



**COMMERCIAL
HEAT RECOVERY VENTILATOR**

HRV

AIR 450-D

Installation Manual

Pre-Installation Notes



Note

- Due to ongoing research and product development, specifications, ratings, and dimensions are subject to change without notice. Refer to www.airflowiaq.com for the latest product information.



Attention

- Do not apply electrical power to the unit until after the completion of the installation (including installation of low voltage control wiring).
- Ensure the installation and wiring is in accordance with all local electrical codes.
- Plug the unit into a standard designated (120 VAC) electrical outlet with ground.
- The use of an extension cord with this unit is not recommended. If the installation requires further wiring, have a licensed electrician make all the electrical connections. The recommended circuit is a separate 15 A/120 V circuit.



Caution

- Before installation, careful consideration must be given to how this system will operate if connected to any other piece of mechanical equipment, i.e. a forced air furnace or air handler, operating at a higher static. After installation, the compatibility of the two pieces of equipment must be confirmed, by measuring the airflows of the HRV, by using the balancing procedure found in this manual. Never install a ventilator in a situation where its normal operation, lack of operation or partial failure may result in the back drafting or improper functioning of vented combustion equipment
- Unit must be installed level to ensure proper condensate drainage. Due to the broad range of installation and operational conditions, consider the possibility of condensation forming on either the unit or connecting ducting. Objects below the installation may be exposed to condensate.
- Do not install control wiring alongside electrical wire.



Warning

- Disconnect the power from the unit before cleaning or servicing.
- To prevent electrical shock, it is extremely important to confirm the polarity of the power line that is switched by the safety (disconnect) switch. The hot line (black) is the proper line for switching. Use either a voltmeter or test lamp to confirm the absence of a voltage between the disconnect switch and ground (on the cabinet) while the door is open. This procedure must be followed, as dwellings are occasionally wired improperly. Always ensure the proper grounding of the unit.
- Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer or service agency.

Table of Contents

1	Controlling Your HRV	4
2	Selecting the Mode of Operation That’s Right for You	5
3	How the Dehumidistat Works.....	6
4	Main wall Controls (Operation)	7
4	Main Wall Controls (Operation).....	8
5	Timers (Operation).....	8
5	Timers (Operation).....	9
6	Location Notes	10
7	The Duct Work System.....	11
8	The Integrated HVAC System	12
8	The Integrated HVAC System	13
9	Stale Air Return and Fresh Air Supply System	14
10	Weatherhoods	15
11	Drain Connections.....	16
12	Main Control Installation	17
13	Additional Controls	18
13	Additional Controls	19
14	Timer Installation	20
14	Timer Installation	21
15	Repeater Installation.....	22
16	Balancing the Airflows	23
17	Balancing the Airflows	24
18	Service and Maintenance.....	25
19	Service and Maintenance.....	26
20	Troubleshooting.....	27
21	Troubleshooting.....	28
22	Wiring Diagram – AIR 450-D	29
23	Warranty	30



1 CONTROLLING YOUR HRV

Today's modern, tight buildings require fresh outdoor air to maintain a healthy indoor air environment. The amount of ventilation you require in the building will depend upon:

- The number of occupants and their activity levels
- The way the building was built
- Your personal preferences for fresh air

A Heat Recovery Ventilator (HRV) is an air to air energy exchanger found in modern, energy efficient homes. Due to the tight construction of new homes, your home can no longer "breathe" on its own. An HRV allows for fresh air exchange by exhausting stale indoor air and supplying an equal volume of fresh air from outside, ensuring high quality indoor air year-round. An HRV will transfer a high percentage of heat to the cooler air stream lessening the load on your heating and cooling appliances.

An HRV that is properly installed, operated, and maintained will:

- Exhaust stale, contaminated air
- Recover most of the energy from the exhausted stale air
- Use the recovered energy to preheat or precool outside air that is drawn into the building
- Distribute the fresh air throughout the building
- Mitigate high indoor humidity during the cooler winter months of the year by exchanging the humid indoor air with the dryer air from outside.
- Automatically cycles through its defrost mode when temperatures drop below freezing to avoid frost build up in the core

Each time the HRV is powered/energized, the self-test function automatically initiates. The unit cycles through the available speeds and tests the damper motor operation. The unit resumes operations at the selected mode and speed (approximately 60 seconds in duration).

Optional timers may be installed at specific exhaust locations (i.e. bathroom) to initiate high speed ventilation.

During seasons when your windows and doors are closed (winter, and summer if air conditioned), the HRV should be set to operate continuously on low speed with the option of going to high speed as the need arises. For example, if you are entertaining and there are several people present, the unit should be switched temporarily to high speed.

HRV Setting	Description	Result
Standby (fan speed set to 0 or OFF)	Allows unit to run on demand from remote controls such as a timer or dehumidistat.	Good
Intermittent low speed operation 20 ON / 40 OFF	Provides 20 minutes air exchange and 40 minutes off.	Better
Continuous LOW fan speed operation	Ensures continuous air exchange within the building. Air is always fresh and healthy.	Best

2 SELECTING THE MODE OF OPERATION THAT'S RIGHT FOR YOU

Operating Modes

The modes of operation and speeds are used to adjust your indoor ventilation rate. Experiment with the ventilation levels in your home to evaluate the ideal amount of ventilation to suit your home and personal preferences. Operational modes available to you will depend on the main control that is installed. Some features and modes may be unavailable to you.

1) Continuous Ventilation

This mode of operation provides continuous ventilation within the home. You may, for example, select Continuous Ventilation at low speed for normal operation and increase to high speed during increased activity levels, such as cooking and showering, etc.

2) 20 Minutes On, 40 Minutes Recirculation 20/hr 40/hr

This mode ventilates for 20 minutes and recirculates the household air every 40 minutes each hour. This mode is not applicable if your HRV is connected to a forced air system.

3) 20 Minutes On, 40 Minutes Standby 20/hr 40/hr

This mode of operation provides 20 minutes of ventilation each hour. You can use this ventilation mode at low speed for low household activity levels or when the home is unoccupied.

4) 10 Minutes On, 50 Minutes Standby 10/hr 50/hr

This mode of operation provides 10 minutes of ventilation each hour. You can use this ventilation mode at low speed for low household activity levels or when the home is unoccupied. This mode is useful when 20/40 mode is providing too much ventilation.

5) Continuous Recirculation

This mode continuously recirculates your household air (no ventilation). This mode is not applicable if your HRV is connected to a forced air system.

6) Continuous Low Fan Speed **LO**

This mode will operate the fan in low speed continuously at the selected operating mode (Ventilation or Recirculation)

7) Continuous High Fan Speed **HI**

This mode will operate the fan in high speed continuously at the selected operating mode (Ventilation or Recirculation). This mode is useful when occupancy in the home or activity is high for an extended period.

Recirculation

Recirculates existing household air without introducing fresh air. Recirculation modes (2 and 5) are not applicable if your HRV is connected to a forced air system, since your forced air system already circulates the household air. Recirculation modes are unavailable on some models.

3 HOW THE DEHUMIDISTAT WORKS

During the heating season, high indoor humidity levels have become a problem in many well insulated, tight homes. Excessive condensation on the window is a visual sign of high indoor humidity levels. High indoor humidity levels can result in mold and mildew and the eventual degradation of the building structure itself.

Your HRV reduces indoor humidity levels when the outdoor air is drier than the indoor air. These conditions usually occur during the heating season when outdoor temperatures are less than 15°C (59°F). During the heating season, the operation of the HRV may reduce indoor humidity levels sufficiently to eliminate the need for further dehumidification. If your home requires further dehumidification, use the Dehumidistat feature located on the wall control. High speed ventilation will be initiated upon exceeding the Dehumidistat set point regardless of the mode and speed of operation. Once the humidity in the house is reduced, the HRV will revert to its previous setting. The Dehumidistat function should be set to off for all seasons except the heating season because a dehumidifying effect occurs only when the outdoor air is dryer than the indoor air.

We suggest operating the HRV for the first few days without using the Dehumidistat function to observe if further dehumidification is required. The Dehumidistat operates in percentage of relative humidity (% RH), with 60 being high and 20 being low. If, after a few days, further dehumidification is required (i.e. the house is still too humid), set the humidity level to a lower amount.

The average person is comfortable between 30% RH and 50% RH. The Dehumidistat should be set to off for all seasons except the heating season.



Note

- **Dehumidistat Disable** automatically disables the Dehumidistat function on the main wall control when outdoor temperatures exceed 15°C (59°F) for a full 24-hour period. All other HRV features and functions operate normally while the Dehumidistat function is disabled.
- **Dehumidistat Re-enable** automatically re-enables the Dehumidistat function if either the outdoor temperature drops below 15°C (59°F) for a full 24-hour period or if the HRV is reset (unplugged for 30 seconds).


4 MAIN WALL CONTROLS (OPERATION)

Digital Wall Control (99-GDXPL03)



Operating Instructions:

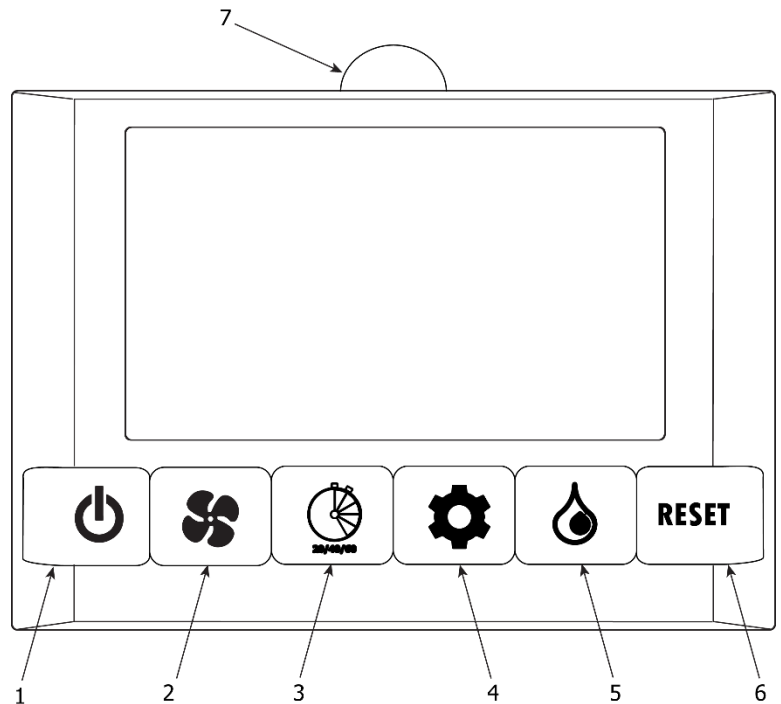
- (1) ON/OFF Button
- (2) Fan Speed Button
- (3) 20/40/60 High Speed Button
- (4) Mode Button
- (5) Dehumidistat Button
- (6) RESET Button
- (7) Instruction Card

Turning on the Control:

Press the ON/OFF Button . The light above will illuminate.

Setting the Ventilation Speed:


Press the Fan Button  to select one of the 5 available fan speeds. The fan speed will be displayed on the screen beside the Fan symbol . Standby mode (Fan OFF) is indicated as speed 0. The fan will turn ON if required by a remote timer (if installed).



