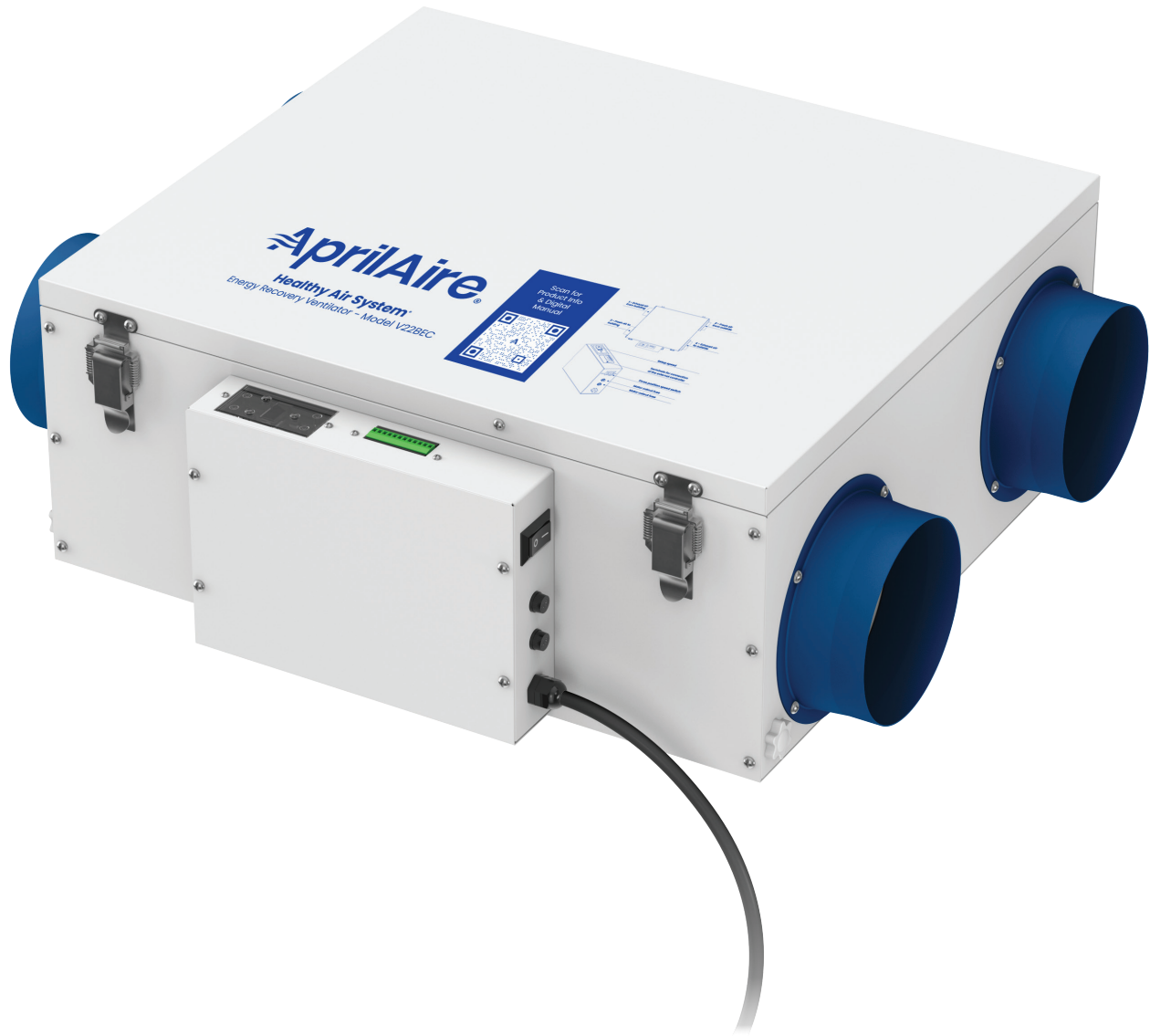


Model V22BEC Energy Recovery Ventilator



READ AND SAVE THESE INSTRUCTIONS

Product Info &
Digital Manual

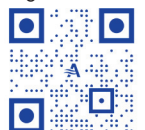


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SAFETY INSTRUCTIONS

WARNING

- **ATTENTION INSTALLER:** Read this manual before installing. Improper installation or maintenance may cause property damage or injury. It is recommended that installation, service, and maintenance be performed by a trained service technician. This product must be installed in compliance with all local, state, and federal codes.
- **ELECTRIC SHOCK HAZARD:** 120 volts may cause serious injury from electric shock. Disconnect electrical power to the HVAC system and ventilator before starting installation or servicing. Leave power disconnected until installation/service is completed.
- Inhalation of toxic gases or fumes can be harmful. The fresh air intake must be mounted in a location away from sources of dangerous toxic gases. All ducting systems must be separate from other household exhaust systems.
- Insufficient combustion air may cause toxic conditions. The unit must not exhaust air from an enclosed room with combustion appliances.
- Excess negative or positive pressure may cause health problems or structural damage. The airflow must be balanced after installation.

