

# SAFETY AND INSTALLATION MANUAL

# Aprilaire®

## ENERGY RECOVERY VENTILATORS

### MODEL 8100

- *Provides year-round fresh air*
- *Recovers 77% of the apparent heating or cooling energy from the exhausted air*

*See Warnings – Page 3*



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# SAFETY INSTRUCTIONS

Read the Safety and Installation Instructions carefully. They will help insure a correct and SAFE installation of the Aprilaire® Energy Recovery Ventilator.

## WARNINGS:

1. 120 Volts may cause serious injury from electrical shock. Sudden operation may cause serious injury from moving parts. Leave power disconnected until installation is completed.
2. The fresh air intake *must be* mounted in a location removed from sources of dangerous toxic gases. Examples of such sources, but not limited to these sources, include the exhausts from condensing furnaces, condensing water heaters and vented space heaters. These exhausts contain toxic substances that can be harmful to humans.

The fresh air *intake* should be installed a minimum of 10 feet from any exhaust vent.

3. Connection with existing air exhaust sources may cause toxic conditions in the living area. The Aprilaire ducting must be separate from sources such as dryer vents, water heater, furnace flues, gas appliance flues or bathroom and kitchen exhausts.
4. Unit weight and dropping may cause personal injury or equipment damage. Handle with care and follow installation instructions.
5. **WARNING: To avoid serious injury, do not mount unit with access door facing down.**  
Unit must be mounted in an upright position.
6. Sharp edges may cause serious injury from cuts. Wear protective gloves and handle with care.
7. Excess negative or positive pressure may cause health problems or structural damage. Air flow *must* be balanced after installation.
8. Insufficient combustion air may cause toxic conditions. The Energy Recovery Ventilator *must not* exhaust air from an enclosed room with combustion appliances.
9. Installation *must* conform to all applicable codes.
10. The fresh air duct from outside the Energy Recovery Ventilator and the stale air duct from the Energy Recovery Ventilator to the outside *must* be fully insulated. The fresh air duct connection to the unit *must* also be completely insulated. This is to prevent condensation from forming on the ductwork.

