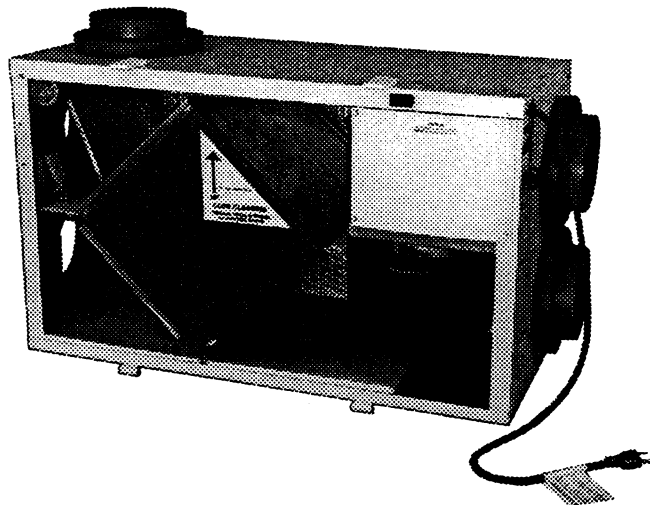


# LIFEBREATH™

## CENTRAL VENTILATION SYSTEMS

# INSTALLATION MANUAL

**Models 150SP, 150MAX,  
200STD, 200MAX**



### **APPLICATION WARNING!!!**

It is always important to assess how the operation of any Heat Recovery Ventilator may interact with vented combustion equipment (i.e., Gas Furnaces, Oil Furnaces, Wood Stoves, etc.)

**NEVER** install a Heat Recovery Ventilator in a situation where its normal operation (including defrost function), lack of operation or partial failure may result in the backdrafting or improper functioning of vented combustion equipment !



**Do Not Attempt Installing Unit  
Without First Reading Entire Manual**

TI-70  
938

## INTRODUCTION

*This Heat Recovery Ventilator (HRV) is designed to provide fresh air into the dwelling while exhausting an equal amount of stale air. During the winter months, the incoming cold fresh air is warmed by utilizing the heat recovered from the stale air before it is exhausted to the outdoors. During the summer months, the cool outgoing stale air from the air conditioned dwelling is used to cool the incoming fresh air.*

## TOOLS REQUIRED

The following is a list of tools you may require for the installation of your Heat Recovery Ventilator:

- Jigsaw/ Reciprocating Saw
- Electric Drill
- Flat Screwdriver
- "Robertson" screwdrivers #2 & 3 (square)
- Philips (for straps)
- Hex head for sheet metal and electrical box
- Pencil
- Extension Cord
- Measuring Tape
- Knife
- Duct Tape
- Hammer
- Pliers
- Crimpers
- Snips (Hand Shears)

**For Technical  
Information  
Call  
NUTECH  
Service Dept.  
(519) 457-1904**

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**LIFEBREATH**  
CENTRAL VENTILATION SYSTEMS

## ENGINEERING DATA

### CORE

Single, engineered with aluminum for superior thermal conductivity, meets the flame spread and smoke developed classifications of the National Building Code.

### MOTOR

High efficiency PSC on all models.

### FILTERS

Washable air filters in exhaust and supply air streams.

### BLOWERS

Each of the two air streams has 1 centrifugal blower driven by a common motor. When typically installed at .2 In. WG, the HRV delivers:

150SP	140 CFM
150MAX	140 CFM
200STD	195 CFM
200MAX	195 CFM

### CONNECTION DUCT SIZES

Four (4) - 6" (15 cm) Diameter

### UNIT DIMENSIONS

Length	31.0" (775 mm)
Width	14.75" (368.75 mm)
Height	19.0" (475 mm)
Weight	71 lbs. (32 kg)
Shipping Weight	73 lbs. (33 kg)

### MOUNTING HRV

Four (4) - 10/24" (10.5 mm) threaded inserts at corners of case designed to accept four (4) - PVC reinforced polyester straps (supplied with unit)

### CASE

20 gauge prepainted steel is insulated with a foil faced fibreglass duct liner where required to prevent exterior condensation.

### CONTROLS

- Lighted power switch
- STD / SP models have 3 speed (LOW, MED, HIGH) blower control
- MAX models have 5 speed with Off position controlled by autotransformer
- Defrost light indicates when defrost occurs. This is automatic when outside condition drops below -5°C (23°F)
- 24 VAC (low voltage) override of speed control to HIGH speed
- 150MAX, 200STD and 200MAX have a built in dehumidistat (automatically increases ventilation when RH[humidity] exceeds operators set point)

### CODES and STANDARDS

All models are CSA approved.  
All components are UL listed.  
Model 200MAX is R2000 approved.  
Model 200MAX is HVI Certified.

## ELECTRIC DEFROST

### OPERATION OF ELECTRIC DEFROST MODELS 150SP, 200STD

These Models are equipped with an electric defrost element and a factory pre-set automatic temperature controller in the fresh air supply stream which work to defrost the heat exchange core as necessary. The element will start to operate at about -5°C (23°F) as set at the factory (user adjustable) and cycle ON and OFF until about -15°C (5°F) at which time it is on until the temperature warms up (i.e. warmer than -15°C (5°F)).