CAUTION

- **SHARP EDGES MAY CAUSE INJURY FROM CUTS.** Use care when cutting and handling ductwork. Always wear glasses/goggles and gloves when installing the unit.
- Dropping may cause personal injury or equipment damage. Handle with care and follow installation instructions.

NOTICE

EQUIPMENT DAMAGE MAY OCCUR IF INSTALLATION INSTRUCTIONS ARE NOT FOLLOWED.

- Disconnect power to HVAC system during wiring to avoid electrical shorts.
- Screwing the brackets or any other hardware into any other location but the designated mount location may cause damage and invalidate the warranty.
- Do not force damper blades by hand, as damage to the product may occur.
- The fresh air duct from outside and to the house and the stale air duct from the unit to the outside must be fully insulated to prevent condensation from forming on the ductwork.

SPECIFICATIONS

TABLE 1: MODEL V22BEC SPECIFICATIONS

SRE	72%
ASRE	74%
Airflow	118 cfm @ 0.30 in. w.c. external ductwork resistance, i.e. 240 equivalent feet for each of the "fresh" and "stale" air streams.
Efficacy	1.45 cfm/watt @ 0.2 in. w.c. (at maximum fan setting).
Electrical	120 VAC, 1.3 A. Unit equipped with 4 foot grounded power cord.
Filters	2x washable foam air filters.
Mounting Configurations	Ceiling, wall, and floor mounting capable.
Unit Weight	50 lbs.

FIGURE 1: DIMENSIONS (INCHES)

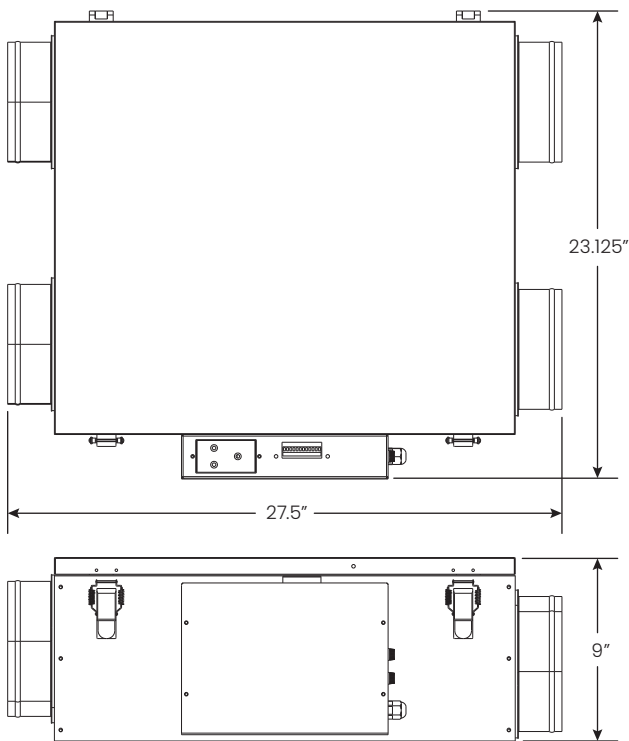
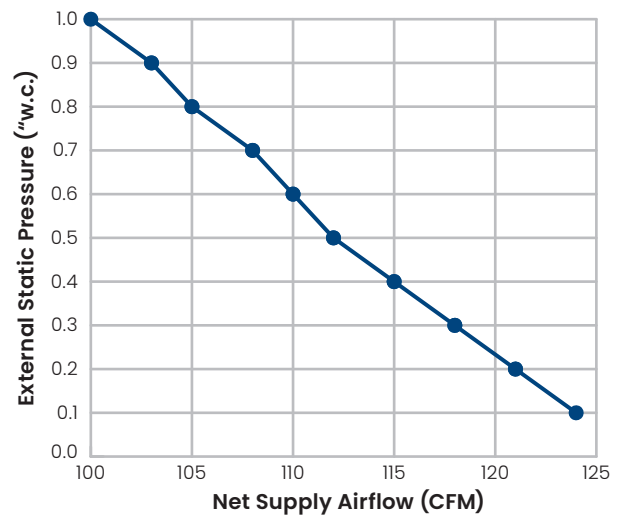