20/40/60 High Speed Button:

Press the 20/40/60 High Speed Button  to temporarily initiate HIGH Fan Speed for 20, 40, or 60 minutes.

- Press one time for 20 minutes
- Press two times for 40 minutes
- Press three times for 60 minutes
- Press four times to disable.

The  will appear on the screen and the corresponding section of the clock will flash to indicate the time interval selected. When the timer runs out, the unit will return to its previous operating fan speed.




Attention









- Only one main control can be installed on your system.
- Recirculation is not available on all models.
- Timers will not function when mode of operation is set to "OFF", unless specifically installed for the function. (See Installation Guide for other options.)

4 MAIN WALL CONTROLS (OPERATION)


Digital Wall Control (99-GDXPL03) Operating Instructions (cont.):

Setting the Mode of Operation:

There are 5 modes of operation available with this control. Press the Mode Button  to cycle through the different modes of operation:

- Continuous Ventilation 
- 20 min. Ventilation / 40 min. Recirculation  
- 20 min. Ventilation / 40 min. OFF  
- 10 min. Ventilation / 50 min. OFF  
- Continuous Recirculation 



Setting the Dehumidistat:

Press the Dehumidistat Button  to adjust the Dehumidistat set point. The Dehumidistat can be set between 20% RH and 60% RH. The digital wall control displays the current indoor humidity in LARGE numbers and the Dehumidistat setting in SMALL numbers on the screen. If the indoor humidity is above the set point, the digital wall control will initiate HIGH Fan speed operation in Ventilation mode until the indoor humidity has been reduced below the set point.

Reset Button:

The RESET Button will clear the current Fan, Timer, Mode, and Dehumidistat settings set the unit into LOW fan speed, Ventilation Mode, and set the Dehumidistat set point to 40% RH.

Service Indicator:

A service indicator  appears when the unit requires routine maintenance. Refer to [Service and Maintenance](#). Press and hold the ON/OFF button  for 5 seconds to reset the service indicator after routine maintenance has been performed.

5 TIMERS (OPERATION)

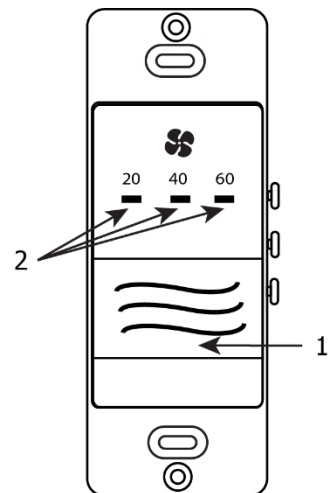
20/40/60 Minute Timer (99-DET01) Operation:

- (1) Select Button
- (2) 20/40/60 minute status lights

Press the Select Button on the timer to initiate high speed ventilation for 20, 40, or 60 minutes. The 20/40/60 minute status lights indicate high speed operation.

Lockout mode is useful if you wish to disable the timer:

- Enable Lockout Mode by holding the Select Button for 5 seconds.
- Disable Lockout Mode by holding the Select Button for 5 seconds.



5 TIMERS (OPERATION)

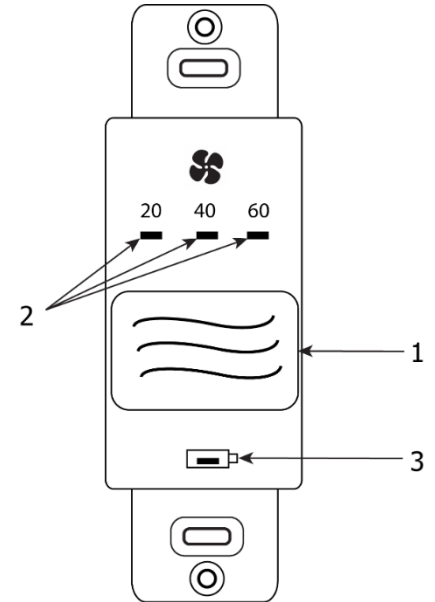
20/40/60 Minute Wireless Timer (99-DET02) Operation:

- (1) Select Button
- (2) 20/40/60 minute status lights
- (3) Red LED battery indicator

Press the Select Button on the timer to initiate high speed ventilation for 20, 40, or 60 minutes. The 20/40/60 minute status lights indicate high speed operation. To cancel the high speed fan operation, press the Select Button until the 20/40/60 minute status lights are no longer illuminated.

When the battery in the timer needs to be replaced, the red LED Battery Indicator will illuminate.

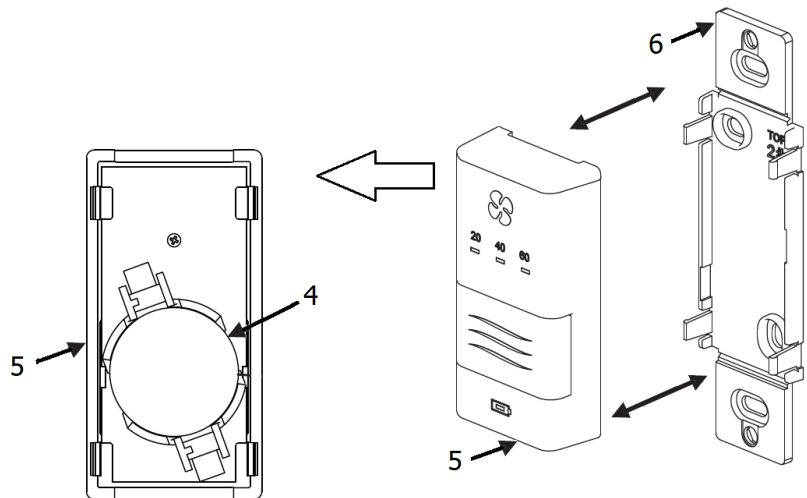
When paired to the digital wall control, the wireless timer may be moved to a remote location in the home such as a bathroom. Wireless timers have an estimated range of 40 ft with no obstructions



Replacing the Timer Battery (99-DET02):

- (4) Battery
- (5) Face plate
- (6) Back plate

- a) Remove the face plate by separating it from the back plate. On the back of the face plate the battery will be exposed.
- b) Replace the battery and re-attach the face plate to the back plate.



Attention

- Be careful not to damage the tabs on the back plate when re-attaching the face plate.

6 LOCATION NOTES

The HRV must be in a heated space where the surrounding air temperature does not fall below 60°F (16°C). The unit must be mounted level (horizontal) to obtain proper drainage of water from the heat exchange element and drip pans. The warranty will be void if these conditions are not met.

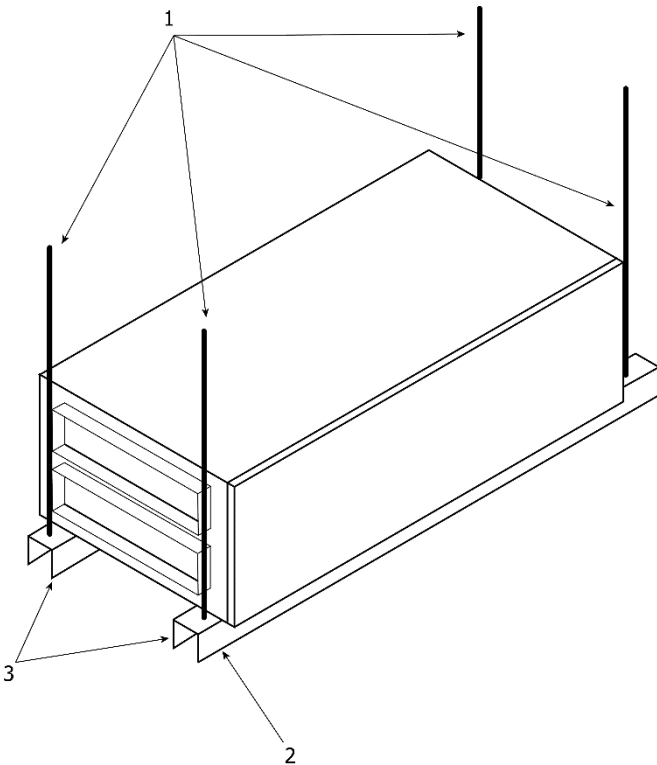
Typically, the HRV is positioned close to an outside wall or the roof to simplify the connections and keep the length of insulated ducting required for the fresh air intake to a minimum.

A minimum clearance of 30 inches (76 cm) in front of the HRV is recommended to service the heat exchanger cores and the filters. The HRV may be mounted on an equipment platform providing the drain hoses are clear and there is enough space to open the doors for servicing.

Saddle Installation

- (1) Threaded rod (supplied by others)
- (2) U-channels
- (3) Vibration isolators (supplied by others)

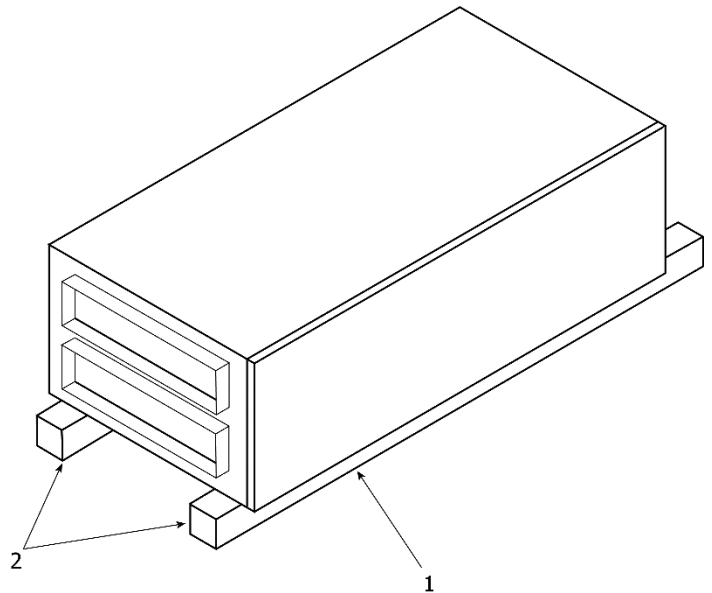
Hang unit with suspended rods and "U" channel members



Curb Mounted Installation

- (1) Curb—Wood or Metal (supplied by others)
- (2) Vibration isolators (supplied by others)

Mount unit on wooden or metal curb assembly. Unit must be raised an adequate height for installation and slope of drain lines. May be anchored to floor, leaving space for drain connections.



Warning

- Flexible duct connectors should be installed between the HRV and the galvanized ductwork.