## DAMPER DEFROST

### OPERATION OF DAMPER DEFROST MODELS 150MAX, 200MAX

These Models have an electronically controlled damper defrost mechanism. If the outside temperature drops below -5°C (23°F), the defrost timer is activated. After waiting approximately 17 minutes (during which time the core may experience some nominal frost build-up), the timer activates a motor driven damper door mechanism which opens the defrost port while at the same time closing off the supply air from outside. After approximately 4.5 minutes, the damper operates in the opposite direction to close off the defrost port and reopen the fresh air at the supply port (See Figure #1). The 17 minute wait time and 4.5 minute defrost cycle repeat until the temperature again rises above -5°C (23°F).

The defrost mechanism incorporates an easy to "self-test" feature. Each time power to the unit is interrupted (unplugged then plugged back in or turned OFF then ON, etc.), the unit initiates a defrost cycle. The defrost L.E.D. illuminates and the damper door operates for the pre-set 4.5 minute (approximate) time interval. This allows visual inspection of the operating components involved in the defrost cycle as they perform their function.

## LOCATION for MOUNTING

The Heat Recovery Ventilator must be located in a heated space where the surrounding air temperature does not fall below the freezing point. This is to prevent freezing of the condensate lines. It is also very important that the unit be mounted level (horizontal) in order that the proper condensate drainage can occur. Failure to do so will void warranty.

Typically, the HRV is positioned in the mechanical room or area close to the outside wall on which the weatherhoods will be mounted. Remember it needs a 120 VAC outlet to plug into (extension cords should not be used except if required to test unit on initial startup). If a basement area is not convenient or does not exist, a utility or laundry room may be used. Attic installations are not normally recommended due to complexity of work to prevent freezing while allowing access for service and cleaning.

Sufficient clearance to the front of the HRV is required for servicing of the air filters and exchange cores. A minimum of 25 in. (625 mm) clearance is recommended.

The four PVC reinforced polyester hanging straps supplied are for mounting the HRV to the basement floor joists. The hanger straps should be attached to the unit at the top end corners (mounting screws already located on the HRV case). Securely fasten the other end of the straps to the floor joists with wide head nails (not supplied) making sure unit is level. The rubber straps are designed to reduce the possibility of noise, resonance or harmonics, therefore using the full length of the strap between the HRV and the floor joists is recommended.

There are two prepunched holes in the bottom of the HRV through which the drain pan connectors will protrude once you place them as shown in Figure #1. They have been stored inside to avoid breakage of the connection point during shipping. Do not forget the "O Ring" which seals the connector to the pan. **REMEMBER TO HAND TIGHTEN ONLY** the washer and lock nut which hold the drain connector in place.

See Figure #1 for proper placement of the drainage hose. The drain line must be located in an area that is not subject to freezing and should be outletted into floor drain, sink, standpipe or condensate pump. Make sure the drain line slopes down to provide proper condensate removal. Should no "fall" be available, a condensation pump may be used.

**NOTE:** A "P-Trap" should be made to prevent odours from being drawn in through drain line.

## THE DUCTWORK SYSTEM

A well designed ducting system will allow the HRV to operate at its maximum efficiency. Air flow will be restricted by undersized ducting, use of too many elbows, tees, bends, etc. Always try to keep duct runs as short and straight as possible. When in doubt about the airflow capacity of a duct's diameter, always install the next larger size.

**NOTE:** Fully insulated ducting with an integral vapour barrier must be used on all runs passing through unheated areas in order to avoid condensation problems and energy losses from the air streams. We recommend NUFLEX from NUTECH ENERGY SYSTEMS INC. Check local codes for required insulation values.

Four 6 in. (15 cm) ports on the HRV are for attachment to the ductwork system. See Figure #1 for the function of these ports.