**NOTE:** This manual does not express or imply any warranty conditions. See Owner's Manual for further information.

# Aprilaire®

THE BEST IN INDOOR AIR COMFORT

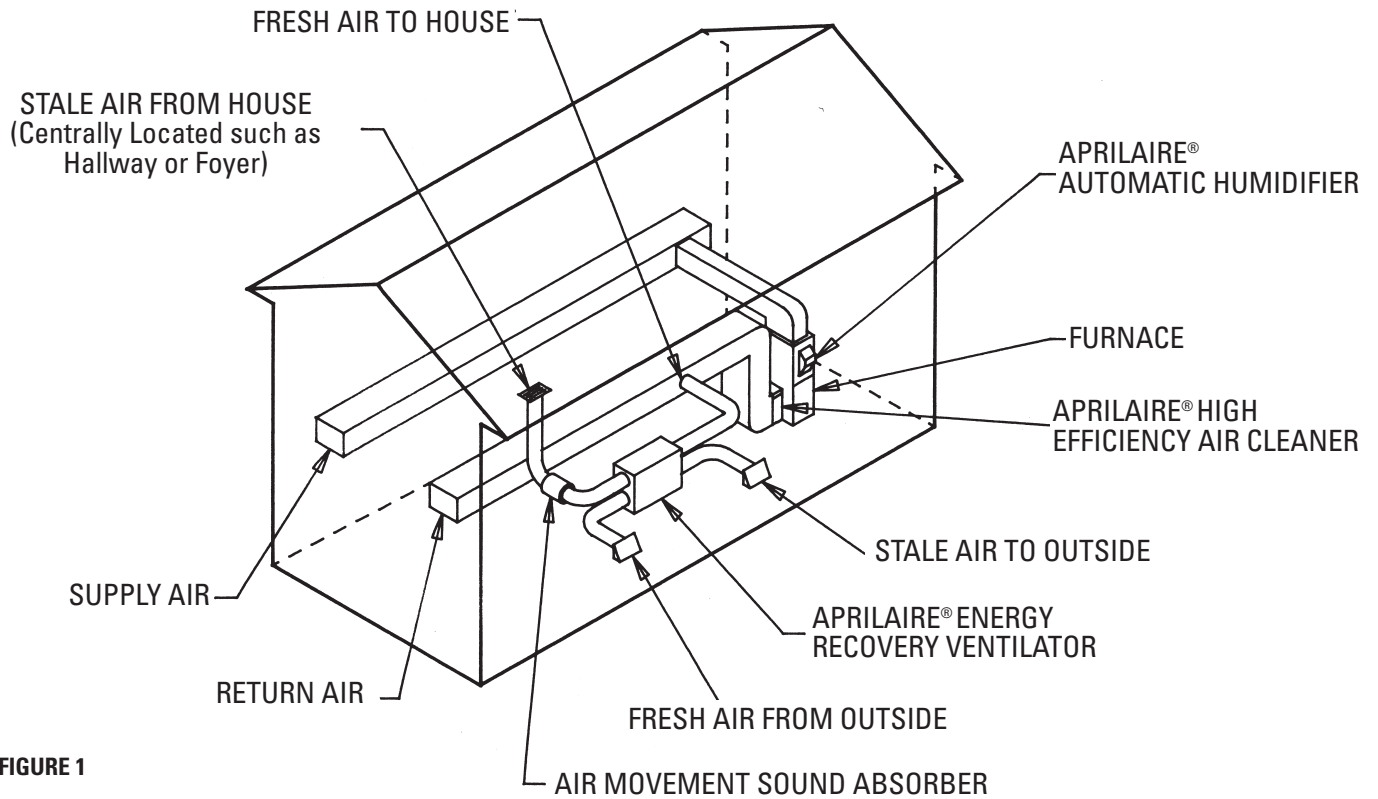


FIGURE 1

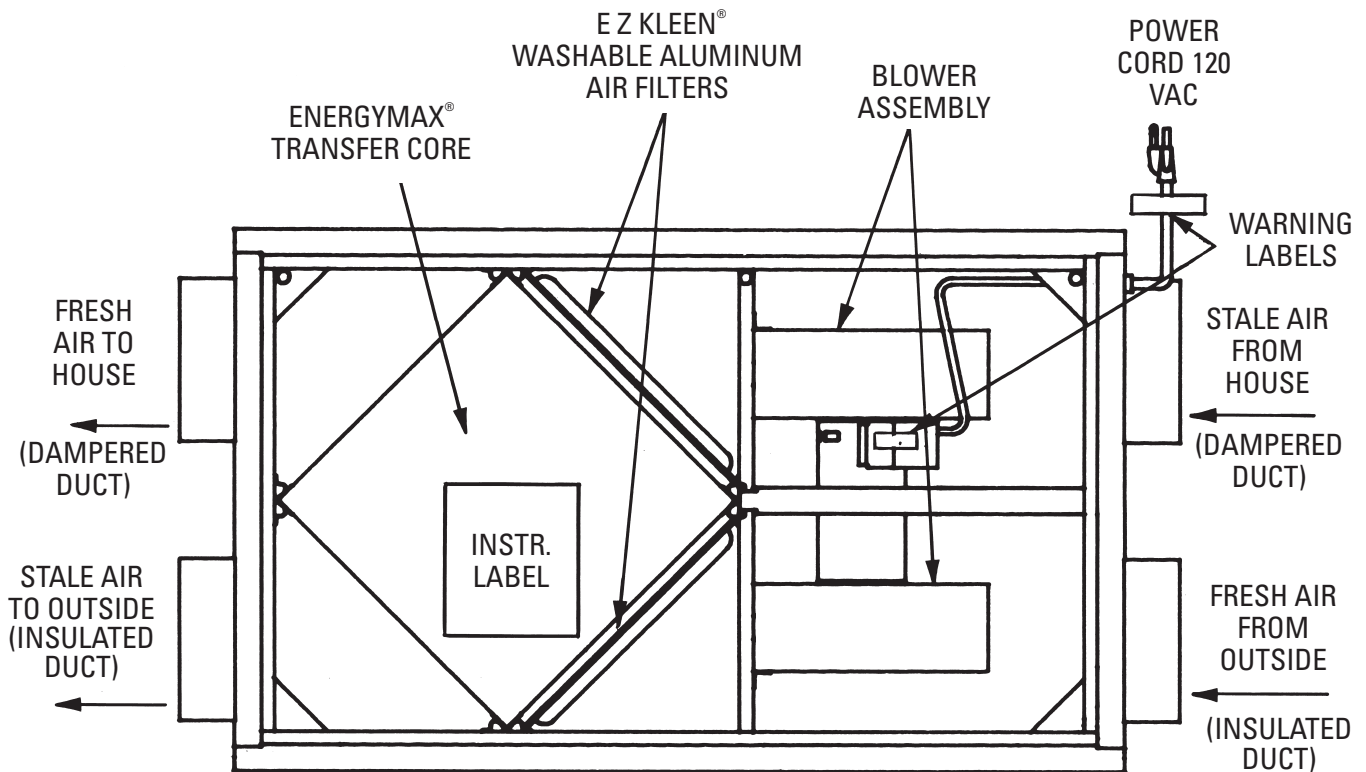
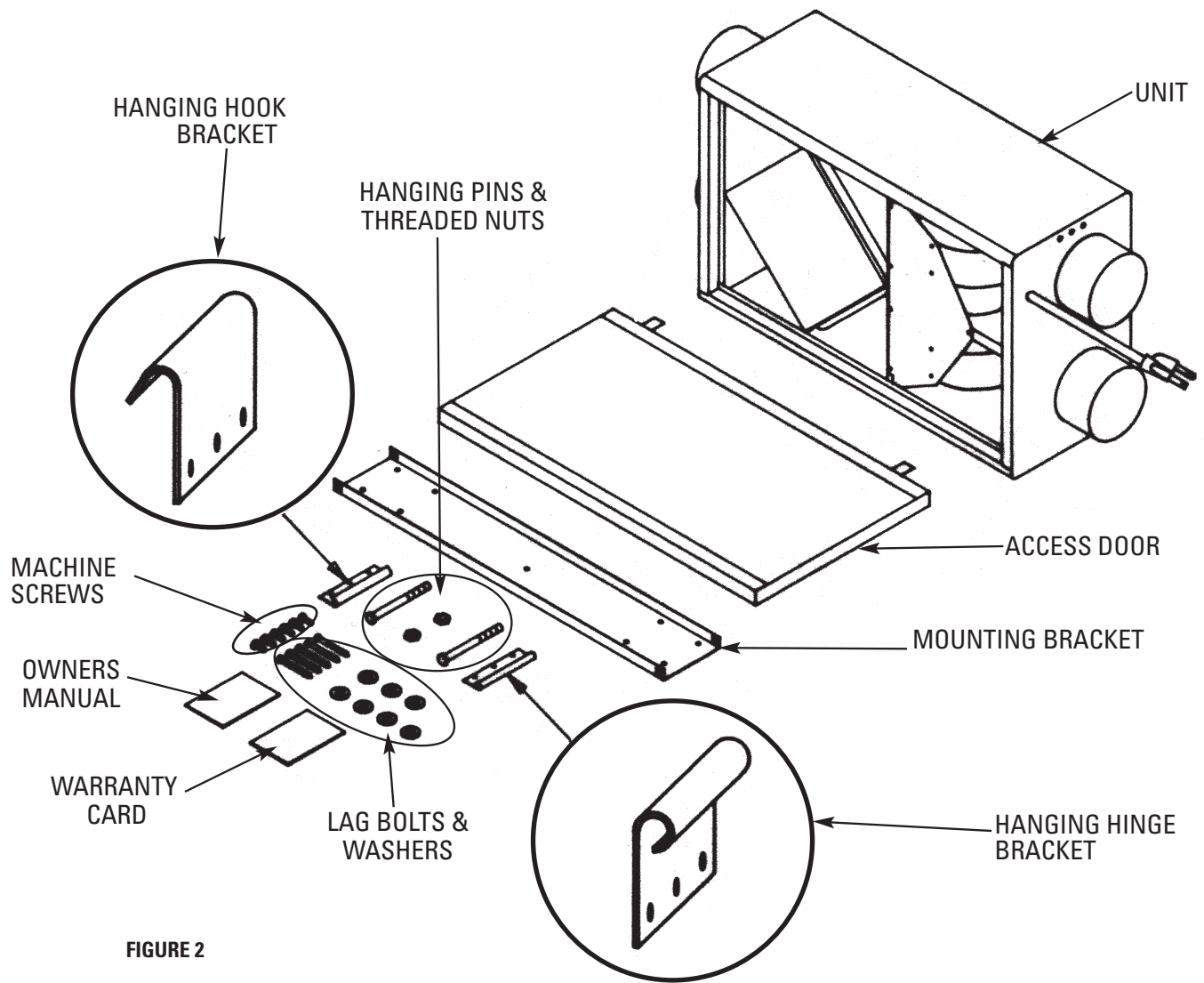


