Fantech
Your Ventilation Solutions Company

LIGHT COMMERCIAL
Heat Recovery Ventilator

IMPORTANT - PLEASE READ THIS MANUAL BEFORE INSTALLING UNIT

CAUTION - Before installation, careful consideration must be given to how this system will operate if connected to any other piece of mechanical equipement, 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 airflow's of the Heat Recovery or Energy Recovery Ventilators by using the balancing procedure found in this manual.
It is always important to assess how the operation of any HRV/ERV may interact with vented combustion equipment (i.e. Gas Furnaces, Oil Furnaces, Wood Stoves, etc.).

NEVER - install a ventilator in a situation where its normal operation, lack of operation or partial failure may result in the backdrafting or improper functioning of vented combustion equipment!!!

Your ventilation system should be installed in conformance with the appropriate provincial or state requirements or in the absence of such requirements with the current edition of the National Building Code, and / or ASHRAE's " good Engineering Pratice".

KHP 10000

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

The Best Limited Warranty in the Business

- The limited warranty covers normal use. It does not apply to any defects, malfunctions or failures as a result of improper installation, abuse, mishandling, misapplication, fortuitous occurrence or any other circumstances outside Fantech's control.
- Inappropriate installation or maintenance may result in the cancellation of the warranty.
- Any unauthorized work will result in the cancellation of the warranty.
- Fantech is not responsible for any incidental or consequential damages incurred in the use of the ventilation system.
- Fantech is not responsible for providing an authorized service centre near the purchaser or in the general area.
- Fantech reserves the right to supply refurbished parts as replacements.
- Transportation, removal and installation fees are the responsibility of the purchaser.
- The purchaser is responsible to adhering to all codes in effect in his area.
- The warranty is limited to 2 years on parts and 1 years on the motor from the date of purchase, including parts replaced during this time period. If there is no proof of purchase available, the date associated with the serial number will be used for the beginning of the warranty period.

** This warranty is the exclusive and only warranty in effect relative to the ventilation system and all other warranties either expressed or implied are invalid.*

TABLE OF CONTENTS

ASHRAE Standard 62-2001 defines acceptable ventilation rates for various applications.

Outdoor Air Requirements Examples

Application	CFM per Person	L/s per Person
Coin-operated laundry	15	8
Cafeteria, Fast Food	20	10
Bars	30	15
Conference Room	20	10
Reception Area	15	8
Beauty Shop	25	13
Classroom	15	8
Libraries	15	8
Medical	15	8
Photo Studios	15	8
Living Areas (residential)	.35 air changes per hour but not less than 15 cfm (7.5 L/s) per person	
Autopsy Rooms	– (0.5 cfm/Ft^2 or 2.5 L/s m^2)	
Locker Rooms	– (0.5 cfm/Ft^2 or 2.5 L/s m^2)	
* Swimming Pools	– (0.5 cfm/Ft^2 or 2.5 L/s m^2)	
Public Restrooms (cfm/wc or cfm/urimac)	50	25

* Call factory for details 1.800.565.3548

NOTE: Some products may not be exactly as illustrated in the Installation, Operation and Maintenance Manual.

Fantech Inc. reserves the right to modify, at any time and without notice, any or all of its products' features, designs, components and specifications, to maintain their technological leadership position.

Fantech
Heat Recovery Ventilator

KHP 10000
Light Commercial HRV

The KHP 10000 Heat Recovery Ventilation system (HRV) complements the energy efficiency of modern buildings by filtering incoming fresh outdoor air before it enters the heat-recovery core where it is preheated by the outgoing, stale contaminated air. The HRV then distributes the preheated fresh filtered air throughout the building by direct ductwork installed specifically for the HRV or through the ductwork of a forced-air system

APPLICATIONS INCLUDE:

- Class Rooms
- Retail Shops
- Hair Salons
- Bars & Restaurants
- Offices
- Clinics
- Animal Shelters
- Swimming Pools *

POWER & WEIGHT

• Volts	120V
• Amperage	13.4 Total Amps
• Weight	185 Lbs
• Shipping Weight	225 Lbs
• Motors	115V, 60Hz, 6.7 Amps
• Phase	Single Phase

OPTIONAL CONTROLS

- MDEH 1 – Mechanical Low Voltage Dehumidistat
- FD30M – 30 Minutes Crank Timer
- AQS 2 – Air Quality Sensor (with transformer)

- External dry contacts (provided)

* Protective coating of coil is recommended for this application. Contact factory for details.

SPECIFICATIONS

CASE 20 gauge galvanized steel. Baked powder coated paint, grey. Insulated with 25.4 mm (1") foil-face insulation to prevent condensation. Two (2) drain connections ½" NPT.

BLOWERS Two (2) direct drive blowers. Blowers come with galvanized wheel and housing. Blowers are rubber mounted to reduce noise and vibration.

MOTORS Two (2) totally enclosed self cooled energy efficient motors with permanent split capacitor, electrically reversible, sleeve & ball bearing with epoxy enamel finish. ½ horsepower, 1625 RPM, single phase, 115 volts, and over load protection.

CORES Two (2) modular heat pipe cores (stack one over the other) configured for an efficient performance retrieval of heat.

FILTERS Two (2) Washable Air Filters, 375 mm (14 ¾") x 597 mm (23 ½") x 15.8 mm (⅝")

MOUNTING Unit can be installed using mounting brackets included. Brackets fasten to HRV with bolts provided and to floor joists using wood screws (purchased separately). Unit may also be suspended by using the supplied brackets and threaded rod (purchased separately) or placed on a platform.

