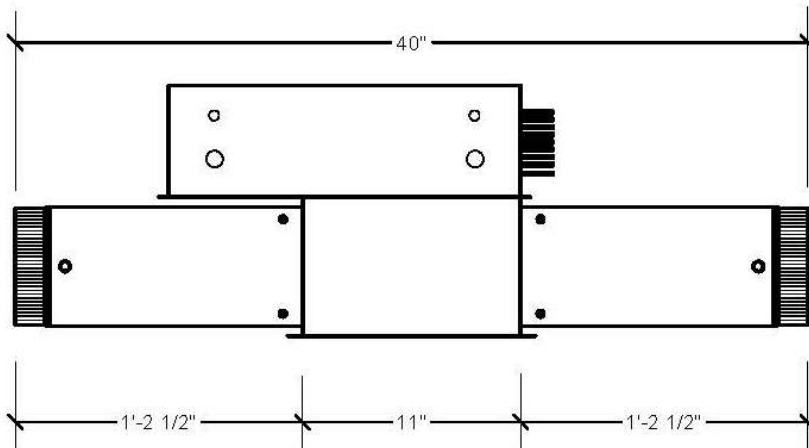
Duct extensions with 1/2" dia. mounting holes for sensors



Assembly of Duct Extensions on Heater Box

1. Slide non-crimped end of duct over duct collar on heater box.
2. Rotate duct on duct collar to orient 1/2" dia. hole in duct in line with bottom of control box (where grommets are located).
3. Fasten each duct to duct collar with (3) self-piercing sheet metal screws (install screws equidistant around the circumference of the duct).
4. Air-seal the joint between the duct and heater box.
5. Repeat steps 1-4 for the other end of the heater box.

Heater assembled with duct extensions



Installation of Sensors in Duct Extensions

Air Flow Sensor with mounting plate, cable and connector

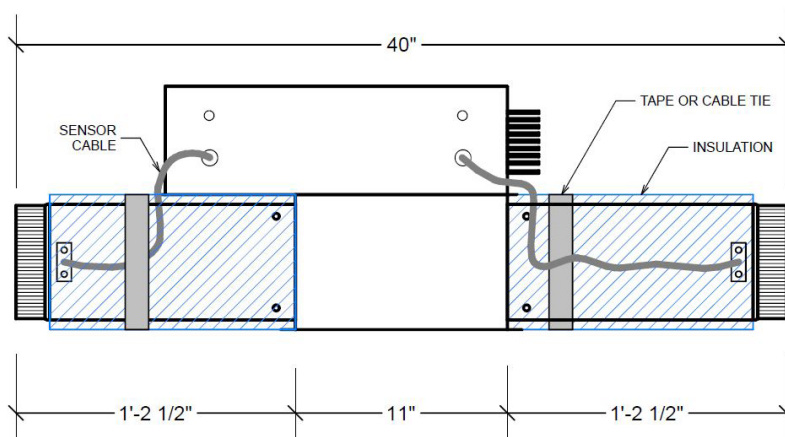


Temperature Sensor with mounting plate, cable and connectors



1. Identify which end of the heater will be the “upstream” side (closer to the Outside Air exterior grill) and which end will be the “downstream” side (closer to the HRV/ERV).
- Note: It may be helpful to review the “Installation Orientation” section before finalizing the identification of the upstream and downstream ends of the heater.
2. Insert the Air Flow Sensor into the $\frac{1}{2}$ " dia. hole on the **upstream** duct and fasten the sensor mounting plate to the exterior of the duct with (2) self-piercing sheet metal screws.
 3. Insert the Temperature Sensor into the $\frac{1}{2}$ " dia. hole on the **downstream** duct and fasten the sensor mounting plate to the exterior of the duct with (2) self-piercing sheet metal screws.
 4. Air-seal around the sensor mounting plates and fasteners.
 5. Coordinate the routing of the sensor cables with the installation of the duct insulation. Insulation will need to be air-sealed around the sensor cables and the connectors on the other end of the sensor cables will need to be passed through the grommets on the control box.
 6. Secure the sensor cables to the ducts/insulation with the appropriate UL-rated cable ties or tape.
 7. When ready, connect the sensor control cables to the controller per the instructions in the “Electrical Installation” section.