7 THE DUCT WORK SYSTEM

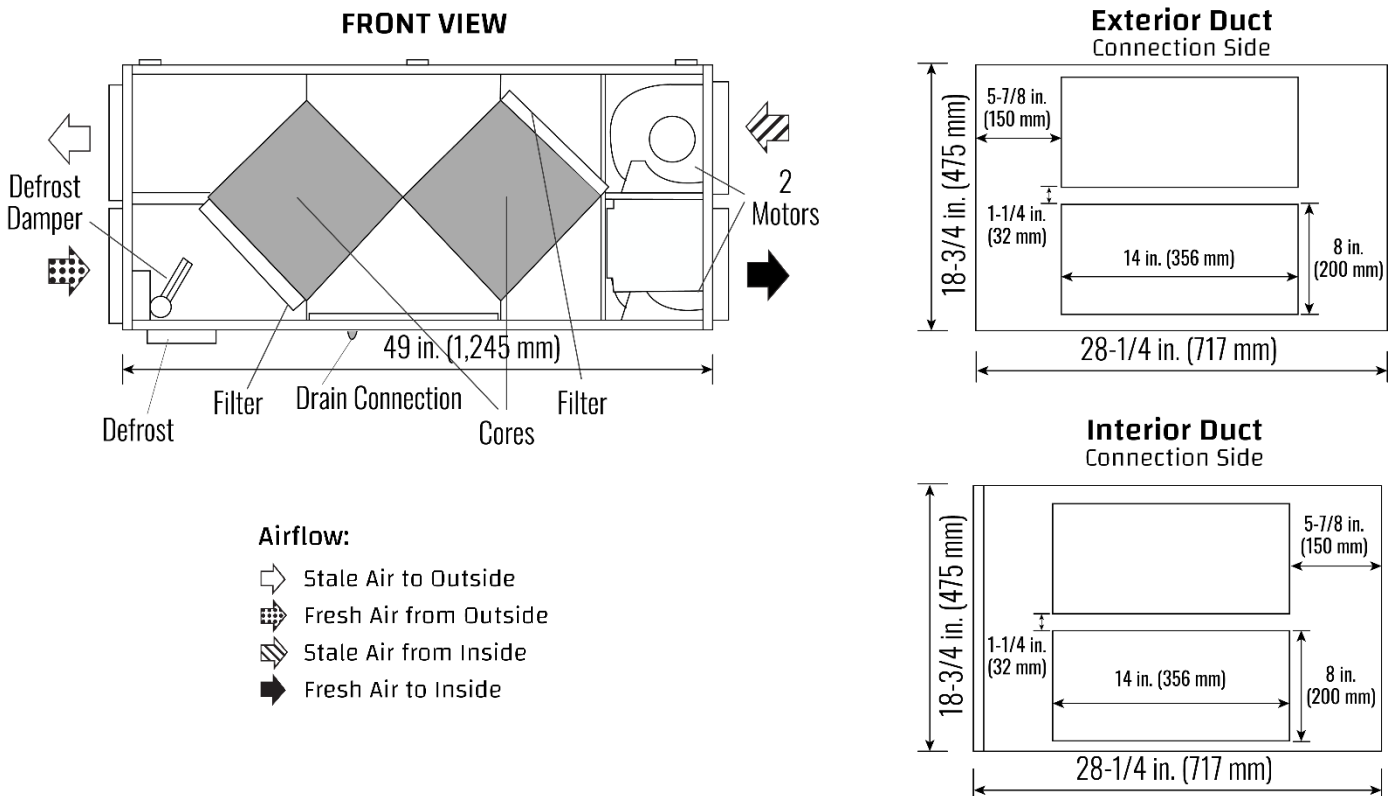
A properly designed ducting system will allow the HRV to operate at its maximum efficiency. (Air flow will be restricted by undersized ducting, use of too many elbows, tees, bends, etc.). Always try to keep duct runs as short and straight as possible.

All joints must be airtight, sealed and impervious to moisture. See below for exact duct sizes and location.

To minimize pressure drop and noise, galvanized metal ducts, properly sized, are recommended. Keep ducting as short as possible and use a minimum of elbows and tees.

Connecting sections and shorter runs may be flexible ducting one size larger than the metal equivalent. Use flexible duct connectors at the HRV to avoid noise transmission.

All duct joints must be secured with screws, rivets or duct sealant and sealed with aluminum duct tape to prevent leakage.



Attention

- 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 systems.

8 THE INTEGRATED HVAC SYSTEM

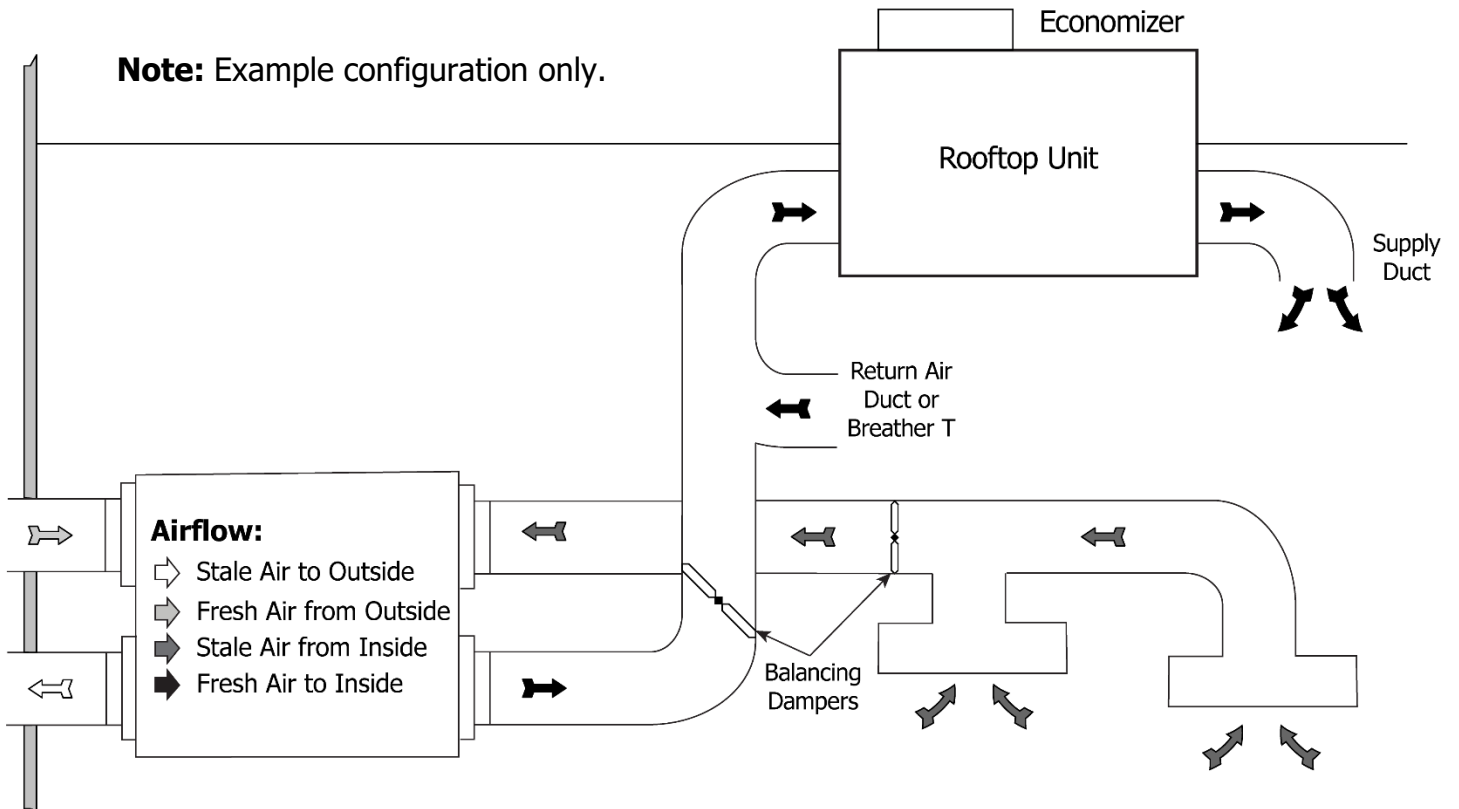


Figure A

The HRV has become an integral component of the HVAC system. Figure A shows an HRV unit providing fresh air directly to the return air plenum of a rooftop heat/cool unit.

In the balanced airflow system, the HRV exhaust removes stale room air (eg. from lunchroom, storage or copy area) and returns to the space an equal amount of fresh outdoor air, making the use of an economizer obsolete in conjunction with an HRV.

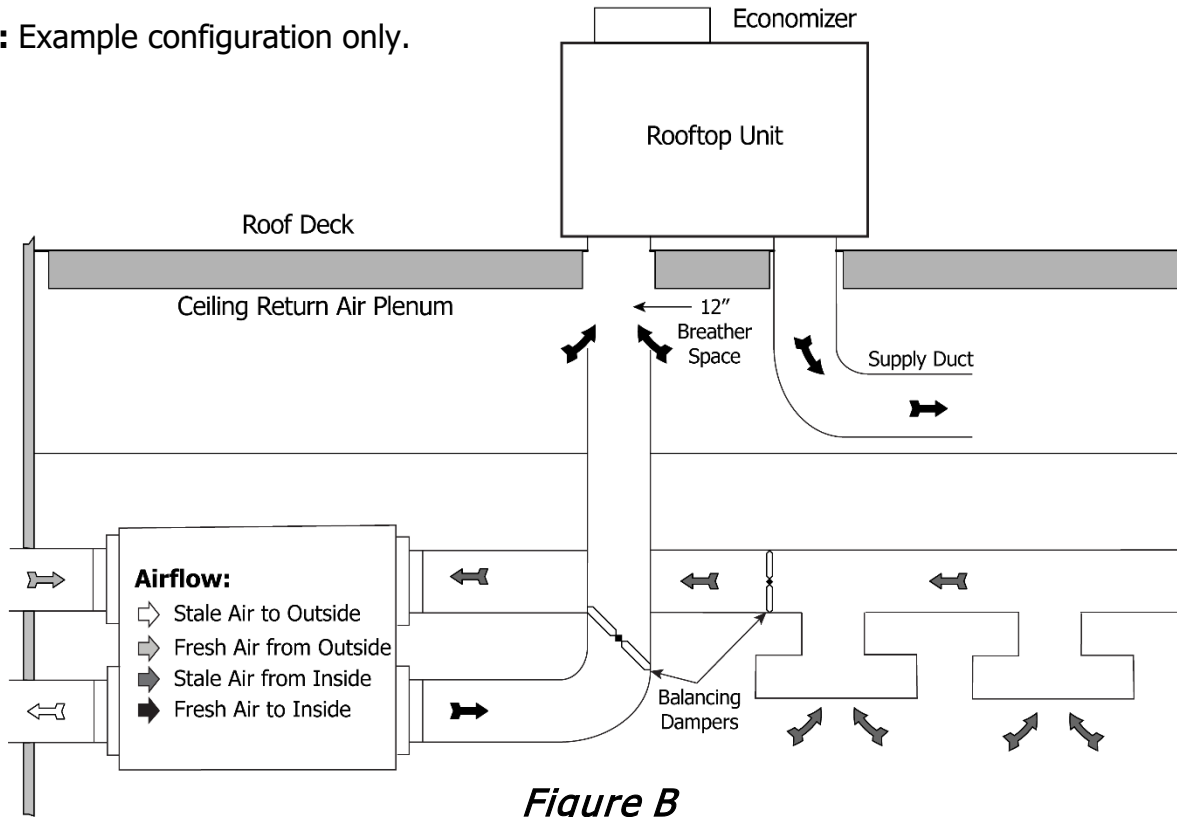


Warning

- At no time should the air handler Total External Static Pressure (TESP) on the return duct exceed that of the HRV.
- When interlocking a rooftop unit with an ERV take care to ensure the fans of both units operate in the correct rotation.

8 THE INTEGRATED HVAC SYSTEM

Note: Example configuration only.