**A**

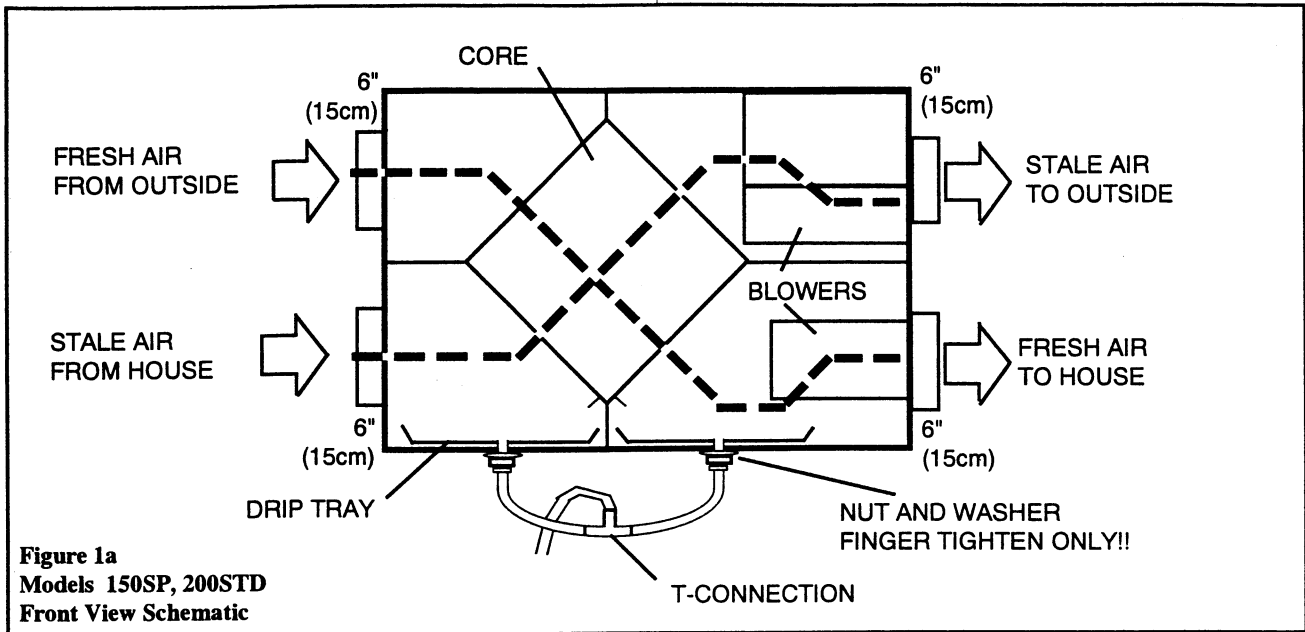
## OUTSIDE WEATHERHOODS

The weatherhoods must have built-in "bird" screens with 1/4 in. (.635 cm) minimum mesh to prevent foreign objects from entering into the ductwork. Do not use smaller mesh as it will be very susceptible to plugging up. Flappers and dampers at the vents must not be used as they will restrict air flow and often "seize up". The preferred location of the outside weatherhoods is:

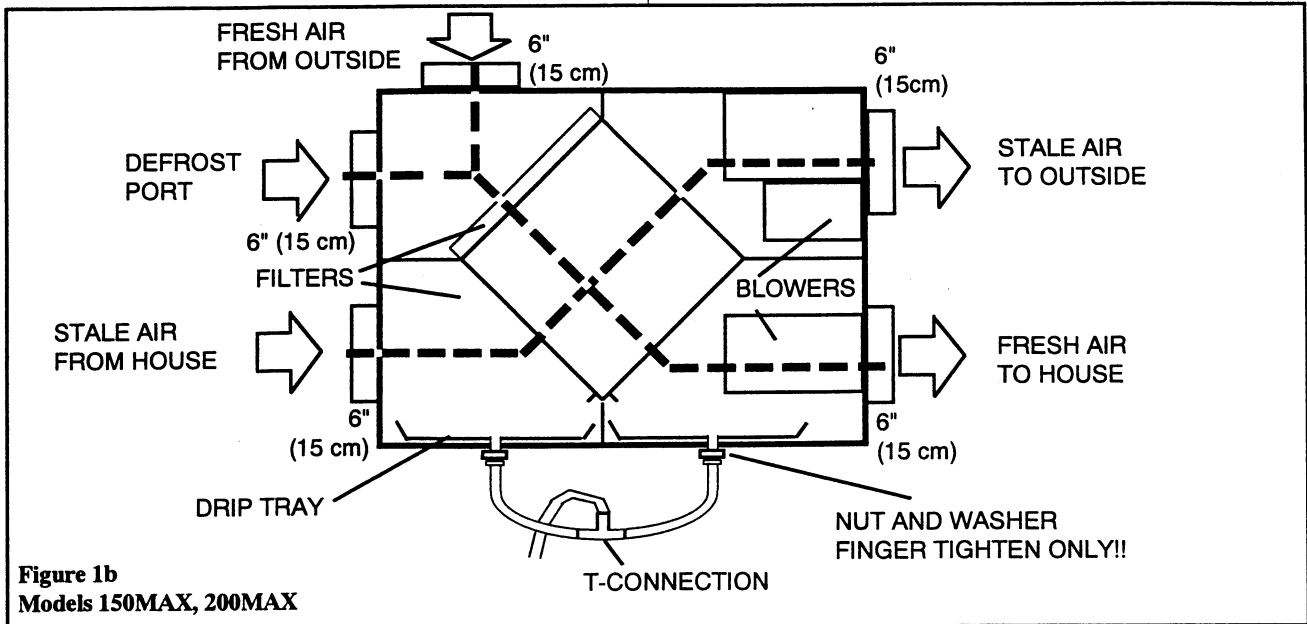
- no less than 6 ft. (2 m) apart from each other
- at least 18 in. (46 cm) above ground level
- away from sources of contaminants, such as automobile exhaust fumes, gas meters, garbage cans, barbecues, etc.
- not exposed to prevailing winds, whenever reasonably possible

The outside perimeter of the weatherhood must be caulked.

## ELECTRIC DEFROST



## DAMPER DEFROST



**B****DUCTING from  
the WEATHERHOODS**

Six inch (15 cm) diameter insulated duct with an integral single piece vapour barrier should be used. **Duct must meet ULC Class 1 fire rating.**

A minimum RSI value of insulation should be equal to 0.75 (R4), or that of the local building codes.

The inner and outer liners of the flexible insulated duct must be clamped to the sleeve of the weatherhood (as close to the outside as possible) and the appropriate port on the HRV. To keep the insulation and outer liner in place, a clamp and duct tape must be used. It is very important that the fresh air intake line be given special attention to make sure it is well sealed. A good bead of high quality caulking (preferably acoustical sealant) will seal the inner flexible duct to both the HRV port and the weatherhood prior to clamping.

To minimize air flow restriction, the flexible insulated duct that connects the two outside weatherhoods to the HRV should be stretched tightly and be as short as possible.

See Figure #2 for the recommended connection of flexible insulated ducts to both the outside weatherhoods and the HRV.