Heater assembled with duct extensions, sensors and insulation

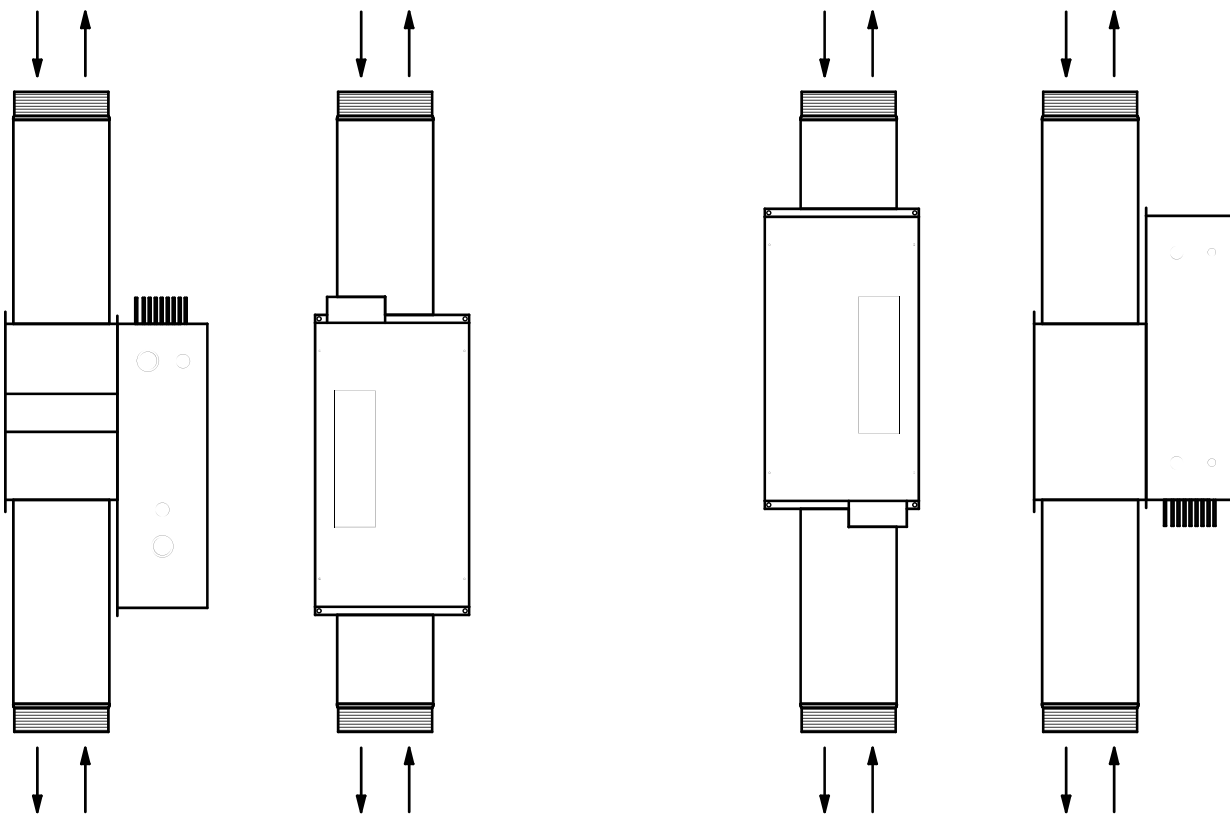


ComfoInline Heaters must always be installed with their INTERNAL heating elements placed horizontally (± 15 degrees). (Orientation of the heating elements can be viewed from the end.)