CONTROLS Low voltage (24VAC) external dry contacts to activate high speed. External three (3) position switch for LOW/STAND BY/ MED continuous ventilation speeds.

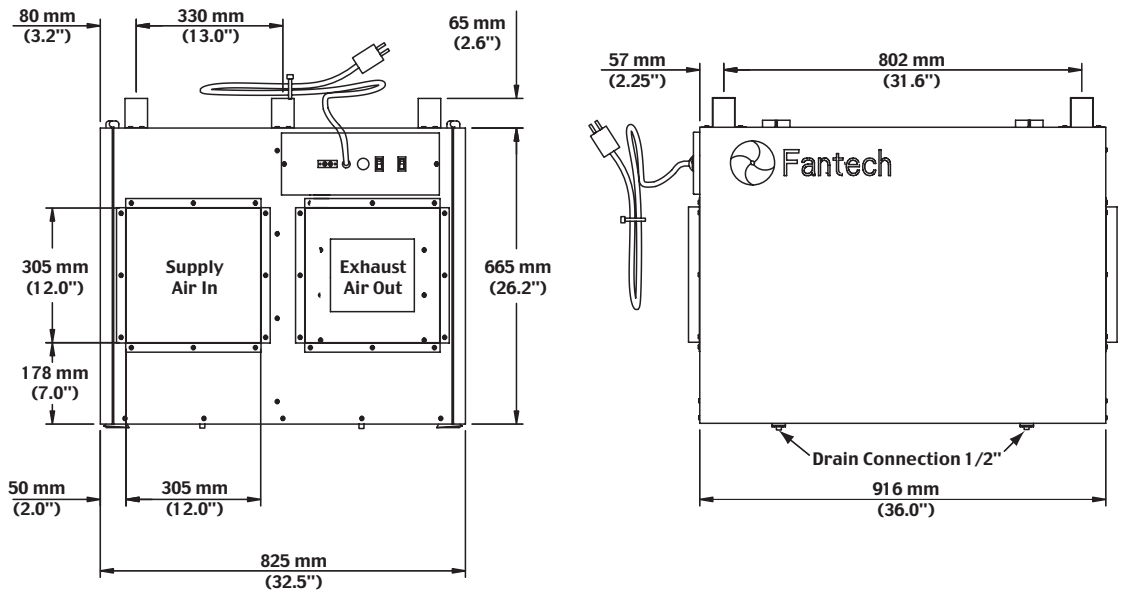
DEFROST The defrost sequence is activated when the exhaust air temperature drops below the preset level, the sensor shuts down the supply fan until the core defrosts and then the unit returns to normal operation.

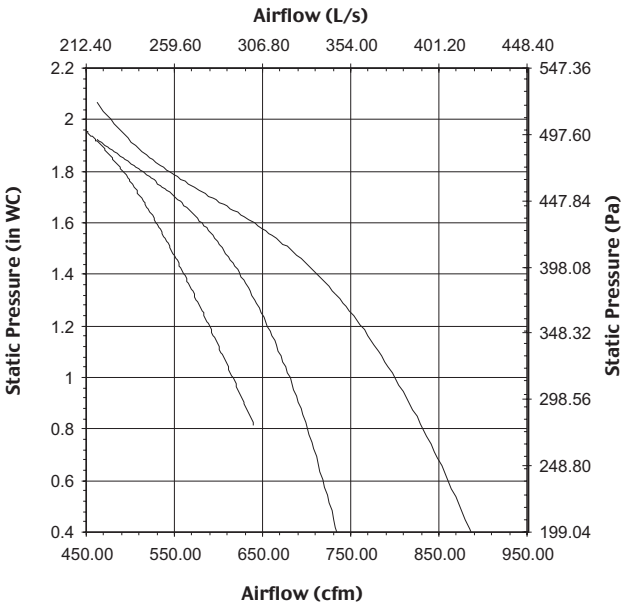
SERVICEABILITY Cores, filters, blowers and drain pans can be accessed easily from both sides of the HRV through hinged access panels.

FOR MORE INFORMATION CONTACT:

KHP 10000 Light Commercial HRV

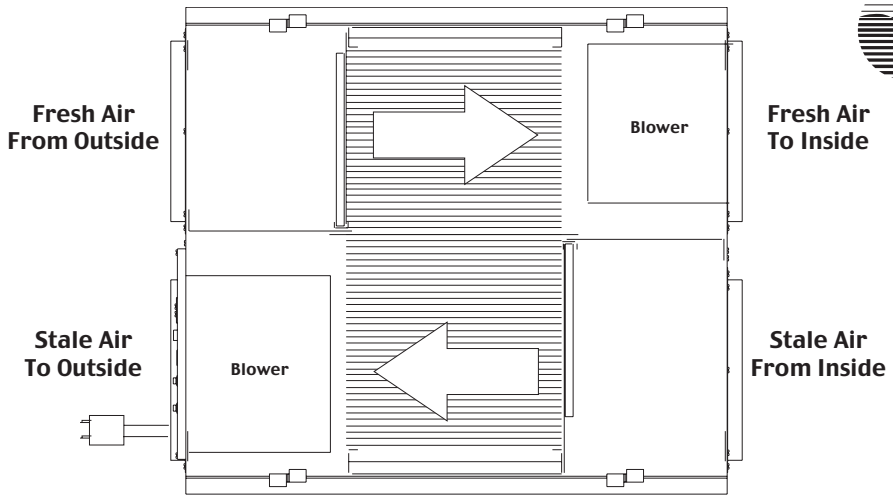
Dimensions





Unit is 55% (average) efficient at transferring Heat/Energy from the exhaust to the supply air stream.

