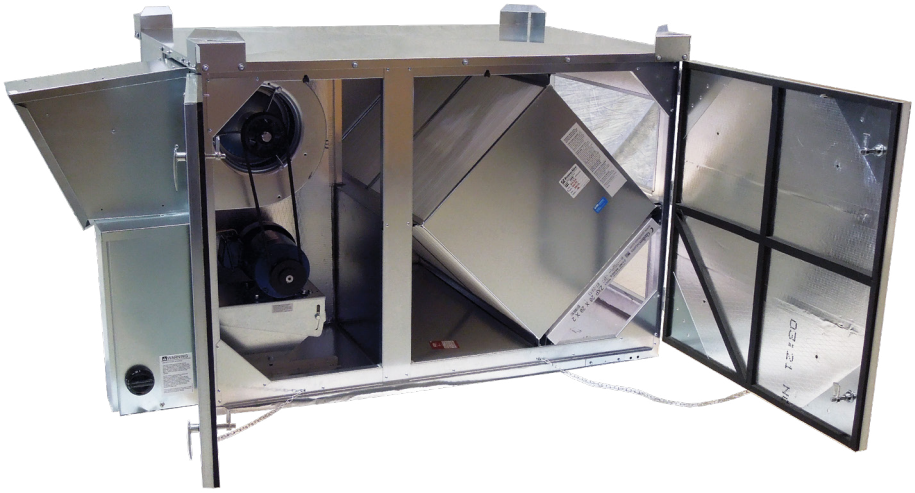
RenewAire
Energy Recovery Ventilation

HE SERIES ERV

Installation, Operation and Maintenance Manual

HE2XRTC
HE3XRTC
HE4XRTC



HE-2XRTC Shown

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RTC INFO

TABLE OF CONTENTS

CONFIGURATION CODE

NOTE: Not all options are available on every model.

MODEL NUMBER	H	E	-		X	J	R	T	C							-	-						-		
DIGIT NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Digits 1–5:	Model
"HE07-", "HE10-", "HE1.5", "HE-2X", "HE-3X", "HE-4X", "HE-6X", "HE-8X"	

Digits 7–8:	Location
"IN" = Indoor	
"RT" = Rooftop	

Digit 9:	Orientation (see Restriction 1)
"V", "H" (Indoor Units)	
"V", "H", "R", "F", "C" (Rooftop Units)	

Digit 11:	Wall Type
"S" = Single	
"D" = Double	

Digit 12:	Phase (See Restriction 2, 8, 11, & 20)
"1" = Single Phase	
"3" = Three Phase	

Digit 13:	Voltage (see Restrictions 3, 4, 5, 6, 7, 11, 19, & 26)
"1" = 120V	
"4" = 460V	
"5" = 208-230V	
"8" = 575V	
"9" = 277V	

Digit 14:	FA Horsepower (see Restrictions 7, 8, 9, 10, 21, & 25)
"E" = EC Direct Drive Motors (HE07-, HE-10-, and HE1.5 only)	
"A" = Advanced EC Direct Drive Motorized Impellers (HE07- and HE10- only)	
"B" = Intermediate EC Direct Drive Motorized Impellers (HE07- only)	
"S" = Standard Impellers (HE1.5 only)	
"U" = 1.5HP (HE-2X only)	
"V" = 2HP (HE-2X, HE-3X, HE-4X only)	
"W" = 3HP (HE-3X, HE-4X, HE-6X, HE-8X only)	
"X" = 5HP (HE-3X, HE-4X, HE-6X, HE-8X only)	
"Y" = 7.5HP (HE-6X, HE-8X only)	
"Z" = 10HP (HE-8X only)	

Digit 15:	EA Horsepower (see Restrictions 7, 8, 9, 10, 21, & 25)
"E" = EC Direct Drive Motors (HE07-, HE-10-, and HE1.5 only)	
"A" = Advanced EC Direct Drive Motorized Impellers (HE07- and HE10- only)	
"B" = Intermediate EC Direct Drive Motorized Impellers (HE07- only)	
"S" = Standard Impellers (HE1.5 only)	
"U" = 1.5HP (HE-2X only)	
"V" = 2HP (HE-2X, HE-3X, HE-4X only)	
"W" = 3HP (HE-3X, HE-4X, HE-6X, HE-8X only)	
"X" = 5HP (HE-3X, HE-4X, HE-6X, HE-8X only)	
"Y" = 7.5HP (HE-6X, HE-8X only)	
"Z" = 10HP (HE-8X only)	

Digit 18:	Flow Control* (see Restrictions 12, 13, & 14)
"-" = No Isolation Dampers (with no Bypass)	
"D" = Motorized Damper both Airstreams (with no Bypass)	
"E" = Motorized Damper EA or RA Airstream (with no Bypass)	
"F" = Motorized Damper FA or OA Airstream (with no Bypass)	
"S" = Backdraft Damper OA Airstream (with no Bypass)	
"R" = Backdraft Damper EA Airstream (with no Bypass)	
"B" = Backdraft Damper both Airstreams (with no Bypass)	
"T" = Motorized Damper OA, Backdraft Damper EA (with no Bypass)	
"0" = Dry Bulb Face and Bypass Dampers only	
"1" = Dry Bulb Bypass with Motorized Dampers all Airstreams	
"4" = Dry Bulb Bypass with Backdraft Damper OA Airstream	
"5" = Enthalpy Face and Bypass Dampers only	
"6" = Enthalpy Bypass with Motorized Dampers all Airstreams	
"9" = Enthalpy Bypass with Backdraft Damper OA Airstream	

Digit 19:	Unit Control (see Restrictions 15, 16, 17, 18, 19, 20, 21, 24, & 27)
"A" = Standard Unit Control Wiring	
"D" = Independent Blower Control (HE1.5 only)	
"V" = Onboard VFD Both Airstreams with IE3 Premium Efficiency Motors	
"W" = Onboard VFD Both Airstreams with IE5+ Ultra Premium Efficiency Motors	
"G" = Terminal Strip for EC Motors or Impellers	

Digit 20:	Disconnect
"N" = Non-Fused (Standard)	
"F" = Fused	

Digit 21:	Unit Control Enhancements (see Restrictions 16 & 22)
"T" = Transformer with Isolation Relay (Standard)	
"1" = Enhanced Controls	
"2" = Premium Controls	
"3" = Enhanced Controls with BACnet License	
"4" = Premium Controls with BACnet License	

Digit 22:	Filter Options (see Restriction 22)
"-" = None (Standard)	
"F" = Filter Monitor Both Airstreams	

Digit 23:	Other Options
"-" = None (Reserved)	

Digit 24:	Paint and Customization
"-" = None	
"W" = White Paint	
"C" = Custom Paint	
"X" = Custom Unit	

Digit 25:	Safety Listing (see Restriction 23)
"L" = Listed	
"N" = Non-Listed	

***NOTES:**
Digit 6 "J" = G5 Core Type. Digits 10, 16, and 17 are not used in these models.
*Digit 18: For units with the Bypass Option, the face damper also acts as an isolation damper in the EA or RA airstream.

RenewAire® Energy Recovery Ventilation

⚠ WARNING

ARC FLASH AND ELECTRIC SHOCK HAZARD

Arc flash and electric shock hazard. Disconnect all electric power supplies, verify with a voltmeter that electric power is off and wear protective equipment per NFPA 70E before working within electric control enclosure. Failure to comply can cause serious injury or death.

Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable.

Before proceeding with installation, read all instructions, verifying that all the parts are included and check the nameplate to be sure the voltage matches available utility power.

The line side of the disconnect switch contains live high-voltage.

The only way to ensure that there is NO voltage inside the unit is to install and open a remote disconnect switch and verify that power is off with a volt meter. Refer to unit electrical schematic. Follow all local codes.

IMPORTANT

This equipment is to be installed by following Industry Best Practices and all applicable codes. Any damage to components, assemblies, subassemblies or the cabinet which is caused by improper installation practices will void the warranty.

IMPORTANT

Air ducts connecting this ERV to the Occupied Space must 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).

⚠ CAUTION

RISK OF CONTACT WITH HIGH SPEED MOVING PARTS

Disconnect all local and remote power supplies, verify with a voltmeter that electric power is off and all fan blades have stopped rotating before working on the unit.

Do not operate this unit with any cabinet panels removed.

⚠ CAUTION

RISK OF ELECTRIC SHOCK OR EQUIPMENT DAMAGE

Whenever electrical wiring is connected, disconnected or changed, the power supply to the ERV and its controls must be disconnected. Lock and tag the disconnect switch or circuit breaker to prevent accidental reconnection of electric power.

IMPORTANT

This unit is intended for general ventilating and heating only. Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this equipment to range hoods, fume hoods or collection systems for toxics.

IMPORTANT

This unit is for ventilating finished structures only. It is not to be used until after all construction has been completed and construction debris and dust are cleaned from the Occupied Space.

RTC INFO

FEATURES

RenewAire's RTC units bring the convenience of single-end connection to rooftop Energy Recovery Ventilators (ERVs). Now you can more easily connect an ERV to an existing Rooftop Air conditioning Unit (RTU), without additional roof penetrations.

The RTC units also offer airflow measurement and balancing features. Simply by using a manometer or a magnehelic, you can measure the amount of fresh air supplied by the RTC and the amount of stale air being exhausted. Then you can adjust these amounts using the supplied dampers (HE1XRTC only) or variable sheaves (all other sizes).

USE WITH ECONOMIZERS

In most applications, the RTC unit itself provides far greater savings and ROI than any economizer, and codes often recognize this and allow for use of an ERV as an alternative to an economizer. With many RTUs, the RTC unit is connected to the RTU in the same place an economizer might have been installed. In these cases, an economizer cannot be installed.

There are some RTUs that will allow for installation of both an RTC unit and an economizer. For these installations, the Independent Blower Control option must be ordered and installed for the HE1XRTC only. This optional feature allows for separate control of the exhaust and the supply blowers, for optimized operation with the economizer.

Another alternative, if use of an economizer is required, is to use our standard RTV models, connecting into the system ductwork below the roofline.

INSTALLATION

PLANNING YOUR INSTALLATION

Once the correct RTC unit has been selected for the installation, the installer will need to:

1. Prepare the RTU for connection of the RTC;
2. Prepare a location on the roof for the RTC unit;
3. Connect the RTC to the RTU (or an exposed Return Air Duct) with a Transition Piece (either built on site, or a factory-built accessory kit);
4. Provide operating power and control connections to the RTC;
5. Measure and balance the airflows.