FIGURE 1A

## SPECIFICATIONS

<b>Model:</b>	The Aprilaire® Model 8100 Energy Recovery Ventilator is an enthalpy (sensible and moisture transfer) type unit. The unique paper/aluminum EnergyMax® Transfer Core exchanges energy between the fresh air supply and exhaust air streams.
<b>Unit Dimensions:</b>	Overall Unit – 37 <sup>3</sup> / <sub>8</sub> " W x 12 <sup>3</sup> / <sub>4</sub> " D x 20 <sup>9</sup> / <sub>16</sub> " H EnergyMax® Transfer Core – 12 <sup>1</sup> / <sub>8</sub> " x 12 <sup>1</sup> / <sub>8</sub> " x 10 <sup>3</sup> / <sub>4</sub> ".
<b>Air Flow Capacity:</b>	120 cfm @ 0.30 in. w.g. external ductwork resistance, i.e. 240 equivalent feet for each of the "fresh" and "stale" air streams.
<b>Performance:</b>	Apparent Sensible Effectiveness (ASE) – 77% at rated ventilation capacity with 72°F indoor temperature and 32°F outdoor temperature.
<b>Home Size:</b>	Up to 3600 sq. ft. home at rated air flow.
<b>Power Requirements:</b>	120 VAC, 1.4 ampere maximum. Unit equipped with a 3 ft. grounded power cord.
<b>Interior Insulation:</b>	Entire interior surface is sealed with 1" single face insulation.
<b>Filters:</b>	(2) – 10 <sup>13</sup> / <sub>16</sub> " x 11 <sup>5</sup> / <sub>16</sub> " x <sup>3</sup> / <sub>2</sub> " EZ Kleen® air filters coated with Super Filter Coat adhesive for maximum performance.
<b>Unit Weight and Packaging:</b>	Total Shipping Weight with Mounting Hardware – 76 lbs.

# Energy Recovery Ventilator Components



# GENERAL INFORMATION

## OPERATION

The Aprilaire® Energy Recovery Ventilator is designed to work in conjunction with the home's forced air system, or totally independent, incorporating its own duct system to provide the homeowner with 1) a supply of fresh air distributed into the living space and 2) to exhaust stale air from the home to the outdoors through the EnergyMax® Transfer Core. It is designed to handle homes with up to 3,600 ft<sup>2</sup> living space.

During the winter season, the cross flow design of the EnergyMax® Transfer Core allows the incoming cold fresh outside air to be preheated by the warm stale air being exhausted, reducing the energy required to heat the incoming fresh air.

During the air conditioning season the Aprilaire Energy Recovery Ventilator operates with a reverse effect. Cool stale air, exhausted from the house, cools the incoming warm fresh air. It also removes moisture from the incoming fresh air to the home.

## PROCEDURE AND EQUIPMENT REQUIRED

Read the installation instructions carefully to become familiar with the requirements and refer to the proper section of the instructions if any installation question arises.

The Aprilaire Energy Recovery Ventilator is preassembled and ready to install. See Figure 2 to become familiar with all components and inspect unit and box containing all mounting hardware to be sure all components are included.

The following equipment will be needed and is detailed throughout the manual.

**Mounting** – A mounting system is provided with the unit, which requires 1/4" x 3" lag bolts (furnished) for wood mounting and lag bolt anchors (not furnished) for concrete mounting.

**Ducting** – All ducting must be 6" round or equivalent and two balancing dampers must be installed. You must also plan on temporarily installing two air flow measuring devices according to balancing instructions found on Page 15. These measuring devices are later removed after the system has been installed and balanced. Use galvanized uninsulated ducting (not furnished) between the Aprilaire Energy Recovery Ventilator and home interior. **Use insulated ducting between the Aprilaire® and the outdoors or duct runs through any unheated space.** (Dampers and air flow measuring devices not furnished.)

**Duct Hanging** – Duct tape, sheet metal screws, nylon straps and duct hangers will also be needed to properly hang, connect and seal ductwork (not furnished).

**Balancing** – Two balancing dampers designed to fit the ductwork must be installed. See instructions page 15 (not furnished).

**Collar** – When connecting directly to furnace return ductwork, a collar will be needed.

**Return Grille** – At least one return grille located in the living space with a minimum of 75 square inches free area will be required.

**Hoods** – Two outdoor hoods with cleanable screens and caulk to seal them.

**Sound Absorber** – One 6' long sound absorber duct section is required in the stale air return duct from the house between the house and unit.

**Supply Grilles** – If the installation is in a home *without* forced air heating, it is recommended that *no more than 3 fresh air* supply ducts be used to assure adequate air flow. The total free area should *not* be less than 75 square inches. Use of less than the minimum free area may result in greater than normal air movement noise. Three supply ducts require a minimum of 25 square inches of free area each; two supply ducts 40 square inches and one supply duct 75 square inches of free area.

**Electrical** – The Aprilaire Energy Recovery Ventilator is pre-wired from the factory. The preferred installation of the unit should be within 30" of an electrical outlet.

# INSTALLATION – NEW HOME

## A. LOCATION

- It is recommended that the Model 8100 Aprilaire Energy Recovery Ventilator be mounted in a conditioned space. If the unit is mounted in an area where the temperature may drop below 32°F (0°C) or exceed 100°F (38°C), ALL DUCTWORK in the unconditioned space MUST BE INSULATED.
  - The recommended mounting location is on the basement foundation wall, or a stud wall with easy access to the furnace. This will minimize sound level and shorten the length of duct runs and elbows required. Unit may be mounted to basement ceiling joists if desired.
- NOTE:** If the home has engineered ceiling "I" beam wood trusses in the basement, the unit must be installed on the wall. If that's not possible, the installation procedure must be approved by a qualified builder before installation.
- Mounting on a utility or laundry room wall, any heated space or where the temperature is kept above 32°F (0°C, i.e. in a closet) is also acceptable.
  - If possible, do not locate the unit directly under bedrooms, This unit is designed for quiet operation, but with any blower system there is some sound generated.

## B. GENERAL MOUNTING

**WARNING:** To avoid serious injury, do not mount unit with access door facing down. Unit must be mounted in an upright position.

- The unit must be mounted with the mounting kit provided on the wall or suspended from the ceiling joists.
- For scheduled maintenance or service, the unit must be mounted in a position which allows easy access to all duct connections, electrical components and all interior components.
- A minimum of 36" opening clearance is recommended to ensure that the access door can be safely removed for easy access to all interior components for maintenance and service.

## C. MOUNTING THE UNIT

To reduce the unit weight, remove the access door, filters and EnergyMax Transfer Core. Lift only at the corners of the core to avoid damage.

Determine whether unit is to be wall or ceiling mounted. Brackets will be attached according to Figure 2A below.