Many buildings have ceiling return air plenum as in Figure B. Fresh air from the HRV can be introduced directly into the ceiling space, but this should occur near the air handler's intake.

By operating the HRV on a 24 hour/7 day battery backed timer, the unit can be set to operate only when occupancy or indoor conditions require the air exchange.

In installations where it is satisfactory to provide general exhaust from the space, the air to be exhausted may be taken directly from the return air plenum to the HRV as it is drawn back to the air handler. Fresh air supplied by the HRV is then introduced directly into the return air plenum but at a location closer to the air handler. The air handler would have a constant running blower to effectively distribute the fresh air and remove the stale air. Balancing dampers would be in both the HRV supply and exhaust ducts between the return air plenum and the HRV.



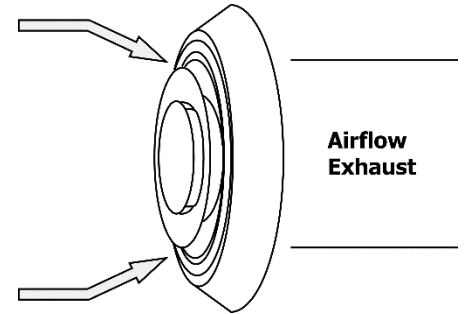
Warning

- At no time should the air handler Total External Static Pressure (TESP) on the return duct exceed that of the HRV.
- When interlocking a rooftop unit with an ERV take care to ensure the fans of both units operate in the correct rotation.

9 STALE AIR RETURN AND FRESH AIR SUPPLY SYSTEM

Stale Air Return System

Many commercial activities produce air contaminants in the form of dusts, fumes, mists, vapors and gases. Contaminants should be controlled at the source, so they are not dispersed through the building or allowed to increase to toxic concentration levels. The ventilator allows for economical operation of the HVAC system while effectively removing contaminants from the space. In designing the exhaust portion of the system, the exhaust grilles are situated to remove the contaminants while not allowing them to enter the breathing zone of the occupants.



The stale air return system is used to draw air from the points in the building where the worst air quality problems occur. Balancing dampers and/or adjustable grilles are recommended on all return air lines which are used during installation to help balance the "draw" from different areas of the building.

For contaminants lighter than air, grilles should be located high on the wall. If contaminants are heavier than air, a lower placement of the grilles will be required. Information on a contaminants specific gravity and toxicity should be available from chemical data sheets.

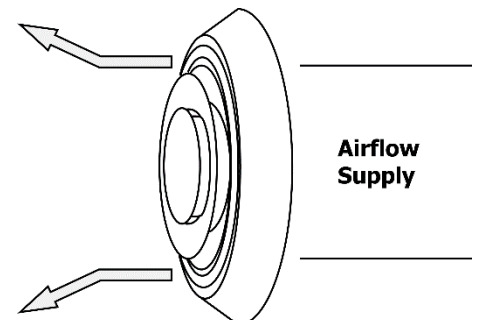
Alternately, the stale air may be drawn directly from the return air duct. When this system is used the air handler's blower will need to operate constantly when ventilation is required. The exhaust takeoff connection must be at least 3 ft (1 m) from a directly connected HRV supply duct if both are connected to the same duct run. Note and compensate for the static pressure of the air handlers return system if the static pressure of the return in the air handler exceeds 0.1 to 0.15 in. w.g.

A damper located just prior to the HRV is required to balance the stale air exhausted with the fresh air supply entering the building.

Return air suction points should be located on the opposite side of the room from the fresh air inlet. The inlets may be in the ceiling or high on the walls and fitted with inlet grilles.

Fresh Air Supply System

The fresh air supply ductwork from the HRV may be directly connected to the return air duct of the forced air system. Check the air flow balance of the HRV with the air handler blower 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 flex duct or other non-metallic connector in this hard ducted line in order to keep the HRV acoustically isolated and separately grounded (electrically) from the air handler. This will avoid a possible shock hazard to service people if a short to ground develops in one of the devices.



When installing an HRV, the designer and installer should be aware of local codes that may require smoke detectors and/or firestats in the HVAC or HRV ductwork. Because an HRV is designed to bring fresh air into the building, structures may require supply voltage interrupt when smoke or flame sensors are triggered, or when a central fire alarm system is activated.

It may be necessary to install a separate fresh air supply ductwork system if the heating is other than forced air.

Supply air grilles may be ceiling or high wall mounted. Avoid locating incoming fresh air grilles that could cause a direct draft on the occupants as the incoming air may be below room temperature. A reheat duct heater can be installed to improve occupant comfort.

10 WEATHERHOODS

Outside Weatherhoods:

- The weatherhoods must have built-in "bird" screen with 1/4 in (6.35 mm) minimum mesh to prevent birds and rodents from entering the ductwork.

Recommend:

- no less than 10 ft. (3 m) apart from each other
- at least 18 in (46 cm) above snow line or ground level
- away from sources of contaminants, such as automobile exhaust fumes, gas meters, garbage cans, containers, etc.
- not exposed to prevailing winds
- The outside perimeter of the weatherhood must be caulked to prevent leakage into the building.
- The design and size of the weatherhoods or louvers chosen by the installer must allow for adequate free area. Water and debris penetration of the system is minimized when the airflow does not exceed 1000 FPM (5.08 m/s) free area velocity.

Ducting from the Weatherhoods:

- Galvanized sheet metal ducting with sufficient cross section with an integral single piece vapor barrier should be used to connect the ERV to the weatherhoods.
- A minimum R value of insulation should be equal to 4 (RSI 0.75)
- A good bead of high quality caulking (preferably acoustical sealant) and taping with a high quality aluminum foil tape is recommended to seal the duct to both the ERV and the weatherhood.

Techgrilles:

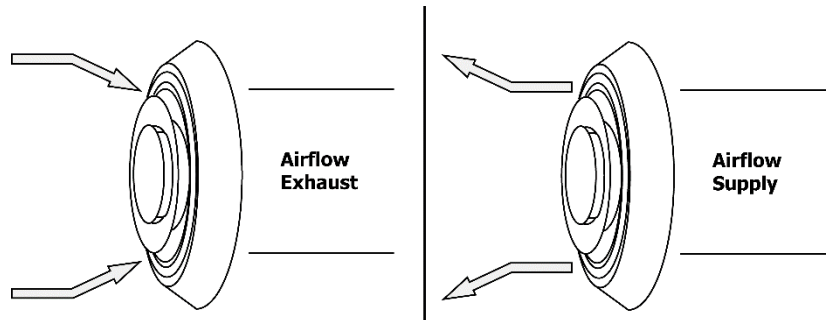
The use of balancing dampers or adjustable grilles as supply air diffusers and air exhaust covers are recommended. TECHGRILLES™ are round, efficient, sound absorbing devices available in 4", 5", 6" and 8" (100, 125, 150, and 200 mm) models.

Part# 99-EAG4 4" diameter Techgrille

Part# 99-EAG5 5" diameter Techgrille

Part# 99-EAG6 6" diameter Techgrille

Part# 99-EAG8 8" diameter Techgrille



Attention

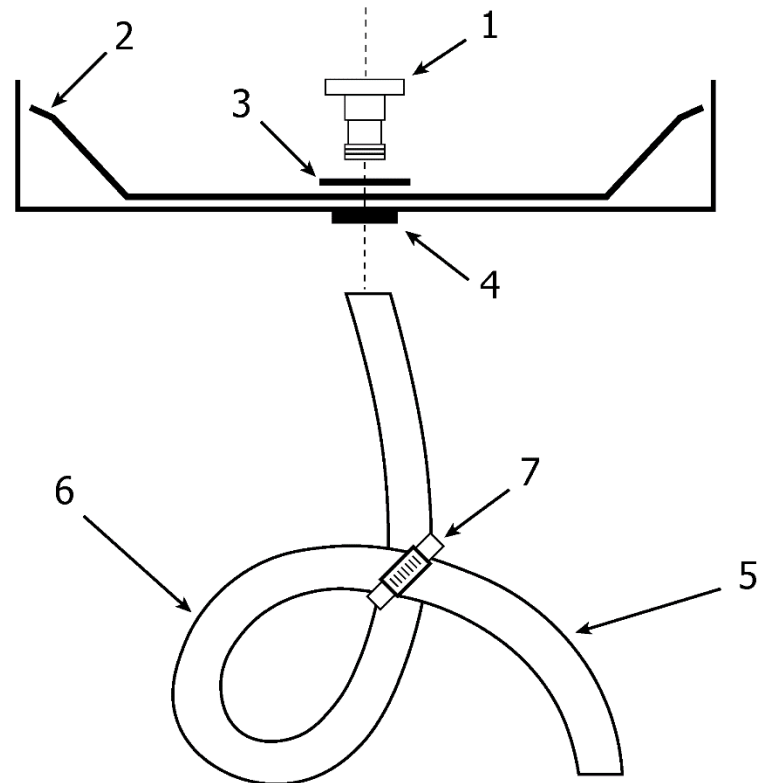
- All ducting must meet UL Class 1 requirements
- Design and install the fresh air intake in an area where the hoods will gather the freshest air.
- Do not use smaller mesh as it will be very susceptible to plugging up. Gravity dampers at the vents must not be used as they will restrict air flow and often "seize up".

11 DRAIN CONNECTIONS

The HRV cabinet has pre-punched holes for the drain. The HRV may produce some condensation during a defrost cycle. This water should flow into a nearby drain or be taken away by a condensate pump.

Figure Callouts:

- (1) Drain Spout
- (2) Drain Pan
- (3) O-ring
- (4) Nut
- (5) 1/2 in. Drain Hose
- (6) P-Trap
- (7) Zip Tie



Installation Steps:

1. Insert the drain spout with O-ring through the hole in the drain pan.
2. Install the washer and nut onto the drain spout. Hand-tighten the nut.
3. Construct a P-trap using 1/2 in. drain hose (not included). Ensure that the loop is large enough to avoid kinks. Secure it with a zip tie.
4. Pour a cup of water into the drain pan of the HRV after the drain connection is complete. This creates a water seal which will prevent odours from being drawn up the hose and into the fresh air supply of the HRV.