Airflow



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OPERATION

MODES OF OPERATION

1. Continuous / Ventilation Mode

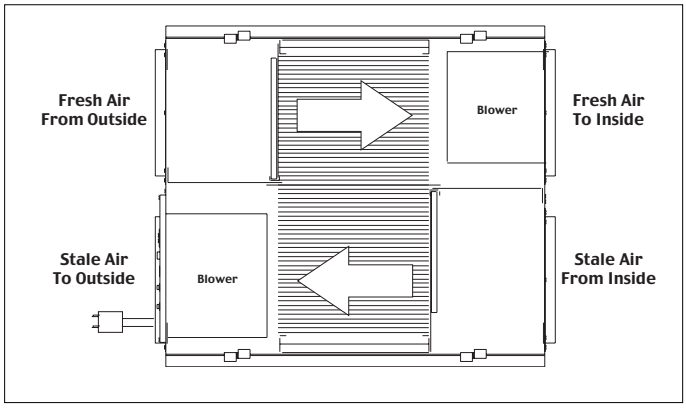
In this mode of operation both fans are operating and exchanging air with the outside. The heat recovery ventilator (HRV) constantly exchanges the air at the rate you select, either at low or medium speed, and switches to high speed when activated by an optional remote control. The "Low" and "Med" fan speed selection will cause the unit to operate in continuous exchange mode at a reduce exchange rate. Continuous mode is recommended, since pollutants are slowly but constantly being generated in a building.

2. Intermittent / Standby Mode

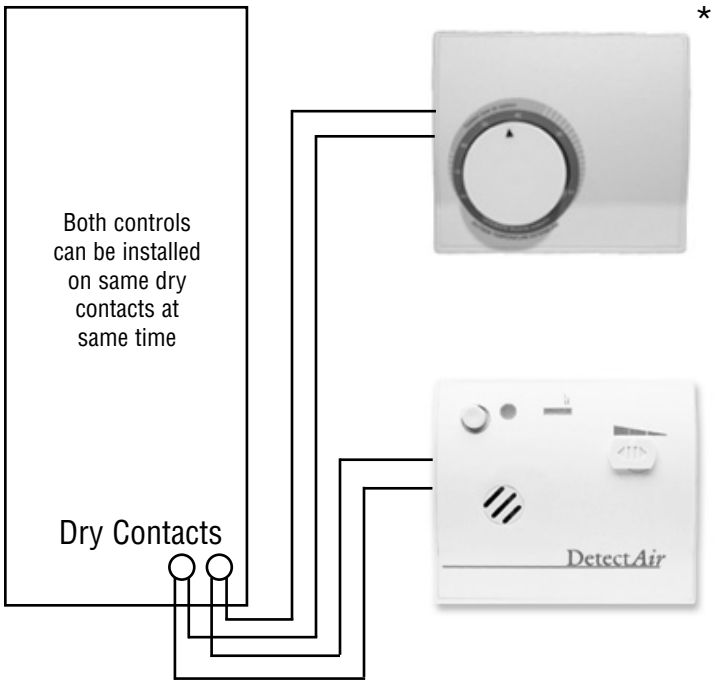
The system is always on standby and operates at high speed when activated by an optional remote control (required): "Standby" should be selected if the user wishes to stop the unit from continuous exchange.

3. Defrost (Fan shutdown)

The defrost sequence is activated when the exhaust air temperature drops below the preset level, the sensor shuts down the supply fan until the core defrosts and then the unit returns to normal operation.



OPTIONAL REMOTE CONTROLS



*** Dehumidistat – MDEH 1**

The wall mount dehumidistat monitors the humidity level in the area it is installed. When the humidity level rises above the desired set-point, the HRV will activate to high speed/override mode. Once the humidity level returns to desired condition, the unit will return to the normal mode. Two (2) low voltage wires required for operation. *Note the dehumidistat helps dehumidify by increasing the speed of the HRV. Dehumidification will only take place when the air outside is dryer than the air inside.*

Air Quality Sensor – AQS 2

The wall mount Air Quality Sensor (AQS) monitors indoor air quality and activates the override mode when cigarette smoke, formaldehyde, benzene, volatile organic compounds and other pollutants are detected. The unit will then return to normal mode once the air pollutants are reduced to a pre-determined lower level.
Three low voltage wires are required for operation
* This control is not a warning device.

INSTALLATION

PRACTICAL TIPS

- *Install the unit close to the outside wall on which the supply and exhaust hoods will be mounted.*
- *Have a nearby power supply 120 Volts, 60 Hz.*
- *Have the possibility of mounting the unit to supporting beams.*
- *Have access to a water drain for the condensate of the unit during defrost.*

LOCATION

The HRV must be located in a heated space where it will be possible to conveniently service the unit. Typically the HRV would be located in the mechanical room, above a drop ceiling or an area close to the outside wall where the weatherhoods will be mounted. Attic installations are not normally recommended due to extreme temperatures, and difficulty in performing, required service & maintenance. If an attic is slected, special care should be taken in ensuring the unit will perform as intended. Unit may need to be protected with insulated shelter, built on site.