Vertical Installations

- The heater may be installed vertically with either end pointing up.
- Air may flow in either direction (locate sensors accordingly per instructions above).

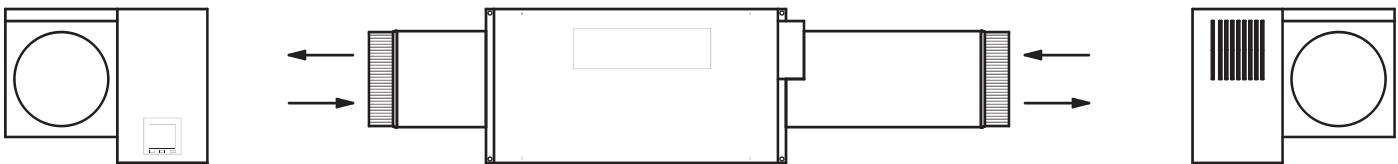
Permissible vertical installations (± 15 degrees)



Horizontal Installations

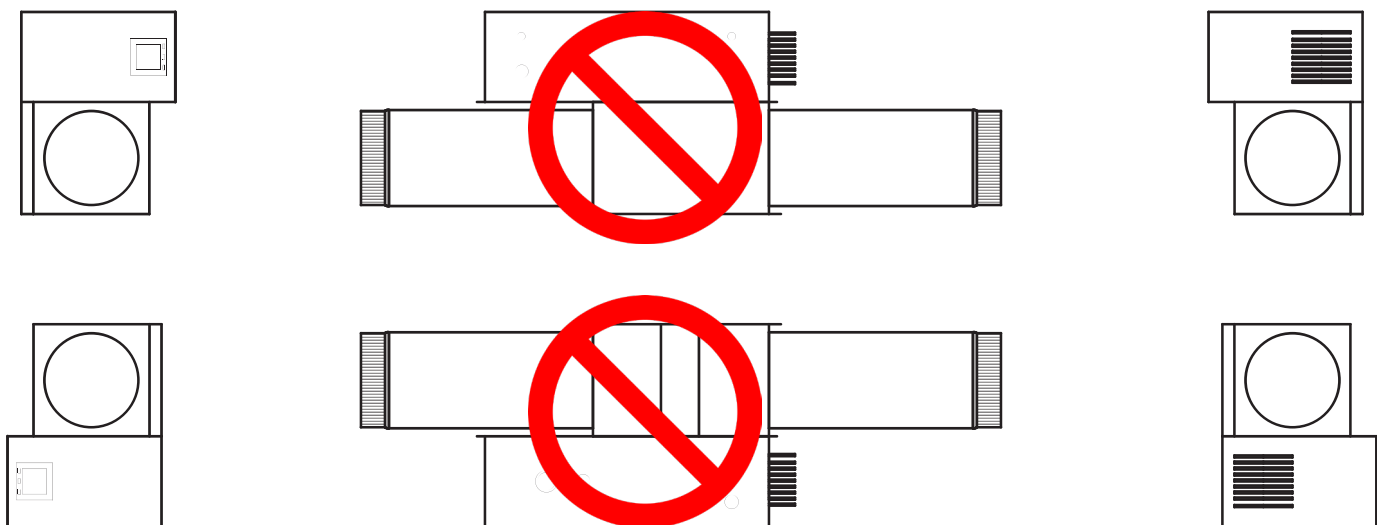
- The heater may be installed horizontally **ONLY** with the control box in front of the heater box.
- Air may flow in either direction (locate sensors accordingly, per instructions above).