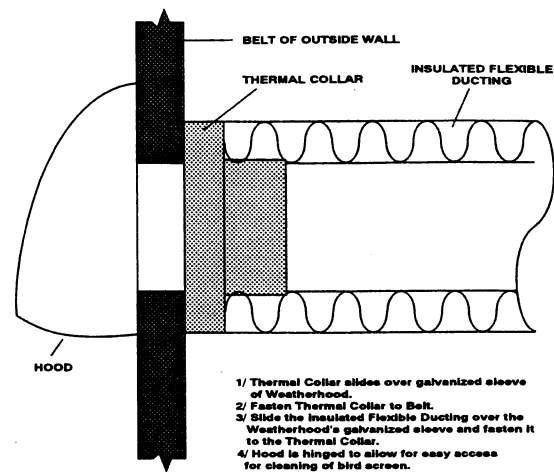
Ducting from the HRV to the different areas in the dwelling is recommended to be galvanized metal whenever possible, though flexible duct can be used in moderation if so desired.

**WARMSIDE DUCTING - General**

Main supply and return lines to/from Heat Recovery Ventilator must be 6 in. (15 cm) minimum. Branch lines to the individual rooms may be as small as 4 in. (10.2 cm), but 5 in. (13 cm) lines are preferred whenever possible.

To minimize airflow losses in the ductwork system, all ducts should be as short as possible and with as few bends or elbows as possible. 45° elbows are preferred to 90° elbows, whenever possible. Use Y tees instead of 90° tees whenever possible.

All duct joints must be fastened with screws, rivets or duct sealant and wrapped with a quality duct tape to prevent leakage. We recommend aluminum foil tape.

**WEATHERHOOD INSTALLATION**

**Figure 2**  
**Weatherhood Installation**

To avoid possible noise transfer through the ductwork system, a short length approximately 12 in. (30 cm) of non-metallic (i.e. *NUFLEX* flexible insulated) duct may be connected between the HRV and the supply/exhaust ductwork system.

The use of *TECHGRILLES™* (from *NUTECH*) as supply air diffusers and air exhaust covers are recommended. They are efficient, sound absorbing devices specifically designed for this installation.

If a "regular style" steel grille is used, the preferred wall grille size is 5 X 12 in. (13 X 30 cm) and floor grille size is 4 X 10 in. (10.2 X 25 cm). Smaller grille sizes may restrict air flow.

**FRESH AIR SUPPLY SYSTEM**

The fresh air from the HRV may be directed at a grille installed in the cold air return duct of the furnace. The fresh air supply outlet from the unit should be no closer than 4 in. (10.2 cm) and no further than 12 in. (30 cm) from the grille.

**NOTE:** *The grille in the cold air return duct must be at least 6 1/2 ft. (2 m) from the furnace, if fossil fueled, or as specified by local regulatory codes.*

The use of balancing dampers and/or adjustable grilles to balance the flow rates into various rooms is recommended. The *TECHGRILLE™*, available in 4", 5", 6" (100, 125 and 150 mm) is highly recommended.

**NOTE:** Do not use any louvered hoods with installation of LIFE BREATH™ HRV, as this will restrict the required air flow.

The TECHGRILLE™ is a round, fully adjustable grille, which provides superior, quiet air distribution. See Fig. 3.

The fresh air supply from the HRV to the house can follow several installation strategies. See Figures #4 and #5 for two installation schematics. The installation schematic shown in Figure #4 has proven to be an excellent method for both retrofit and new home situations where a forced air furnace is available. The installation schematic shown in Figure #5 is often installed in new or existing homes that do not have a forced air ducting system to distribute the fresh air throughout the house. For Figure #5, fresh air should be supplied to all rooms, but it is not required in those with exhaust points in them.

Supply air grilles may be floor or high wall mounted, but should not be located in areas where the fresh air will cause an uncomfortable draft on the occupants. **TECHGRILLES™ diffuse cool air exceptionally well to avoid drafts.** Avoid installing supply air grilles in bathrooms, or any other small room (with significant air quality problems) if it has an exhaust duct.

#### INSTALLATION FIGURE #6

In this method, the supply air is ducted directly into the cold air return of the central forced air furnace.

*NOTE: The installation schematics show a balancing damper on the supply duct leaving the unit. This is installed to balance the supply of air from the unit.*

Should you wish to hard duct the supply air directly into the cold air return of the furnace, remember to check the air flow balance of the HRV with the furnace fan both "ON" and "OFF" to determine that it does not imbalance the HRV more than 10%. Also, it is advisable to include a short length of fabric flex duct or other non-metallic connector in this hard ducted line in order to keep the HRV separately grounded (electrically) from the furnace. This will avoid a possible shock hazard to Service People if a short to ground develops in one of the devices.

#### STALE AIR RETURN SYSTEM

The stale air return system is used to draw air from the points in the house where the worst air quality problems occur. It is recommended that return air ducts are brought back from the bathroom, kitchen, and

laundry room. Additional return air ducts from strategic locations (i.e. greenhouse, atrium, swimming pool, sauna, etc.) may be installed. Note that the installation schematics show balancing dampers and/or adjustable grilles on all return air lines coming back to the unit. These are installed to help balance the "draw" from the different areas of the house.

The damper located just prior to the Heat Recovery Ventilator is provided to balance the stale air exhausted out of the house with fresh air supply entering the house.

We recommend the use of high duct mounted wall returns with grilles. The exhaust air line from the kitchen should never be connected to a range hood. Instead, an exhaust air grille should be mounted high on the wall at least 4 ft. (1.2 m) horizontally away from the stove. A flip up 8" x 10" rectangular kitchen grille with removable grease filter is available from NUTECH if desired.

