PuriFresh®

ENERGY RECOVERY VENTILATOR

US PATENT 6,257,317

INSTALLATION MANUAL AND OPERATING INSTRUCTIONS

CAUTION:
READ AND UNDERSTAND THIS MANUAL THOROUGHLY BEFORE INSTALLING OR OPERATING THE UNIT!

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Made in the USA

I. INTRODUCTION

There is a need for ventilation. According to the Environmental Protection Agency, indoor air is typically 3 to 5 times more polluted than outdoor air. This is understandable since all indoor air ultimately come from outside. The less ventilation you have, the longer this air sits inside picking up more pollution from indoor sources. These indoor sources include cooking, cleaning products, insecticides, out-gassing from building products, paint, furniture, and floor coverings. Carpets, bedding and furniture fabrics build up dirt and dander from humans and pets, which breed dust mites, bacteria and mold. If one or more of the occupants is a smoker, this is a particularly severe source of pollution.

In addition to pollution, poor ventilation leads to a buildup of moisture and carbon dioxide in the air. High levels of carbon dioxide can lead to sleepiness and lethargy. High humidity can lead to mold growth and dry rot. Moisture is released through breathing, sweating, bathing, cooking, etc.

There has been a dramatic rise in the number of people with asthma and allergies in recent years. While some exotic theories not involving air pollution exist, a prime suspect is the deterioration in indoor air quality combined with children spending much more time indoors. Even if indoor air pollution is not responsible for the rise in the number of asthma and allergy cases, it contributes to the number and severity of asthma and allergy attacks.

Standard 62-1989 of American Society of Heating, Refrigeration, and Air-conditioning Engineers Inc. (ASHRAE), Atlanta, Georgia, states, "When infiltration and natural ventilation are insufficient to meet ventilation air requirements, mechanical ventilation shall be provided. The use of **energy recovery ventilation** systems should be considered for energy conservation purposes in meeting ventilation requirements." (Sec. 5.1.) Standard 62-1989 suggests 0.35 air changes per hour of continuous fresh air for living areas, but not less than 15 Cubic Feet per Minute (CFM) per person based on design occupancy. Control of building humidity levels is not as well specified, but ASHRAE Standard 55, *Thermal Environment Conditions for Human Occupancy* recommends between 25% RH and 60% RH levels. Too low a humidity level causes dry air related health effects and increased ozone generation and too high a level causes growth of mold and mildew, leading to unhealthy indoor air quality.

New houses are being built with very little infiltration of outside air. In addition, older homes are constantly being improved with replacement windows and doors, side vented furnaces, etc., which reduce infiltration of outside air. Building codes have not kept up with this trend by requiring forced mechanical ventilation to bring ventilation up to minimum ASHRAE standards when needed.

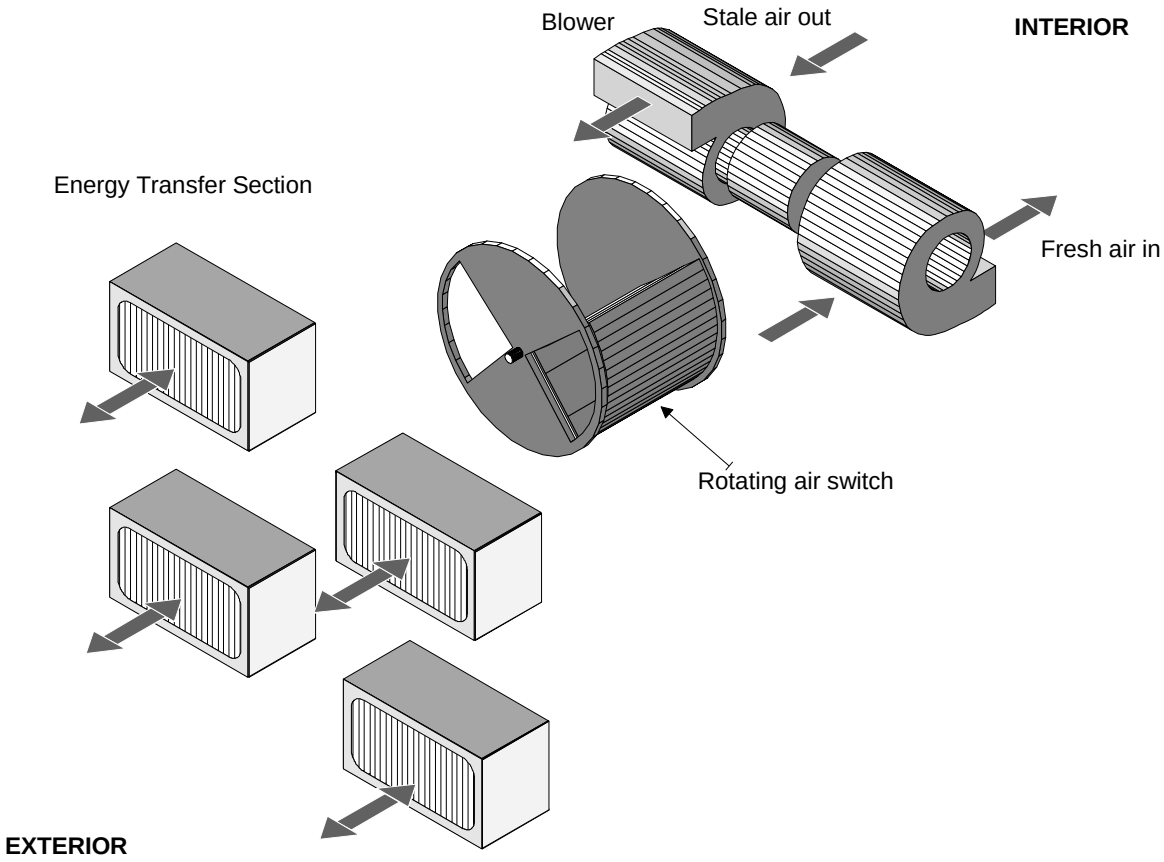
The PuriFresh® Energy Recovery Ventilator provides ventilation in an efficient and cost effective way. Energy recovery is particularly effective in a hot humid climate, dramatically reducing the moisture that would otherwise enter the home with the ventilation air.