Permissible horizontal installation (+/- 15 degrees)

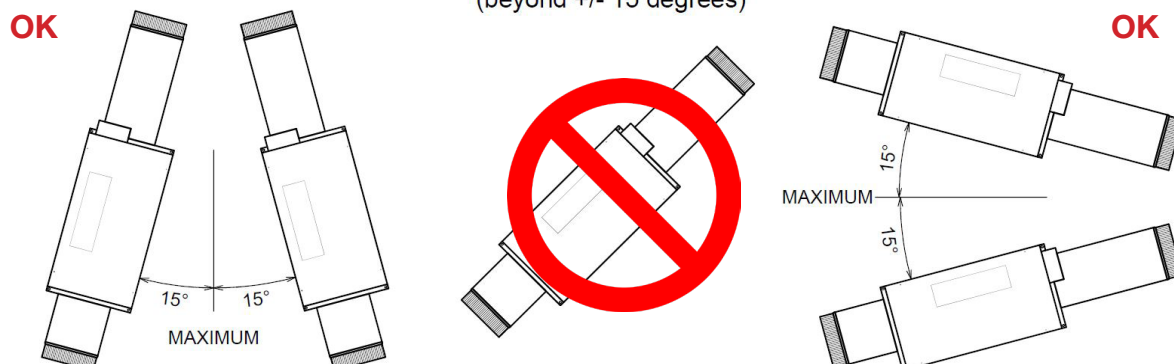


- The heater may **NOT** be installed with the control box situated above or below the heater box. This will put the heating elements in a vertical orientation and is **NOT** permitted.

NON-permissible horizontal installations



Angled Installations



- Angled installations are NOT permitted (except orientations within +/- 15 degrees of the permitted vertical and horizontal installations shown above).

Connecting to Ducts

- Ensure that all ducts are securely supported.
- Ensure that all joints are sealed.
- Ensure that the insulation on the heater duct extensions is continuous with insulation on the Outside Air duct (or Supply Air duct, if applicable).
- Ensure that the vapor retardant jacket on the insulation is sealed continuous with that on the Outside Air duct.

Preventing Damage from Potential Condensation

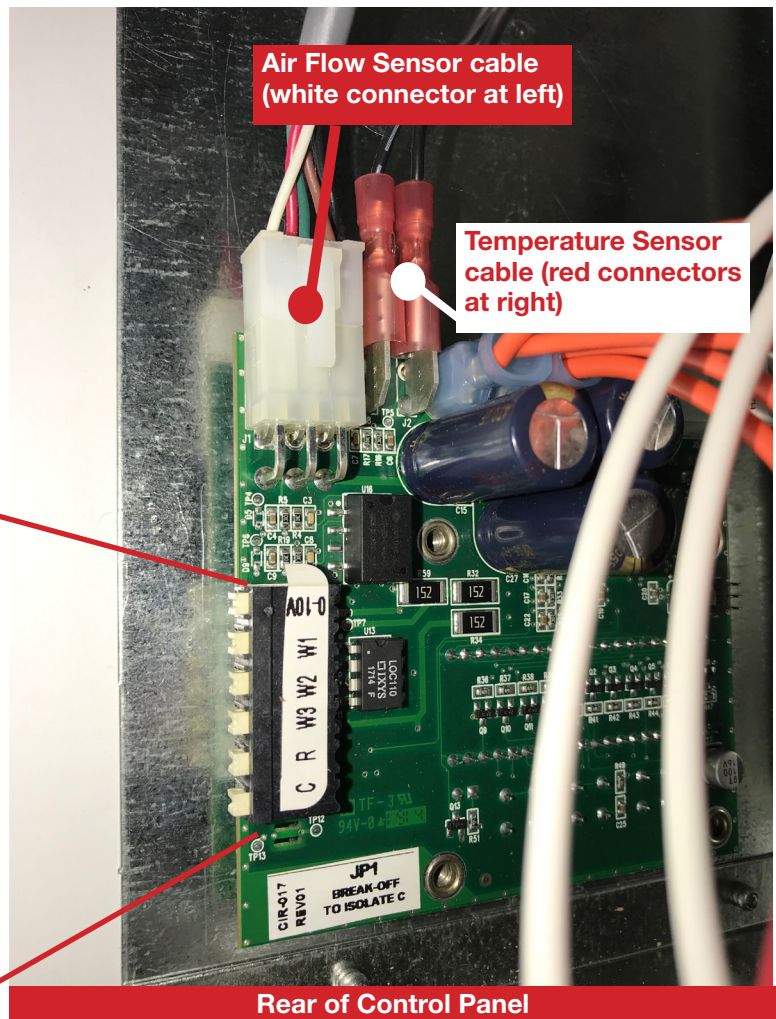
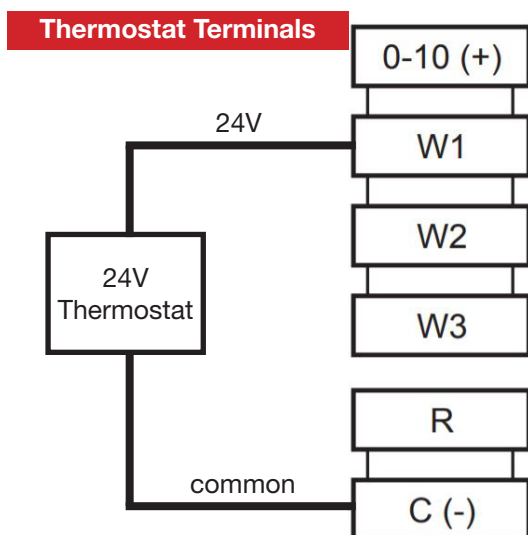
It is possible during colder weather for condensation to form around the outside of the heater box. This may happen when the temperature of the outdoor air being drawn through the heater is colder than the dew point of the air inside the space where the heater is installed. If this is a concern, take precautions to either avoid condensation or avoid potential water damage from condensation. These precautions may include one or more of the following...