TIE-IN DIRECTLY TO ROOFTOP A/C UNIT

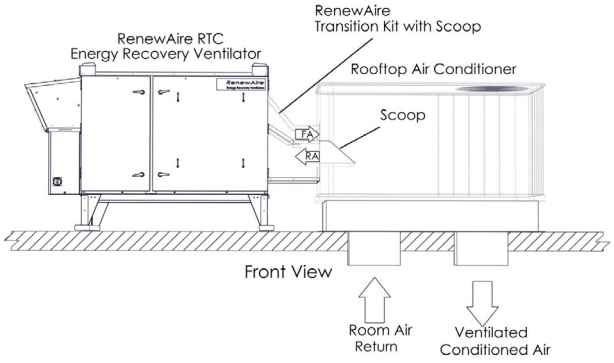
The RTC can be connected to the Return Air Compartment of most rooftop packaged air handling units (RTUs).

Typical connection points:

- a hole cut in a side panel of the RTU by the installer;
- the economizer port (if no economizer is installed); or
- the panel for connection of a horizontal return duct (in convertible RTUs);

A Transition Piece is usually required. The Transition Piece includes a Scoop that diverts return air from the RTU into the RTC; a Supply Air Duct; and Sealing Flanges to make weather-tight connections between the RTU and the RTC.

A variety of Transition Pieces are available from RenewAire to fit various combinations of RTC models and popular RTUs. It is also possible to fabricate the Transition Piece on site, or to request the factory design and build one for you.



RenewAire Energy Recovery Ventilation

INSTALLATION

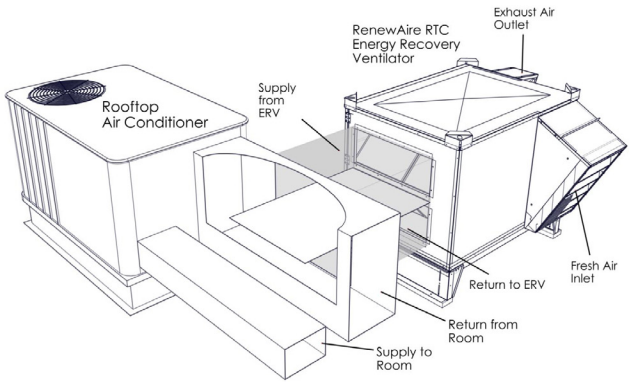
PLANNING YOUR INSTALLATION

TIE-IN TO RETURN AIR DUCT ON ROOF

Use this approach when you have access on the roof to Return Air (RA) ductwork going to the air-handler. A Horizontal Duct Transition Piece is available from RenewAire for each RTC model.

The horizontal baffle in the Transition Piece separates that section of duct into an upper and a lower section. Returning Room Air is taken from the lower section. Supply Air from the RTC enters the upper section. The horizontal baffle prevents recapture of Supply air by the RTC unit.

Alternatively, a site-fabricated transition assembly of similar design may be used.



SOUND ATTENUATION

GENERAL PRACTICES

Take these simple steps to attenuate noise from the unit.

Outside the building:
The exhaust hood is the primary source of noise outside the building. When practical, orient the exhaust air hood to point away from houses or public areas.

At the Curb:
Cut the holes in the roof deck to fit closely around the duct(s) passing through the roof deck. Seal all gaps around the duct(s) at the roof deck.

Ducts:
Make sure the ductwork at the unit outlets is stiff enough to resist the flexure and resulting booming associated with system start-up and shut-off, as well as the turbulent flow conditions at the blower outlets.

In general, provide smooth transitions from the ERV's outlets to the duct. The ducts connecting to the outlets should be straight for a sufficient distance, with gradual transitions to the final duct size.

These guidelines are consistent with SMACNA recommended duct layout practices for efficient and quiet air movement. Follow SMACNA guidelines.

RADIATED NOISE

The RTC units are insulated with high-density fiberglass. This provides significant attenuation of radiated sound from the unit itself.

The outlet ducts can be significant sources of radiated sound as well. The FA duct should be insulated for sound control. This insulation should start at the unit. At a minimum the first ten feet of duct should be insulated. All parts of the FA and RA ducts located in a mechanical space with noise-generating equipment also should be insulated for sound control, both to minimize sound radiation out of the FA duct, and also to control sound radiation into both ducts.

AERODYNAMIC (VELOCITY) NOISE

When sound attenuation is a design concern, the primary consideration is velocity noise at the unit's Exhaust Air blower outlet. The average velocity at the Exhaust Hood outlest is shown below.

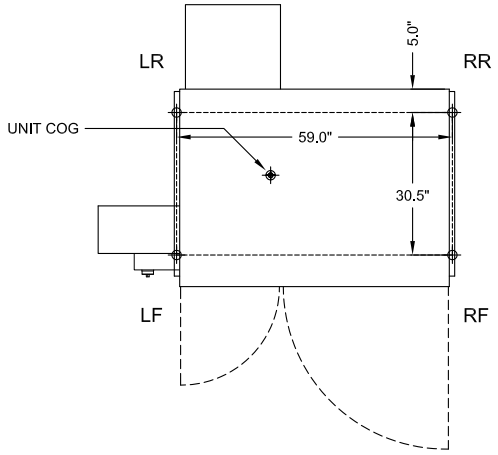
	CFM	Velocities
HE2XRTC	1500	2072
HE3XRTC	2250	2093
HE4XRTC	3000	1203

INSTALLATION

RIGGING INFORMATION

There are pairs of rigging holes at each upper corner of the unit. Use slings or shackles at all four corners. Spreader bars are recommended in order to avoid damage to the unit.

F1

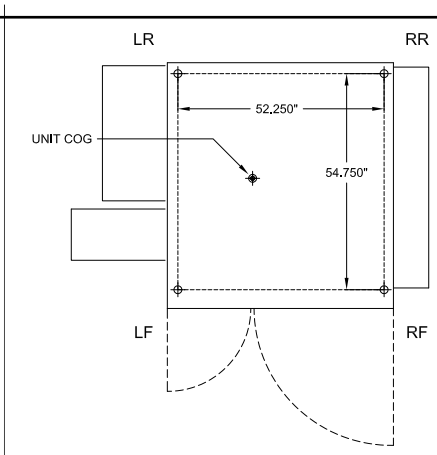


HE2XRTC UNIT CORNER WEIGHTS (LBS.)					
SINGLE-WALL					
HP & PHASE	**UNIT**	**LF**	**LR**	**RR**	**RF**
(2) 2HP, 1-PHASE	566	174	174	108	109
(2) 3HP, 3-PHASE	573	177	177	109	110
⌖ INDICATES LOCATIONS AT WHICH CORNER WEIGHTS ARE CALCULATED AT HOLES PROVIDED IN LEVELING LEGS.					

INSTALLATION

RIGGING INFORMATION

F2



HE3XRTC UNIT CORNER WEIGHTS (LBS.)					
SINGLE-WALL					
HP & PHASE	**UNIT**	**LF**	**LR**	**RR**	**RF**
(2) 3HP, 1-PHASE	762	216	218	165	163
(2) 3HP, 3-PHASE	769	219	221	166	164
⌖ INDICATES LOCATIONS AT WHICH CORNER WEIGHTS ARE CALCULATED ALONG CENTERS OF CURB RAILS.					

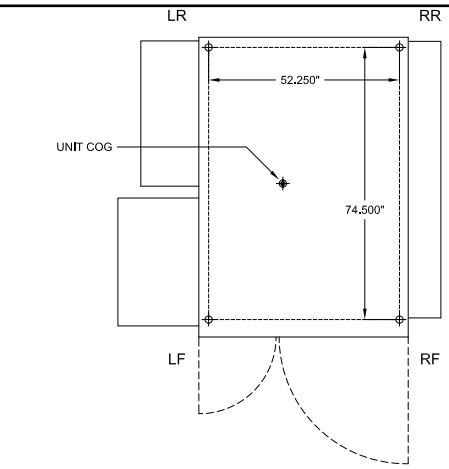
CAUTION

To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc., out of unit.

CAUTION

Do not remove or disable the wiring interconnection between the Overload Relays and the Contactors. Without this interconnection the motor(s) will not be protected against overload.

F3



HE4XRTC UNIT CORNER WEIGHTS (LBS.)					
SINGLE-WALL					
HP & PHASE	**UNIT**	**LF**	**LR**	**RR**	**RF**
(2) 5HP, 3-PHASE	1005	294	292	209	211
⌖ INDICATES LOCATIONS AT WHICH CORNER WEIGHTS ARE CALCULATED ALONG CENTERS OF CURB RAILS.					

INSTALLATION

PLANNING YOUR INSTALLATION

⚠ WARNING

The Supply air inlet should be at least 10' away from chimneys, furnace and water heater exhausts, and other sources of carbon monoxide, humidity or other contamination. Do not locate the Supply air inlet where vehicles may be serviced or left idling. Never locate the Supply air inlet inside a structure.

CAUTION

If installed indoors, this unit must be properly ducted to the outdoors.

PREPARING A SPACE FOR THE UNIT

You'll need to:

- decide which side of the Rooftop Air Conditioning unit (RTU) you will connect the RTC to;
- lay out the location of the RTC unit;
- prepare the roof surface to support the RTC unit; and
- make provisions to position the RTC unit at the right height.

Which Side of the RTU?

The Transition Piece and the RTC unit will always be attached where Return Air enters the RTU. This might be an end or side panel of the RTU. Some Transition Pieces are designed to replace a panel provided in the RTU, perhaps for an economizer or a horizontal duct connection. In all cases, the Transition Piece should be positioned so the Scoop catches some of the Return Air as it enters the RTU. The Scoop will divert a portion of the Return Air to the RTC unit.

How Big A Space?

The standard length of Transition Pieces is 16". Therefore, the end of the RTC unit will be 16" away from the side of the RTU.

Check the latest Specification Sheet for your RTC model, or measure the unit itself, to determine the footprint of the unit.

Prepare the Roof Surface

In most installations, simple equipment rails or pads will be sufficient to support the RTC unit and prevent damage to the roofing system.

When preparing the Roof, you must:

- ensure there is structural support for the weight of the RTC unit;
- protect the roof system from the base of the RTC unit;
- provide a surface for the RTC unit to be tied down;
- elevate the RTC unit so the Transition Piece will align with the opening in the RTU.

How High?

The RTC must be installed at the right height for the transition to connect to the opening in the RTU (or horizontal Return Air Duct).

INSTALLATION

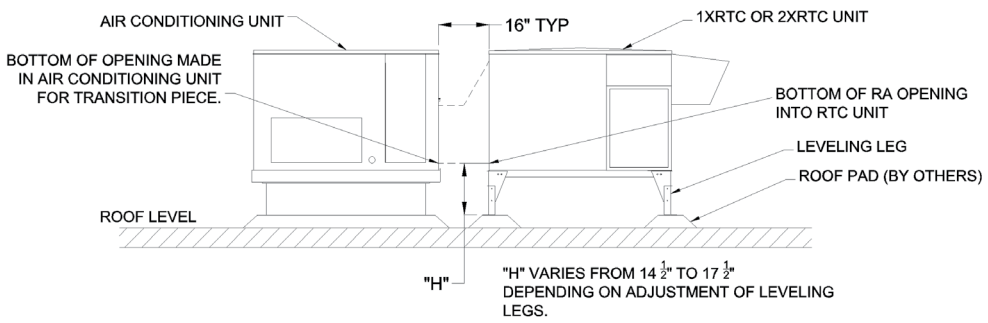
PLANNING YOUR INSTALLATION

HE2XRTC

The HE2XRTC models include leveling leg systems that provide for some height adjustment.