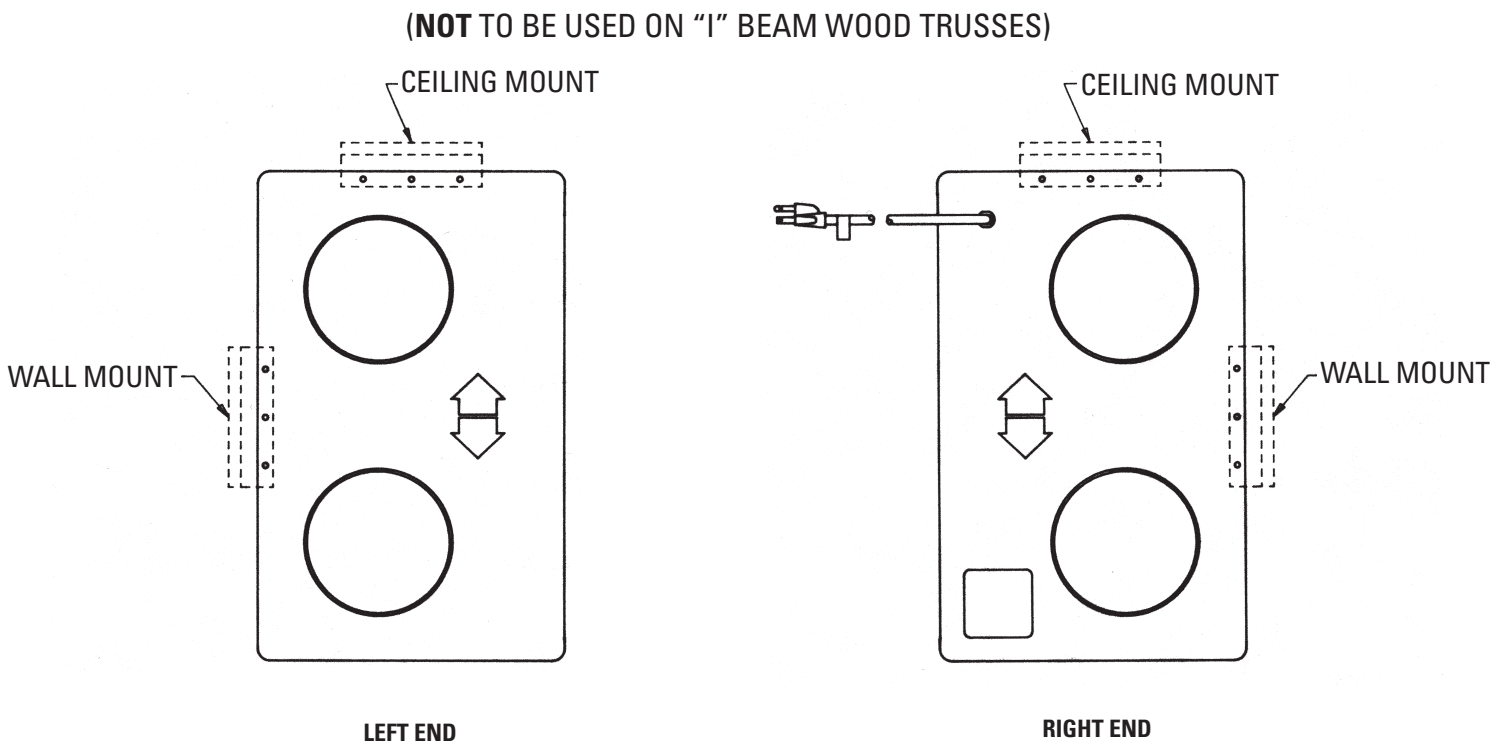


FIGURE 2A



# SEQUENCE FOR MOUNTING THE APRILAIRE® ENERGY RECOVERY VENTILATOR TO CONCRETE WALL

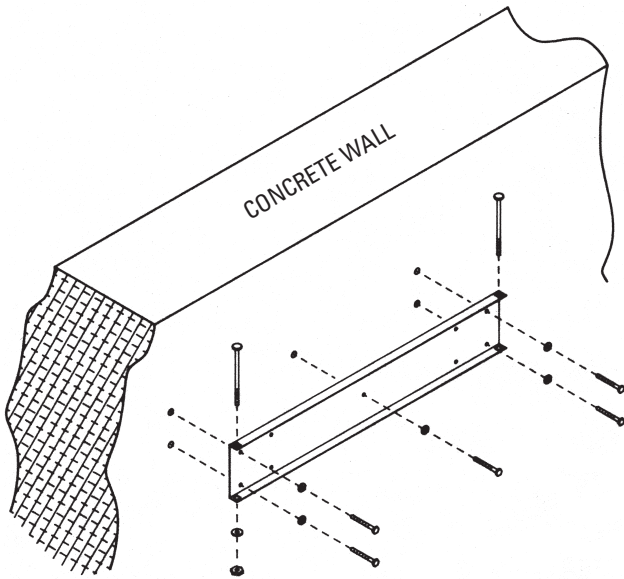


FIGURE 3

**See Figures 3 through 6.**

Fasten mounting bracket (furnished) to concrete wall using lag bolts (furnished) and concrete anchors (not furnished). Insert hanging pin in left hole of mounting bracket and hand tighten with threaded nut.

**NOTE:** If mounting on a stud wall, mounting bracket is pre-drilled for fastening to standard 16" O.C. or 24" O.C. stud spacing using lag bolts (furnished).

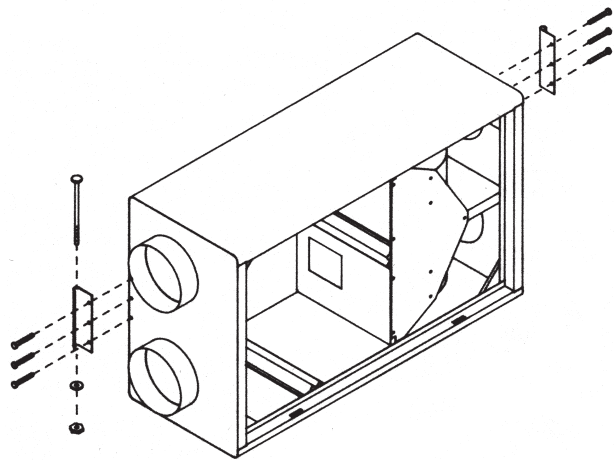
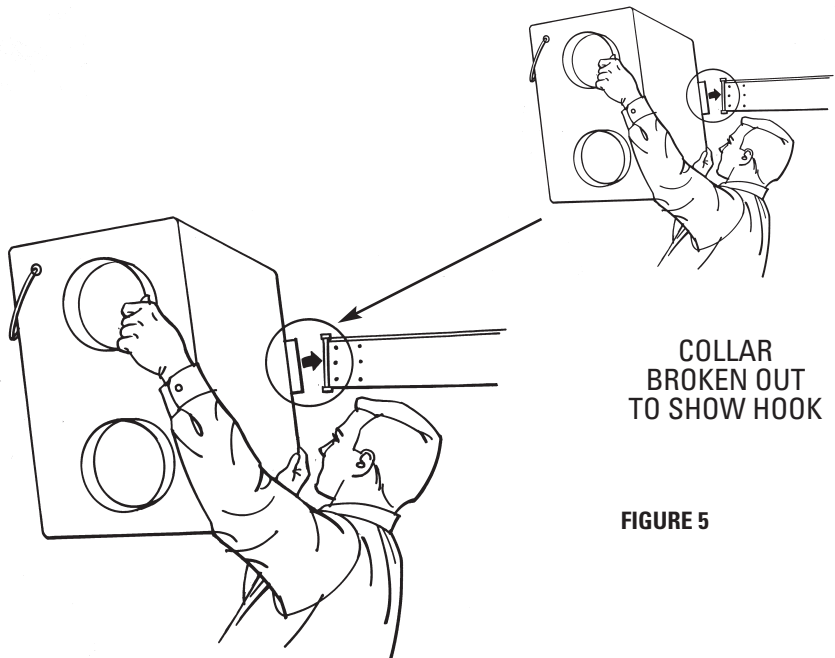