Product Specifications:	
Size (width, depth, height) & weight	18" x 11.75" x 9", 23.5 pounds.
Power	45 Watts (max.)
Ventilation rate (Fresh air flow)	70 CFM (Cubic Feet per Minute) (max.)
Heat exchange (sensible effectiveness)	85% at 70 CFM
Moisture exchange (latent effectiveness)	60% at 70 CFM
Energy Transfer Sections [1]	8 7/8" x 4 3/8" x 1"
Energy Transfer Section medium	Silica gel powder permanently bonded to plastic sheets

II. Operating Principle

The unit has two blowers. One exhausts stale air from the room to the outside and the other draws fresh air into the room from outside. The unit also has two "Energy Transfer Sections". These are located directly under the exterior cover. Each of the Energy Transfer Sections are divided into two subsections, resulting in a total of four Energy Transfer Subsections. The stale air is forced through a "rotating air switch", then through two Energy Transfer Subsections before leaving the unit to the outside. The position of the air switch determines which two Energy Transfer Subsections have stale air flow. The fresh air is drawn in through the remaining two Energy Transfer Subsections, then through the rotating air switch before going through the blower and entering the room. Viewing any one of the four Energy Transfer Subsections in time, stale air flows out, followed by fresh air in, and so on, as the rotating air switch turns. This "breathing" action, caused by the rotating air switch, causes the Energy Transfer Subsection to act as a heat and moisture exchanger. In winter, the warm moist stale air deposits heat and moisture on the Energy Transfer Section. When the flow reverses and cold dry fresh air passes through it, the heat and moisture is transferred to the fresh air. In summer, the same principle works to keep heat and moisture out of the room. The Energy Transfer Sections contain a desiccant in the form of Silica gel. The Silica gel can absorb moisture from the air even when the air temperature is above the dew point. This dramatically improves the removal of humidity from the fresh air on a hot and humid summer day.

[1] Manufactured for ElasTek, Inc. by Airxchange, Inc. a leading manufacturer of large Energy Recovery Ventilators for commercial buildings. (www.airxchange.com)



A significant advantage of the oscillating flow is that the Energy Transfer Sections are self-cleaning. After a year of continuous use under typical conditions, there is hardly any reduction in flow due to build up of dust. Another advantage is that the Energy Transfer Sections can be easily removed and thoroughly washed. Since the Silica gel is permanently bonded to the plastic strips, there is no loss of performance.

The patented PuriFresh® design has the Energy Transfer Sections stationary as opposed to the conventional approach of a rotating energy recovery wheel. As a consequence, there are no sliding seals between the indoor and outdoor environment, which can freeze in winter and damage the unit. In the PuriFresh® design, there are no "cold" moving parts at all.

III. INSTALLATION

Open the box. Check to see that you have the following:

1. The ***PuriFresh***® unit.
2. One black open cell foam gasket block 2" x 2" x 36".
3. One sash-retaining angle with screw hardware.
4. Two pieces of corrugated plastic board 10" x 12" x 3/16".
5. Eight sheet metal screws.
6. Two aluminum side brackets.

For installation, you will need a Philips head screwdriver, a utility knife, a ruler, and a small drill for making a pilot hole.

Figure 1 shows a perspective view of the unit with the mounting brackets and side bracket mounting holes labeled.