Caution

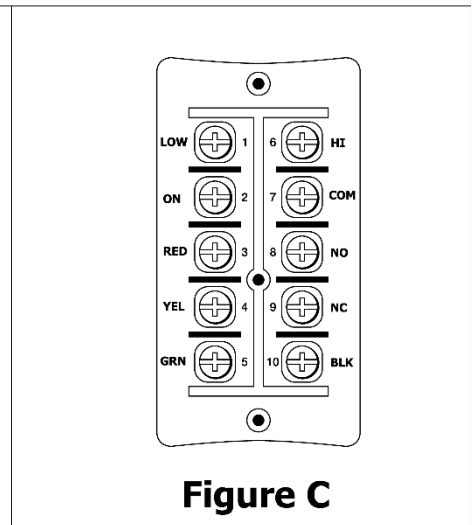
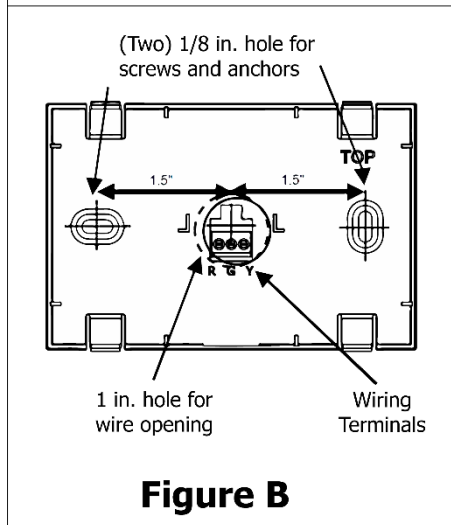
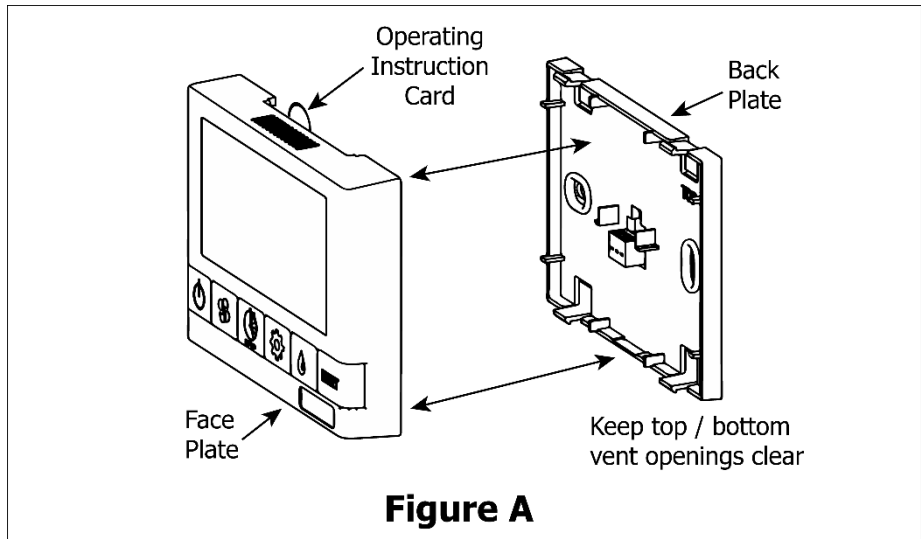
- The HRV and all condensate lines must be installed in a space where the temperature is maintained above the freezing point.
- Drain trap and tubing MUST be below bottom of door with 1/4" per foot downwards slope away from unit.
- A secondary drain pan may be required to protect from condensate leakage

12 MAIN CONTROL INSTALLATION

The 99-GDXPL03 wall control must be surface mounted onto a wall. Only one main control should be installed into a ventilation system.

Installation:

1. Remove the operating instructions card from the top of the main control (figure A).
2. Carefully separate the face plate and the back plate by firmly pulling it apart. Be careful not to damage face late contract pins (figure A).
3. Position the back plate of the control in the desired location on the wall and mark the wall for the desired screw holes (figure B).
4. Remove the back plate from the wall and mark the hole for the wires in between the two screw holes (figure B).
5. Drill two holes for the screws and wall anchors and drill one hole for the wires in between the two screw holes (figure B).
6. Pull the 3 wire 20 gauge (min.), 100 ft length (max.), through the opening in the wall.
7. Connect the wires to the R, G, and Y terminals on the back plate (figure B).
8. Using the two supplied screws and anchors, install the back plate on the wall.
9. Attach the face plate to the back plate. Be careful to correctly align the face plate with the backplate, to avoid damaging the face plate contact pins (figure A).
10. Install the operating instructions card in the top of the main control (figure A).
11. Connect the 3 wires 20 gauge (min.), 100 ft length (max.), to the 3 (RED), 5 (GRN), and 4 (YEL) terminals located on the terminal block on the HRV (figure C).



Attention

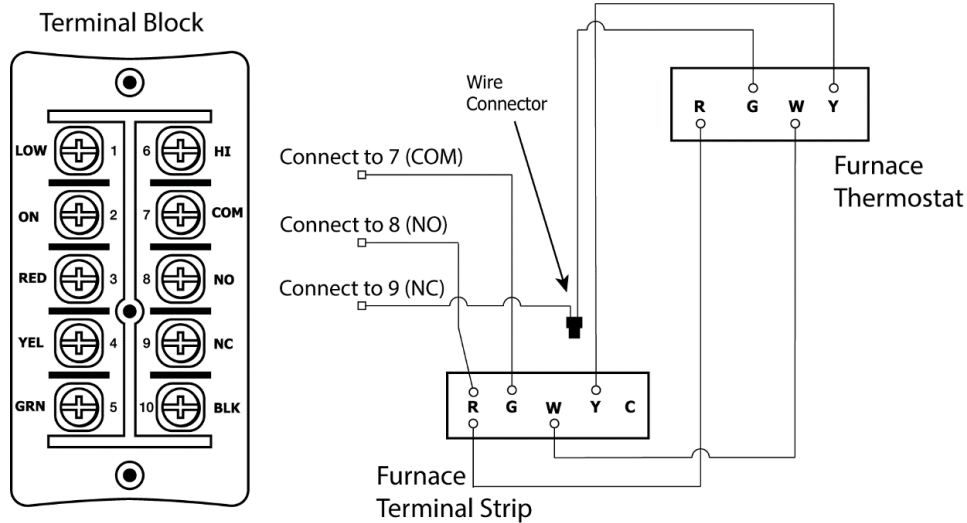
- When separating or attaching the face plate, be careful not to damage the contact pins.

13 ADDITIONAL CONTROLS

Interlocking the HRV to an Air Handler or Furnace Blower

Connecting the HRV as shown below will ensure that the air handler/furnace blower motor is operating whenever the HRV is venting.

- The HRV must be interlocked to the furnace/air handler with a [Simplified Installation \(Return/Return Method\)](#).
- The HRV should be interlocked to the furnace/air handler with a [Partially Dedicated System Installation](#).



Caution

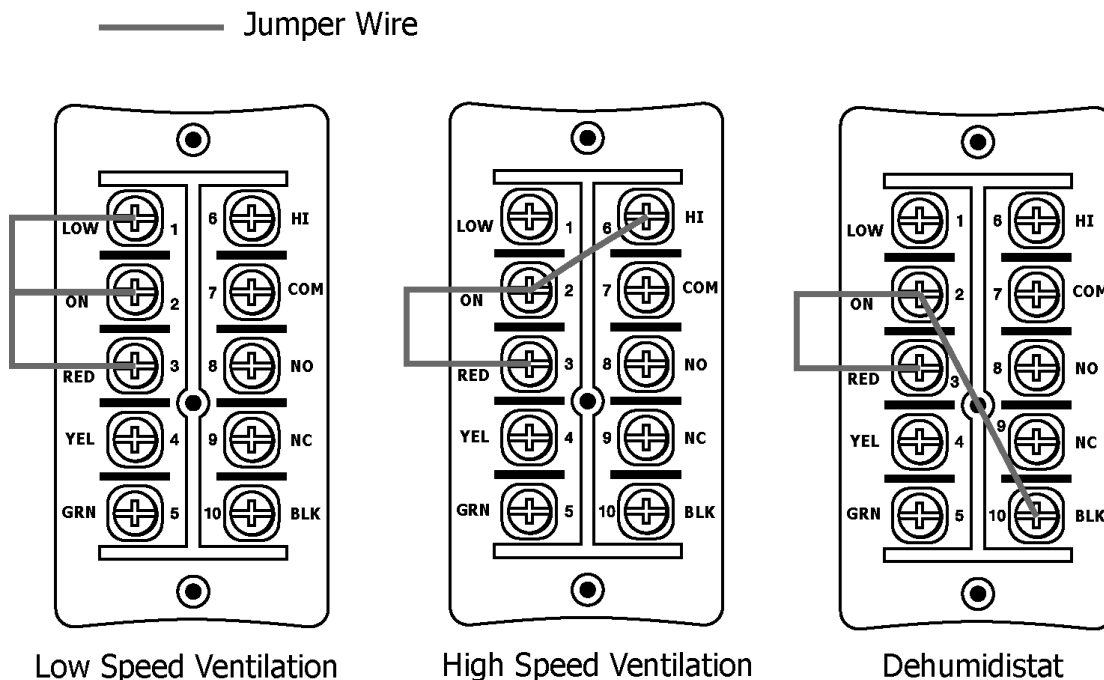
- Consideration should be given to competing airflows when connecting the HRV in conjunction with an air handler/ furnace blower system.

13 ADDITIONAL CONTROLS

Setting "Standby" When Using the Main Control

The HRV will be "fully-off" when selected on the main control. Timers and/or other controls will not function when the HRV is in off position.

The "fully-off" feature can be modified to "standby-off" by adding a jumper on the HRV terminal block between 2 (ON) and 3 (RED) terminals. "Standby" can also be achieved by setting the main control to the on position and selecting speed 0. Timers and/or additional controls will initiate high speed ventilation when activated.



Adding Dry Contact Controls

A jumper must be placed between 2 (ON) and 3 (RED) terminals on the HRV terminal block to activate the HRV for timers and/or dry contact controls, or if installing the unit without a main control. Jumpers can be added between terminals on the HRV terminal block for additional controls, per the table below:

Setting	Terminals	
Low Speed Ventilation	2 (ON)	1 (LOW)
High Speed Ventilation	2 (ON)	6 (HI)
Dehumidistat	2 (ON)	10 (BLK)



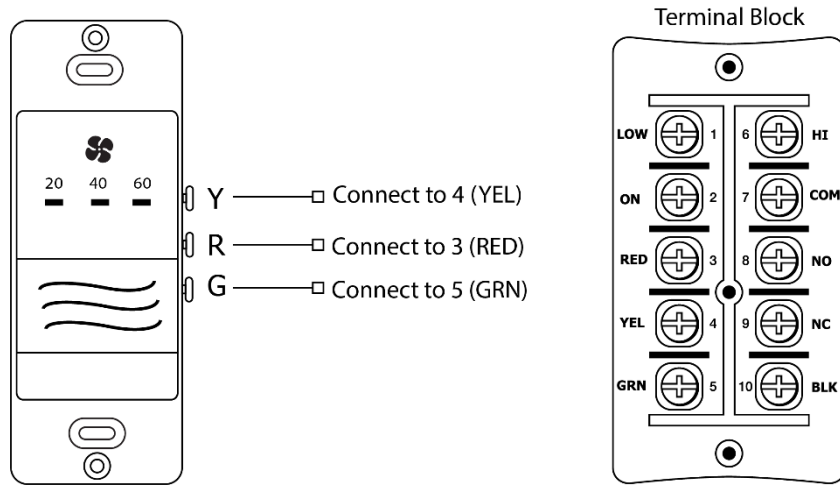
Caution

- Building codes in some areas require "fully-off" functionality. Check with your local building authority before modifying the unit to "standby-off". Unintentional operation of the HRV by the end user may occur if the unit is modified from "fully-off" to "standby-off".