Use the Leveling Legs to raise or lower the RTC unit to align to bottoms of the RA openings in the RTC and the RTU. If additional height is required for the RTC, place appropriately sized roof pads under base of legs.

F5



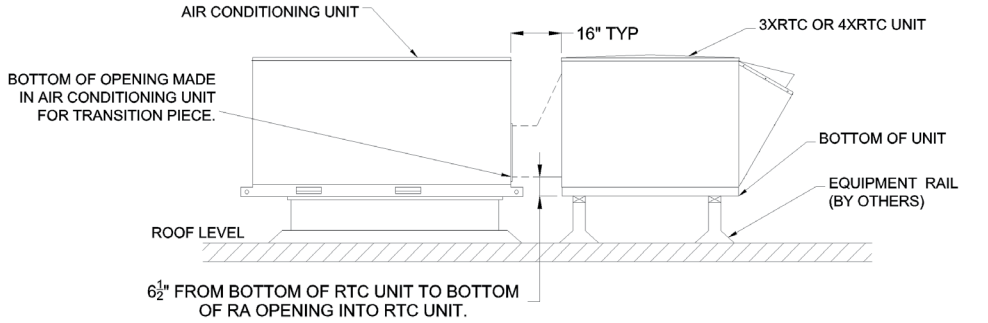
HE3XRTC & HE4XRTC

The HE3XRTC and HE4XRTC require equipment rails to support the unit. Position the equipment rails so you have some room to adjust the RTC unit back and forth. Be prepared with shims so you can adjust the vertical alignment of the RTC unit as you connect the Transition Piece.

Another alternative for supporting the HE3XRTC and HE4XRTC units is to use a standard Roof Curb. Use the same curbs as for our standard HE3XRT and HE4XRT models.

However, if you use a standard Roof Curb, you must locate it very accurately so the Transition Piece fits properly.

F6



INSTALLATION

PLANNING YOUR INSTALLATION

INSTALLING THE TRANSITION PIECE

After the roof and the Rooftop Air-conditioning Unit (RTU) have been prepared, you need to attach the Transition Piece to the RTU. Then you will be able to install the RTC.

Direct tie-in Method

1. You have already decided where you will connect the Transition Piece to the RTU. Double check, considering the height of the RTC. Check for anything inside the RTU (for example, filter racks) that would interfere with the Transition Piece's airflow or its Scoop.
2. Cut a hole in the RTU (or remove a panel, in some cases) to accommodate the transition piece.
3. Insert the transition scoop into the opening. Adjust its location and screw and caulk its flanges to the panel of the air handler.
4. Set the RTC unit against the Transition Piece. Check that the RA and FA openings are properly aligned with the corresponding pieces in the Transition Piece.
5. Screw and caulk the flanges of the Transition Piece to the RTC unit.

Horizontal Duct Transition

1. Cut a hole in the Return Air duct to accommodate the transition piece. Consider the height of the RTC unit.
2. Insert the transition. The horizontal baffle has a sliding section. Push it back against the far side of the duct and screw it in place.
3. Screw and caulk the transition's flanges to the duct.
4. Set the RTC unit against the Transition Piece. Check that the RA and FA openings are properly aligned with the corresponding pieces in the Transition Piece.
5. Screw and caulk the flanges of the Transition Piece to the RTC unit.

Securing the RTC Unit

Although the RTC unit is attached to the RTU via the Transition Piece, we recommend that the RTC unit be secured to the building structure as appropriate to withstand winds or earthquakes.

Follow local codes and standards. The Leveling Legs of the HE1XRTC and HE2XRTC can be bolted to equipment rails. Brackets can be attached to the base of the HE3XRTC and HE4XRTC for bolting to equipment rails.

INSTALLATION OF HOODS

Rooftop units (RT models) have weatherhoods that are assembled at the factory and shipped on a separate pallet or on top of the unit for field installation. See instructions/figures below.

Installation of the hoods is normally performed after all rigging and hoisting is completed because of the chance of damage to the hoods by the rigging equipment.

All weatherhoods have a flange on the top rear that must be inserted behind the roof panel overhang. To install any hood, remove the factory-installed roof edge screws and keep them for re-use.

5.3.1 Outside Air Hood

Remove and save the screws in the roof panel overhang above the EA hood.

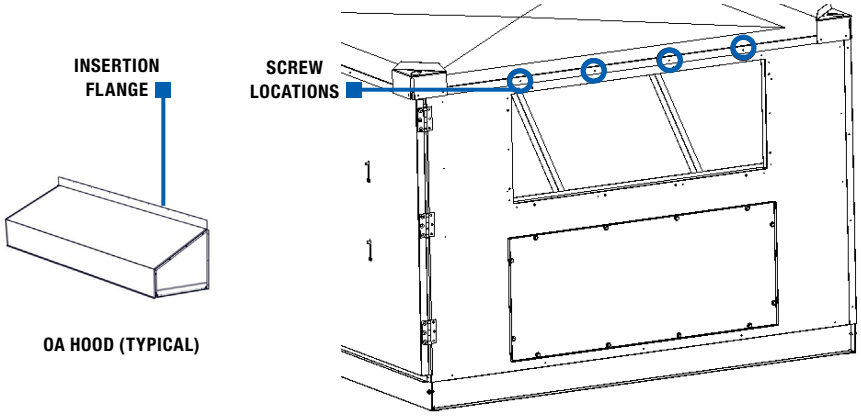


FIGURE 5.3.0 OUTSIDE AIR SCREW LOCATIONS

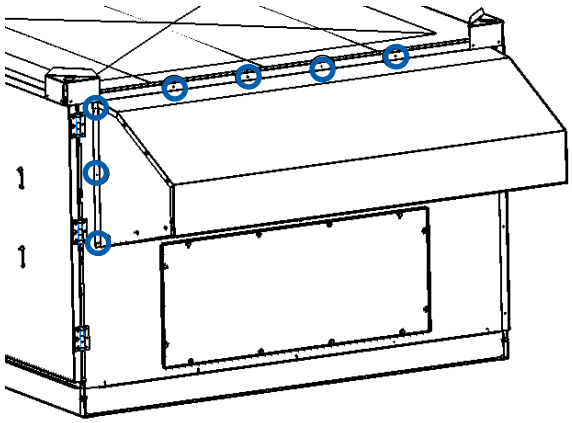


FIGURE 5.3.1 OUTSIDE AIR HOOD (TYPICAL)

Slip the top flange of the OA hood assembly under the roof panel overhang to flash the hood assembly from precipitation. You may need to pry the roof panel overhang away from the unit side pan to get the hood assembly top flange under that roof panel overhang. Align the side screw holes on the hood assembly with the holes in the unit side pan and attach the hood assembly with screws (provided). Replace the self-tapping screws that were removed from the roof panel overhang above the hood.

INSTALLATION

Remove and save the screws in the roof panel overhang above the EA hood.

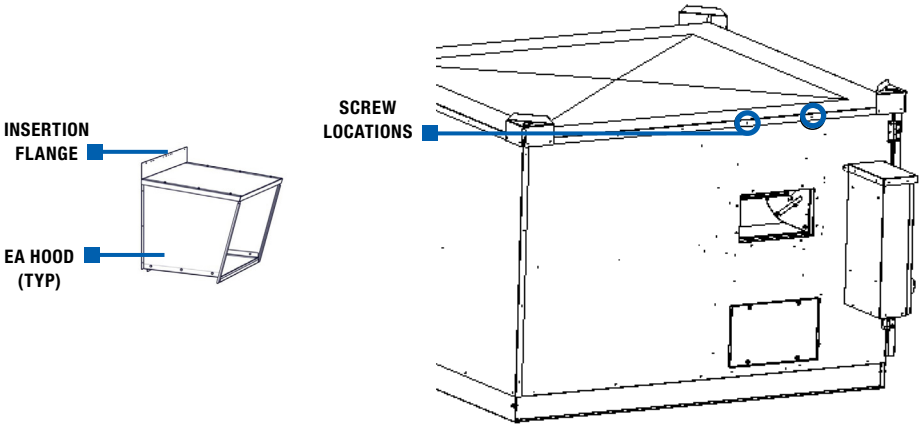


FIGURE 5.3.2 EXHAUST AIR SCREW LOCATIONS

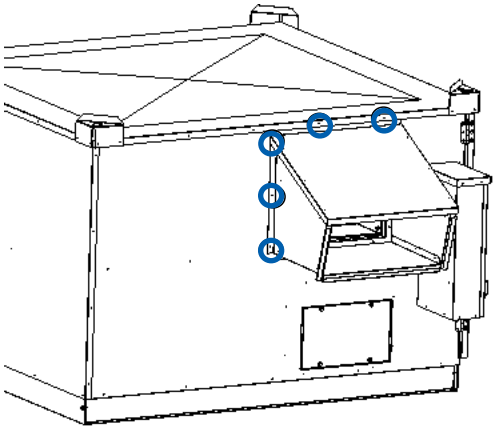


FIGURE 5.3.3 EXHAUST AIR HOOD (TYPICAL)