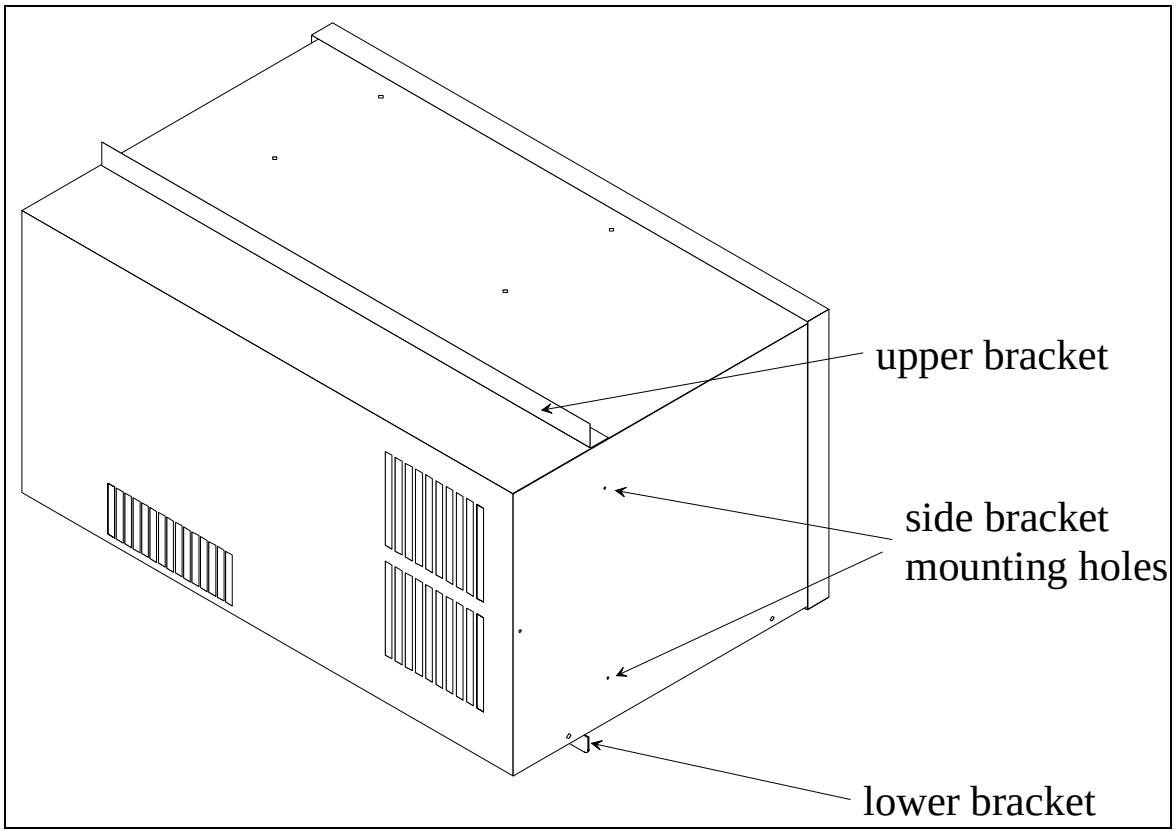


Figure 1

INSTALLATION IN A WINDOW

The unit can be installed in any double hung window with a width between 20 and 40 inches. **DO NOT INSTALL IN A WINDOW ABOVE A SIDEWALK OR ANYWHERE SOMEONE MAY BE BELOW WHO CAN BE INJURED OR**

KILLED IF THE UNIT OR A TOOL FALLS OUT DURING INSTALLATION. Select a window where the cord can be plugged into a three-pronged grounded outlet directly. The use of an extension cord is not recommended. If the outlet is not three pronged, have a qualified electrician convert it.

Before installing the unit in the window, attach the two aluminum side brackets to the unit, one on each side, using four of the sheet metal screws. (See Figure 2.) Note: You may choose to place the unit all the way to either side of the window opening. In that case, you will only need to install one of the side brackets.