TABLE 2: AIRFLOW CURVE

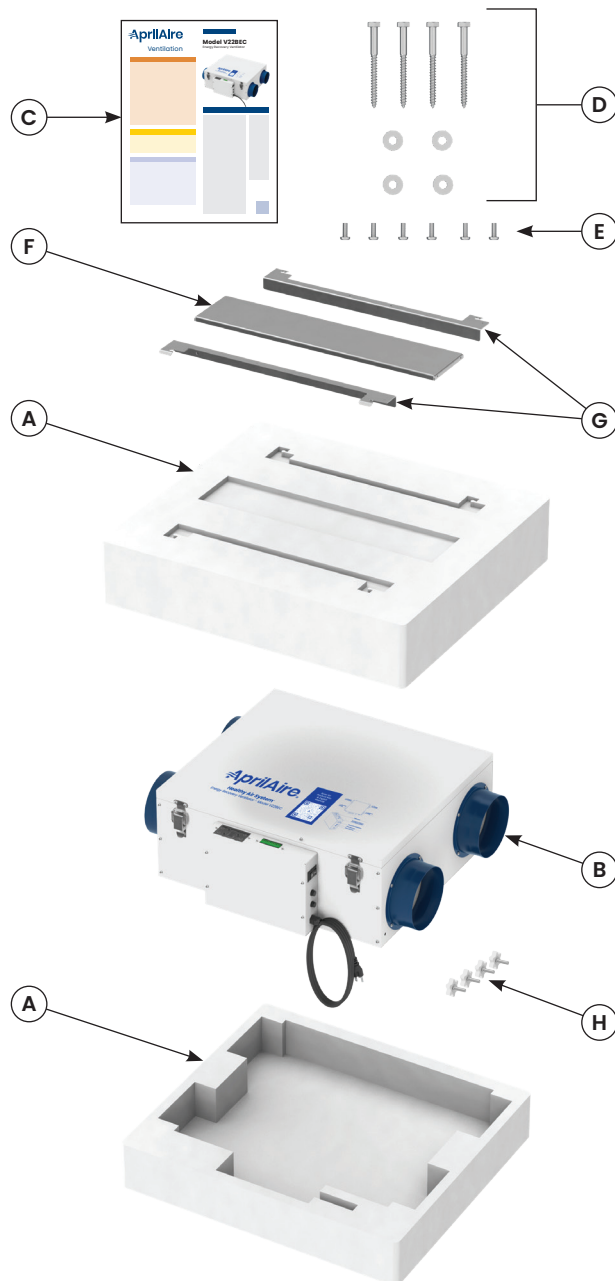
External Static Pressure ("w.c.)	Net Supply Airflow (CFM)
0.1	124
0.2	121
0.3	118
0.4	115
0.5	112
0.6	110
0.7	108
0.8	105
0.8	103
1.0	100



CARTON CONTENTS

- A. Inner Pack
- B. Energy Recovery Ventilator
- C. Quick Start Guide
- Mounting Hardware**
 - D. 4 Lag Bolts and Washers
 - E. 6 Mounting Bracket Screws
 - F. Mounting Bracket Brace
 - G. Left and Right Mounting Brackets
 - H. 4 Thumb Screws

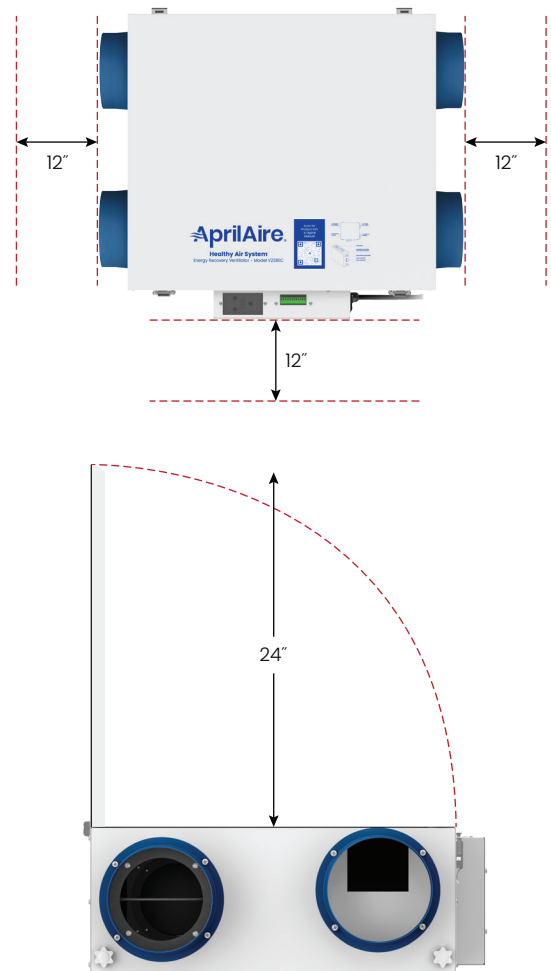
FIGURE 2: CARTON CONTENTS



LOCATION CONSIDERATIONS

- **Install Unit Indoors:** It is recommended that the unit be mounted in a conditioned space. If the unit is mounted in an area where the temperature may drop below 32°F or exceed 100°F, it is recommended that all ductwork in the unconditioned space be insulated to prevent condensation.
- Unit can be mounted on the floor, wall, or ceiling. Select a location with sufficient strength and stability, such as beams, ceilings, or other sturdy structures capable of fully supporting the weight of the unit. The mounting bracket is predrilled for fastening to standard 16" on-center (O.C.) or 24" O.C. stud spacing.
- Ensure the proper weight-bearing capacity of the chosen mounting surface and material. Insufficient strength can lead to safety hazards, vibrations, and abnormal operating noises.
- **Ensure that there are no obstructions blocking the air passage around the installation site. Proper airflow is essential for optimal performance.**
- Provide ample clearance around the unit to facilitate maintenance and service activities. Allow a minimum of 24" clearance around the access door. Allow for 12" of clearance to access duct connections, on/off switch and wiring connections. See **FIGURE 3**.