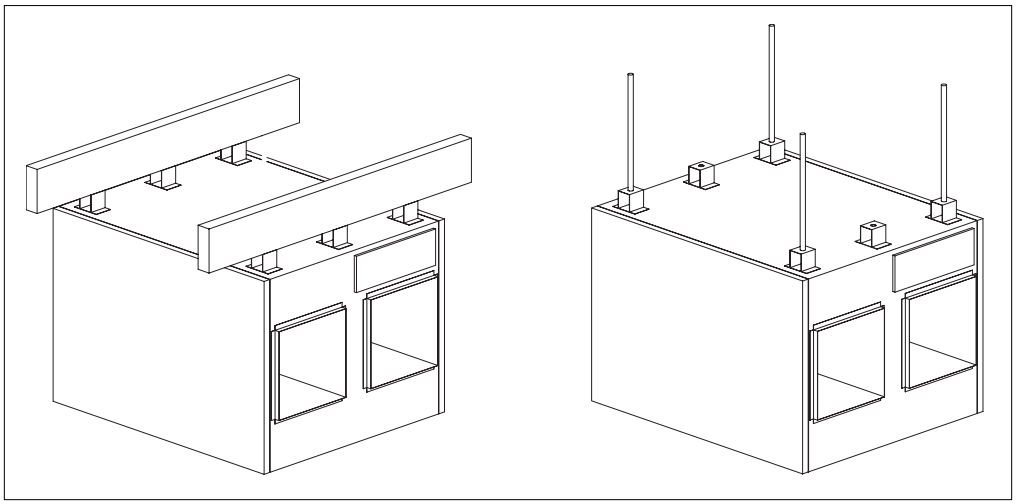
Connecting appliances to the HRV It is not recommended, including:

- clothes dryer
- kitchen exhaust hoods
- combustion venting
- vacuum system

These appliance may cause lint, dust or grease to collect in the HRV , damaging the unit.
NOTE: Connecting any of these type of appliances to the HRV will invalidate your warranty

MOUNTING

The exhaust side of the unit must be installed so that it is 1/2" lower than the supply side. See spec sheet for port location.



NOTE: For optimum performance from the HRV, during the air-conditioning season; the HRV should be tilted so that the supply side of the unit is 1/2" lower than the exhaust side.

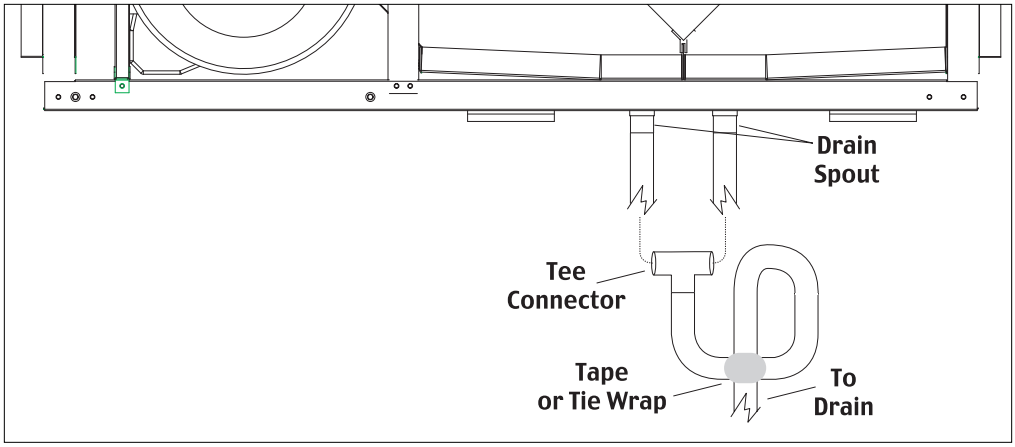
NOTE: Illustrations may not be exactly as product.

INSTALLATION

Installing Drain Line

Through normal operation and including defrost mode, the HRV may produce some condensation. This water should flow into a nearby drain, or be taken away by a condensate pump. The HRV and all condensate lines must be installed in a space where the temperature is maintained above the freezing point. A “P” trap should be made in the drain line. This will prevent odors from being drawn back up into the unit. The drain connection is a 1/2" NPT nipple.

Install the drain hose, making a “P” trap



INSTALLING DUCTS GOING TO / FROM OUTSIDE

INSTALLING THE DUCTING TO THE WEATHERHOODS

OUTSIDE WEATHERHOODS – The weatherhoods must have built-in "bird" screens with 1/4 inch (6.35 mm) minimum mesh to prevent birds and rodents from entering into the ductwork. Do not use smaller mesh as it will be very susceptible to pluging up. The preferred location of the weatherhoods is:

- no less than 10 ft. (3 m) apart from each other.
- at least 18 inches (457.2 mm) above snow line or ground level.
- supply hood must be kept away from source of cantaminants, such as automobile exhaust fumes, gas meters, garbage cans, containers, cooling towers, tar roofs, etc.
- avoid prevailing winds, whenever reasonably possible.

The outside perimeter of the weatherhood must be sealed 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 snow 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–TO AND FROM THE HRV – Insulated galvanized sheet metal ducting with sufficient cross section with an integral single piece vapor barier should be used to connect the HRV to the weatherhoods. Insulated flex duct may be used in moderation, if sized and installed properly. (Consult local codes)

A minimum R value of insulation should be equal to 4 (RSI 0.75) ,consult local codes.

All ducts should be sealed using a good bead of high quality caulking (preferably acoustical sealant) and a high quality aluminum foil tape, or other approved duct sealant.

INSTALLING DUCTS TO / FROM INSIDE

To maximize airflow in the ductwork system, all ducts should be kept short and have as few bends or elbows as possible. Forty-five degree are preferred to 90˚ elbows. Use “Y” tees instead of "T" duct whenever possible.
All duct joints must be fastened with screws or duct sealant and wrapped with a quality duct tape to prevent leakage. Aluminum foil duct tape is recommended.