The gyproc and studs of the wall can be used as a "duct" for high wall returns. When using wall cavities this way, they should be lined with either galvanized sheet metal or polyethylene (check Local Codes). The wall plate and the floor ply must be cut out to accept either ducting or the proper sized sheet metal boot.

#### INSTALLATION FIGURE #7

In this method, the exhaust air is not ducted back to the HRV with "dedicated lines": from bathrooms, kitchens, etc. Instead, the exhaust air is drawn out of the cold air return of the central forced air furnace. This method has become popular and provides good ventilation when installed in accordance with the noted instructions.

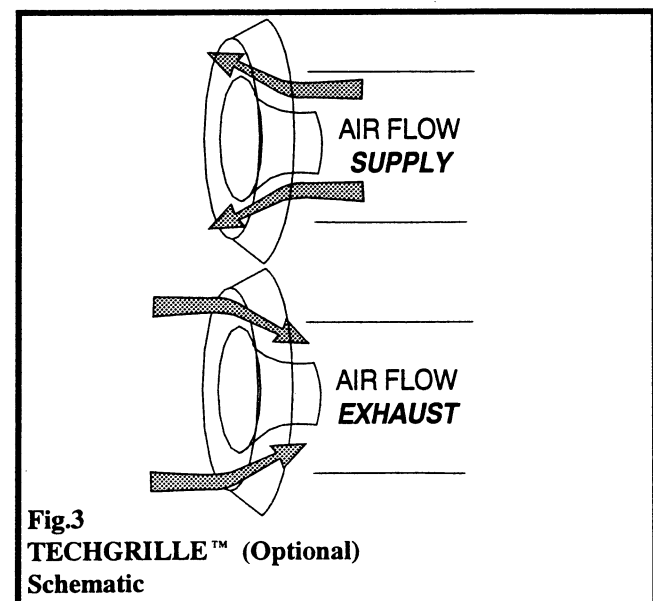


Fig.3  
TECHGRILLE™ (Optional)  
Schematic

## ELECTRICAL CONNECTIONS

The models 150/200 series is a 3 prong 120 VAC plug in type, if further wiring is required it is recommended that a licensed electrician make all electrical connections. It is very important that the unit be properly grounded. It is recommended that a separate 15 amp/120 volt circuit be used.

**WARNING:** *In order to prevent electric shock when cleaning or servicing the HRV, it is extremely important to confirm the polarity of the power line that is switched by the safety (disconnect) switch whose control arm is located on the outside of the electrical control box area. The hot line (black) is the proper line to be switched. To confirm the proper polarity, use voltmeter or test lamp to make sure there is no power after the switch when the door is open. Check between that point and ground (on the cabinet). This must be done as occasionally some dwellings are improperly wired. Always make sure the HRV is properly grounded.*

## AIR FLOW BALANCING

It is necessary to have volume balanced air flows in an HRV. The volume of air brought in from the outside must equal the volume of air exhausted by the HRV. If the air flows are not properly balanced, then;

- The HRV may not operate at its maximum efficiency
- A negative or positive air pressure may occur in the house
- The HRV may not defrost properly
- Failure to balance HRV may void warranty

**An excessive positive pressure** may drive moist indoor air into the external walls of the building where it may condense (in cold weather) and degrade structural components. Also, it may cause key holes to freeze up.