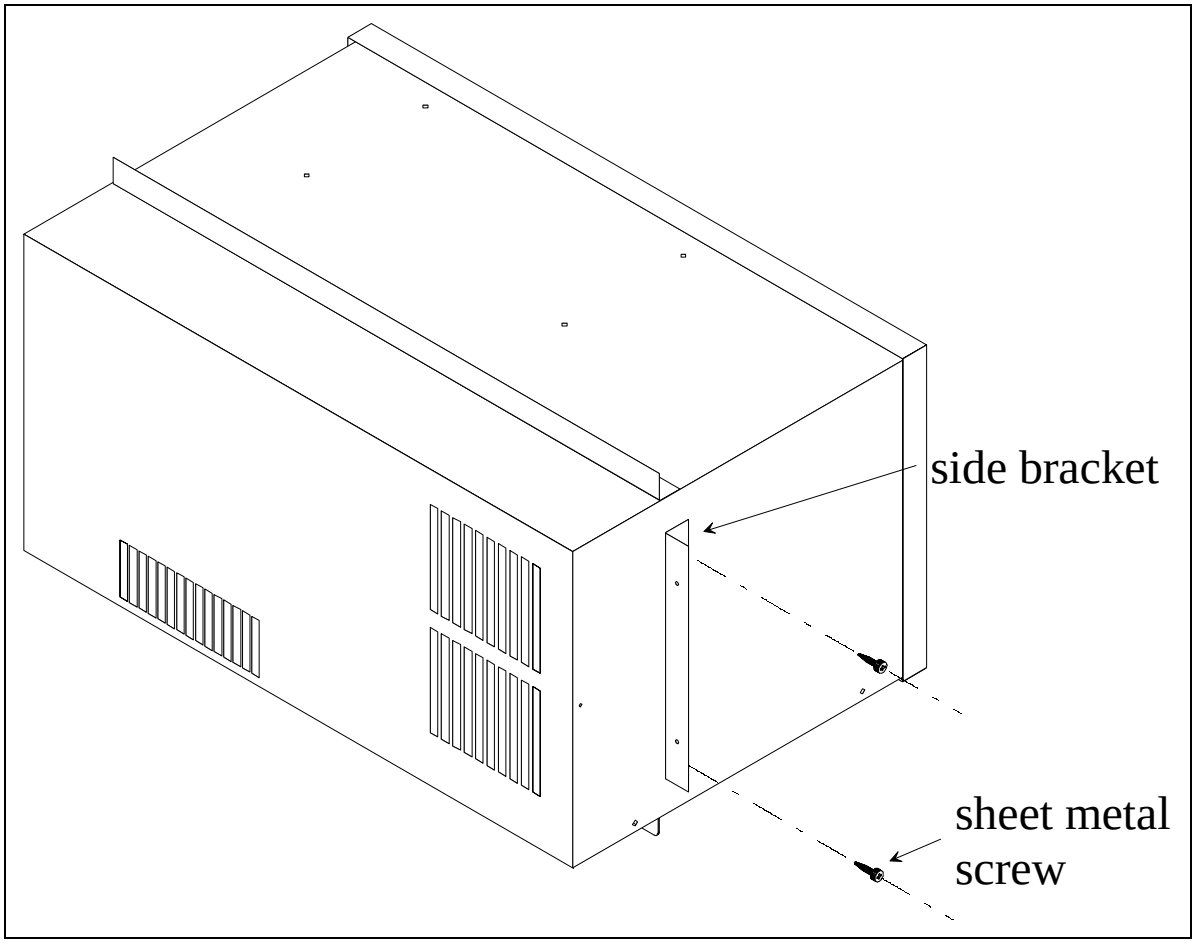


Figure 2

Open the window sash approximately 12 inches or more. Holding the unit securely, place the unit into the window with the bottom of the unit resting on the stool and the flange of the lower bracket up against the outer edge of the stool, as shown in Figure 3. While continuing to hold the unit securely, lower the sash until it comes to rest in the position shown in Figure 3. Gradually release your grip on the unit, making sure that it is secure before completely letting go of it.