1. To avoid condensation, install insulation around the heater box...
 - The heater is “zero clearance” approved, so there is no danger installing insulation on the **outside** of the heater.
 - The insulation must be continuous and must include an outer vapor barrier that is air-sealed in the same fashion as the vapor barrier on the duct extensions.
 - Do not insulate over the heat sink fins on the control box or over the control panel display (seal insulation around these features).
2. To avoid condensation if relative humidity is especially high in the mechanical space, consider installing a dehumidifier to lower the dew point.
3. If preventative measures are not taken to avoid condensation, consider installing a drip pan below the heater. Consider including a water sensor alarm and/or drain on the drip pan.

Control Wiring

CAUTION: Disconnect all power sources before removing the control box cover and making any electrical connections.

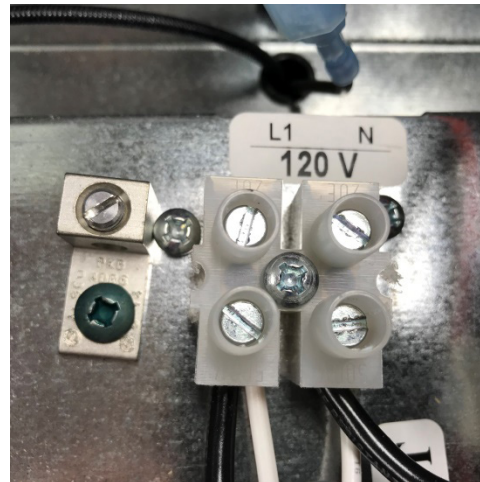
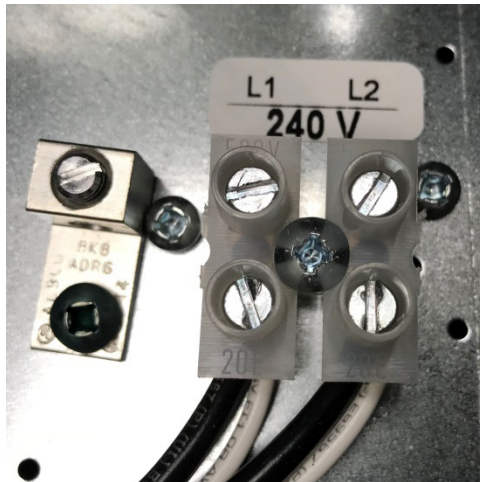
1. Pass the connectors on the sensor cables through the grommets on the control box.
2. Open the control box and connect the sensor cables to the rear of the control panel as indicated in the following images...
3. **FOR POST-HEATER ONLY WITH WALL-MOUNTED THERMOSTAT**
Use a standard 24V thermostat. Connect thermostat wire to terminals labeled C and W1 (common wire to C and 24V wire to W1).