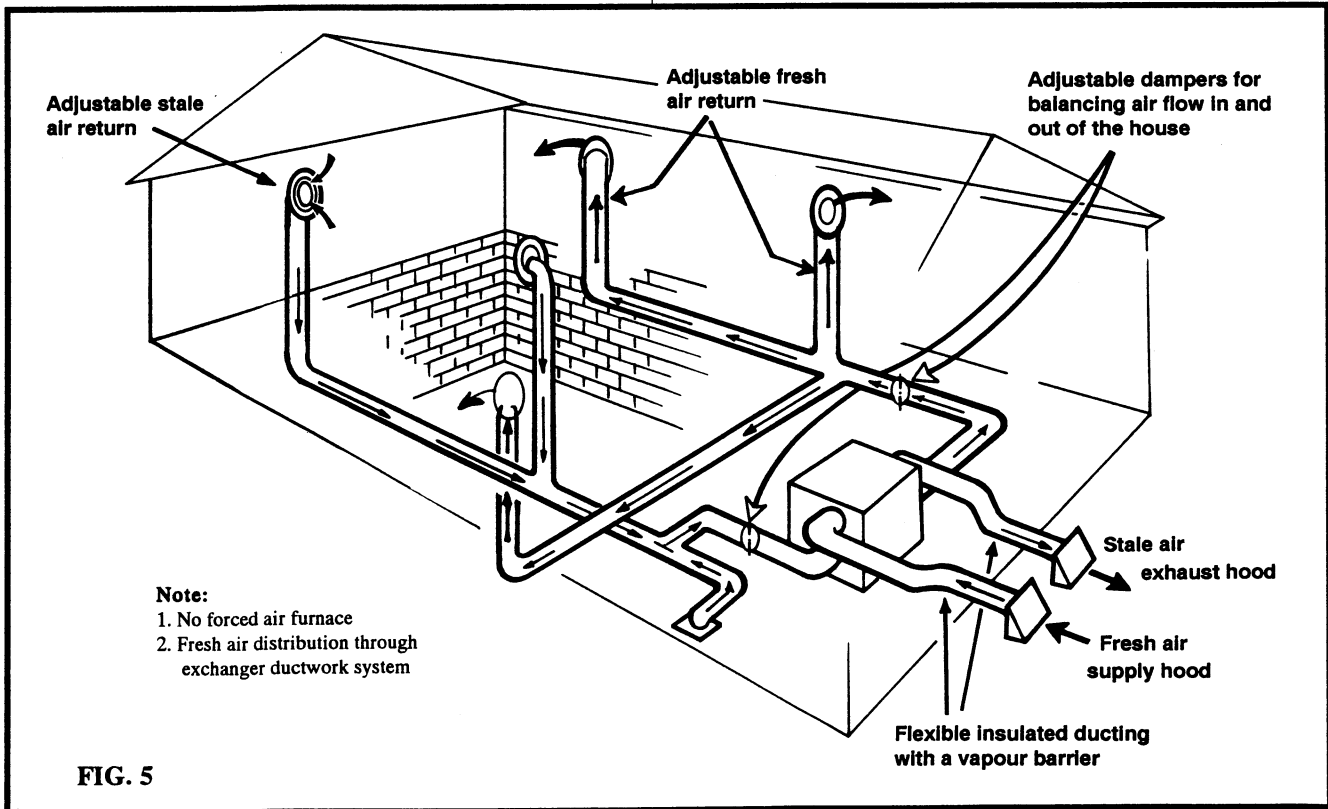
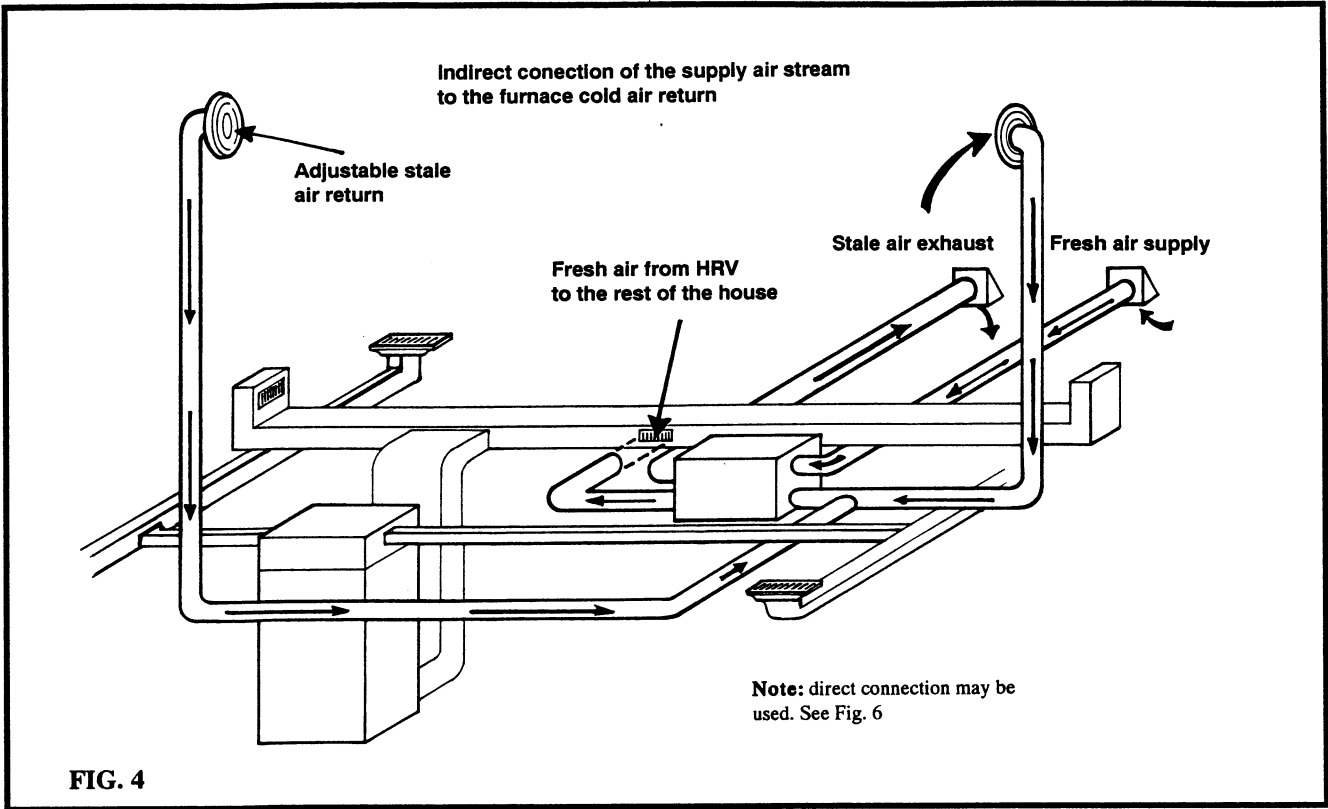
**An excessive negative pressure** may have several undesirable side effects. In some geographic locations, soil gases such as methane and radon gas may be drawn into the home through basement/ground contact areas. Radon is believed to be a cause of lung cancer. As well, an excessive negative pressure may cause the backdrafting of vented combustion equipment if an adequate combustion air supply is not provided. **Read the Application Warning at the start of this manual!**