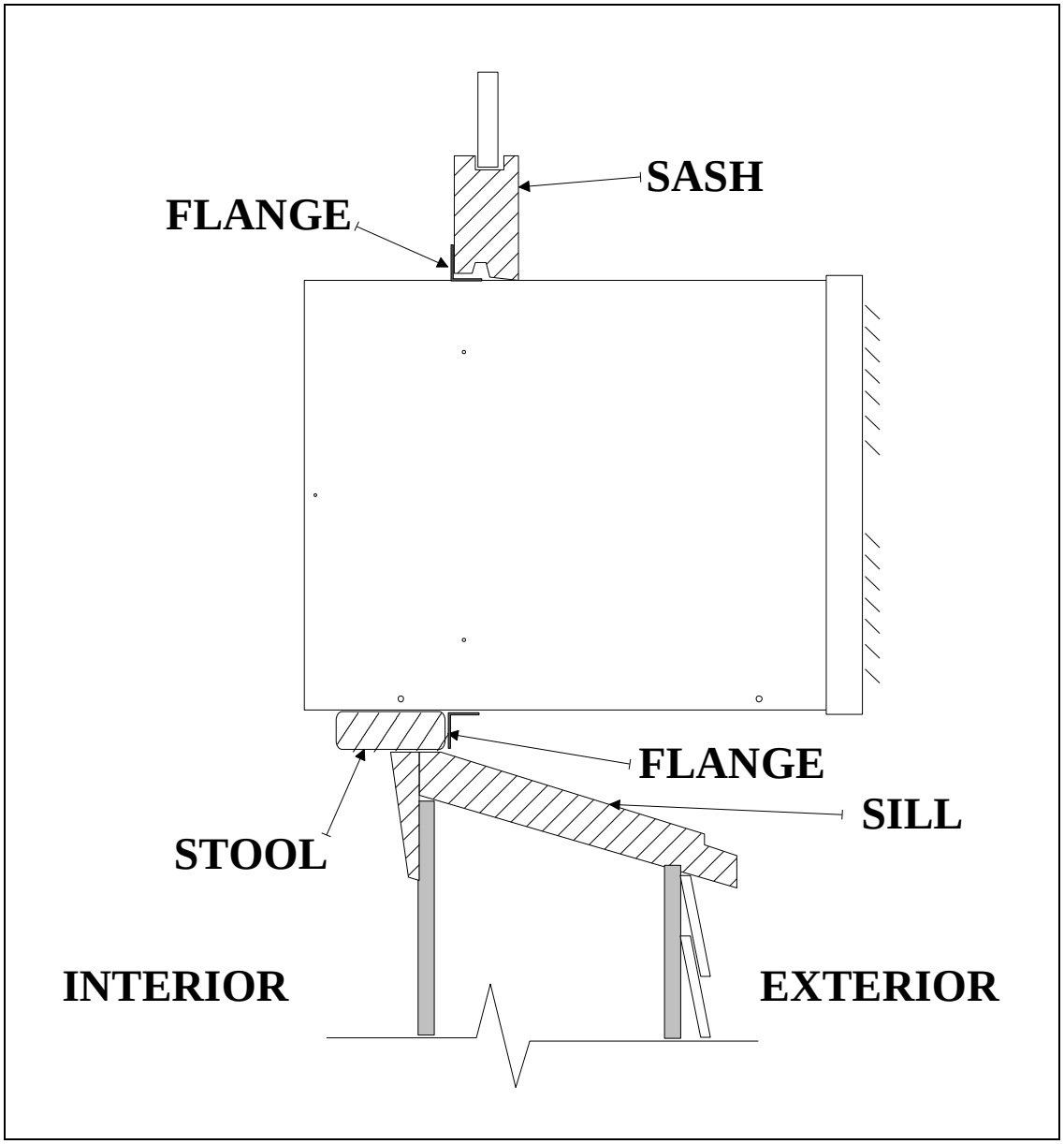


Figure 3

If the window also has a storm window, the stool will often be below the level of the storm window frame. This will prevent proper installation of the unit since it must be level. Referring to Figure 4, add a wood board of the proper thickness along the entire length of the stool so that the top of this wood board is as high or higher than the storm window frame. The board should be fastened securely to the stool with screws or nails.

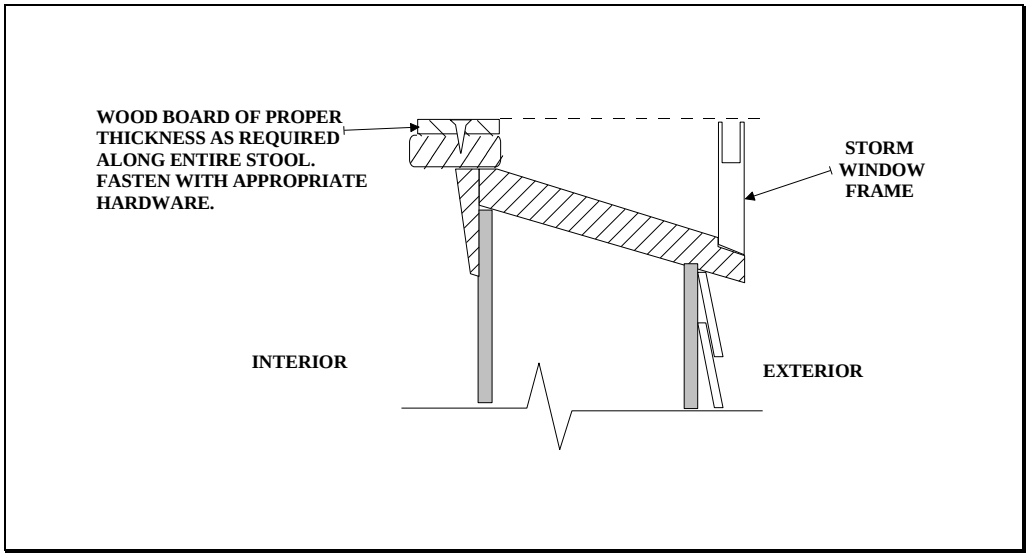


Figure 4

Immediately after the unit is in place in the window, the sash-retaining angle, supplied with the unit, should be placed as shown in Figure 5, and secured with the wood screw provided. We recommend drilling a pilot hole for the wood screw. **It is important that the sash-retaining angle be used since it prevents the window from accidentally being opened with the unit in place. The unit is held as a cantilever. If the window is accidentally opened, the unit will fall out of the window!**

Now take the foam gasket and insert it as shown in Figure 5 between the sash and the upper window glass to seal this opening. Cut off any excess length of the gasket.

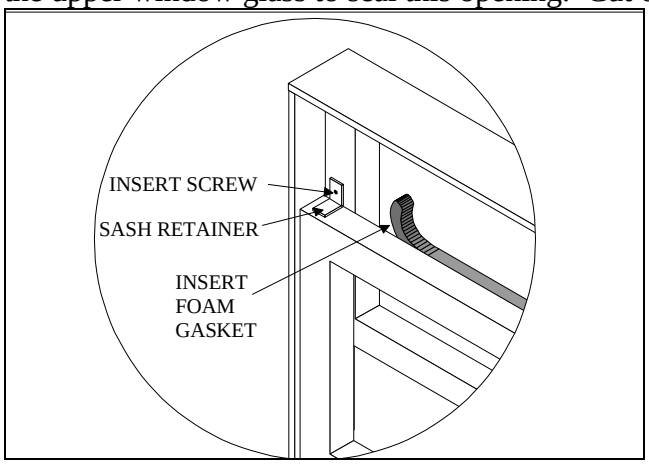


Figure 4

There are two pieces of corrugated plastic sheet supplied with the unit, which serve to seal and insulate the openings on either side of the unit. Measure the widths of the openings, L_1 and L_2, as shown in Figure 5. Measure these openings as accurately as possible, preferably to the nearest 1/16 of an inch.