Electrical Power Supply

CAUTION: Disconnect all power sources before removing the control box cover and making any electrical connections.

- The heater is to be hard-wired to the building electrical service in accordance with the electrical codes and building codes in your area.
- The heater is to be connected by a licensed electrician in accordance with the electrical codes and building codes in your area.
- Carefully read the name plate before you start wiring and verify the voltage and current.
- Disconnect all power sources before making any electrical connections.
- For electrical supply, use insulated conductors rated for 75°C. Consult the electrical codes in your area to determine the proper wire gauge.
- Connect electrical power to the ground, load and neutral terminals as shown below...



CAUTION: Replace the control box cover before turning on any power sources.

Setting the Controls

Control Panel

The digital control panel (CIR-017) includes the following:

- Digital display
- Heater “on” indicator (amber LED)
- “Down” selection button
- Menu button
- “Up” selection button



Unless interrupted by touching the menu button, the display will show the current air temperature as detected by the Temperature Sensor installed downstream from the heater.

Temperature Set Point

The temperature set point is adjusted by simply pressing the down or up arrow buttons until the desired set point is displayed. (The menu button should not be touched to adjust the temperature set point.) See the table below to select the appropriate set point for your application.

Once the desired set point is displayed, simply leave the controls alone and the display will return to the current temperature.

As long as sufficient air is flowing through the heater and the source air temperature is lower than the set point, the heater “on” indicator should be lit and the display should eventually show the temperature at or near the set point, where the temperature should be maintained.

Pre-heater Set Points	HRV	ERV
ComfoAir (160/200/350/550) Without internal pre-heater	32F/0C	20F/-7C
ComfoAir (160/200/350/550) With internal pre-heater*	10F/-12C	5F/-15C
Focus 200 or Novus 300 Without internal pre-heater	32F/0C	20F/-7C
Focus 200 or Novus 300 With internal pre-heater*	10F/-12C	5F/-15C
*The set points shown for units with internal pre-heaters are intended to allow the more efficient internal pre-heater to operate down to its low limit before the external ComfoInline Heater is activated during colder weather.		
Post-heater Set Point	If regulating Supply Air temp:	Post-heater may be set to desired comfort temp **
	If regulating Room temp with thermostat:	Post-heater may be set to the maximum temp **
**Observe local code limits for your duct type!		

Navigating Other Controls

Settings are established in the factory so that the only adjustment needed during installation or operation is the temperature set point. The following information is provided for reference.

1. MODE

Tapping the menu button once brings up the “operation mode” (LINE) menu. The arrow up or down buttons are used to switch between various modes.

- For Pre-heater operation or for Post-heater operation regulating Supply Air temperature only: The unit should be set to “SELF” mode to regulate to the set point temperature on the heater.
- For Post-heater operation regulating room temperature with a thermostat: The unit should be set to “1” mode to allow the thermostat to regulate the heater.

2. UNITS

Tapping the menu again brings up the units (C-F) menu. The arrow up or down buttons are used to switch between Celsius and Fahrenheit.