14 TIMER INSTALLATION

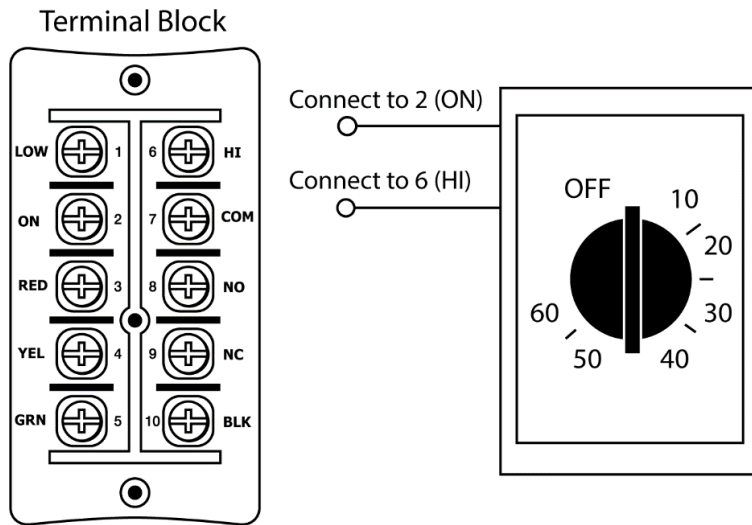
20/40/60 Minute Timer (99-DET01) Installation:

Connect the wires from the Y, R, and G terminals on the timer to the 4 (YEL), 3 (RED), and 5 (GRN) terminals on the terminal block as shown.



Mechanical Timers (99-101) Installation:

The Mechanical Timer is a 2 wire “dry contact” timer. Connect a jumper wire between the 2 (ON) and 3 (RED) terminals on the terminal block and connect the two timer wires to the 2 (ON) and 6 (HI) terminals on the terminal block as shown.



! Attention





- Timers mount in standard electrical boxes.
- Use 3 wire 20 gauge (min.) 100 ft length (max.) low voltage wire and multiple timers individually wired back to the unit.

14 TIMER INSTALLATION

Wireless 20/40/60 Minute Timer (99-DET02)

The timers may be installed onto a flush mounted electrical switch box or it may be surfaced mounted onto a wall. Multiple timers may be installed in a ventilation system.

Pairing:

1. Remove the battery from the back of the timer, if installed.
2. Press the ON/OFF Button  on the wall control to turn it on.
3. **GDXPL03 control:** Press the left and right buttons ( and RESET) simultaneously on the main control. The screen will go blank and the wireless symbol  will appear flashing on the bottom right of the display. This indicates that the main control is now in pairing mode.
4. Keep the timer within 16 in. of the main control when pairing.
5. Install the battery into the remote timer. The four lights will immediately flash five times. The red battery light will remain on for 12 seconds, then the 40 minute status light will flash. The 20, 40, and 60 minute status lights will flash for up to 30 seconds and then stop.
6. Press the Power Button  on the main control to exit pairing mode.
7. Press the Select Button on the timer to test that pairing was successful (figure A).
 - If the HRV initiates HIGH fan speed ventilation, pairing was successful.
 - If the HRV does not initiate HIGH fan speed ventilation, pairing was not successful. Un-pair the timer and return to step 1 of the pairing procedure and restart the pairing process.
8. Pair additional timers as necessary by repeating steps 1 through 8.

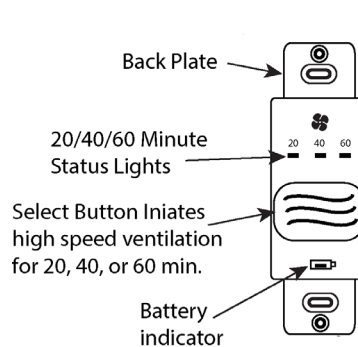


Figure A

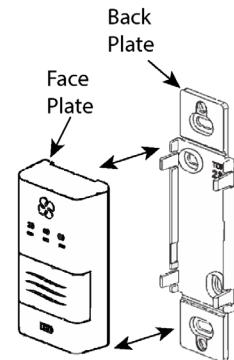


Figure B

Alternate Wall Mount

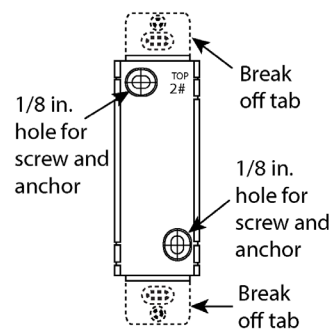


Figure C

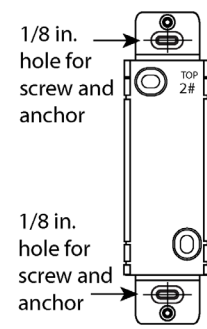


Figure D

Un-pairing:

1. Remove the battery from the back of the timer.
2. Press and hold the Select Button on the front of the timer (figure A).
3. While holding the Select Button, reinstall the battery in the timer. Continue holding the Select Button until the 20, 40, and 60 minute status light begins flashing (this can take up to 30 seconds). The timer will now be unpaired with the main control (figure A).

Installation:

1. Separate the face plate from the back plate by firmly pulling apart (figure B).
2. For mounting the main control without a Decora plate, break off top and bottom tabs (figure C).
3. Place the back plate of the main control in the desired location on the wall and pencil mark the top and bottom screw holes. Drill two 1/8" holes (figure C or D).
4. Attach the back plate to the wall using the two supplied screws and anchors.
5. Attach the face plate to the back plate (figure B).

Attention

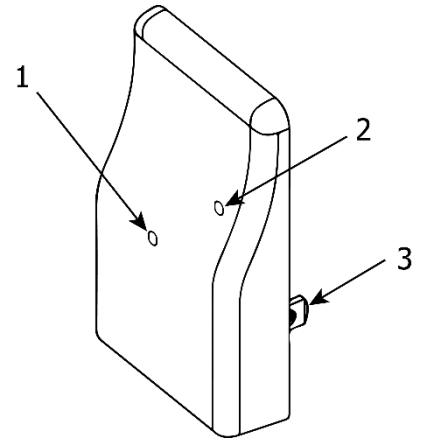
- The wireless timers and repeaters must be paired to the main control of the HRV. This process is called "Pairing". Multiple timers and repeaters can be paired to the main control.

15 REPEATER INSTALLATION

99-RX02 Repeater

- (1) Green LED
- (2) Red LED
- (3) 120V Plug





The wireless repeater is used to extend the range of the 99-DET02 wireless timers. The repeater plugs directly into a 120V power outlet. The 99-RX02 repeater wirelessly connects to the main wall control as well as the 99-DET02 wireless timers.




The 99-RX02 repeater should be installed at the halfway point between the 99-DET02 wireless timer and the main wall control if the timer is out of range. The LED will indicate the repeater’s connection strength to the main wall control per the table below. Re-adjust the repeater’s position as necessary.

LED Colour	Connection	Action
Solid Green	Good	No further adjustments are required.
Flashing Green	Moderate	The repeater will function properly but shouldn’t be moved further away from the main control.
Red	Bad	The repeater needs to be moved closer to the main wall control.

Pairing:

1. Turn on the main control by pressing the ON/OFF button .
2. **GDXPL03 control:** Press the left and right buttons simultaneously on the main control  and RESET). The screen will go blank and the wireless  will appear flashing on the bottom right of the display. This indicates that the main control is now in pairing mode.
3. The RX02 Repeater must be powered within 16 in. of the main control for pairing. If an outlet is not available an extension cord should be used to power the Repeater initially for pairing.
4. Plug the repeater into the power outlet. The green light will flash after approximately 12 seconds indicating that the repeater is paired with the main control.
5. Press the ON/OFF button  on the main control to exit pairing mode and the repeater may now be unplugged and moved to its permanent location.
6. To pair additional repeaters with the same main control, repeat steps 1 through 5 until all repeaters have been paired.

 **Attention**

- The repeaters are to be plugged directly into a 120V power outlet.

16 BALANCING THE AIRFLOWS

It is necessary to have balanced air flows in an HRV. The volume of air brought in from the outside must equal the volume of air exhausted by the unit. 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 building
- The unit may not defrost properly
- Failure to balance HRV properly may void warranty

Read the Application Warning on the front of this manual!

Prior to balancing, ensure that:

1. All sealing of the ductwork system has been completed.
2. All of the HRV's 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 fresh air to the house duct, the duct with the lower CFM ([L/s] velocity) reading should be left alone, while the duct with the higher reading should be adjusted back to match the lower reading.
7. Return unit to appropriate fan speed for normal operation

Balancing Procedure

The following is a method of field balancing an HRV using a Pitot tube, advantageous in situations when flow stations are not installed in the ductwork. Procedure should be performed with the HRV on high speed.

1. The first step is to operate **all** mechanical systems on high speed, which have an influence on the ventilation system, i.e. the HRV itself and the forced air furnace or air handler if applicable. This will provide the maximum pressure that the HRV will need to overcome and allow for a more accurate balance of the unit.
2. Drill a small hole in the duct (about 3/16"), three feet downstream of any elbows or bends, and one foot upstream of any elbows or bends. These are recommended distances, but the actual installation may limit the amount of straight duct.
3. The Pitot tube should be connected to a manometer capable of reading 3 digits of resolution. The tube coming out of the top of the pitot is connected to the high pressure side of the gauge. The tube coming out of the side of the pitot is connected to the low pressure or reference side of the gauge. Insert the Pitot tube into the duct; pointing the tip into the airflow.
4. For general balancing it is sufficient to move the pitot tube around in the duct and take an average or typical reading.
5. Repeat this procedure in the other (supply or return) duct.
6. Determine which duct has the highest airflow (highest reading on the manometer).
7. Adjust the higher airflow adjusting the field supplied damper. The flows should now be balanced. Actual airflow can be determined from the gauge reading. The value read on the gauge is called the velocity pressure. The Pitot tube comes with a chart that will give the air flow velocity based on the velocity pressure indicated by the gauge. This velocity will be in either feet per minute or meters per second. To determine the actual airflow, the velocity is multiplied by the cross-sectional area of the duct being measured.



Attention

- Continuous, excessive, positive pressure may drive moist indoor air into the external walls of the building. Once inside the external walls, moist air may condense (in cold weather) and degrade structural components or cause locks to freeze.
- Continuous, excessive, negative pressure may have several undesirable effects. In some geographic locations, soil gases such as methane and radon gas may be drawn into the home through basement or ground contact areas and may also cause the backdrafting of vented combustion equipment.

17 BALANCING THE AIRFLOWS

Example:

This is an example for determining the airflow in a 6 in. (0.5 ft) duct.

- The Pitot tube reading was 0.025 inches of water. From the chart, this is 640 ft/min.