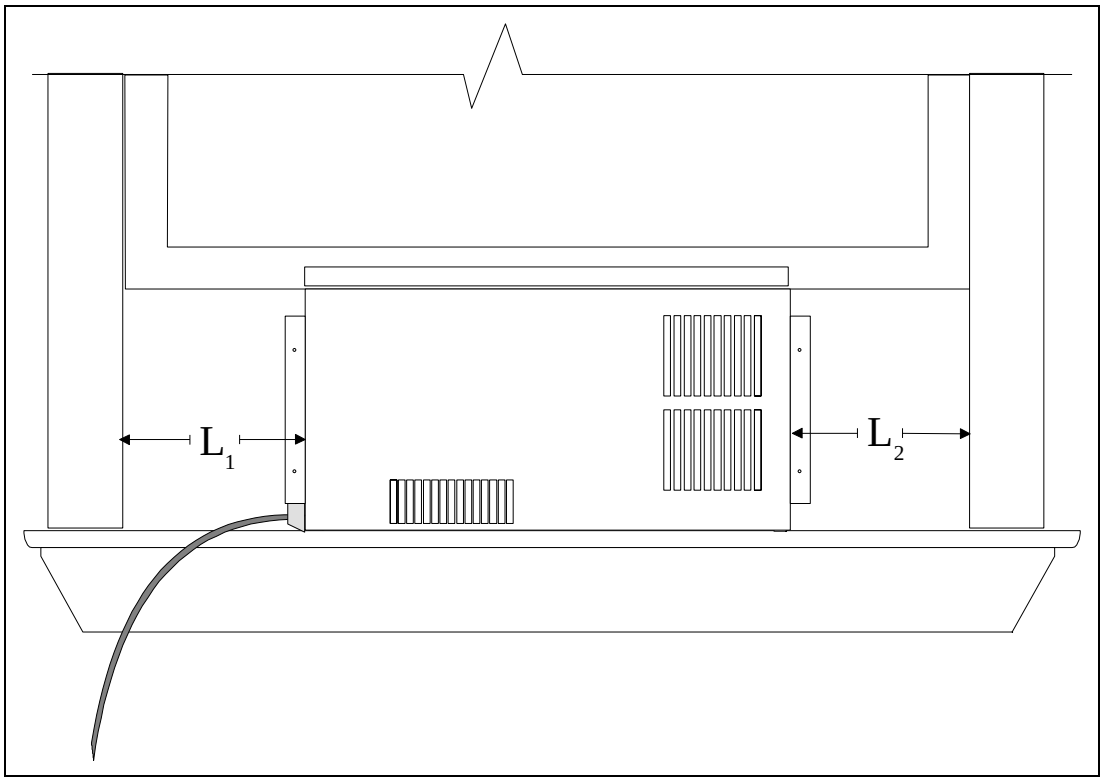


Figure 5

Take on of the sheets of corrugated plastic. Measure and mark a line a distance L_1 from the edge adjacent to the two mounting holes, as shown in Figure 6. With a straight edge and a utility knife, cut the plastic along that line. Repeat this procedure for the opening on the other side of the unit, cutting the other piece of plastic to the width L_2. Use a cutting board, or the like, to prevent damage to a nice tabletop.