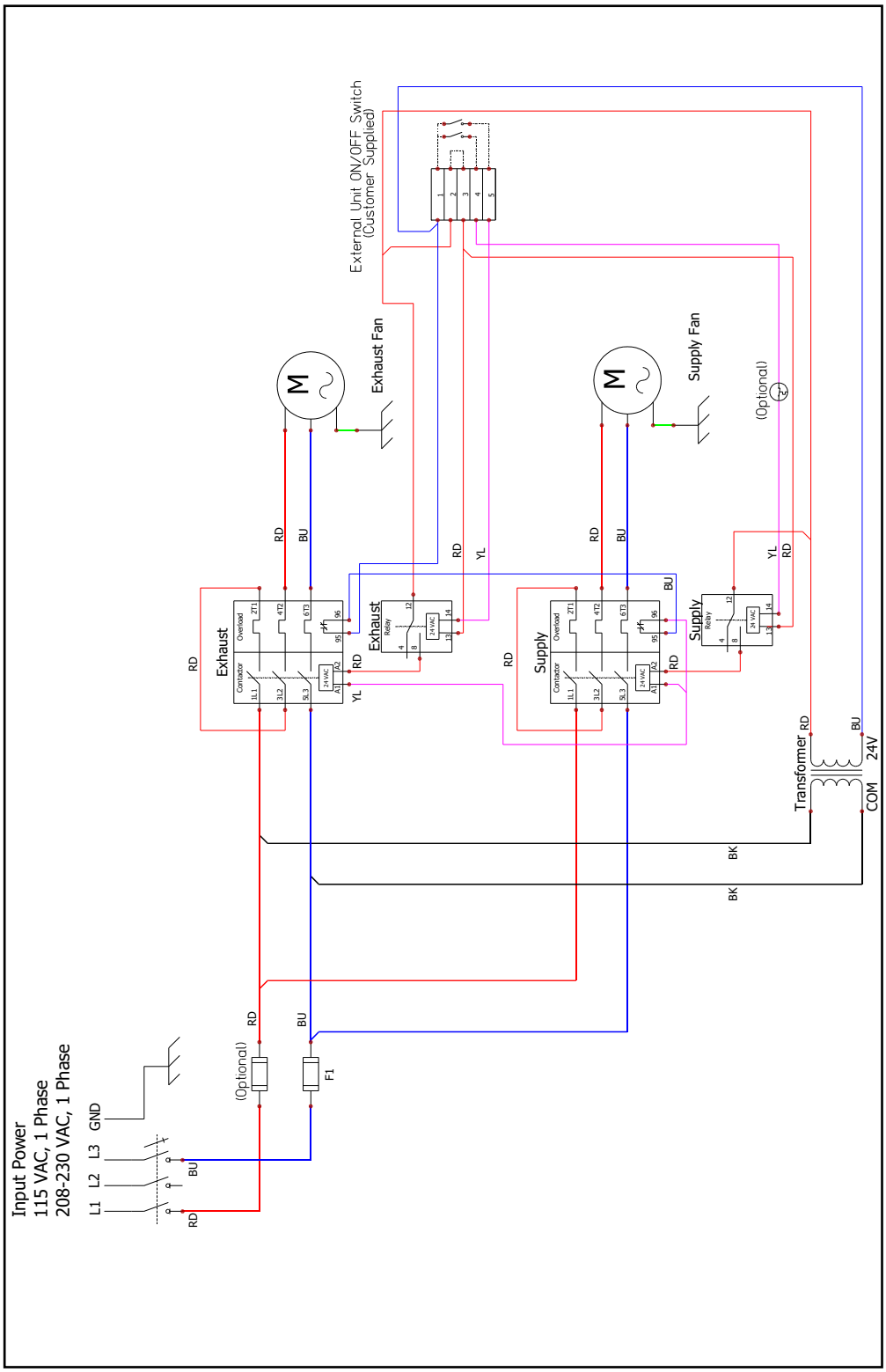
Slip the top flange of the EA hood assembly under the roof panel overhang to flash the hood assembly from precipitation. You may need to pry the roof panel overhang away from the unit side pan to get the hood assembly top flange under that roof panel overhang. Align the side and bottom edge screw holes on the hood assembly with the holes in the unit side pan and attach the hood assembly with screws (provided). Replace the self-tapping screws that were removed from the roof panel overhang above the hood.

INSTALLATION

WIRING SCHEMATICS

NOTE: Schematics shown are representative of standard units. See Unit Schematic label for detailed information.

HE2XRTC, HE3XRTC P1, AND HE4XRTC SINGLE PHASE UNIT

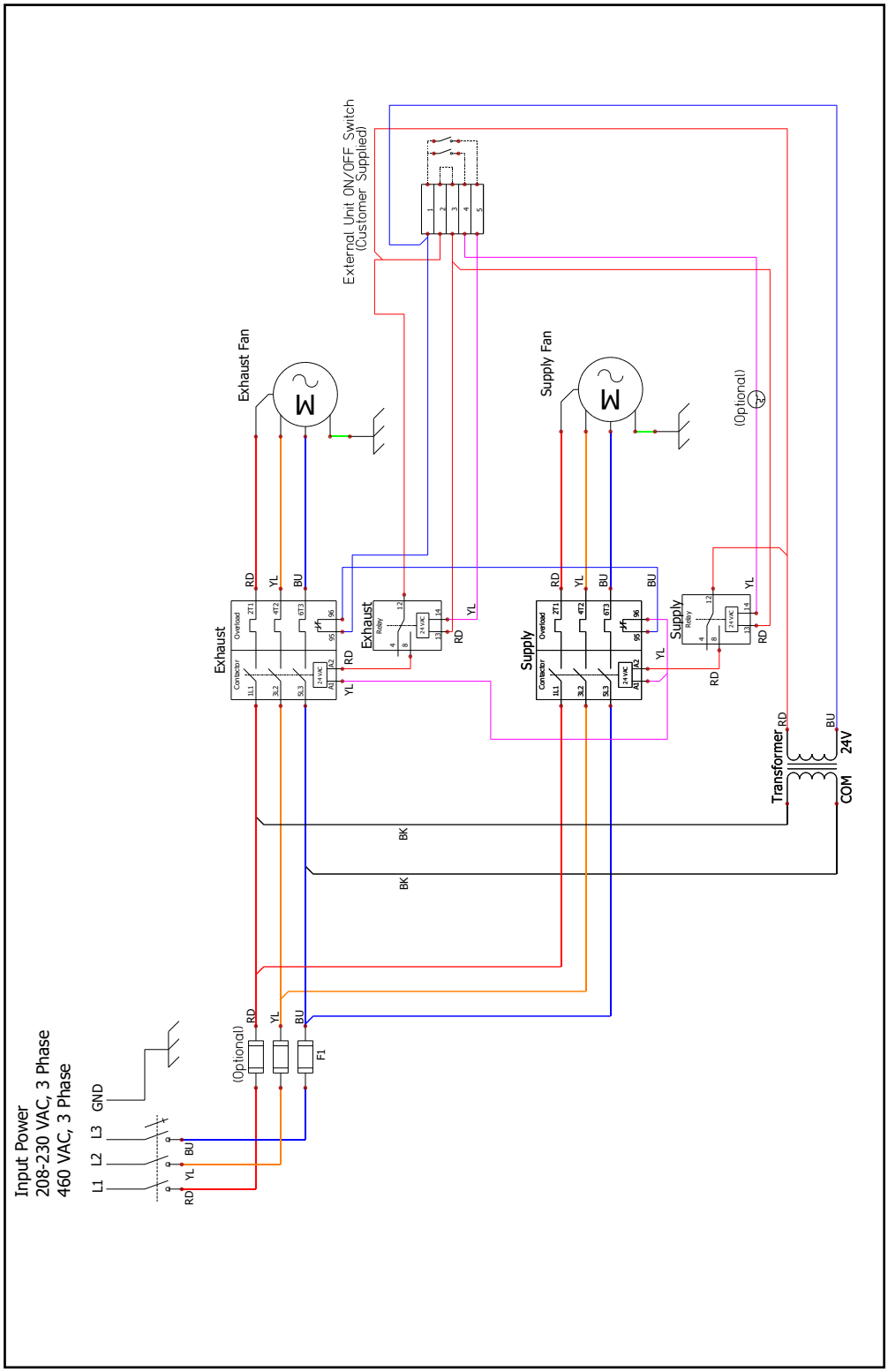


INSTALLATION

WIRING SCHEMATICS

NOTE: Schematics shown are representative of standard units. See Unit Schematic label for detailed information.

HE2XRTC, HE3XRTC, AND HE4XRTC P3 THREE PHASE UNIT



RenewAire Energy Recovery Ventilation

INSTALLATION

INSTALLATION INSTRUCTION

LOW VOLTAGE CONTROL SYSTEM

This ERV is provided with a Class II 24VAC power supply system that operates the unit's contactors. The ERV's 24VAC Power Supply can also be used to power the externally-installed controls system: up to 8VA of power is available.

The unit's power supply system includes isolation relays so you can use external controls whose contact ratings are as low as 50mA (1.2VA). Also, it is possible to operate the isolation relays with 24VAC power from an external source (with proper wiring connections).

A built-in circuit-breaker prevents damage to the transformer and other low-voltage components in the event of a short-circuit or overload. In extreme cases, the transformer itself is designed to fail safely.

SPECIFICATIONS

- Nominal Output Voltage under load: 24VAC
- Typical Output Voltage at no load: 29-31V
- Minimum contact rating for connected control device: 50mA (1.2VA)
- Circuit Breaker Trip Point: 3A

CAUTION

1. Connect only to components intended for use with 24VAC power.
2. Do not undersize the low-voltage wires connected to this device. Observe the wire length and gauge limits indicated in this manual.
3. Do not overload this unit's 24VAC power supply system. Confirm that the power requirements of devices you connect to this power supply system do not exceed 8VA in total.
4. If an external source of 24VAC power is used to control the unit, consult the wiring schematics and connect the external power only to the specified terminals in order to avoid damaging the unit or external controls. Connect only CLASS II power to the control terminals of this unit.
5. Unit is not equipped to receive analog signals (such as 1-10vdc or 4-20mA).
6. Unit is not equipped to communicate directly with Building Management Systems (such as BACNET, LONWORKS, etc.). However, the unit can be controlled by powered or non-powered contacts operated by any kind of control system.

HOW TO RESET THE 24VAC CIRCUIT BREAKER

If the transformer is subjected to an excessive load or a short circuit, the circuit breaker will trip to prevent the failure of the transformer. When it trips the circuit breaker's button pops up. Shut off the primary-side power to the unit, and remove the excessive load or the short. The circuit breaker can be reset about fifteen seconds after it trips by pressing in the button.

LIMITS OF POWER OUTPUT

If limits on wire gauge and length are observed, you may connect control devices that draw up to 8VA to the blue and red wires. More than one device can be connected as long as total steady-state load does not exceed 8VA.

OBSERVE THESE LIMITS TO WIRE LENGTH AND GAUGE
in order to ensure reliable operation of the control system.

Wire Gauge	#22	#20	#18	#16	#14	#12
Circuit Length	100'	150'	250'	400'	700'	1000'

"Circuit Length" is distance from ERV to Control Device.

CAUTION

Before bringing power to the unit check unit nameplate to confirm it matches the voltage and phase of the power you are supplying. Remember that your field connections need to be accessible for inspection.

INSTALLATION NOTES

If primary-side voltage is 230VAC, move black primary-side lead from transformer's "208V" terminal to the transformer's terminal marked "240V" ("230V" in some units).

Do not move the black primary-side lead that is connected to the transformer's "COM" terminal.

INSTALLATION

CONTROL WIRING SCHEMATICS

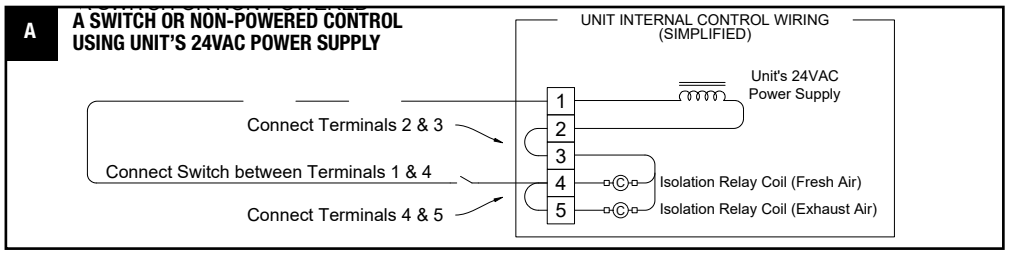
NOTE: The simplified schematics below show only the relevant portions of the low-voltage control circuit in the ERV unit and representational external control approaches. See the complete unit schematics elsewhere in this manual.