FIGURE 4

Fasten hanging "hook" bracket (furnished) securely to left side of unit with 10-32 machine screws  $\frac{3}{8}$ " long (furnished) using pre-tapped holes along side edge of unit. Fasten hanging "hinge" bracket to right edge. Be sure both brackets face outward from unit. Insert hanging pin ( $\frac{5}{16}$ " x  $6\frac{1}{2}$ " long bolt furnished) in right hole of mounting bracket.

For the wall installation (which is preferred) pick the unit up from the back side with your left hand in the upper duct opening and right hand supporting the lower right corner. Carefully lift unit up and hook the hanging "hook" bracket behind the hanging pin previously installed on the left side of the mounting bracket. **Keep pressure against unit to prevent it from swinging away from wall.**



COLLAR  
BROKEN OUT  
TO SHOW HOOK

FIGURE 5

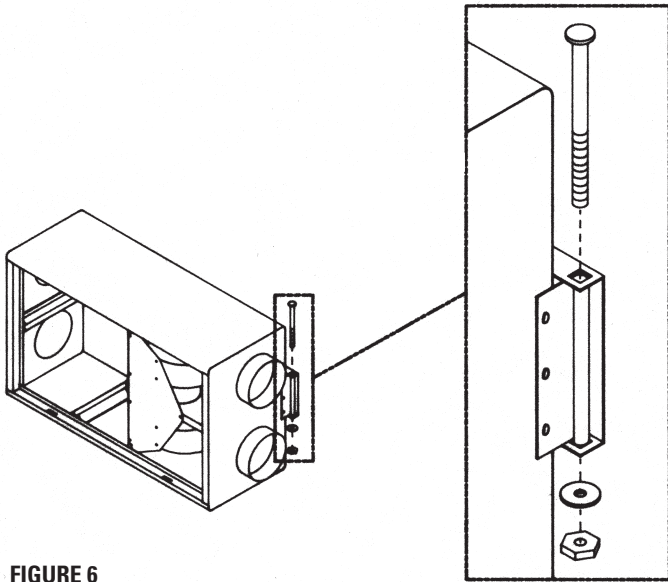


FIGURE 6

While maintaining pressure, push unit up against bracket, remove right side pin, align hanging "hinge" hook with bracket and reinsert hanging pin. Tighten both threaded nuts securely. **Do not plug in unit until installation is completed.** Carefully reinstall EnergyMax Transfer Core, air filters and access door.

## SEQUENCE FOR MOUNTING THE APRILAIRE® ENERGY RECOVERY VENTILATOR TO CEILING

**CAUTION:** Do not mount the Energy Recovery Ventilator to ceiling "I" beam wood trusses.

To reduce the unit weight, remove the access door, filters and EnergyMax Transfer Core. Lift only at the corners of the core to avoid damage.

For ceiling mounting, refer to the following Figures #7 through #10.

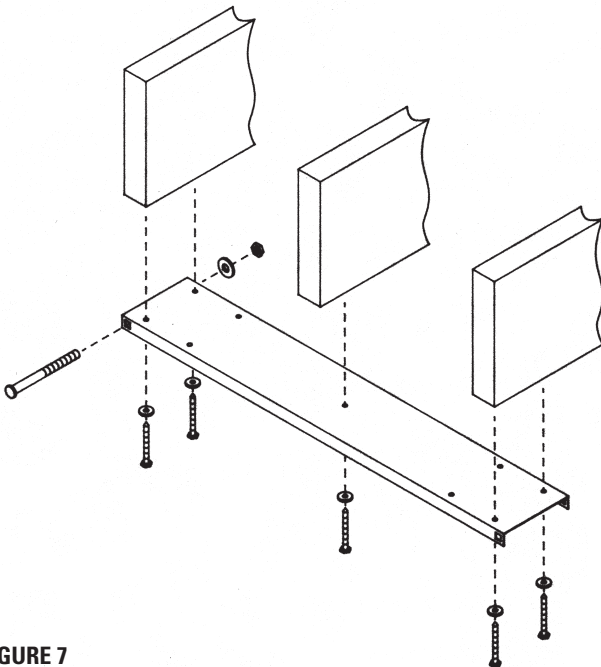


FIGURE 7

Mounting bracket (furnished) is pre-drilled for fastening to standard 16" O.C. or 24" O.C. ceiling joists using lag bolts (furnished).