FIGURE 3: SERVICE CLEARANCES

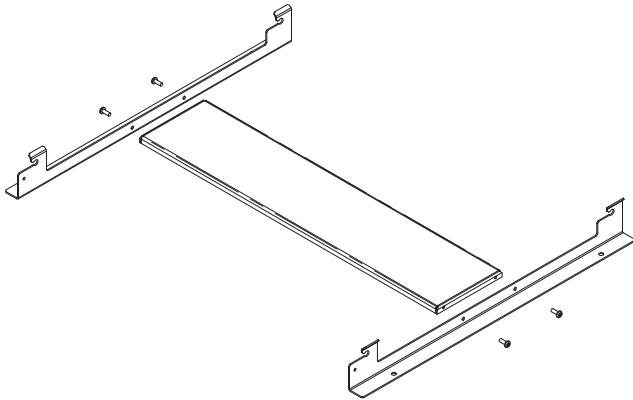


MECHANICAL INSTALLATION

BRACKET ASSEMBLY AND UNIT PREPARATION

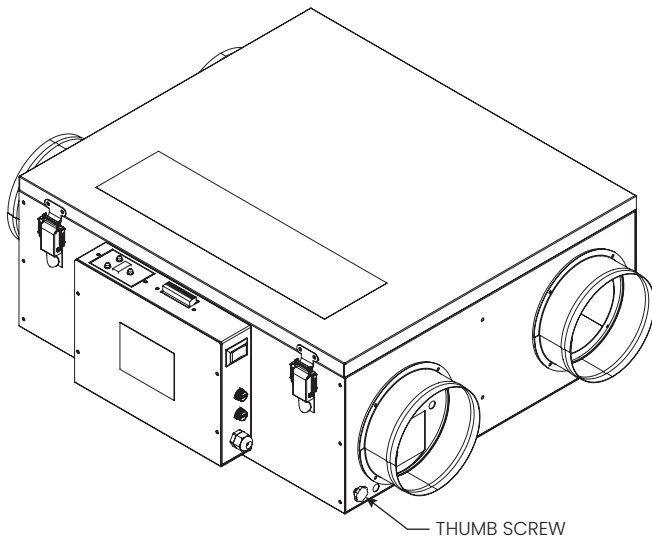
- Using 4 of the bracket screws provided, secure the left and right brackets to the bracket brace. See **FIGURE 4**.
- Install the 4 thumb screws into the ERV leaving 3/16" of exposed thread (Approximately 6 turns from fully seated). See **FIGURE 5**.

FIGURE 4: BRACKET ASSEMBLY



90-02818

FIGURE 5: THUMB SCREWS

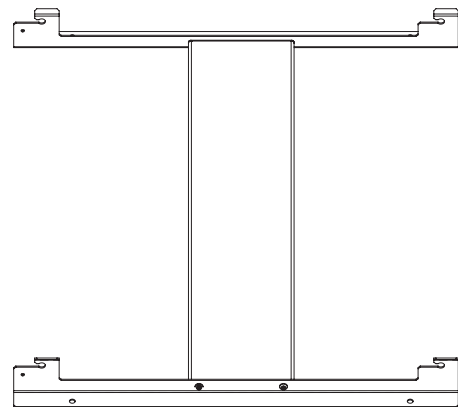


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WALL MOUNT

- If installing to 16" on-center (O.C.) studs for a wall mount configuration, the bracket shall be oriented so the bracket brace is vertical. We recommend positioning the openings of the slots so they are open to the left for ease of reading the digital display. See **FIGURE 6**.
- If installing to 24" O.C. studs for a wall mount configuration, the bracket shall be oriented so the bracket brace is horizontal. **The openings of the slots MUST be facing up to safely secure the unit.** See **FIGURE 7**.
- Using the supplied lag bolts and washers, fasten the bracket to the wall in the appropriate orientation referred to above. **Mount the ERV at a location and into materials that are suitable to handle the weight of the unit (50 lbs.) and the jostling of the unit that occurs during maintenance.**
- Once the bracket is secure, the unit can be hung. Pick up the unit, and position it so the control box is facing away from the openings of the slots in the bracket.
- Slide the unit between the brackets so the exposed threads from the thumb screws fall into the slots in the brackets and then into the holes.
- Once positioned into the holes, tighten the thumb screws.
- Insert and tighten two remaining bracket screws into the retention holes in the brackets to lock the unit into place.