### Procedure:

- A. Six inch (15 cm) diameter flow collars connected to an inclined or digital manometer, magnehelic etc. with a range of 0 to .25 in. (0 to 62.5 Pa) of water are recommended for accurate air flow measurements. To avoid air flow turbulence and incorrect readings, the flow stations should be located at a point at least ten duct diameters, i.e. 6 in. (15 cm) duct requires 10 diameters X 6" = 60" (150 cm) away from the nearest valve or flow restriction. Refer to HRAI installation manual. This requirement applies to both the stale air to exchanger duct and the fresh air to house duct.
- B. Prior to balancing, make sure:
1. All sealing of the ductwork system has been completed.
  2. All of the HRV components are in place and functioning properly.
  3. Balancing dampers are fully open.
  4. Unit is on HIGH speed.
  5. Air flows in branch lines to specific areas of the house should be adjusted first prior to balancing the unit. A smoke pencil used at the grilles is a good indicator of each branch line's relative air flow.
  6. After taking readings of both the stale air to the HRV duct and the fresh air to the house duct, the duct with the lower CFM (velocity) reading should be left alone, while the duct with the higher reading should be dampered back to match the lower reading.
  7. Return unit to appropriate fan speed for normal operation.



**OTHER INSTALLATION METHODS**



## OTHER INSTALLATION METHODS

### DIRECT CONNECTION of the SUPPLY AIR STREAM to the FURNACE COLD AIR RETURN of LIFE BREATH™ HRVs

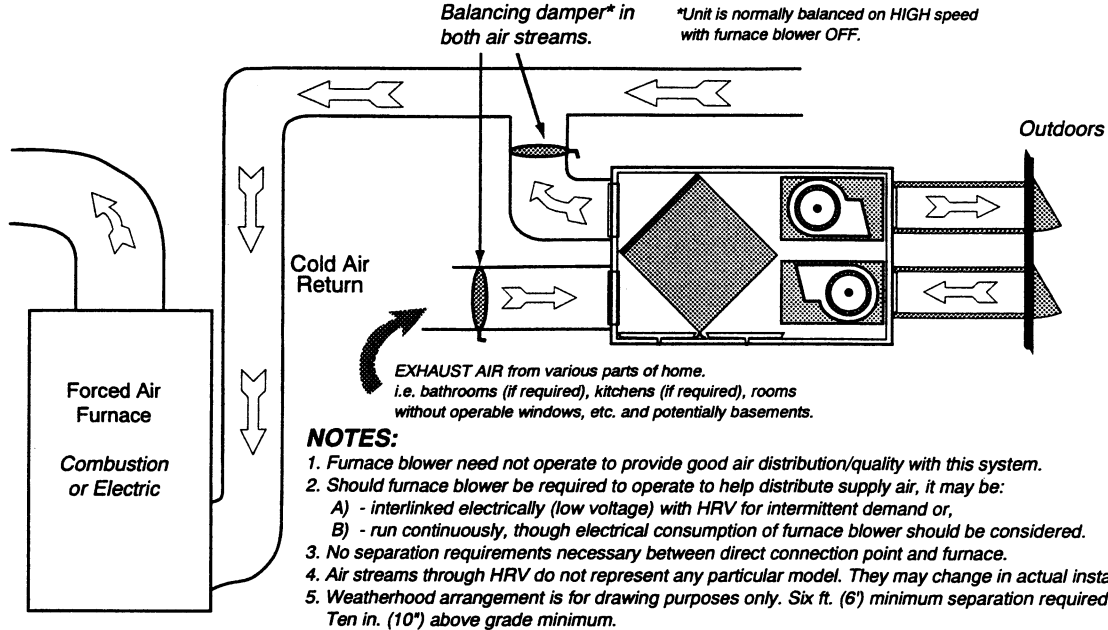


FIG. 6

### DIRECT CONNECTION of both the LIFE BREATH™ HRV SUPPLY AIR STREAM and EXHAUST AIR STREAM to the FURNACE COLD AIR RETURN