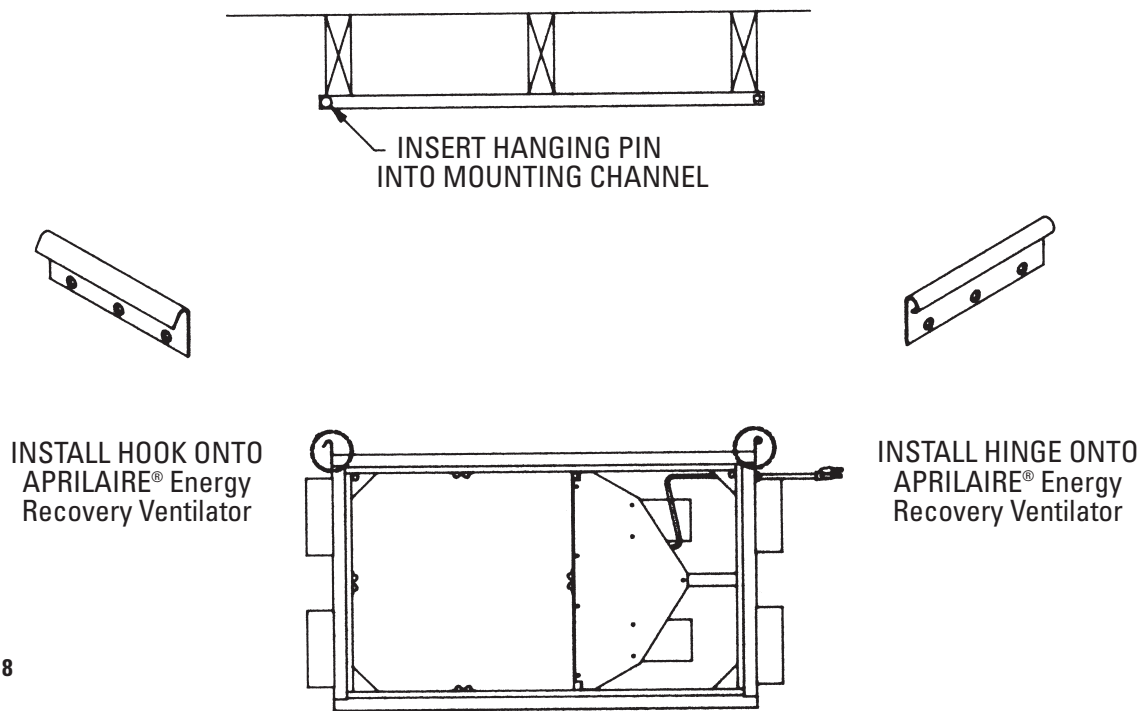


FIGURE 8

Fasten hanging "hook" bracket (furnished) securely to left end of unit with 10-32 machine screws  $\frac{3}{8}$ " long (furnished) using pre-tapped holes along top left edge of unit. Fasten hanging "hinge" bracket to right edge. Be sure both brackets face outward from unit. Insert hanging pin in left hole of mounting bracket and hand tightened with threaded nut.

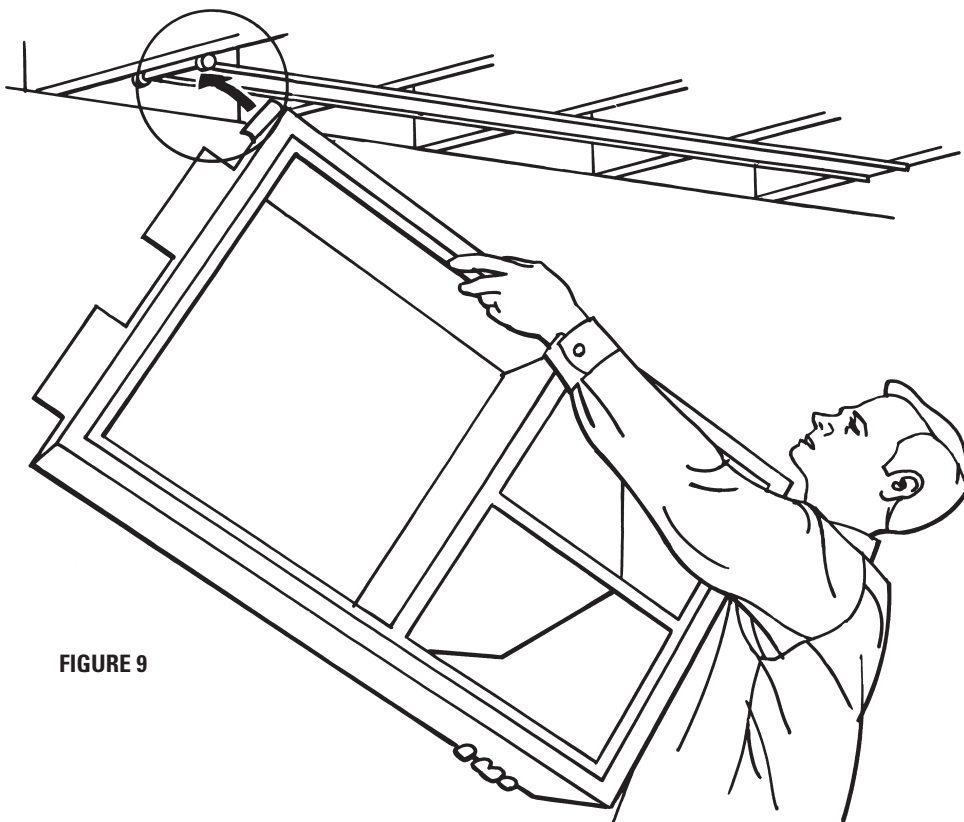
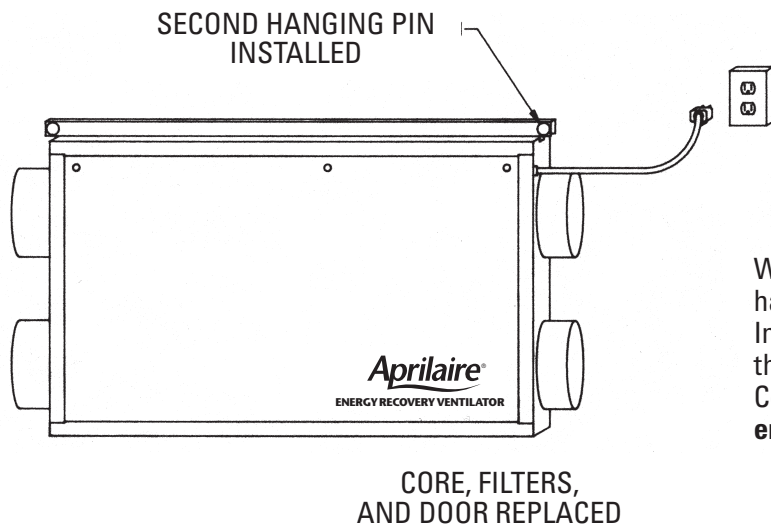


FIGURE 9

For the ceiling installation lift the unit with the blower end against you. Left hand should be under the top edge and right hand should be under the lower right corner as shown in the drawing. Tilt the far end up toward the mounting bracket and "hook" the hanging "hook" bracket over the hanging pin.



With second pin accessible, lift right side of unit up so hanging “hinge” bracket is aligned with mounting bracket. Insert second pin through hole and tighten both bolts with threaded nuts. Carefully reinstall EnergyMax Transfer Core, air filters and access door. **Do not plug in unit until entire installation is completed.**

FIGURE 10

#### D. DUCTWORK SPECIFICATIONS

- You must plan on temporarily installing two air flow measuring devices, according to Balancing Section instructions. These measuring devices are later removed after the system has been balanced. Please refer to Figure 11, page 16.
- A sound absorber at least 6' long consisting of 1" thick rigid fiberglass duct or insulated flexible duct (ATCO series 70 or equivalent) is required for maximum absorbing of air movement sounds between the unit and the living space return grille.
- All flexible ducts used **must** meet U.L. safety standards for Class 1 air ducts and connectors.
- All ducting **must** be installed according to locally applicable HVAC codes and standards.
- Round 6" galvanized duct or equivalent should be used for all duct runs that do not use insulated ducting.
- All ducting located in an unheated space must be completely sealed and insulated.
- All ductwork runs should be kept as short, straight and equal in length as possible to minimize system resistance for optimum performance and quiet operation.

#### E. GRILLE AND HOOD SPECIFICATIONS

- Living space return grille should **not be less than 75 square inches free area**. Grille surfaces less than this may produce excess air noise.