CONTROL WIRING EXAMPLES BY TYPE OF APPLICATION

A. Single 2-wire Control: Use schematic below if the control requires no power from the unit to operate and acts like a simple on/off switch. The control must not supply any power to the ERV unit. Install jumper (provided) between terminals 2 & 3. Connect the control's contacts to terminals 1 & 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.

CAUTION

Make sure the control provides no voltage or current at its output terminals.

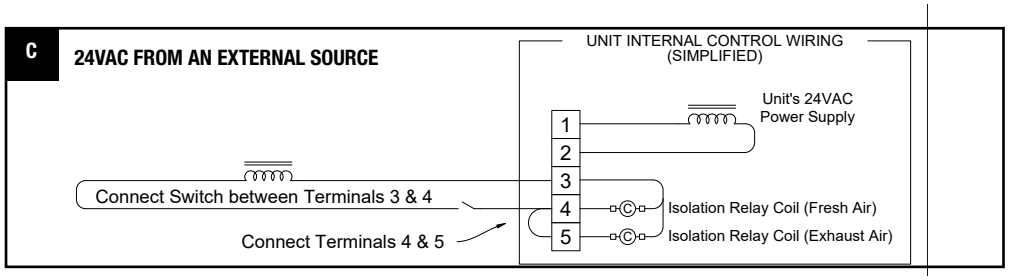


B. Single 2-wire Control on separate Power Supply, no power present at Control Output: Wire as shown for the Single 2-wire control (A. above).

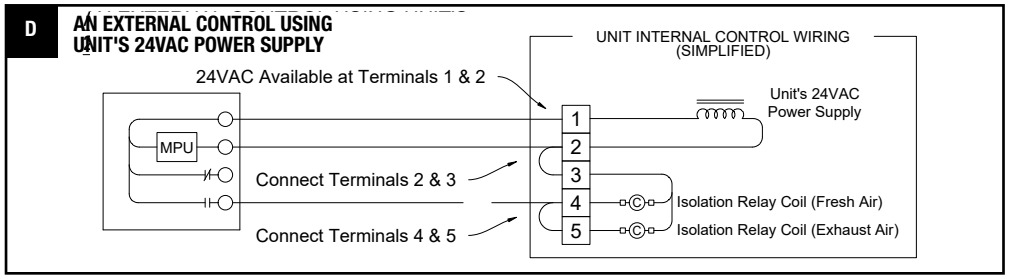
CAUTION

Supply only 24VAC (not VDC) from a Class II Power Source.

C. Control Sending 24VAC "On" Signal (from an external power source) to ERV: Make sure jumper is NOT installed between Terminals 2 & 3. Now you safely can apply 24VAC to the Terminals 3 & 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper (provided) between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.



D. Control operating on Unit's 24VAC Power Supply: 24VAC power is available at the Terminals 1 & 2. CAUTION: external control system should not draw more than 8VA. Install jumper (provided) between terminals 2 & 3. Connect the switched output of the Control to Terminal 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.

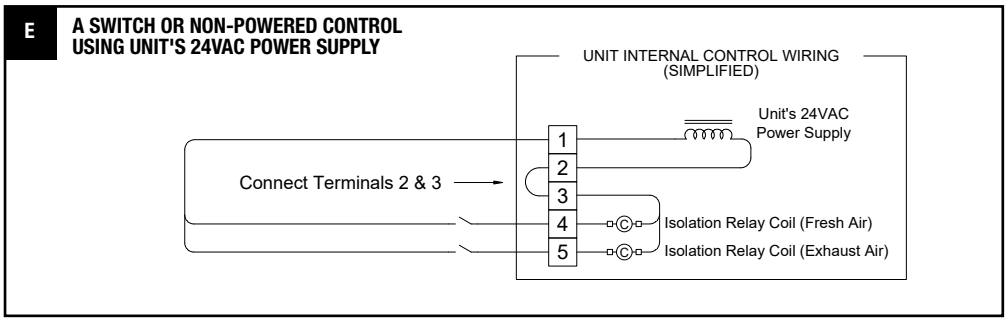


RenewAire Energy Recovery Ventilation

INSTALLATION

CONTROL WIRING SCHEMATICS

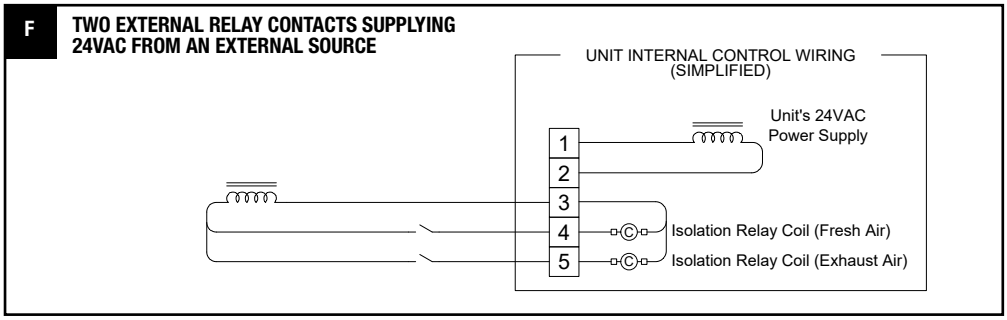
E. Control System with 2 Non-powered Relay Contacts: Use this schematic if the external control system provides no voltage or current at its output contacts. Install jumper (provided) between terminals 2 & 3. Connect one side of each of the output contacts to Terminal 1. Connect the other side of the output contact to control the FA Blower to Terminal 4, and the output contacts to control the EA Blower to Terminal 5.



CAUTION

Make sure the control provides no voltage or current at its output terminals.

F. Control System Sending two 24VAC "On" Signals from an external power source: Make sure the jumper is NOT installed between Terminals 2 & 3. Now you safely can apply one of the 24VAC signals to Terminals 3 & 4 to operate the ERV's isolation relay for the Supply Air Blower. Apply the second 24VAC signal to Terminals 3 & 5 to operate the ERV's isolation relay for the Exhaust Blower (make sure the polarity of each wire connected to Terminal 3 is the same).



CAUTION

Supply only 24VAC (not VDC) from a Class II Power Source.

G. Control System Operating Isolation Dampers with End Switches: Use Isolation Dampers with electrically separate end switches. The end switches are used to separately control the ERV unit's Isolation Relays. This ensures that each damper is open before the respective blower starts up.

NOTE: Because the ERV's Motor Starters will only be operating once the Dampers are open, the power draw of the Damper Actuators is allowed to be as much as 35VA while opening (including power draw of the external control system, if any). However, the power draw of the fully-opened (stalled) Actuators (and external control system if any) must be less than 8VA. (Most damper actuators have much lower power draws.)

START-UP & OPERATION

OPERATION

PRINCIPAL OF OPERATION

The RTC has one basic purpose: to exhaust air from a structure and bring in fresh air from outside, while transferring heating or cooling energy from the exhaust air to the fresh air.

The RTC is a very simple device, and will accomplish this purpose as long as the blowers for both airstreams are able to move air through the energy-exchange core.

CHECKING THAT UNIT IS OPERATING

Air Flow

Airflow should be occurring in both airstreams. Sometimes the easiest place to confirm that air is moving is at the weatherhoods.

If exact airflow is critical, it may be desirable to permanently install flow measuring stations and manometers in the ductwork connected to the unit. These also can be used to determine when filters should be cleaned or changed.

Use Static Taps in Doors to Measure Airflow Rates

See “Cross-Core Static Drop” in MEASURING AIRFLOW table. These may be used to directly measure airflow in the unit.

Energy Exchange

Precise determination of installed sensible energy exchange effectiveness requires careful measurement of temperatures and air flows in all four air streams, and in practice is somewhat difficult.

It is possible to confirm that energy is being exchanged simply by feeling the ducts. If the Supply Air duct from the unit into the room is closer to room temperature than to the outside temperature, energy is being recovered.

Operating Controls

A wide variety of control schemes may be selected by the engineer, installer, or owner to meet the ventilation needs of the facility. These may include timer clocks, occupancy sensors, dehumidistats (for cool-weather operation), carbon dioxide sensors, and others. DDC systems may also control the unit. Most control schemes will operate the unit only when needed.

CONTINUOUS OPERATION

Continuous operation is acceptable in virtually all conditions. Unit will not be damaged by continuous operation as long as air flow occurs. Blower motors may overheat if filters become completely blocked due to lack of maintenance. Motors are thermally protected. With continuous operation, some external frosting may occur in very cold weather (see OPERATION IN EXTREME COLD WEATHER).

OPERATION IN EXTREME COLD WEATHER

Unit is capable of operating at outside temperatures down to -10°F, with indoor humidities below 40%, without any internal frosting. Unit can operate at more severe conditions occasionally with little or no impact on its performance. At lower humidities, it can operate at lower outside temperatures without freezing the energy-exchange core.

MOTOR STARTERS

This unit uses IEC-style motor starters to protect the motors against overload.

IEC-style motor starters use Overload Relays to detect excessive current and interrupt the control circuit that engages the motor’s contactors.

START-UP & OPERATION

OPERATION

⚠ WARNING

The Overload Relay output contacts 95 & 96 must remain in series with the low-voltage control circuit! Altering this will create a hazardous situation in which the motor is not protected against overload!

Adhere to applicable local codes when adjusting the dial setting of the overload relays.

Overload Relays are sized to Full Load Amp (FLA) rating of the protected motor. The Overload Relays can be adjusted to trip (interrupt the control circuit) at a specific setting within a range.

Overload Relays should initially be set at the FLA rating of the motor (see Unit Rating Label). If necessary to prevent nuisance tripping at start-up, the Relays can be adjusted to trip no higher than 115% of the motor's FLA rating.

For safest operation, the overload relays should also be used in manual reset mode with trip test capability.

NOTE: As factory-wired, if one blower motor is shut down due to overload by its Motor Starter, the other motor will also be shut down.

NOTE: Terminals 96 & 97 of the Overload Relays and terminals 14 & 13 of the Contactors are normally-open dry contacts that may be used to signal that the contactors are closed and/or that the Overload Relays have tripped.

⚠ WARNING

DANGER OF INJURY OR DAMAGE.

The motors in this unit must not be run at an amperage that exceeds the motor's rated full load amps and overload relays on the motor starters must be set at or below motor full load amps. For safest operation, the overload relays should also be used in hand reset mode with trip test capability.