SUPPLY AIR DUCTING

In buildings without a forced air HVAC systems, fresh air should be supplied to all habitable areas. It should be supplied from high wall or ceiling locations. Grilles that diffuse the air comfortably such as Fantech grille {MGE (metal) or PGE (plastic)}s are recommended.To avoid possible noise transfer through the ductwork system, a piece of flexible ducting should be connected between the HRV and the supply ductwork system. If the floor is the only option available, then special care should be taken in locating grilles. Areas such as under baseboard heaters will help to temper the air. Also optional inline duct heaters are available for mounting in the supply duct work to add heat if required.In buildings with a forced air HVAC systems, you may want to connect the HRV to the HVAC ductwork (see information below).

PRACTICAL TIPS

- *The fresh air inlet from the HRV needs to ensure proper air mixing and temperature in the air handler. Units should be interlocked with one another so that the air handler runs, when there is a call for ventilation.*

- *Units may be operating at different static pressures. Compatibility of the two (2) systems must be verified by checking that balance of the HRV found in this manual.*

Notes: See air handler manufacturer for appropriate specifications.

Direct Connection to Furnace/ Air handler return duct

- Should you wish to hard duct the supply air directly into the cold air return of the HVAC systems, remember to check the airflow balance of the HRV with the HVAC systems fan both “on”and “off” to determine that it does not imbalance the HRV more than 10%. Make sure you respect the minimum distance from the supply air in of the HRV and the HVAC systems (Refer to your local and National Building & Heating Codes for any variations in these notes).
- It may be necessary to install a separate fresh air supply ductwork system if the heating is other than forced air.
  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.

  * See installation examples found in this manual.

INSTALLING DUCTS TO / FROM INSIDE (CON'T)

Exhaust Air ducting

The stale air exhaust system is used to draw air from the points in the building where the worst air quality problems occur. (See installation examples in the manual.)

PRACTICAL TIPS

- *Choose the location your Supply and Exhaust Fantech grille {MGE (metal) or PGE (plastic)}s. The Exhaust Grilles should be located in areas where known contaminant's exist.*
- *A piece of flexible ducting should be placed between the HRV and the rigid ducting to absorb any noise or vibrations.*
- *The grilles should be installed on the ceiling or on high the wall 6" (152 mm) to 12" (305 mm) from the ceiling.*

Push the Fantech grille {MGE (metal) or PGE (plastic)} into the optional mounting collar or directly into installed elbow.

Backdraft Dampers

Backdraft dampers may be desired to prevent the passive migration of unwanted outside air when the HRV is set to standby or off mode.

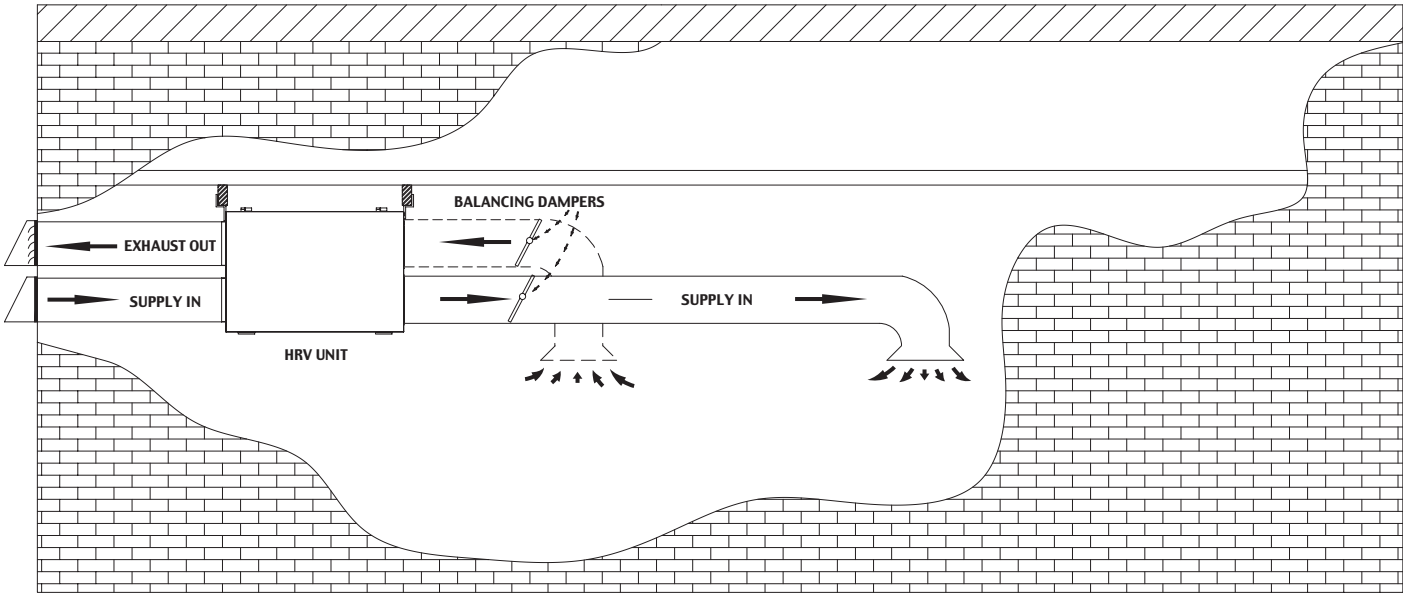
INSTALLATION EXAMPLES - ILLUSTRATIONS ONLY, CHECK SPEC PAGE FOR DETAILS

*** Drawings are illustrations only and actual port locations and airflow directions may vary, consult unit spec sheets.**

It is the responsibility of the installer to ensure all ductwork is sized and installed as designed to ensure the system will perform as intended. The amount of air (CFM) that an HRV will deliver is directly related to the total external static pressure (E.S.P.) of the system. Static pressure is a measure of resistance imposed on the blower by length of duct work/number of fittings used in duct work, duct heater etc.