FIGURE 6: 16" O.C. WALL MOUNT ORIENTATION



90-02819

FIGURE 7: 24" O.C. WALL MOUNT ORIENTATION



90-02819

CEILING MOUNT

- Determine mounting position for the unit and orient the bracket assembly appropriately for either 16" or 24" O.C. installation. **Mount the ERV at a location and into materials that are suitable to handle the weight of the unit (50 lbs.) and the jostling of the unit that occurs during maintenance.**
- Using the supplied lag bolts and washers, fasten the bracket to the ceiling.
- Once the bracket is secure, the unit can be hung. Pick up the unit and position the unit so the control box is facing away from the openings of the slots in the bracket.
- Slide the unit between the left and right brackets so the exposed threads from the thumb screws fall into the slots in the brackets and then into the holes.
- Once positioned into the holes, tighten the thumb screws.
- Insert and tighten two remaining bracket screws into the retention holes in the left and right bracket to lock the unit into place.

FLOOR MOUNT

- Determine mounting position for the unit and orient the bracket assembly accordingly.
- Using the supplied lag bolts and washers, fasten the bracket to the floor.
- Once the bracket is secure, the unit can be placed into the bracket. Pick up the unit and position the unit so the control box is facing away from the openings of the slots in the bracket.
- Slide the unit between the brackets so the exposed threads from the thumb screws fall into the slots in the brackets and then into the holes.
- Once positioned into the holes, tighten the thumb screws.
- Insert and tighten two remaining bracket screws into the retention holes in the brackets to lock the unit into place.

DUCTING

DUCTWORK SPECIFICATION

1. Temporarily install two air flow measuring devices. The system will have to be balanced (**BALANCING THE SYSTEM** section), after all ductwork has been installed. The measuring devices are removed after the system has been balanced.
2. All flexible ductwork must meet UL safety standards for Class 1 air ducts and connectors.
3. All ductwork must be installed according to local HVAC codes and standards.
4. All ductwork located in an unheated space must be completely sealed and insulated.
5. For optimal performance and quiet operation, all duct runs should be kept as short, straight, and equal in length as possible.

GRILLE AND HOOD SPECIFICATIONS

1. The living space return grille should not have less than 75 in² of free area. Grille surfaces less than this may produce excess air noise.
2. Exterior intake and exhaust hoods must be weather resistant. The hoods must also incorporate a screen to prevent unwanted debris, animals, and insects from entering the ductwork. The screen should have a maximum of 1/4" openings.
3. Caulk both hoods to prevent water leakage.
4. Intake and exhaust hoods should be above the expected snow line or a minimum of 18" above ground level, whichever is greater.

DUCTWORK CONNECTIONS-FORCED AIR SYSTEM

1. All duct collars are clearly labeled and must be connected properly.
2. Rigid ductwork should be connected to the collars with sheet metal screws.
3. It is recommended that flexible ductwork be connected with clamps or bands.
4. All duct connections should be sealed with duct tape or mastic to prevent leakage.

RETURN: FROM LIVING SPACE TO ERV

1. Stale air from the house should be pulled from one grille centrally located, such as a hallway. For multi-floor homes, the exhaust grille should be located on the same floor as the kitchen.
2. To keep the core free of grease, the ERV ductwork must not be connected to a kitchen exhaust fan duct.
3. The ERV ductwork should remain separate from bathroom exhaust fan ducts.

SUPPLY: FRESH AIR FROM ERV TO HOUSE

It is recommended that the fresh air supply duct be connected directly to the HVAC return duct with a collar, a minimum of 10 feet from the HVAC blower.

OUTDOOR: EXHAUST AND FRESH AIR CONNECTIONS

1. Insulated duct is recommended for both duct runs connecting the ERV to the outdoors. The vapor barrier must be sealed at both ends and extend from the ERV housing to the outer wall.
2. The intake and exhaust hoods must be located at least 10 feet apart to avoid cross contamination.
3. The intake hood should be a minimum of 10 feet from an appliance vent that exhausts toxic fumes. The hood should not be installed near sources of pollution and/or extreme temperatures, such as furnace exhaust, car exhaust, dryer vents, etc.
4. Do not connect the ERV exhaust to any gas appliance flue.
5. Do not connect the exhaust outlet into an attic, storage or garage space. Excess moisture could develop in these areas, possibly causing damage to the home.

DUCTWORK CONNECTIONS WITHOUT FORCED AIR

1. All the ducting connection procedures apply, with the exception of the following changes:
2. The fresh air supply can be ducted to various parts of the home, where fresh air is needed.
3. It is recommended that no more than 3 fresh air supply ducts be used to ensure adequate airflow.
4. The total free area of supply grilles should not be less than 75 in². For example: Three supply ducts would require a minimum of 25 in² of free area each.
5. Do not place a supply outlet in the same room or in the vicinity of the stale air return from the house.
6. It is recommended that the fresh air supply be in a hall or foyer to avoid drafts and blower noise in occupied areas.