It is the installer's responsibility to measure the operating amperage of each motor. If the full load amp rating is exceeded, the amp draw must be reduced by substituting a smaller motor pulley or by adjusting the variable sheave. Continue these adjustments until the actual amperage is no more than the motor's faceplate full load amps.

Failure to make this adjustment may result in unsafe motor winding temperatures or tripping of the supplied motor starter's overload relay motor protection devices set at full load amps.

⚠ WARNING

DANGER OF INJURY OR DAMAGE.

The relay must be set for correct FLA rating depending on the motor horsepower. See Unit Rating Label on motor for HP and FLA specifications.

MEASURING AIRFLOW

EQUIPMENT REQUIRED

- A magnehelic gauge or other device capable of measuring 0 to 1.5 in. water of differential pressure.
- 2 pieces of natural rubber latex tubing, 1/8" ID, 1/16" Wall works the best.

NOTE: Be sure to remove cap from pressure port before inserting tubing. Insure tubing is well seated in pressure ports.

NOTE: The tubing should extend in the pressure port approx. 1 inch.

CROSS CORE STATIC PRESSURE MEASUREMENT INSTRUCTIONS

The individual differential static pressures (DSP) can be measured using the installed pressure ports located in the front of the units core access doors. **NOTE:** These ports have been carefully located on the unit as to give you the most accurate airflow measurement. Do not relocate pressure ports.

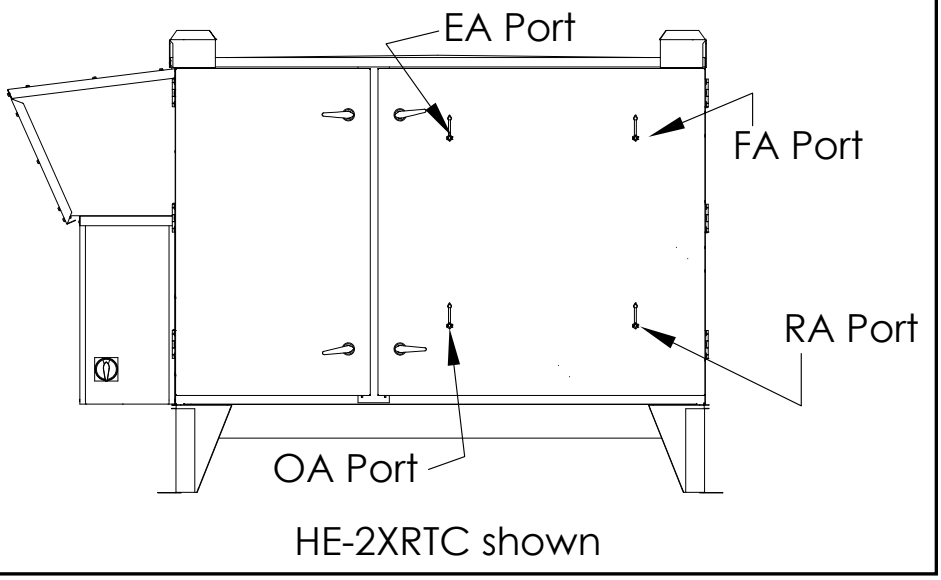
- To read SCFM of Supply Air (SA) install the "high" pressure side (+) of your measuring device to the Outside Air (OA) port and the "low" pressure side (-) to the Supply Air (SA) port.
- To read SCFM of Room Air (RA) install the "high" pressure side (+) of your measuring device to the Room Air (RA) port and the "low" pressure side (-) to the Exhaust Air (EA) port.
- Use the reading displayed on your measurement device to cross reference the CFM output using the conversion chart.

NOTE: Be sure to replace cap into pressure port when air flow measuring is completed.

START-UP & OPERATION

MEASURING AIR FLOW

F5



HE-2XRTC shown

RenewAire Energy Recovery Ventilation

START-UP & OPERATION

MEASURING AIR FLOW

CAUTION

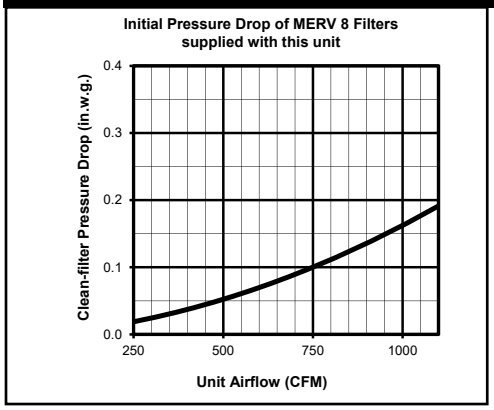
The proper operating airflow range for this model is 500 - 1700 CFM.

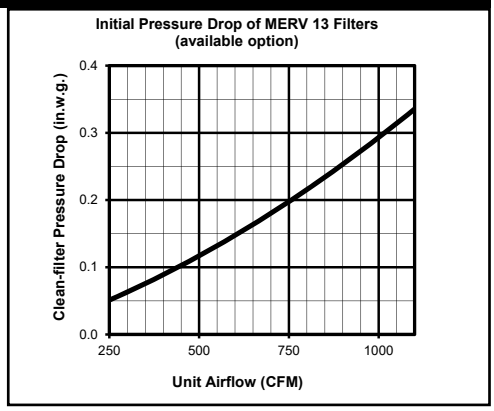
DIFFERENTIAL STATIC ACROSS CORE DSP VS. CFM								
HE2XRTC		DSP	0.30	0.40	0.50	0.60	0.70	0.80
	Supply Air (SA)	CFM	870	1130	1450	1780	2000	2250
		DSP	0.60	0.65	0.70	0.75	0.80	0.85
	Exhaust Air (EA)	CFM	1070	1225	1400	1540	1740	1900

FILTER SPECIFICATIONS HE2XRTC EXHAUST AIRSTREAM

- (2) 20” x 20” x 2” (nominal) pleated filters. Actual size: 19.5” x 19.5” x 1.75”.
- Unit shipped with MERV-8 Filters. Minimum recommended effectiveness: MERV-6

INITIAL PRESSURE DROP OF FILTERS SUPPLIED WITH HE2XRTC EXHAUST AIRSTREAM



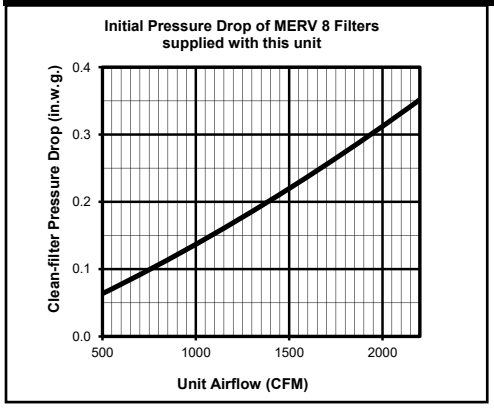


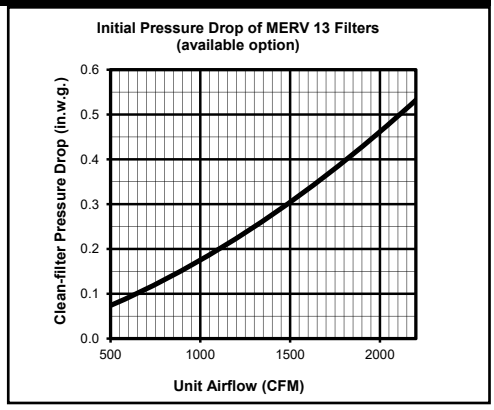
NOTE: pressure drop of standard filter supplied is included in unit airflow performance tables

FILTER SPECIFICATIONS HE2XRTC SUPPLY AIRSTREAM

- (2) 14” x 20” x 2” (nominal) pleated filters. Actual size: 13.5” x 19.5” x 1.75”.
- Unit shipped with MERV-8 Filters. Minimum recommended effectiveness: MERV-6

INITIAL PRESSURE DROP OF FILTERS SUPPLIED WITH HE2XRTC SUPPLY AIRSTREAM





NOTE: pressure drop of standard filter supplied is included in unit airflow performance tables

START-UP & OPERATION

MEASURING AIR FLOW

CAUTION

The proper operating airflow range for this model is 1100 - 2400 CFM.

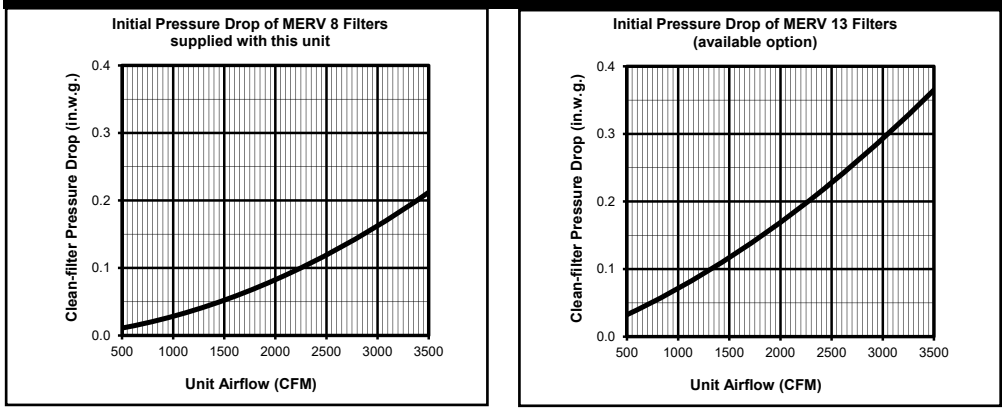
DIFFERENTIAL STATIC ACROSS CORE DSP VS. CFM

HE3XRTC		DSP	0.25	0.35	0.45	0.50	0.55	0.6
	Supply Air (SA)	CFM	1050	1470	1890	2100	2310	2520
		DSP	0.35	0.45	0.55	0.60	0.65	0.70
	Exhaust Air (EA)	CFM	1210	1550	1900	2070	2240	2420

FILTER SPECIFICATIONS HE3XRTC EXHAUST AIRSTREAM

- (3) 20” x 20” x 2” (nominal) pleated filters. Actual size: 19.5” x 19.5” x 1.75”.
- Unit shipped with MERV-8 Filters. Minimum recommended effectiveness: MERV-6