- **Exterior intake and exhaust hoods must be weather resistant. These hoods must also incorporate an easily cleaned screen to help prevent unwanted debris, animals and insects from entering the ductwork. This screen should have no greater than ¼ inch openings.**

#### F. DUCTWORK CONNECTIONS – FORCED AIR SYSTEM

- All duct collars are clearly labeled and must be connected properly.
- Rigid ductwork should be connected to the collars with sheet metal screws.
- Flexible ductwork **must** be connected with clamps or bands.
- All ductwork should be sealed with duct tape to prevent leakage, and hung with straps where needed.

#### RETURN: From Living Space to Aprilaire® Energy Recovery Ventilator (Stale Air From House)

- Stale air from the house should be exhausted from one exhaust grille centrally located; such as in a hallway. For multi-floor homes, the exhaust grille should be located on the same floor as the kitchen.
- Energy Recovery Ventilator ductwork **must not** be connected to a kitchen exhaust fan duct in order to keep the core free of grease.

- It is recommended that Aprilaire® Energy Recovery Ventilator ductwork remains separate from bathroom exhaust fan ducts.
- Galvanized ductwork (6" round) is recommended between the living space return grille and return inlet. If rectangular duct is used, be sure it has an equivalent air flow rating. Undersized ducting can cause air flows to be out of balance or air flow reductions in the system, resulting in poor performance.
- With any blower system, some sound is transferred along the ductwork. A sound absorber at least 6' long consisting of 1" thick rigid fiberglass duct or insulated flexible duct (ATCO series 70 or equivalent) is recommended for maximum absorbing of air movement sounds between the unit and the living space return grille. A balancing damper must be installed in this duct near the Aprilaire® Energy Recovery Ventilator, see Figure 11, page 16. Install an air flow measuring device at least 5' from damper in straight section and then complete the system installation before proceeding to the balancing instructions found on page 15.

### **SUPPLY: Fresh Air From Unit to House (Fresh Air To House)**

- The supply duct should be connected directly to the forced air system return duct a minimum of 10' from the furnace blower. Avoid making this connection in the area of any return grille.

**NOTE:** In some areas, local codes prohibit a direct connection to the forced air system. In this case an "INDIRECT" or "SOFT" CONNECTION must be made.

- Use of a collar when connecting to the return duct is recommended.
- 6" round galvanized ductwork is recommended.
- Be sure to install two balancing dampers, see Figure 11, page 16.

### **EXHAUST AND FRESH AIR OUTDOOR CONNECTIONS (Stale Air To Outdoors and Fresh Air From Outdoors)**

- Insulated duct (often flexible ducting) of at least R-4 insulating value with a continuous vapor barrier must be used for both duct runs connecting the Energy Recovery Ventilator to the outdoors. The vapor barrier must be sealed at both ends and extend from the Aprilaire Energy Recovery Ventilator Housing to the header (outer wall).

**Note:** In climates where the outdoor temperature drops below 10°F (-12°C), the fresh air inlet duct insulation must extend all the way to the Aprilaire Energy Recovery Ventilator housing. Extra insulation may be needed at the fresh air inlet duct connection to the unit.

- The fresh air intake hood and exhaust air outlet hood must be located at least 10' apart to avoid cross contamination. **Also, the fresh air intake should be a minimum of 10 feet from an appliance vent that exhausts toxic gases.** Using adjacent walls around an outside corner will accomplish this easily. Both of these hoods should be at least 18" above the ground or above the expected snow line, whichever dimension is greater.
- The duct runs should be kept as straight, short and equal as possible to minimize resistance and optimize blower performance. Also, try to use as few bends and restrictions as possible.
- **DO NOT connect the exhaust outlet into an attic, storage or garage space. This can cause excess moisture to collect in these areas, causing possible damage to the home from outdoors.**
- The fresh air intake must be mounted in a location removed from sources of pollution and extreme temperatures such as furnace exhaust, car exhaust, dryer vents, central air condensing units, pet enclosures, etc.
- **DO NOT connect the Aprilaire Energy Recovery Ventilator exhaust to any gas appliance flue.**
- Both intake and exhaust hoods must have a screen to prevent small animals, insects, and large airborne debris from entering the ductwork. This screen must be accessible for easy cleaning. Both hoods must be caulked to prevent water leakage.

**WARNING:** 120 Volts may cause serious injury from electrical shock. Leave unit disconnected until installation is complete.

### **G. ELECTRICAL CONNECTION**

- The power cord can be plugged into any 120 VAC grounded outlet preferably within 30" of unit.

## INSTALLATION INTO EXISTING HOME (RETROFITTING)

- All the same mounting, locating, ducting and electrical hook-up guidelines apply for retrofitting as they do in new home installations.

## INSTALLATION IN HOMES WITHOUT FORCED AIR (HYDRONIC OR ELECTRIC BASEBOARD)

All the same mounting, locating, ducting and electrical connection procedures apply to this situation as they do in new home construction, except for the following changes:

- The Aprilaire Energy Recovery Ventilator can be properly installed into a home with no forced air ducts by installing fresh air supply ducts to various parts of the house where fresh air is needed.
- It is recommended that no more than 3 fresh air supply ducts be used to assure an adequate air flow.

The total free Area of supply grilles should not be less than 75 square inches. Use of less than the minimum free area may result in greater than the normal air movement noise.

- Three (3) supply ducts require a minimum of 25 square inches free area each. Two (2) supply ducts require a minimum of 40 square inches free area each. One (1) supply duct requires a minimum of 75 square inches free area.
- **Do not place a supply outlet in the same room or in the vicinity of the stale air return from the house.**
- Try to place the supply of fresh air to the house outlet, or outlets, in a hall or foyer to avoid drafts and possible blower noise in occupied areas.
- Try to keep all supply duct runs short, straight and equal in length.

## SYSTEM START-UP

1. Make sure the EnergyMax Transfer Core and filters are installed correctly.
2. Double check all ductwork connections to be sure they are installed and sealed properly.
3. Check to be sure all tools are removed from interior and exterior of housing.
4. Make sure the blower motor and duct connections are not obstructed.
5. Fasten door securely to housing.
6. Place all dampers in "full open" position.
7. Balance the system air flows per instructions on page 15.
8. Give owner's manual and warranty card to homeowner after explaining operation of unit.



# BALANCING THE SYSTEM

In order for the Aprilaire® Energy Recovery Ventilator to perform most effectively, the volume of fresh air supplied to the house must match the volume of stale air exhausted. Because the duct work in the two airstreams will most likely be different, the system must be balanced. Balancing is accomplished by installing dampers in both airstreams, measuring the airflow, then dampering down the airflow in the stream with the highest flow until the airflow in both streams is the same.