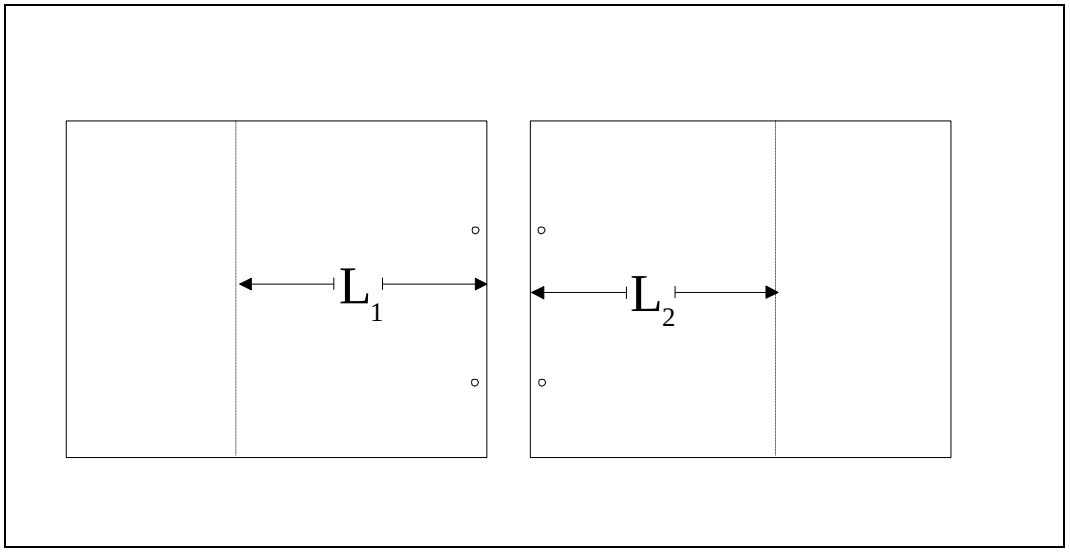


Figure 6

Take the two cut pieces of plastic and attach them to the side brackets as shown in Figure 7 with the four remaining sheet metal screws supplied. A drop of oil on the screw thread is helpful. Do not tighten the screws beyond what is needed to just secure the side panels since the plastic is delicate. Small wood screws (not supplied) can be used to secure the plastic to the sash.

To improve appearance and/or security, the cut plastic pieces can be replaced with pieces of wood. Any lumberyard can cut the pieces of wood.

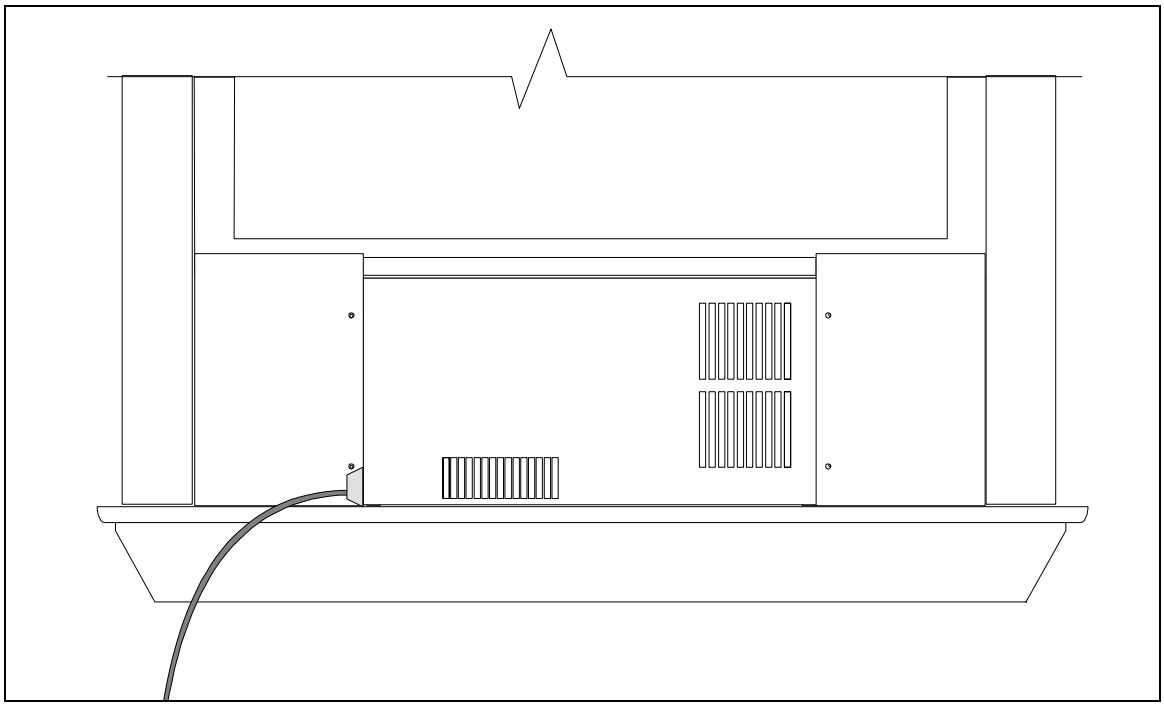


Figure 7

The unit is now installed. Plug the power cord into the electric outlet and turn it on. Turn the power switch clockwise past the click to turn the unit on high. To lower the blower speed, continue turning the switch clockwise.

To remove the unit from the window, perform the above in reverse order.

INSTALLATION THROUGH A WALL

The unit can be installed through any exterior wall with a total thickness of eight inches or less. Cut and frame a rectangular opening 18 ½ inches wide by 9 ¼ inches high through the wall. Follow local building codes. Choose a location close enough to a grounded three-pronged outlet such that the unit can be plugged in without the need for an extension cord. Place the PuriFresh® Energy Recovery Ventilator into the opening. Caulk and seal it in place. The side brackets should not be attached in the through the wall installation.

With the unit permanently in place in an exterior wall, the Energy Transfer Sections can be accessed for cleaning from the outside of the building.