SETTING AIR FLOW AND BALANCING THE SYSTEM

EQUIPMENT REQUIRED

- Two Dwyer Magnahelic Differential Pressure Gauges; Series 2000, 0–0.25" w.c. (or equal). **NOTE:** Do not use a standard differential pressure gauge that reads above 0.25" w.c. The reading will not be accurate for the airflow provided by the ERV.
- Two airflow measuring devices, Part #5158, or airflow measuring device of your choice.
- 3/16" ID flexible tubing.
- Drill with 7/8" bit.

BALANCE PREPARATION

Before balancing the system, verify the following:

1. Make sure the energy transfer core and filters are installed correctly. **The filters come in a protective plastic that must be removed before operation of the unit.**
2. Check all ductwork connections to be sure they are installed and sealed properly.
3. Fasten door securely to housing.

The unit features a three-position speed switch, with **I** or **II** settings used for establishing continuous operation mode or the **STANDBY/OFF** mode. External controls can be connected to allow the unit to provide fresh air as determined by need. **I** setting shall be used for set up and operation of the unit. See **FIGURE 8**.

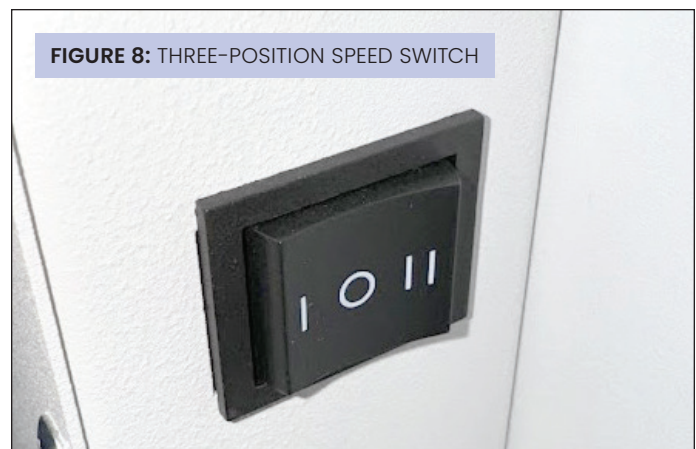


FIGURE 8: THREE-POSITION SPEED SWITCH

MEASURING AIRFLOW

1. Drill a 7/8" hole in the return and supply ducts.
2. Install the two airflow measuring devices in the duct using the drilled holes and seal with tape. Verify the airflow arrows are pointed in the direction of airflow. The measuring devices should be a minimum of 2-1/2 feet from the damper in a 5 foot section of straight duct. See **FIGURE 9**.
3. Set up the pressure gauges so that they are vertical and level and adjust to zero.
4. Connect the tubing from the airflow measuring devices in the ducts to the pressure gauges. See **FIGURE 9**. The high pressure tap on the airflow measuring device must be connected to the high pressure tap on the pressure gauge. Similarly, connect the low pressure tap on the measuring device to the low pressure tap on the pressure gauge.
5. Turn off the HVAC system blower and any other exhaust fans.
6. Plug in and turn on the unit to **I** setting.
7. Read the pressure gauges. If the values are the same, the system is balanced, and the air flow can be set to either gauge. If the values are different, make note of the lower of the two, as this is what will be used to set the airflow.
8. Using the appropriate gauge reading, locate that value in **TABLE 3** on page 9, and compare it to the desired airflow.
9. If the measured airflow matches the desired airflow and the two gauge readings are equal, then set-up of the blower speeds is complete.
10. If the measured airflow does not match the desired airflow or is not balanced, then adjustment will be required. See **ADJUSTING BLOWER SPEEDS** section.

ADJUSTING BLOWER SPEEDS

- Both the supply and exhaust fan speeds can be adjusted individually.
- The controller circuit board is equipped with a digital indicator and buttons labeled <KEY1>, <KEY2>, and <KEY3>. These buttons are used for setting the operation mode and editing operation parameters. To access the set-up menu, press <KEY1>.

- Navigate the menu using the <KEY2> and <KEY3> buttons. The display indicates the current setting for the menu item. Menu items available are:

ALL – Changes the speed equally for both the supply and exhaust air streams. The display shows the air speed as a percentage of motor speeds and ranges between 1%-100% of maximum CFM.

SPL – Changes the speed of only the supply air stream. The display shows the supply air speed as a percentage of motor speeds and ranges between 1%-100% of maximum CFM.