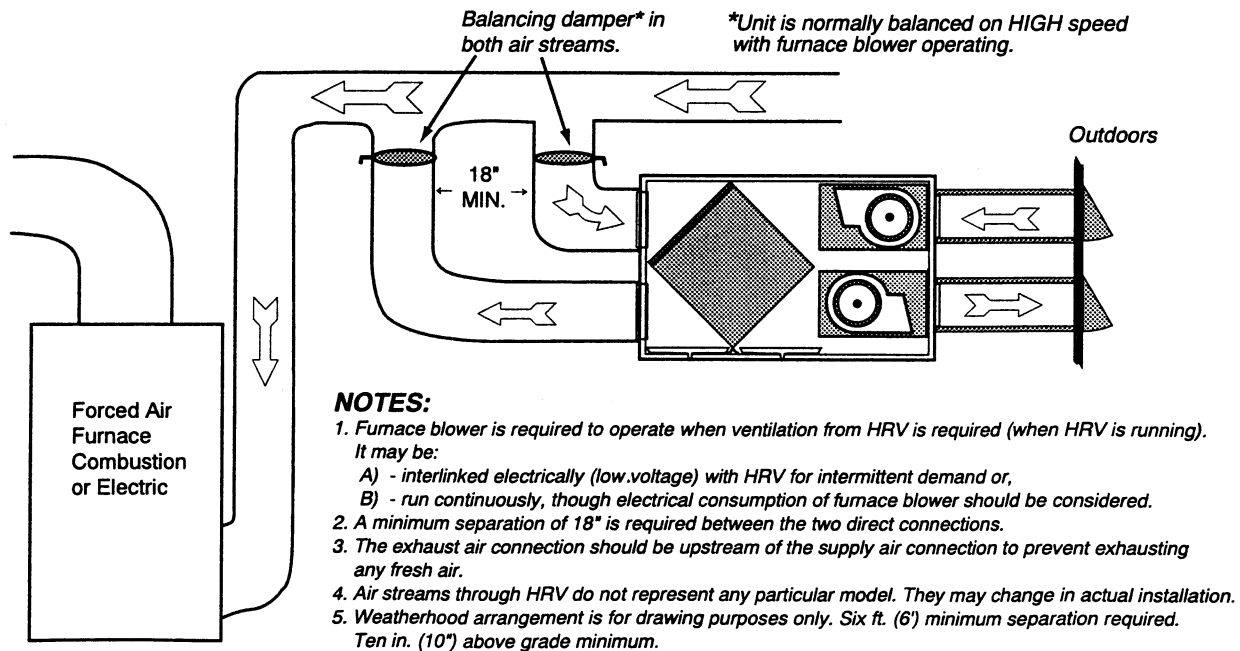


FIG. 7

## TROUBLESHOOTING YOUR HRV

SYMPTOM	CAUSE	SOLUTION
Humidity levels too low	<ul style="list-style-type: none"> <li>• HRV air flows improperly balanced</li> <li>• Dehumidistat control set too low</li> <li>• Lifestyle of occupants</li> </ul>	<ul style="list-style-type: none"> <li>• Balance HRV</li> <li>• Set dehumidistat higher</li> <li>• Humidity may have to be artificially added via humidifiers</li> </ul>
Humidity levels too high	<ul style="list-style-type: none"> <li>• HRV air flows improperly balanced</li> <li>• HRV undersized initially</li> <li>• Dehumidistat set too high</li> <li>• HRV undersized to handle hot tub, indoor pool etc.</li> <li>• Lifestyles of occupants</li> <li>• HRV not operating or malfunctioning</li> </ul>	<ul style="list-style-type: none"> <li>• Balance HRV</li> <li>• Set dehumidistat</li> <li>• Cover pools, hot tubs etc. when not in use</li> <li>• Avoid hanging clothes to dry, storing wood and venting clothes dryer inside</li> </ul>
Remote switch is not operating	<ul style="list-style-type: none"> <li>• Improper connection to external 24V board</li> <li>• Improper connection of external low voltage wiring between HRV and remote switch</li> <li>• External low voltage is shorted out by a staple, nail, etc.</li> <li>• Malfunction with 24V transformer in HRV</li> </ul>	<ul style="list-style-type: none"> <li>• Check 24V board on HRV to ensure unit able to jump to high speed</li> <li>• Check external wiring for short</li> <li>• Check wall switch for proper connection</li> </ul>
HRV and/or Ducts Frosting up	<ul style="list-style-type: none"> <li>• HRV air flows improperly balanced</li> <li>• Back draft dampers not installed or working when HRV is turned off</li> <li>• Malfunction with HRV's defrost system</li> </ul>	<ul style="list-style-type: none"> <li>* Note minimal frost build up is expected on cores before unit initiates defrost cycle function</li> <li>• Balance HRV</li> <li>• Install backdraft dampers</li> </ul>
Supply air feels cool	<ul style="list-style-type: none"> <li>• HRV air flows improperly balanced</li> <li>• Poor location of supply grilles</li> <li>• Outdoor temperature extremely cold</li> </ul>	<ul style="list-style-type: none"> <li>• Balance HRV</li> <li>• Locate grilles high on walls or under baseboards</li> <li>• If supply air is installed into return of furnace, furnace fan may need to run continuously to distribute ventilation air comfortably</li> </ul>
Water in bottom of HRV	<ul style="list-style-type: none"> <li>• Drain pans plugged</li> <li>• Improper connection of HRV's drain lines</li> <li>• HRV is not level</li> <li>• Drain lines obstructed</li> <li>• HRV heat exchange core not installed properly</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure O-Ring on drain nozzle sits properly</li> <li>• Look for kinks in line</li> <li>• Check water drain connections</li> <li>• Make sure water drains properly from pan</li> </ul>
Condensation or ice build up in insulated duct to outside	<ul style="list-style-type: none"> <li>• Incomplete vapour barrier around insulated duct</li> </ul>	<ul style="list-style-type: none"> <li>• Tape all joints</li> <li>• Ensure that vapour barrier is completely sealed</li> </ul>
Poor air flows	<ul style="list-style-type: none"> <li>• HRV air flow improperly balanced</li> <li>• Filters/Core plugged up</li> <li>• 1/4" mesh on outside hoods plugged up</li> <li>• House grilles closed</li> <li>• Dampers closed</li> <li>• Poor power supply</li> <li>• Improperly sized ducting</li> <li>• Under sized HRV</li> <li>• Improper speed control setting</li> <li>• Malfunction with HRV</li> </ul>	<ul style="list-style-type: none"> <li>• Tape all joints</li> <li>• Use proper air flow measuring equipment</li> <li>• Open all grilles</li> <li>• Remove obstructions in duct(s), hoods, and grilles</li> <li>• Balance air flows</li> </ul>

**DATE** \_\_\_\_\_

**PROJECT** \_\_\_\_\_

**MECHANICAL CONTRACTOR** \_\_\_\_\_

***NUTECH***  
**ENERGY SYSTEMS INC.**

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