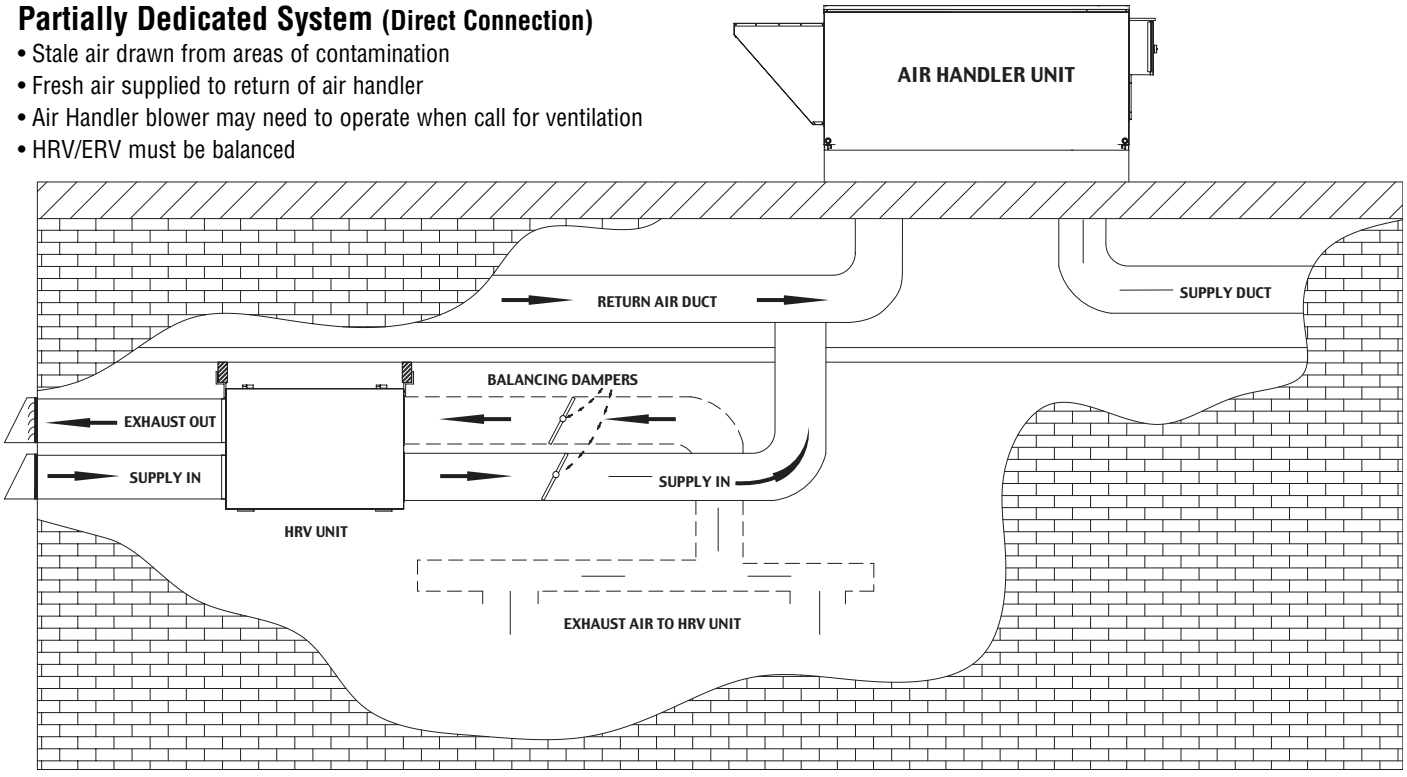
Fully Dedicated System

- Stale air drawn from areas of contamination
- Fresh air supplied to main areas
- HRV must be balanced
- External heating or cooling coil may be needed if air is not able to mix confortably.



Partially Dedicated System (Direct Connection)

- Stale air drawn from areas of contamination
- Fresh air supplied to return of air handler
- Air Handler blower may need to operate when call for ventilation
- HRV/ERV must be balanced