3. CALIBRATION

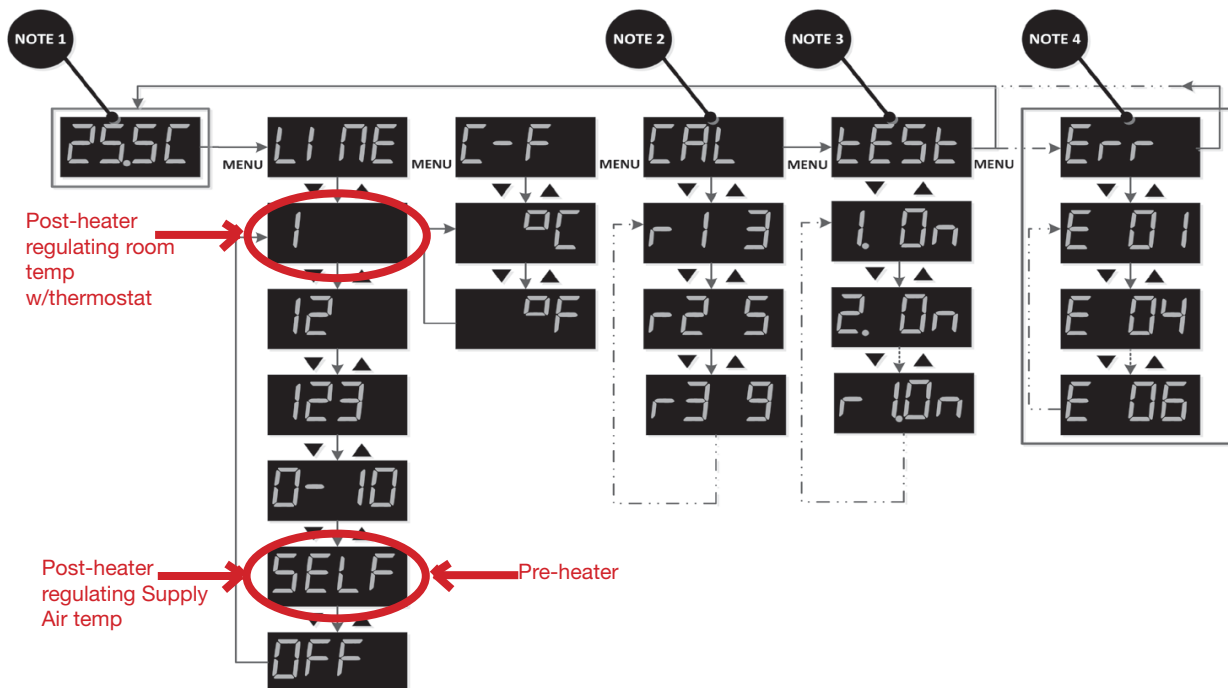
Tapping the menu again brings up the calibration (CAL) menu. This function is not used in this application.

4. TEST

Tapping the menu again brings up the test (tEst) menu. This function is not used in this application.

5. ERROR CODES

Tapping the menu again brings up the error codes (Err) menu. The arrow up or down buttons may be used to display any error codes that are active.



The ComfoInline Heater will operate without any control input from the HRV/ERV. As long as the heater senses the appropriate air flow and the air temperature is below the set point, the heater coils will activate and the amber LED adjacent to the heat icon will be lit. If there is insufficient air flow or if the air temperature is higher than the set point the heater coils will deactivate and the amber LED will turn off.

Troubleshooting

You may contact Zehnder America for service and support of the ComfoInline Heater. The following troubleshooting information is provided for reference.