INITIAL PRESSURE DROP OF FILTERS SUPPLIED WITH HE3XRTC EXHAUST AIRSTREAM

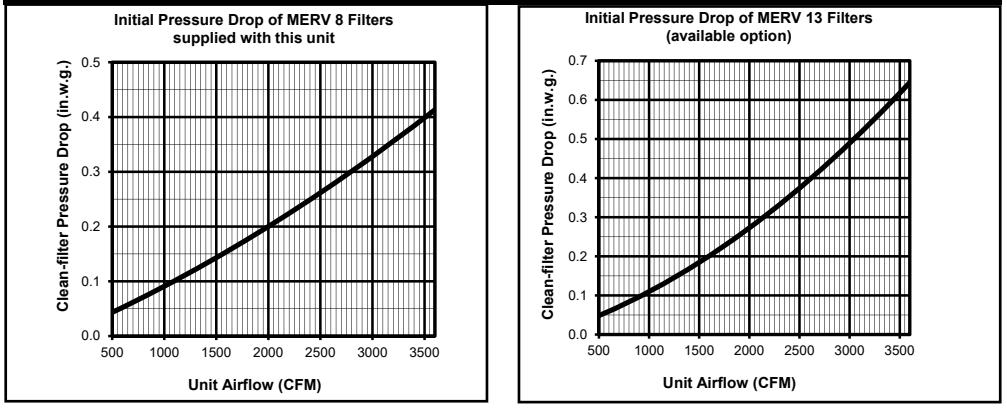


NOTE: pressure drop of standard filter supplied is included in unit airflow performance tables

FILTER SPECIFICATIONS HE3XRTC SUPPLY AIRSTREAM

- (2) 16” x 25” x 2” (nominal) pleated filters. Actual size: 15.5” x 24.5” x 1.75”.
- Unit shipped with MERV-8 Filters. Minimum recommended effectiveness: MERV-6

INITIAL PRESSURE DROP OF FILTERS SUPPLIED WITH HE3XRTC SUPPLY AIRSTREAM



NOTE: pressure drop of standard filter supplied is included in unit airflow performance tables

START-UP & OPERATION

MEASURING AIR FLOW

DIFFERENTIAL STATIC ACROSS CORE DSP VS. CFM								
HE4XRTC		DSP	0.60	0.70	0.80	0.85	0.90	0.95
	Supply Air (SA)	CFM	2520	2940	3360	3570	3780	3990
		DSP	0.75	0.85	0.95	1.05	1.15	1.25
	Exhaust Air (EA)	CFM	2590	2930	3280	3620	2970	4310

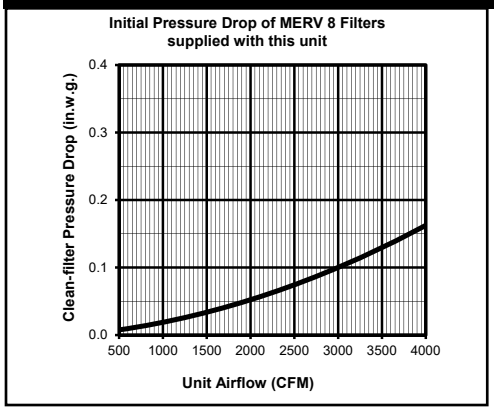
CAUTION

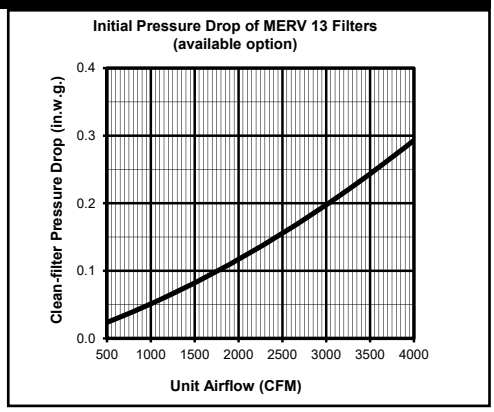
The proper operating airflow range for this model is 2500- 3900 CFM.

FILTER SPECIFICATIONS HE4XRTC EXHAUST AIRSTREAM

- (4) 20" x 20" x 2" (nominal) pleated filters. Actual size: 19.5" x 19.5" x 1.75".
- Unit shipped with MERV-8 Filters. Minimum recommended effectiveness: MERV-6

INITIAL PRESSURE DROP OF FILTERS SUPPLIED WITH HE4XRTC EXHAUST AIRSTREAM



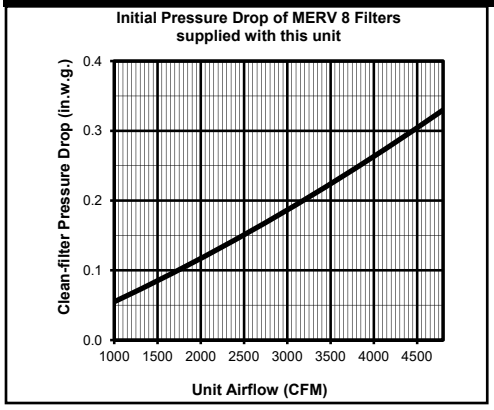


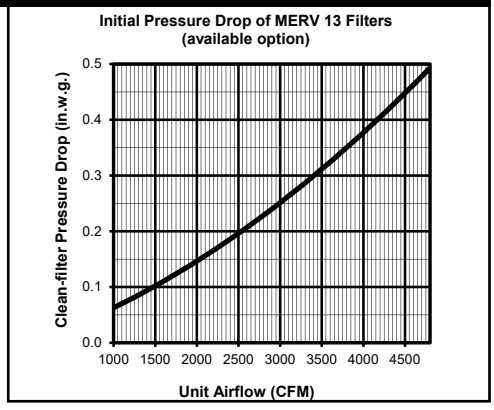
NOTE: pressure drop of standard filter supplied is included in unit airflow performance tables

FILTER SPECIFICATIONS HE4XRTC SUPPLY AIRSTREAM

- (4) 16" x 20" x 2" (nominal) pleated filters. Actual size: 15.5" x 19.5" x 1.75".
- Unit shipped with MERV-8 Filters. Minimum recommended effectiveness: MERV-6

INITIAL PRESSURE DROP OF FILTERS SUPPLIED WITH HE4XRTC SUPPLY AIRSTREAM



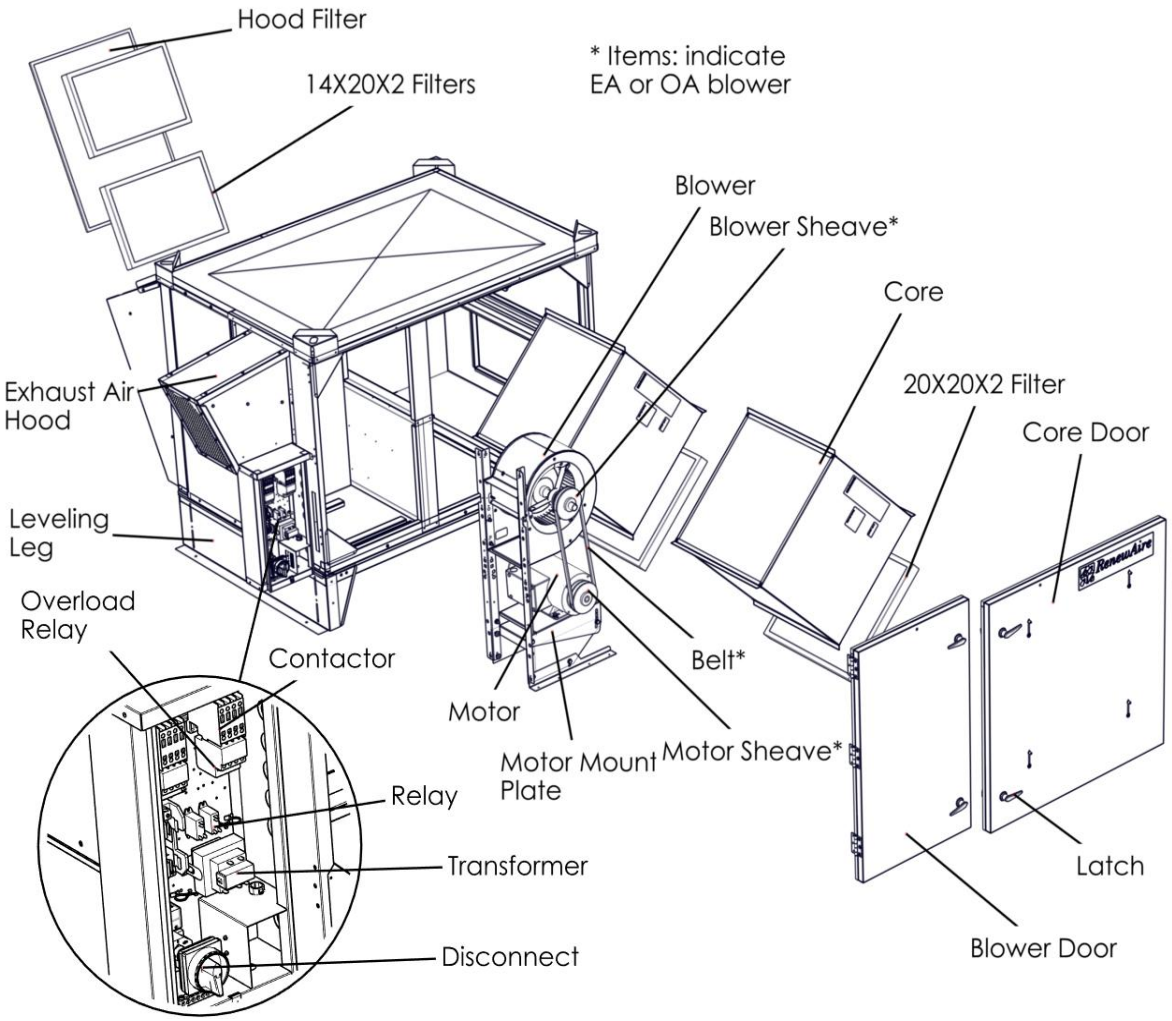


NOTE: pressure drop of standard filter supplied is included in unit airflow performance tables