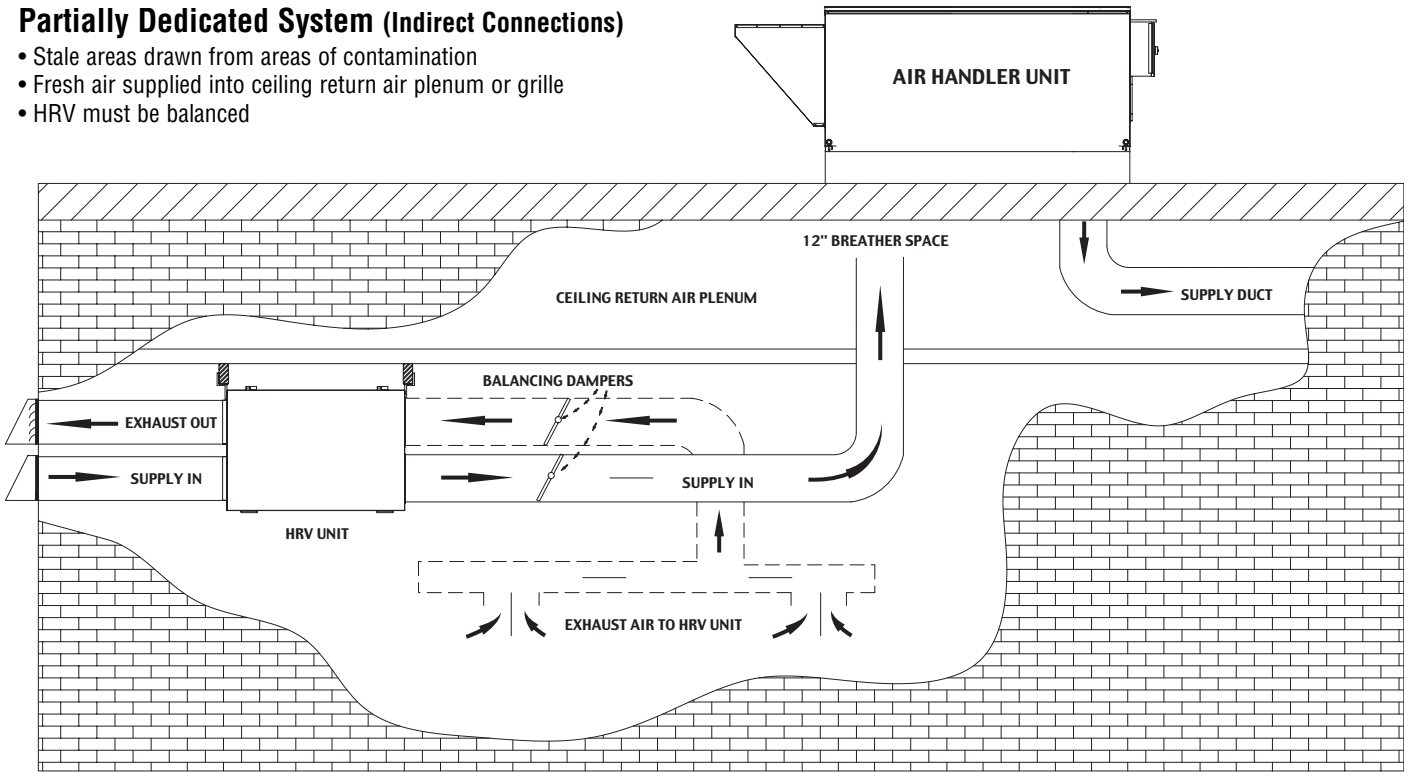
INSTALLATION EXAMPLES (CON'T) - ILLUSTRATIONS ONLY, CHECK SPEC PAGE FOR DETAILS

*** Drawings are illustrations only and actual port locations and airflow directions may vary, consult unit spec sheets.**

It is the responsibility of the installer to ensure all ductwork is sized and installed as designed to ensure the system will perform as intended. The amount of air (CFM) that an HRV will deliver is directly related to the total external static pressure (E.S.P.) of the system. Static pressure is a measure of resistance imposed on the blower by length of duct work/number of fittings used in duct work, duct heater etc.

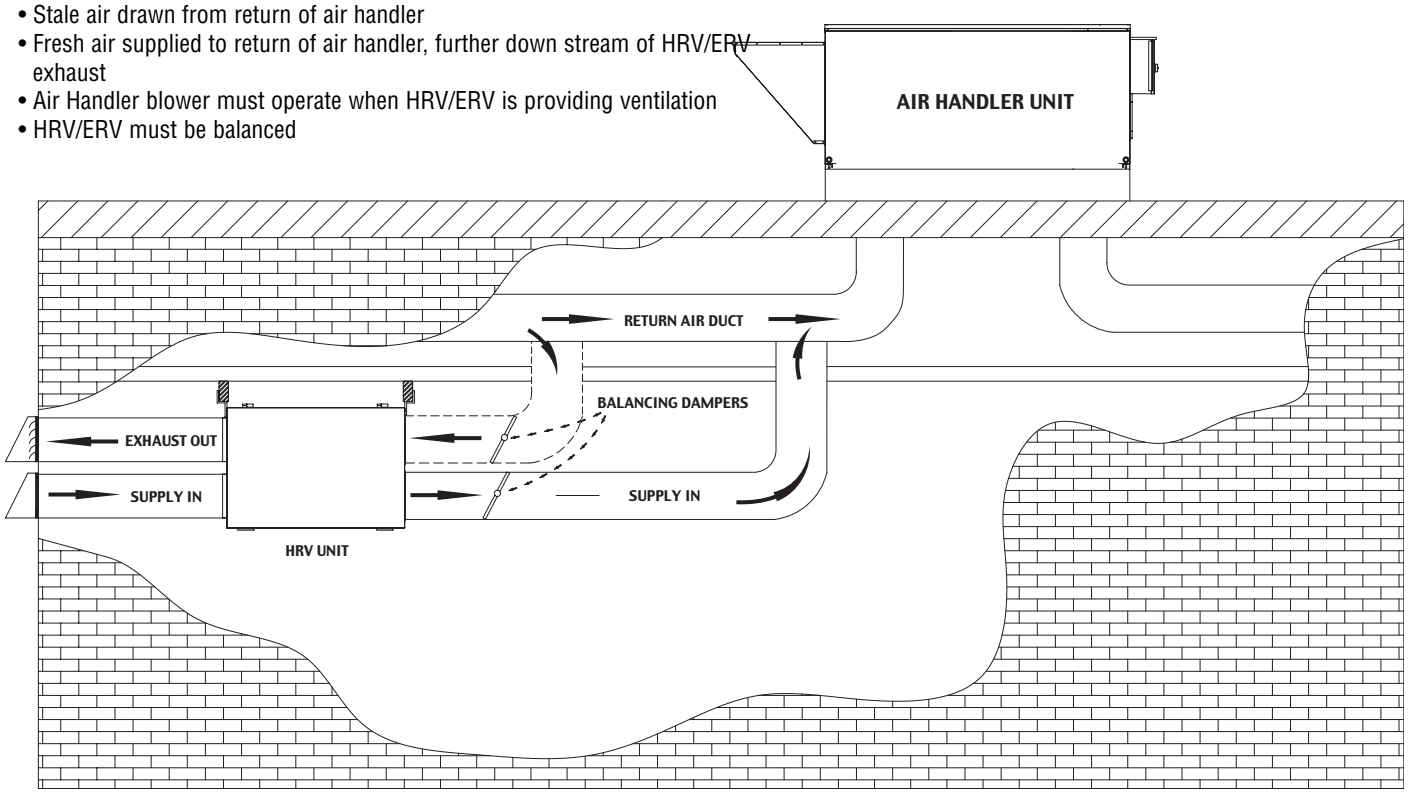
Partially Dedicated System (Indirect Connections)