The 6 in. (0.5 ft) duct has a cross sectional area of:

$$A = \pi r^2 = [\pi d^2] / 4$$

$$A = [3.14 \times (0.5 \text{ ft})^2] / 4$$

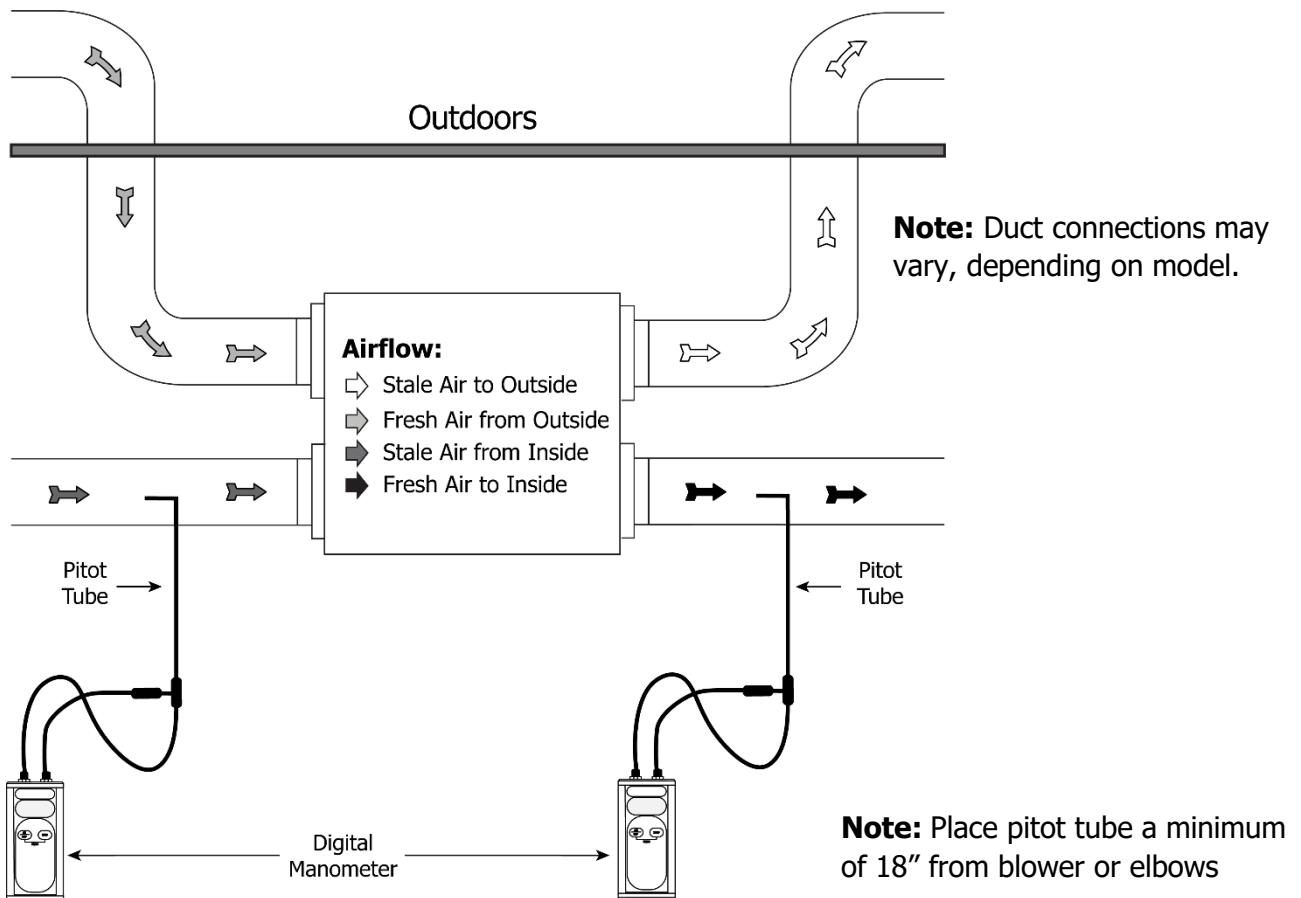
$$A = 0.2 \text{ ft}^2$$

The airflow is then: (640 ft./min.) x (0.2 ft²) = 128 cfm

For your convenience, the cross-sectional areas of some common duct sizes are listed below:

DUCT. DIAM. (inches)	CROSS SECTION AREA (sq. ft.)
5 (127 mm)	0.14
6 (152 mm)	0.20
7 (178 mm)	0.27

The accuracy of the air flow reading will be affected by how close to any elbows or bends the readings are taken. Accuracy can be increased by taking an average of multiple readings as outlined in the literature supplied with the Pitot tube.



18 SERVICE AND MAINTENANCE

Servicing your HRV on a regular schedule will result in optimum operating efficiencies and prolonged life of the equipment. Due to numerous applications in which this equipment can be installed, it is difficult to predict servicing intervals. In certain situations where there is heavy smoke, servicing the equipment every one to two months may be needed, whereas ventilating a meeting room for carbon dioxide may only need service every six months to a year.

Motor

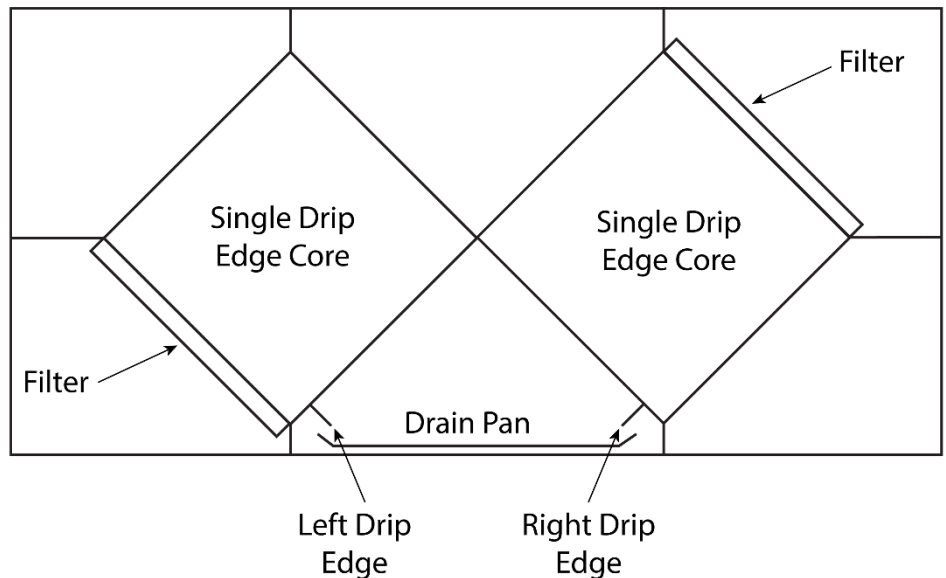
Access to the motor is through the front service doors. Note heat exchanger core can be removed to provide more room. See CORE in this section. The motor is a permanent split capacitor type (PSC) which uses a sleeve mechanism to steady the shaft.

Core

The heat exchange core is accessible through the front service door. Special care and attention should be given to this component as the edges may be sharp, and the core itself susceptible to damage if dropped.

When removing the core, the location it is removed from should be noted.

The core is removed by carefully pulling the core outward from the unit, sliding it evenly along its "H channel" supports found in each corner of the core. Note the core may have some resistance when sliding out. Avoid tilting the core as this will result in its edges catching the H channel and temporarily preventing its removal.



In most cases, washing the core in a mild detergent and warm water will be all that is needed to completely clean them. Do not use harsh chemicals as this may cause corrosion in the HRV. The time between core service will depend on the application the HRV has been installed in. It can be as often as one - two months or at the very least, cleaned every six months. When reinstalling the core, you must note foam location and drip edge location for proper core placement. See diagram below.

With the core in its proper position, place the bottom flange, (approximately 1/4") into its H channel support, then place the left side, the right side and finally the top flange into place in the same fashion. Once all four corners are in place, push the core evenly into the cabinet until it reaches the back. Be sure the drip edges are overlapping the drip trays.

Note the core will protrude slightly out from the front of the cabinet, this is so the access door, when closed, ensures a tight fit.



Attention

- When removing cores and filters note their original location and arrangement
- Soak and rinse the HRV core in warm soapy water.
- Do not use cleaning solutions for the HRV core.
- Do not use bleach or chlorine.
- Do not use a pressure washer on the HRV core.
- Do not place the HRV core in a dishwasher.

19 SERVICE AND MAINTENANCE

Filters

Open front service door to access the filters located in both supply and exhaust air streams. Note to remove and install filters, it may be easier to first remove the core(s). Refer to [Core](#).

The filters are designed to stop large particles from entering in the core. The filters are fastened in place by a metal spring rod. To remove filters from core(s) simply pull the rod from one end, outward until free from core lip, and remove.

Only use cold water with a mild detergent to wash the filters. Do not wring out or use harsh chemicals. The time between filter service will depend on the application the HRV has been installed in. It can be as often as one - two months or at the very least, cleaned every six months.

Condensate Drains

The condensate drain consists of one drain pan, which may collect water after the HRV initiates a defrost cycle, and a drain line to remove the condensate.

Maintenance on this portion of the system should be done as often as possible and should not exceed six months. Note bacterial growth in standing water is a major concern to healthy indoor air quality and should be avoided whenever possible.

To clean these components, open the front service door and flush the pans with water. Ensure that the pans drain completely and in a reasonable amount of time. Note if the water does not drain right away, check for blockage in the drain line, also check that the drain line has a good slope to it. (1/8 - 1/4" per foot)

The drain line itself should have a "P" trap in it below the HRV which is to be filled with water to prevent odors or gases from entering back into the unit.

Duct Work

It is a good idea to inspect ducting, outside weatherhoods (wall caps), and grilles for blockage and dirt buildup, at least every six months.

Outside weatherhoods should be protected by a bird screen which can plug up with debris. Also, it is a good idea to visually confirm that the fresh air supply is free from any sources of contamination, such as other vented combustion equipment added after the fact.

Damper Motor

The damper motor, (if applicable) is a self-contained motor and does not require service. The damper door attached to the motor could use a little lithium grease on the shaft opposite the motor, where it enters its holder, once every two to three years.

General Maintenance

As a final step in a routine maintenance schedule, it is a good idea to confirm operation of the system, checking speed control functions and remote control operation, if applicable. Wipe the inside of the cabinet to remove dust and cobwebs as needed. It is a good idea to keep a service/maintenance log of the unit.

20 TROUBLESHOOTING

Refer to the following table for troubleshooting the HRV unit.

