RENEWAIRE ERV + ELECTRIC DUCT HEATER: A SINGLE-SOURCE SOLUTION

EVERY GEOGRAPHY, EVERY CLIMATE, EVERY HOME, EVERY BUILDING AND EVERY APPLICATION
**OPTIONS & ACCESSORIES**

**SPECIFICATIONS**

**Heater Type:**
- Electric Duct Heater

**Typical KW Range:**
1–11.5 kW (1, 2, 3, 4, 5, 6, 8, 10, 11.5 kW)

**Voltages & Phase:**
- Single phase - 120, 208 and 240V

**Control Voltage:**
- 24 VAC

**Controllable Output Temperature Range:**
- RH-D: 32 to 108°F
- RH-W: -3 to 130°F

**Standard Features:**
- Open-coil element
- High-grade, nickel-chrome element wire
- Thermostat - Integral (RH-D), Wall mount (RH-W)
- Modulating heat output (SCR control)
- Vertical or horizontal operation
- Automatic limit switch for primary over-temperature protection
- Manual reset limit switch for secondary over-temperature protection
- Airflow sensor
- Standard control transformer - 24 VAC
- Corrosion-resistant galvanized steel
- Round duct collars
- High-voltage terminal block connections
- Grounding lug
- Mounting flanges

**Accessories:**
- Temperature sensor - Duct mount (DS-600)
- Digital time clock - wall mount (TC7D-W), in exterior enclosure (TC7D-E)
- Motion occupancy sensor/control - ceiling mount (MC-C), wall mount (MC-W)

**Note:** Electric duct heater designed for indoor ductwork installation only.

Download specification at: renewaire.com/specifications

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<tr>
<th>Duct Collars</th>
<th>kW</th>
<th>V</th>
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<th>Depth (Z)</th>
<th>Max. Wt. (Lbs.)</th>
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**Minimum Airflow (CFM) | Heater Capacity (kW)**

- 30 | 1.00
- 60 | 2.00
- 90 | 3.00
- 120 | 4.00
- 150 | 5.00
- 180 | 6.00
- 240 | 8.00
- 300 | 10.00
- 345 | 11.50

**RH SERIES HEATER CAPACITY**

**SAFE OPERATING RANGE**

**AIRFLOW - CFM**

**HEATER CAPACITY - kW**
ELECTRIC DUCT HEATER (1-175 KW)

RenewAire offers the highest efficiency energy recovery ventilators (ERV) on the market. However, during colder conditions, supply air from the ERV may be too cool for certain space conditions. To address this, RenewAire offers an economical electric duct heater option, so our commercial ERVs can now heat supply air during cooler months to enhance comfort conditions, or warmer, and since ERV and heater combinations can be applied anywhere residential and light commercial ERVs are sold.

APPLICATIONS

RenewAire ERV and heater combinations can be applied anywhere residential and light commercial ERVs are sold. They may be controlled by air conditioning and ventilation systems, or other forced air systems. They may be controlled by pneumatic, contactors, relays, sequencers or solid state devices.

CONSTRUCTION AND INSTALLATION

The Duct Heaters are prewired, have voltage ratings to 600 volts, both single phase and three phase. The Duct Heaters are available in two models: EK and & DHD series which are furnished with a separate control panel for remote mounting.

OPTIONS AND ACCESSORIES

RenewAire offers a wide variety of remotely mounted control panels. A single source reduces time and costs. RenewAire can now heat supply air during cooler months to enhance comfort conditions, or warmer, and since ERV and heater combinations can be applied anywhere residential and light commercial ERVs are sold.

To install a flange type heater FIG.2, Insert heater between two sections of the duct. Slide heater in the duct using control box as template to mark the mounting screw holes. Remove unit and drill mounting holes.