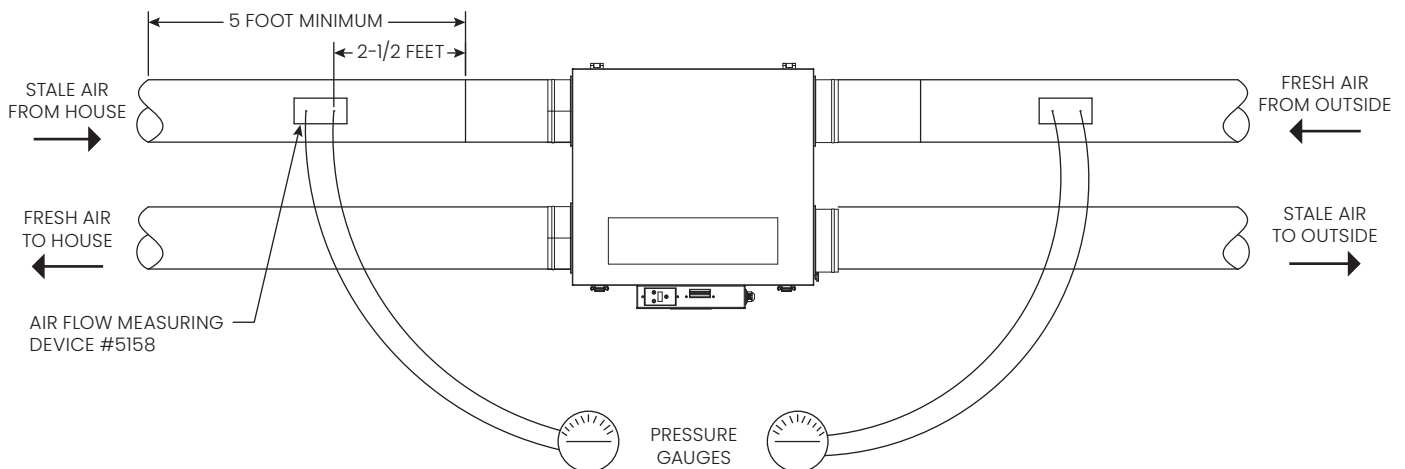
EHT – Changes the speed of only the exhaust air stream. The display shows the supply air speed as a percentage of motor speeds and ranges between 1%-100% of maximum CFM.

def – Resets blower speeds to factory default settings.

Cor – Used to calibrate the temperature sensor correlation at the factory.

Prg – Displays the software version.

FIGURE 9: SET-UP FOR BALANCING AIRFLOW



90-1746

TO ADJUST BLOWER SPEEDS

1. Reference **TABLE 3** and determine what gauge reading corresponds to the desired airflow for your installation. Make a note of the desired pressure gauge reading.
2. Access the set-up menu by pressing <KEY1>. Using the <KEY2> and <KEY3> buttons, navigate to **ALL**.
3. When **ALL** is displayed, press <KEY1> to enter the **ALL** setting. This will display the current fan setting percentage. While observing the pressure gauge readings on the Magnahelic Differential Pressure Gauges, press the <KEY2> and <KEY3> buttons to change the blower speed until the **lower** of the two pressure gauge readings matches the desired pressure gauge reading from **TABLE 3**.
4. Press <KEY1> to exit the **ALL** speed set up menu.
5. Determine if the **higher** pressure gauge reading is in the supply air stream or the exhaust air stream. If the higher reading is in the supply air stream, then the **SPL** speed will need to be adjusted. If the higher reading is in the exhaust air stream, then the **EHT** speed will need to be adjusted.
6. Once it has been determined which air stream needs to be adjusted, Using the <KEY2> and <KEY3> buttons, navigate to either **SPL** or **EHT** depending on which needs to be adjusted.
7. When the correct menu, either **SPL** or **EHT**, is displayed, pressure <KEY1> to enter the setting. While observing the readings on the Magnahelic Differential Pressure Gauges, press the <KEY2> and <KEY3> buttons to change the higher value to match the lower value.
8. Press <KEY1> to exit the speed set up menu.
9. Once this is complete, both pressure gauge readings should be equal and should match the desired pressure gauge reading from **TABLE 3**. The unit is now balanced at the desired airflow.

TABLE 3 – AIRFLOW APPROXIMATIONS: AIRFLOW IN A 6" DUCT AS MEASURED USING MAGNAHELIC DIFFERENTIAL PRESSURE GAUGES

Gauge Readings ("w.c.)	Airflow (CFM)	Gauge Readings ("w.c.)	Airflow (CFM)
0.005	30	0.065	119
0.010	44	0.070	124
0.015	55	0.075	128
0.020	64	0.080	132
0.025	72	0.085	137
0.030	80	0.090	141
0.035	86	0.095	145
0.040	93	0.100	149
0.045	98	0.105	152
0.050	104	0.110	156
0.055	109	0.115	160
0.060	114	0.120	163

NOTES:

1. If airflow is restricted by more than 20% (see **bold** values in **TABLE 3**), check ductwork and connections to increase flow.
2. The pressure reading from the pressure gauges should only be used to translate into CFM per **TABLE 3** – it does NOT measure duct static pressure.

DEFROST OPERATION

The unit has a defrost operation that prevents freezing of the recovery core in the cold season. This function is activated automatically and cannot be manually turned on or off. The ventilation unit periodically switches from normal operation mode to the special defrost mode (the exhaust fan runs on high speed and the supply fan is off) and vice versa according to the signal from the supply air stream temperature sensor.