Table 17.1 – Troubleshooting Procedures

SYMPTOM	CAUSE	SOLUTION
Poor airflows	<ul style="list-style-type: none"> • 1/4 in (6mm) mesh on outside hood is plugged • Filters plugged • Core obstructed • House grilles closed or blocked • Dampers are closed if installed • Poor power supply at site • Ductwork is restricting HRV • Improper speed control setting • HRV airflow improperly balanced 	<ul style="list-style-type: none"> • Clean exterior hoods or vents • Remove and clean filter • Remove and clean core • Check and open grilles • Open and adjust dampers • Have electrician check supply voltage • Check duct installation • Increase the speed of the HRV • Have contractor balance HRV
Supply air feels cold	<ul style="list-style-type: none"> • Poor location of supply grilles, the airflow may irritate the occupant • Outdoor temperature extremely cold 	<ul style="list-style-type: none"> • Locate the grilles high on the walls or under the baseboards, install ceiling mounted diffuse or grilles so as not to directly spill the supply air on the occupant (i.e. over a sofa) • Turn down the HRV supply speed. A small duct heater (1 kW) could be used to temper the supply air • Placement of furniture or closed doors is restricting the movement of air in the home • If supply air is ducted into furnace return, the furnace fan may need to run continuously to distribute ventilation air comfortably
Dehumidistat is not operating	<ul style="list-style-type: none"> • Outdoor temperature is above 15°C (59°F) • Improper low voltage connection • External low voltage is shortened out by a staple or nail • Check dehumidistat setting it may be on OFF 	<ul style="list-style-type: none"> • Dehumidistat is functioning normally (see Auto Dehumidistat Disable in this manual) • Check that the correct terminals have been used • Check external wiring for a short • Set the dehumidistat at the desired setting
Humidity levels are too high condensation is appearing on the windows	<ul style="list-style-type: none"> • Dehumidistat is set too high • HRV is not sized to handle a hot tub, indoor pool etc. • Lifestyle of the occupants Moisture coming into the home from an unvented or unheated crawl space • Moisture is remaining in the washroom and kitchen areas • Condensation seems to form in the spring and fall • HRV is set at too low a speed 	<ul style="list-style-type: none"> • Set dehumidistat lower • Cover pools, hot tubs when they are not in use • Avoid hanging clothes to dry, storing wood and venting clothes dryer inside. Firewood may have to be moved outside • Vent crawl space and place a vapor barrier on the floor of the crawl space • Ducts from the washroom should be sized to remove moist air as effectively as possible, use of a bathroom fan for short periods will remove additional moisture • On humid days, as the seasons change, some condensation may appear, but the homes air quality will remain high with some HRV use Increase speed of the HRV

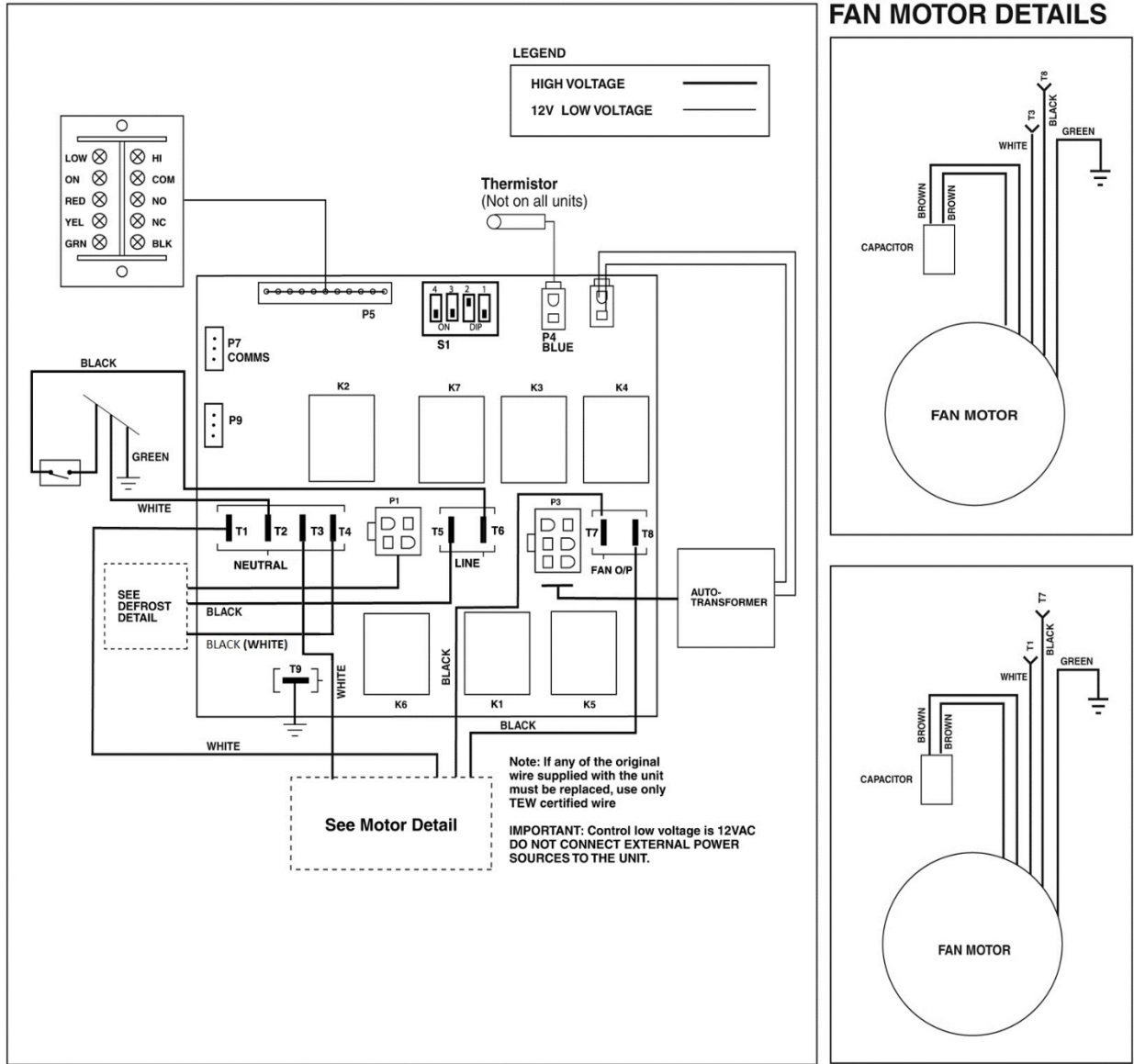
21 TROUBLESHOOTING

Table 17.1 – Troubleshooting Procedures (cont.)

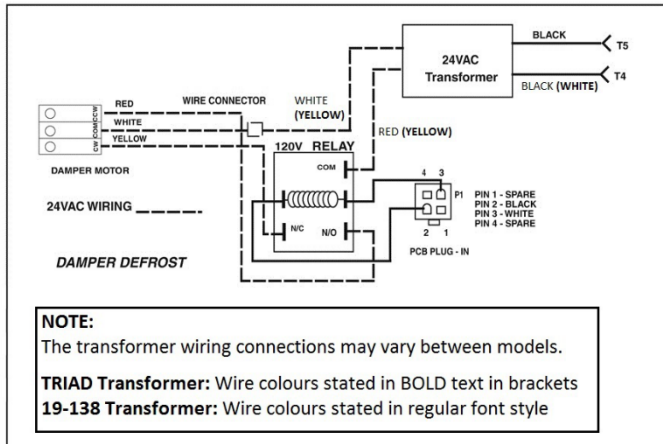
SYMPTOM	CAUSE	SOLUTION
Humidity levels are too low	<ul style="list-style-type: none"> • Dehumidistat control set too low • Blower speed of HRV is too high • Lifestyle of occupants • HRV airflows may be improperly balanced 	<ul style="list-style-type: none"> • Set dehumidistat higher • Decrease HRV blower speed • Humidity may have to be added through the use of humidifiers • Have contractor balance HRV airflows
HRV and/or ducts frosting up	<ul style="list-style-type: none"> • HRV airflows are improperly balanced • Malfunction of the HRV defrost system 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>⚠ Note</p> <ul style="list-style-type: none"> • Minimal frost build-up is expected on cores before unit initiates defrost cycle functions </div> <ul style="list-style-type: none"> • Have HVAC contractor balance the HRV • Ensure damper defrost is operating during self-test
Condensation or ice buildup in insulated duct to the outside	<ul style="list-style-type: none"> • Incomplete vapor barrier around insulated duct • A hole or tear in outer duct covering 	<ul style="list-style-type: none"> • Tape and seal all joints • Tape any holes or tears made in the outer duct cover, ensure that the vapor barrier is completely sealed.
Excess water in the bottom of the HRV	<ul style="list-style-type: none"> • Drain pans plugged • Improper connection of HRV's drain lines • HRV is not level • Drain lines are obstructed • HRV heat exchange core is not properly installed 	<ul style="list-style-type: none"> • Look for obstructions in the drain line • Look for kinks in the drain line
Excessive Vibration	<ul style="list-style-type: none"> • Dirt on fan wheels 	<ul style="list-style-type: none"> • Have contractor service HRV

22 WIRING DIAGRAM – AIR 450-D

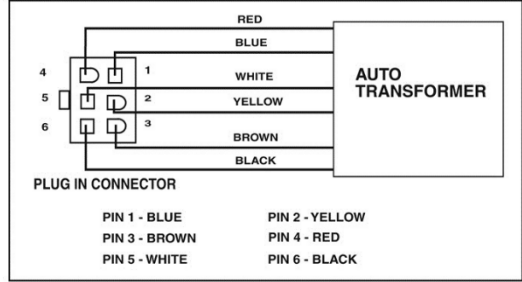
CAUTION: ELECTRICAL CONTROL PANEL, SERVICE BY ELECTRICIAN ONLY



DEFROST DETAILS



AUTO-TRANSFORMER DETAIL



59-TI-126

23 WARRANTY

AIRIA BRANDS INC.® (AIRIA) warrants to the original purchaser of the AIRFLOW® model and accessories referred to below, to be free from manufacturing defects.

This Limited Warranty is personal to AIRIA® and is in effect from the installation date, but no later than 12 months after the date the product was manufactured (if the installation date cannot be verified, the warranty period will begin on the date of manufacture). The serial number can be used to determine the date of manufacture: XX XX MMDDYY ###; or MMDDYY ###. The warranty is dependent on the type of unit:

Type of Unit	Warranty
HRV Residential	Lifetime on the Core / 5 years on other components
HRV Commercial	15 years on the Core / 2 years on other components
ERV Residential	5 years on the Core / 5 years on other components
ERV Commercial	5 years on the Core / 2 years on other components
Accessories (e.g. controls and timers)	1 year
Replacement Parts (e.g. motor)	1 year
Clean Air Furnace (HRV)	Lifetime on the Core / 2 years on other components
Clean Air Furnace (ERV)	5 years on the Core / 2 years on other components
Air Handler	5 years
TFP	5 years

Damage resulting from all other causes, including but not limited to: lightning, hurricane, tornado, earthquake or any other acts of God; improper installation, modification, alteration or misuse of the AIRFLOW® unit or its operation in a manner contrary to the instructions accompanying the unit at the time of sale; accidental or intentional damage, neglect, improper care, or other failure by the owner to provide reasonable and necessary maintenance of the product; any attempt at repair by an unauthorized service representative or not in accordance with this warranty; or any other causes beyond the control of AIRIA®, are excluded from this warranty.

If you feel that the AIRFLOW® unit you purchased is not free from manufacturing defects, please refer to <https://www.lifebreath.com/homeowners-2/find-a-contractor/> to find the name of your nearest dealer in order to repair the product. The labour required to install any replacement part(s) is not covered by AIRIA®.

AIRIA® reserves the right to replace the entire unit or to refund the original purchase price in lieu of repair.

AIRIA® MAKES NO EXPRESS WARRANTIES, EXCEPT FOR THOSE SET FORTH HERIN AND SHALL NOT BE LIABLE FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES WITH RESPECT TO AIRFLOW® COVERED BY THIS WARRANTY. AIRIA'S COMPLETE LIABILITY AND THE OWNER'S EXCLUSIVE REMEDY BEING LIMITED TO REPAIR OR REPLACEMENT ON THE TERMS STATED HEREIN. ANY IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OF MERCHANTABILITY AND OF FITNESS FOR ANY PARTICULAR PURPOSE, ARE EXPRESSLY EXCLUDED.

NO PERSON IS AUTHORIZED TO CHANGE THE WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGES ARE MADE IN WRITING AND SIGNED BY AN OFFICER OF AIRIA®.

MODEL NO.: _____

UNIT SERIAL NO.: _____

INSTALLED BY: _____

DATE: _____