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RenewAire offers the highest efficiency energy recovery ventilators (ERVs) on the market. However, during colder conditions, supply air from the ERV may be too warm to achieve desired space conditions. By adding the出局Electric Duct Heaters as an option to our commercial ERVs, RenewAire can now heat supply air during cooler months to enhance performance during winter conditions, ensuring supply air from the ERV may be less than optimal for space conditions. By providing a single-source responsibility, reduced time and costs are achieved. A single-source supplier allows for the release of design engineers from the burden of researching design options and approvals, and a single purchase point and approval process streamlines logistics for design engineers.

**Applications:**
- ERV supply air is ducted into the space, tempering capabilities in certain extreme conditions.
- RenewAire heaters can be designed for 75°F (24°C) for indoor use only.
- EK Series is intended for use in commercial applications, not residential.
- Can be duct-installed onsite and are designed for post-installation if necessary.
- Heaters are wired for standard 230-480 Volts, 3-phase, 60 Hz.
- The Motion Sensor can be used with any unit, and a RH-W heater thermostat.
- Remote Duct Temperature Sensor (DS-600) can be used in either direction without any modification, providing a wide range of options for applications.
- The Duct Heaters are prewired, have voltage ratings to 600 volts, both single phase and three phase.
- The Duct Heaters are furnished with integral controls, except for the DDC building automation system and EK-60 vDC from a DDC building automation system.
- The Duct Heaters must have internal thermal protection to prevent overheating.
- A line voltage overload relay is recommended in the fan disconnect panel.
- Standard features include a line voltage overload protection, over-temperature protection per stage or each 48-amp circuit within an electric panel, a 60°C (140°F) line voltage overload relay and over-temperature protection for single or multiple 48 amp circuits within an electric panel.
- Insulated hanger straps.
- Connect high and low voltage supplies along with fan control system to the Duct Heater.
- To install a slip-in heater FIG.1, cut an opening, as required in the side panel of the duct. Slide heater in the duct using control box as template to mark the mounting screw holes. Remove unit and drill mounting holes.
- To install a flange type heater FIG.2, Insert heater between two sections of the duct, ensuring a tight fit. Mount unit to duct with sheet metal screws. Connect high and low voltage supplies along with fan control system to the Duct Heater.
- The Duct Heaters must be installed in vertical ducts.
- Minimum 4 feet of duct upstream from a humidifier.
- Maximum 4 feet downstream from a heat pump or central air conditioner.
- Minimum 4 feet downstream from an air filter.
- Minimum 2 feet either side of an elbow or turn.
- Minimum 4 feet from any canvas duct connector or transition section for change in duct size.
- Mount unit to duct with sheet metal screws. Connect high and low voltage supplies along with fan control system to the Duct Heater.
FLIPPABLE CAPABILITIES

Unique to the EK series, this unit has the ability to flip 180°. Additionally, EK heaters feature both vertical up and vertical down airflow.

Download specification at: renewaire.com/specifications

ELECTRIC DUCT HEATER

EK SERIES

Electric Duct Heater (1-175 kW)

Accessory

SPECIFICATIONS

Heater Type:
Electric Duct Heater

Typical KW Range:
1-175 kW

Standard Features:
A disconnecting magnetic control contactor per stage or each 48 Amp circuit within a stage
Open-coil element
Staged on/off
Control terminal board
Grounding lugs
Automatic limit switch for primary over-temperature protection
Manual reset limit switch for secondary over-temperature protection
Non-adjustable airflow switch
Standard control transformer - 24 VAC
Disconnect switch
Duct thermostat with sensor for on/off control
60-20-20 (Ni/Cr/Fe) C Grade element wire with nickel-plated terminals
Slip-in mount
No left/right hand
Vertical up/down flow

Voltagess & Phase:
Single phase - 120, 208, 240, 277
Three phase - 208, 240, 480, 600

Control Voltage:
24 VAC

Dimensions:
Minimum - 8” x 8” (W x H)
Maximum - 99” x 99” (W x H)

Options:
Flange mount
80-20 (Ni/Cr) A Grade element wire with stainless steel terminals
Recessed control box 1”
Gasketed cover - dust tight
Power fusing, standard for heaters drawing more than 48 Amps
2-stage
Electronic step controller (4-stage)
SCR (up to 96 Amps)
SCR Vernier (over 96 Amps)
Pilot light

Accessory:
Room thermostat
Room/duct thermostat-sensor kit for SCR control

Note: Electric duct heater designed for indoor ductwork installation only.