MAINTENANCE

SERVICE PARTS

HE2XRTC

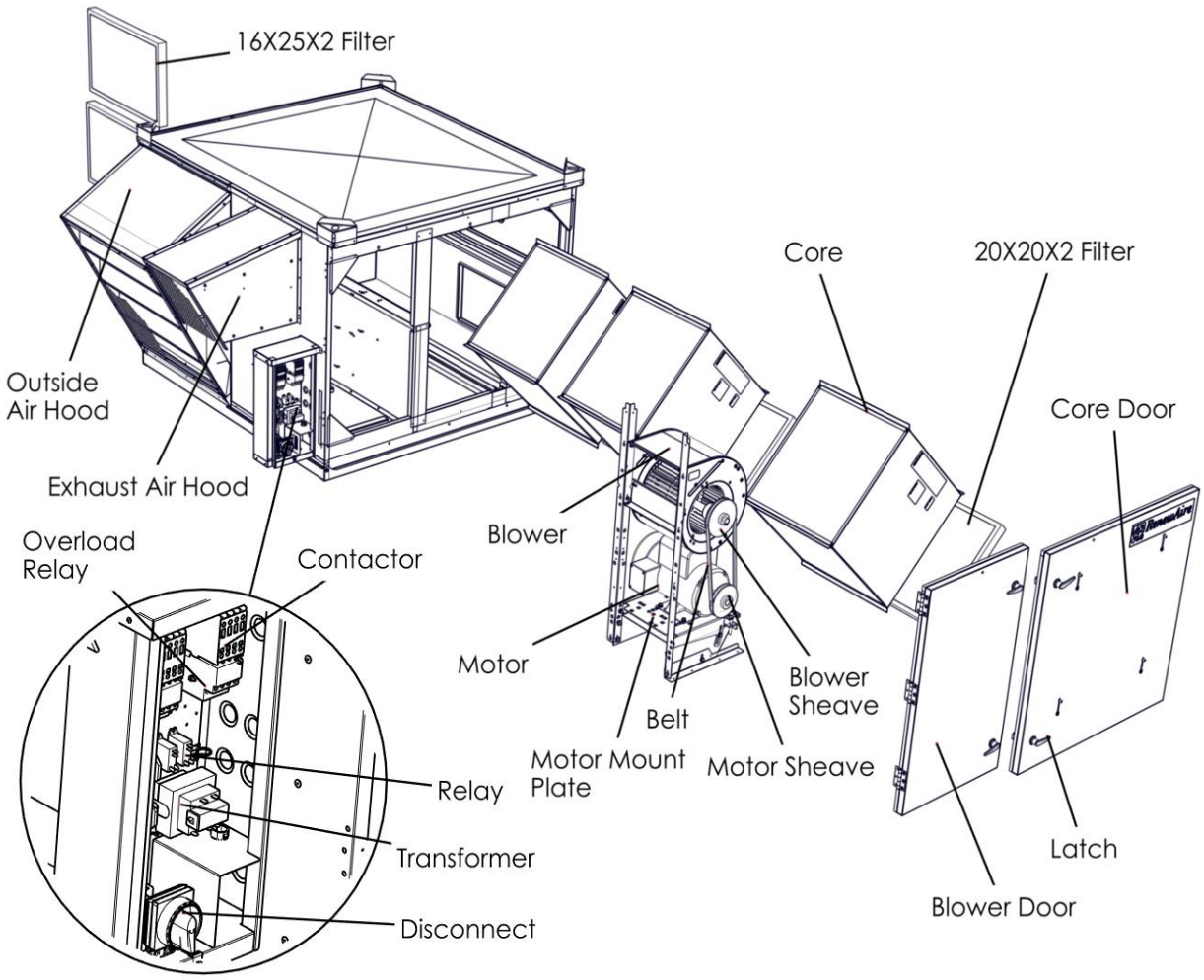


RenewAire Energy Recovery Ventilation

MAINTENANCE

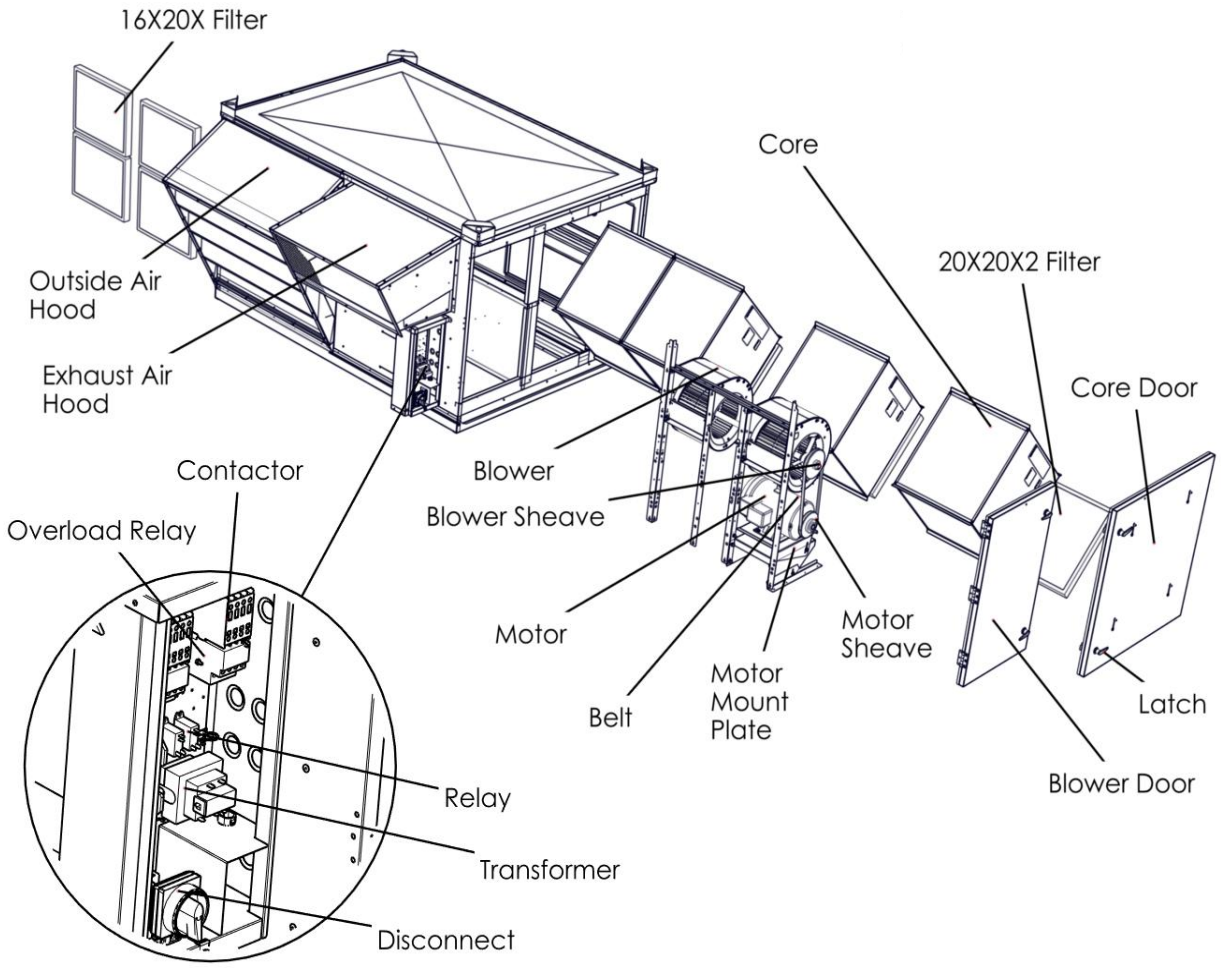
SERVICE PARTS

HE3XRTC



MAINTENANCE

SERVICE PARTS HE4XRTC



RenewAire Energy Recovery Ventilation

MAINTENANCE

REQUIREMENTS

⚠ WARNING

Danger of injury from un-guarded drive belts in unit. Disconnect power to unit before opening door.
Danger of injury if unit starts unexpectedly. Switch power off at service disconnect.
Lock-out/tag-out the disconnect.

TO CLEAN THE ENERGY EXCHANGE ELEMENT

Vacuum the face of the energy exchange element yearly. Dust collects only on the entering face of the energy exchange element, right where the filter sits. The interior of the energy exchange element stays clean even if the element faces are dust covered. The RenewAire core airflow paths are designed to transport the air in a laminar motion. The core flutes move the air in a laminar airflow such that particulate deposition is maintained at virtually nill.

1. Remove the filters.
2. Vacuum the exposed faces of the energy exchange core with a soft brush.
3. Vacuum out dust from the rest of the unit case.
4. Install new filters.

CAUTION

DO NOT WASH THE ENERGY EXCHANGE CORE.

Keep it away from water or fire to avoid damaging it. Always handle the core carefully.

INSPECT AND CHANGE THE FILTERS REGULARLY

Inspect and/or replace filters every two or three months when the unit is in regular use, or as needed.

1. Turn off unit completely! Lock-out and tag-out the unit disconnect switch.
2. Open the Door. The door is secured with turn-type latches or draw latches, plus one Phillips-head securing screw. Keep the securing screw. **NOTE:** Always replace securing screw when reinstalling door for safety reasons.
3. Remove and dispose of all (6) filters. Replace all (6) filters. **NOTE:** See chart for information on the initial resistance of the filters originally supplied with this unit. If replacement filters have higher resistance, the airflow of the system will be lower.
4. Close door; reinstall securing screw.

Filters must be used or the energy exchange core will become blocked by dust and reduce unit efficacy. In extreme cases components may be damaged.

BLOWER INSPECTION

Inspect Blowers every time you change the filters.

1. Confirm bearings are still secure to blower shaft. It should not be possible to move the blower shaft back and forth along its length.
2. Confirm blower wheel is not rubbing against the blower inlet or housing by rotating wheel manually.

BLOWER BELT TENSION

Check belt tension every time you change the filters.

1. Inspect belt(s) for cracking or uneven wear.
2. Check that sheaves are properly aligned so that belt runs straight.

CAUTION

Incorrect Belt Tension will damage this blower and bearings.

Properly tensioned belt will deflect 0.25" when pressed at the center point with the following force:
2 HP BLOWER - 3 pounds
3 HP BLOWER - 4 pounds
5 HP BLOWER - 5 pounds

GENERAL CLEANING AND INSPECTION

Perform general cleaning and visual inspection when changing filters.

1. Remove dust from blower wheels periodically.
2. Remove paper, leaves, etc. from inlet and outlet screens.
3. Inspect for insect nests.

MOTOR MAINTENANCE

If the motors used in this ERV are equipped with grease fittings, motors must be lubricated as part of routine maintenance. Use Exxon Polyrex or equivalent at 2500 operating hour intervals.

About RenewAire

For over 40 years, **RenewAire has been a pioneer in enhancing indoor air quality (IAQ)** in commercial and residential buildings of every size. This is achieved while maximizing sustainability through our fifth-generation, static-plate, enthalpic-core **Energy Recovery Ventilators (ERVs) that optimize energy efficiency**, lower capital costs via load reduction and decrease operational expenses by minimizing equipment needs, resulting in significant energy savings. Our ERVs are competitively priced, simple to install, easy to use and maintain and have a quick payback. They also enjoy the industry's best warranty with the lowest claims due to long-term reliability derived from innovative design practices, expert workmanship and **Quick Response Manufacturing (QRM)**.

As the pioneer of static-plate core technology in North America, RenewAire is the largest ERV producer in the USA. We're **committed to sustainable manufacturing** and lessening our environmental footprint, and to that end our Waunakee, WI plant is 100% powered by wind turbines. The facility is also one of the few buildings worldwide to be LEED and Green Globes certified, as well as having achieved ENERGY STAR Building status. In 2010, RenewAire joined the Soler & Palau (S&P) Ventilation Group in order to provide direct access to the latest in energy-efficient air-moving technologies. For more information, visit: renewaire.com

201 Raemisch Road | Waunakee, WI | 53597 | 800.627.4499 | RenewAire.com

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RenewAire® Energy Recovery Ventilation