The following balancing procedure is recommended by Research Products Corporation. Other measuring instrumentation may be used if it is accurate enough to balance the airflow in the supply and exhaust streams to within 10% of each other.

## EQUIPMENT AND MATERIALS NEEDED

- Two (2) Dwyer Magnahelic® Differential Pressure Gauges; Series 2000, 0-0.25 in. w.g. (or equal).

**Do Not** use a standard differential pressure gauge that reads above 0.25 w.g. because the reading will not be accurate for the airflows required by the Aprilaire Energy Recovery Ventilator.

- Two (2) Research Products' airflow measuring devices. Part No. 5158.
- Flexible tubing,  $\frac{3}{16}$ " inside diameter.
- A  $\frac{7}{8}$ " diameter hole is required to insert the airflow measuring devices. Part No. 5158.

## PROCEDURE FOR BALANCING AIR FLOW DELIVERY

1. Be sure that the two dampers are installed correctly as shown in Figure 11.
2. Install the two airflow measuring devices into the duct as shown in Figure 11 and seal with tape. Be sure the airflow arrows are pointed in direction of airflow. To get an accurate airflow measurement, the devices must be in the center of a five foot minimum straight duct section.

3. Set up the pressure gauges so that they are VERTICAL and LEVEL and adjust to zero. Failure to do so will result in inaccurate gauge readings.
4. Connect the tubing from the airflow measuring devices to the pressure gauges as shown in Figure 11. Be sure to connect high pressure tap on the airflow measuring device to the high pressure tap on the pressure gauge. Likewise, connect low to low pressure taps.
5. Make sure that the two dampers are in the full open position.
6. If the unit is connected to a forced air system, be sure that the furnace blower is **OFF**.
7. Plug in the unit.
8. Read the pressure gauges. (Gauges should read approximately 0.065 in. w.c. when air flow is at 120 cfm in the system.) If the actual gauge readings are the same, the unit is in balance and does not require further adjustment. Skip Step 9 and proceed to Step 10.
9. If the gauge readings are different, slowly close the damper on the duct with the higher gauge reading until the two readings are identical. The unit is now in balance.

**NOTE:** The other damper should remain full open.

10. Secure the dampers to prevent the set positions from changing.
11. Disconnect tubing and pressure gauges and remove airflow measuring devices. Seal the duct openings where the airflow measuring devices were located.

**NOTE:** Be sure the damper positions have not been affected.

# DIAGRAM SHOWING POSITION OF AIR FLOW MEASURING DEVICES AND BALANCING DAMPERS

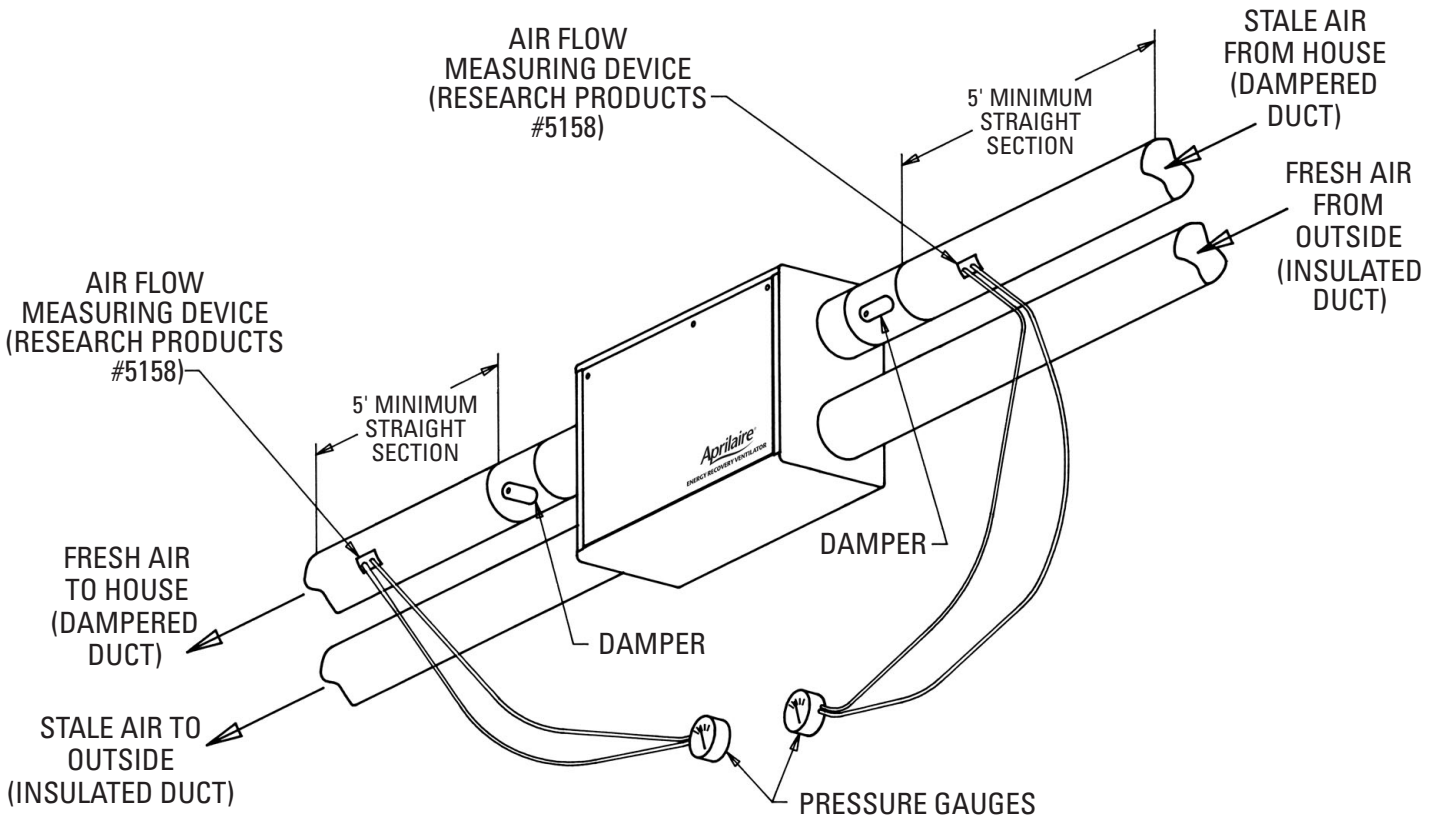


FIGURE 11

Airflow in a 6" duct as measured using RP Airflow Measuring Device #5158

\*A sound absorber at least 6' long consisting of 1" thick rigid fiberglass duct or insulated flexible duct (ATCO series 70 or equivalent) is recommended for maximum absorbing of air movement sounds between the unit and the living space return grille.

**NOTE:** Dampers, air flow measuring devices and pressure gauges not included.

Gauge Readings (in. w.g.)	Airflow (cfm)	Gauge Readings (in. w.g.)	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