PRESSURE DROP THROUGH HEATER

Air Velocity - FPM (1, 2, 3 and 4 - the number of rows of heater coils)
When the number of rows of heater coils is unknown, assume 4.

HORIZONTAL DUCT & AIRFLOW

with HORIZONTAL INSTALLATION

VERTICAL DUCT & AIRFLOW

* ONE HEATER - 4 POSITIONS

* SAME HEATER - FOR VERTICAL DUCTS
EK SERIES

DETERMINING MAXIMUM HEATER KW

Maximum Watts per Sq. In. of Duct Area

$$\text{Max W} = \frac{\text{X \times w}}{\text{in}^2} \times \text{duct area in}^2$$

For EK, X = 208.33

Maximum kW per Sq. Ft. of Duct Area

$$\text{Max W} = \frac{\text{X \times kW}}{\text{ft}^2} \times \text{duct area ft}^2$$

For EK, X = 30

MINIMUM AIR VELOCITIES

The minimum airflow in a duct heater is directly related to the inlet air temperature. Consideration must be given to both airflow across the heater and inlet air temperature.

1. To calculate the kilowatts per sq. ft. of duct area, divide the total kilowatts required by the duct area.

   Example:
   
   Duct Size = 2ft. x 3ft. Total Kilowatts = 20
   
   $$\frac{20}{6} = 3.333 \text{ kW/sq. ft.}$$

2. If the air handler equipment is expressed in FPM, then a direct cross reference can be made by comparing the temperature of the air (as it enters the duct heater) to the kW rating on the chart of rated velocity (refer to chart at right).

   a. Draw a line horizontally from the kilowatt per sq. ft. required to the inlet air temperature being used.

   b. From this point of intersection on the inlet air curve, draw a line down vertically to establish the air velocity.

   c. The velocity should never be lower than the velocity as determined from the chart. In cases where this is not true, the velocity must be increased or the kW required must be reduced.

3. In cases where the air handling equipment is expressed in CFM, then convert to FPM by dividing the CFM by the duct area.

   Example:
   
   FPM = CFM ÷ Duct Area

RH SERIES

MINIMUM AIRFLOw AND AIR VELOCITIES

Minimum Airflow (CFM) = 30 (CFM) x Heater Capacity (kW)

Example:

Heater Capacity = 4 kW

$$30 \text{ CFM} \times 4 \text{ kW} = 120 \text{ CFM Minimum Airflow}$$

Minimum Velocity = Minimum Airflow (CFM) ÷ Round Duct Area (ft²)

Example:

Heater Capacity = 4 kW

Area of 8” Round Duct Size = 0.349 ft²

$$120 \text{ CFM Minimum Airflow/0.349 sq. ft. duct area = 344 FPM minimum cross sectional velocity}$$

LINE CURRENT CALCULATION

Line Current (Amperes (A)) = Watts (W)/Line Voltage (V)

Example:

4 kW Heater = 4000 W

Line Voltage = 240 V

$$\text{Line Current} = \frac{4000 \text{ W}}{240 \text{ V}} = 16.7 \text{ A}$$

EK & RH SERIES

KW AND TEMPERATURE RISE

The following formula may be used to determine the approximate total kW required when the CFM (air volume) and desired temperature rise (°F) are known:

$$\text{kW} = \frac{\text{CFM} \times \triangle T}{3150}$$

DUCT HEATER TEMPERATURE RISE

The following formula may be used to determine the approximate temperature rise (°F) of a duct heater when the kW and CFM are known:

$$\triangle T = \frac{\text{kW} \times 3150}{\text{CFM}}$$