Quick Troubleshooting Guide

Problem	Defective part or part to check
The unit does not work	- Faulty main power supply connection - Open main circuit breaker, fuse or control switch - No thermostat demand (Defective thermostat) - Defective transformer - Open fuse in secondary transformer winding
The unit has power but the elements do not work	- Defective relay or contact switch - Defective electronic controller - Defective transformer - Open fuse in secondary transformer winding - Open thermal protection with automatic or manual reset
The unit runs and/or cycles constantly	Defective relay or contact switch
An element runs and/or cycles constantly	Defective relay or contact switch
The unit overheats and/or the elements cycle when there is a heating demand	Insufficient ventilation
The breaker trips when the unit is turned on	- Faulty power supply connections - Voltage higher than that indicated on the nameplate
Unable to reach the desired room temperature	- One or more defective elements - Defective thermostat, wrong thermostat setting, positioning or wiring - Voltage lower than that indicated on the nameplate - Heat loss in the building greater than the heating capacity of the unit - Defective relay or contact switch - Open thermal protection with automatic or manual reset
The electronic display does not light up	- Faulty power supply connections - Open main circuit breaker, fuse or control switch - Defective transformer - Open fuse in secondary transformer winding - Defective electronic card - Defective electronic display

The electronic controls have the capacity to detect operational malfunctions such as a defective contact switch or relay around the coil (open circuit), damaged relay contacts or contact switches, damaged elements, and defective or poorly connected sensors. If an abnormal condition is detected, the control generates an error code corresponding to the system fault and displays this code on the screen.

Error Codes

CODE	DESCRIPTION	CODE	DESCRIPTION
01	RELAY 1 – COIL – DISCONNECTED / GND SHORT CIRCUIT	21	RELAY 1 – ELEMENT – DISCONNECTED
02	RELAY 2 – COIL – DISCONNECTED / GND SHORT CIRCUIT	22	RELAY 2 – ELEMENT – DISCONNECTED
03	RELAY 3 – COIL – DISCONNECTED / GND SHORT CIRCUIT	23	RELAY 3 – ELEMENT – DISCONNECTED
04	RELAY 4 – COIL – DISCONNECTED / GND SHORT CIRCUIT	24	RELAY 4 – ELEMENT – DISCONNECTED
05	RELAY 5 – COIL – DISCONNECTED / GND SHORT CIRCUIT	25	RELAY 5 – ELEMENT – DISCONNECTED
06	RELAY 6 – COIL – DISCONNECTED / GND SHORT CIRCUIT	26	RELAY 6 – ELEMENT – DISCONNECTED
07	RELAY 7 – COIL – DISCONNECTED / GND SHORT CIRCUIT	27	RELAY 7 – ELEMENT – DISCONNECTED
08	RELAY 8 – COIL – DISCONNECTED / GND SHORT CIRCUIT	28	RELAY 8 – ELEMENT – DISCONNECTED
11	RELAY 1 – COIL – OVERLOAD	29	SSR – ELEMENT – DISCONNECTED
12	RELAY 2 – COIL – OVERLOAD	40	AIR VELOCITY SENSOR (INPUT TEMPERATURE) – DISCONNECTED
13	RELAY 3 – COIL – OVERLOAD	41	AIR VELOCITY SENSOR (INPUT TEMPERATURE) – SHORT CIRCUIT
14	RELAY 4 – COIL – OVERLOAD	43	TEMPERATURE SENSOR – DISCONNECTED
15	RELAY 5 – COIL – OVERLOAD	44	TEMPERATURE SENSOR – SHORT CIRCUIT
16	RELAY 6 – COIL – OVERLOAD	46	AIR VELOCITY SENSOR – DISCONNECTED
17	RELAY 7 – COIL – OVERLOAD	47	AIR VELOCITY SENSOR – SHORT CIRCUIT
18	RELAY 8 – COIL – OVERLOAD		

CAUTION: Turn off power to the unit at the breaker/fuse before performing any inspection, cleaning, or repair.

ANNUAL MAINTENANCE

Visually inspect the duct heater for:

- Accumulation of dust
- Signs of overheating on the chassis of the duct heater or connected ducts or other equipment
- Water marks or rust
- Loose electrical connections (remove control box cover)
- Oxidation or corrosion on electrical connections (remove control box cover)

QUARTERLY MAINTENANCE

- Check all filters throughout ventilation system to ensure adequate air flow through the duct heater.
- Inspect Outside Air intake grill and duct to ensure adequate air flow through the duct heater.