IV. ENERGY TRANSFER SECTION REMOVAL AND CLEANING

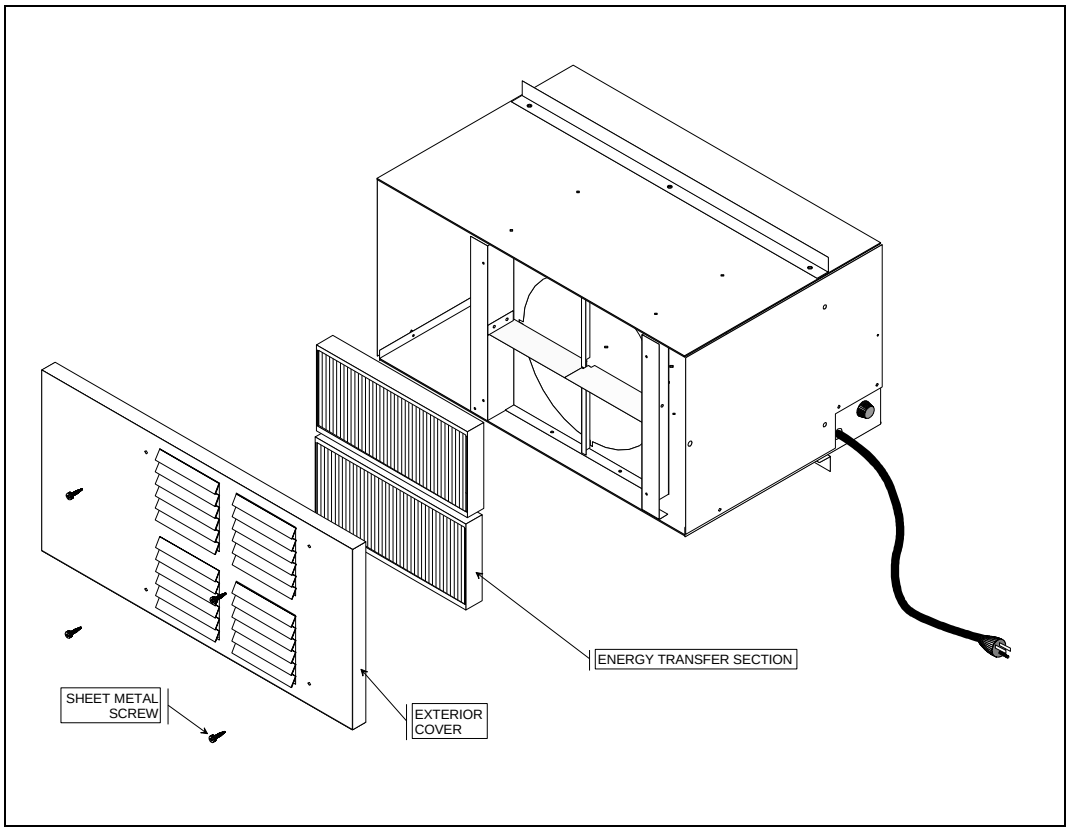


Figure 8

To remove the Energy Transfer Sections for cleaning, the unit must be removed from the window, unless the unit can be easily accessed from the outside, such as, in a ground floor installation. We recommend that the Energy Transfer Sections be cleaned yearly, preferably in the spring. This will clean the desiccant coating for the summer season when it is most needed.

Figure 8 shows an exploded view of the exterior of the unit. To remove the Energy Transfer Sections, remove the rear cover by removing the four sheet metal screws holding it in place. Remove the two Energy Transfer Sections.

To clean the Energy Transfer Sections, fully immerse them in hot water containing any mild dishwashing detergent. Allow them to soak for at least 20 minutes. Remove them, then fully immerse them in clean warm water to rinse them. Moving them around under the water will help the rinsing process. Remove the Energy Transfer Sections from the rinse water and allow them to drain dry. They can be returned to the unit before fully dry. If the Energy Transfer Sections are not fully dry, the unit should be turned on to complete the drying.

V. IMPORTANT NOTES

To be most effective, the unit should be run continuously when the home is occupied. The unit can be operated with a timer to turn it off when the home is unoccupied. **A timer, which accepts a three-pronged plug, must be used.**

If you are looking to ventilate more than just the room or space that the unit is installed in, keep doors between rooms open, most of the time. If a child or teenager insists on keeping his or her door closed most of the time, consider a separate PuriFresh® ERV for that room.

In some cases, the PuriFresh® ERV does not adequately remove moisture from the home in winter. We have Heat Transfer Sections, which are not desiccant coated. Use these in winter, the Energy Transfer Sections for the rest of the year. Contact us to order a set of Heat Transfer Sections. **It is very important to solve your moisture problem to prevent dry rot and mold, so don't delay.**

The unit is ideal for ventilating a room during and after painting or floor or furniture refinishing. It is also great for a room used for hobbies using volatile solvents. It is ideal for making a smoking room. In these cases, keep the door to the room closed and run the unit in a window.

We welcome any comments or concerns you may have so that we can help you use our product most effectively.

VI. WARRANTY

The unit has a full one year warranty on manufacturers defects covering all parts and labor for repair. The warranty does not cover damage to the unit caused by the consumer due to improper handling or installation. The warranty also does not cover damage to the unit when run in unusually corrosive or dusty environments such as, for example, running the unit in a room where wood floors or furniture or cabinets are being sanded. If you are experiencing a problem, first contact us by phone, mail of fax. If we can not assist you in solving the difficulty, we will make arrangements to have it shipped to us for repair or replacement.