The temperature conditions for this mode are described in **TABLE 4**.

TABLE 4: DEFROST CONDITIONS

Air temperature in the air duct for the incoming fresh air	Duration of the operation in the respective mode (min)	
	Defrost mode	Normal mode
Above 23°F (-5°C)	—	continuous
From 5°F (-15°C) up to 23°F (-5°C)	10	30
From -17°F (-27°C) up to 5°F (-15°C)	10	20
Below -17°F (-27°C)	10	15

SYSTEM START-UP

The unit features a three-position speed switch, with **I** or **II** settings used for establishing continuous operation mode or the **STANDBY/OFF** mode. External controls can be connected to allow the unit to provide fresh air as determined by need. **I** setting shall be used for set up and operation of the unit. See **FIGURE 8**.

There are also provisions for connection to the AprilAire Thermostat with IAQ Control, AprilAire Model 8120X Ventilation Controller, or any third-party 24 VAC, dry contact, normally open external control to allow the unit to provide fresh air in accordance with the ASHRAE Standard 62.2-2010. The standard uses home size and the number of bedrooms to determine the required ventilation rate.

CONTINUOUS OPERATION

1. Plug in the power cord to a 120 VAC grounded outlet.
2. Turn the switch to setting **I**.

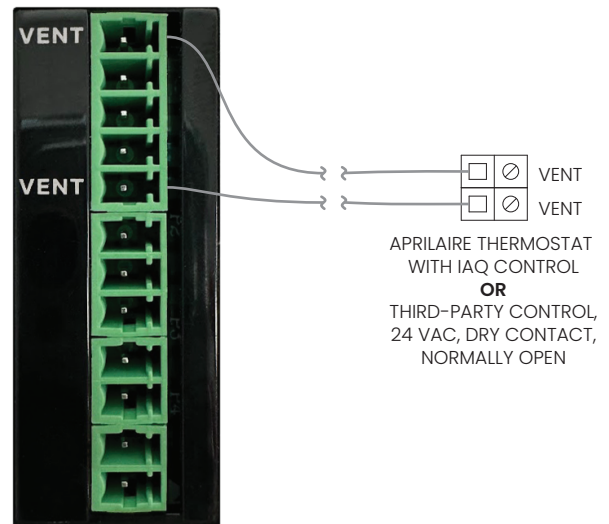
OPERATION WITH AN APRILAIRE THERMOSTAT WITH IAQ CONTROL

1. Locate the terminals for connection to an external controller.
2. Run 2-wire cable (18-24 AWG) from the ERV to the AprilAire Thermostat with IAQ Control.
3. Connect one wire to the terminal block for the position marked VENT. See **FIGURE 10**.
4. Connect the other wire to the terminal block for the position marked VENT.
5. Connect the other end of the 2-wire cable to the VENT terminals of the AprilAire Thermostat with IAQ Control.
6. Reference the AprilAire Thermostat with IAQ Control Installation Instructions to set the ventilation timing.
7. Plug in the ERV.
8. Ensure the switch is in the **STANDBY/OFF** Position

OPERATION WITH AN APRILAIRE MODEL 8120X VENTILATION CONTROLLER OR THIRD-PARTY CONTROL

1. Locate the terminals for connection to an external controller.
2. Run 2-wire cable (18-24 AWG) from the ERV to the ventilation controller.
3. Connect one wire to the terminal block for the position marked VENT. See **FIGURE 10**.
4. Connect the other wire to the terminal block for the position marked VENT.
5. Connect the other end of the 2-wire cable to the A/A terminals of the Model 8120X Ventilation Controller. If using a Third-Party Control, reference the Third-Party Control Installation Instructions to connect to the control.
6. Reference the AprilAire Model 8120X Ventilation Controller Installation Instructions or Third-Party Control Installation Instructions to set the ventilation timing.
7. Plug in the ERV.
8. Ensure the switch is in the **STANDBY/OFF** Position.

FIGURE 10: EXTERNAL CONTROLLER WIRING



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TROUBLESHOOTING

TABLE 4: TROUBLESHOOTING

Symptom	Possible Reason	Troubleshooting Procedure
ERV will not turn on.	No power to the blowers.	• Check that the ERV is plugged in. • Check that the power switch on the ERV is ON. • If wired to an external control, verify wire connections inside ERV and at control.
	Thermal fuse is melted.	Disconnect the unit from power mains. Replace the thermal fuse and check the unit.
ERV blowers are running, but little or no airflow.	The filters, blowers, or core are clogged.	• Clean or replace the internal filters. • Clean the fans and the core.
	The ductwork is clogged or damaged.	Check for blocked ductwork and clear.
Noise, vibration.	The impeller(s) is (are) clogged.	Clean the fan impeller(s).
	Fan screw(s) are loose.	Check and tighten the screws if required.



Manufacturing
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