- Stale areas drawn from areas of contamination
- Fresh air supplied into ceiling return air plenum or grille
- HRV must be balanced



Simplified Installation

- Stale air drawn from return of air handler
- Fresh air supplied to return of air handler, further down stream of HRV/ERV exhaust
- Air Handler blower must operate when HRV/ERV is providing ventilation
- HRV/ERV must be balanced



AIR FLOW BALANCING

PRACTICAL TIPS

- *If the unit's airflows are not properly balanced...*

- *The unit may not operate at it's maximum efficiency.*

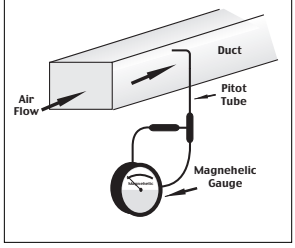
- *Heat & Energy recovery core damage may occur.*

- *The unit's use could cause negative or positive pressure in the building causing cold air to enter or other combustible equipment to backdraft.*

- *The unit may not defrost properly.*

- The balancing procedure consists of measuring the exhaust air leaving the system and the supply air entering the system and ensuring that these two are equal. A deviation of 10% or less is acceptable. In such cases, it is recommended to have a greater amount of exhaust air than supply air as so to increase the supply air's temperature.

A* Pitot tube and gauge



A The duct's airflow velocity is measured with a magnehelic gauge and a pitot tube. See "Pitot Tube Balancing Procedure" below

- To avoid airflow turbulence and incorrect readings, the airflow velocity should be measured on steel ducting a minimum of 3 duct cross-section from the unit or elbow and before any transition.

PITOT TUBE BALANCING PROCEDURE

PITOT TUBE

BALANCING PROCEDURE

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

The first step is to operate all mechanical systems on high speed, which have an influence on the ventilation system, i.e. the HRV/ERV itself and the forced air HVAC system or air handler if applicable. This will provide the maximum pressure that the HRV/ERV will need to overcome, and allow for a more accurate balance of the unit.

Drill a small hole in the duct (about 3/16"), four feet downstream of any elbows or bends, and two feet upstream of any elbows or bends.
These are recommended distances but the actual installation may limit the amount of straight duct.
The Pitot tube should be connected to a magnehelic gauge or other manometer capable of reading from 0 to 0.25 in (0-62 Pa) of water, preferably to 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. For general balancing it is sufficient to move the pitot tube around in the duct and take an average or typical reading. Repeat this procedure in the other (supply or return) duct. Determine which duct has the highest airflow (highest reading on the gauge). Then damper that airflow back to match the lower reading from the other duct. 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 areas of the duct being measured.

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.

MAINTENANCE

Make sure unit is unplugged before attempting any maintenance work.

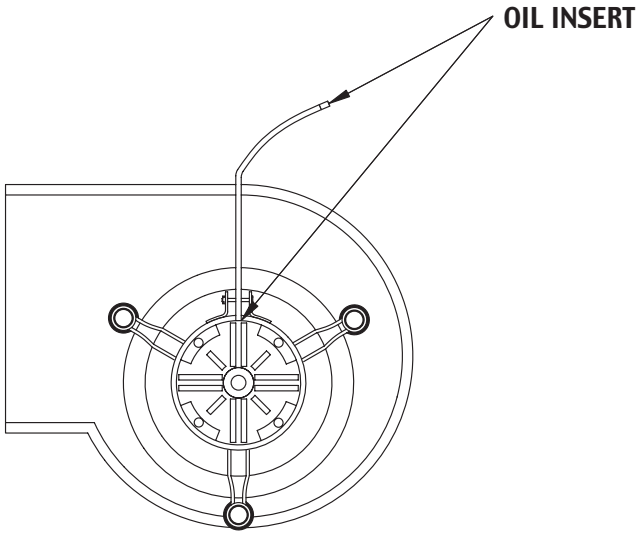
Filters
The filters need to be checked and cleaned every three(3) months. Cleaning the filters can be done with a vacuum cleaner. Filters need to be replaced every 6 months, or sooner depending on the operating and environmental conditions.

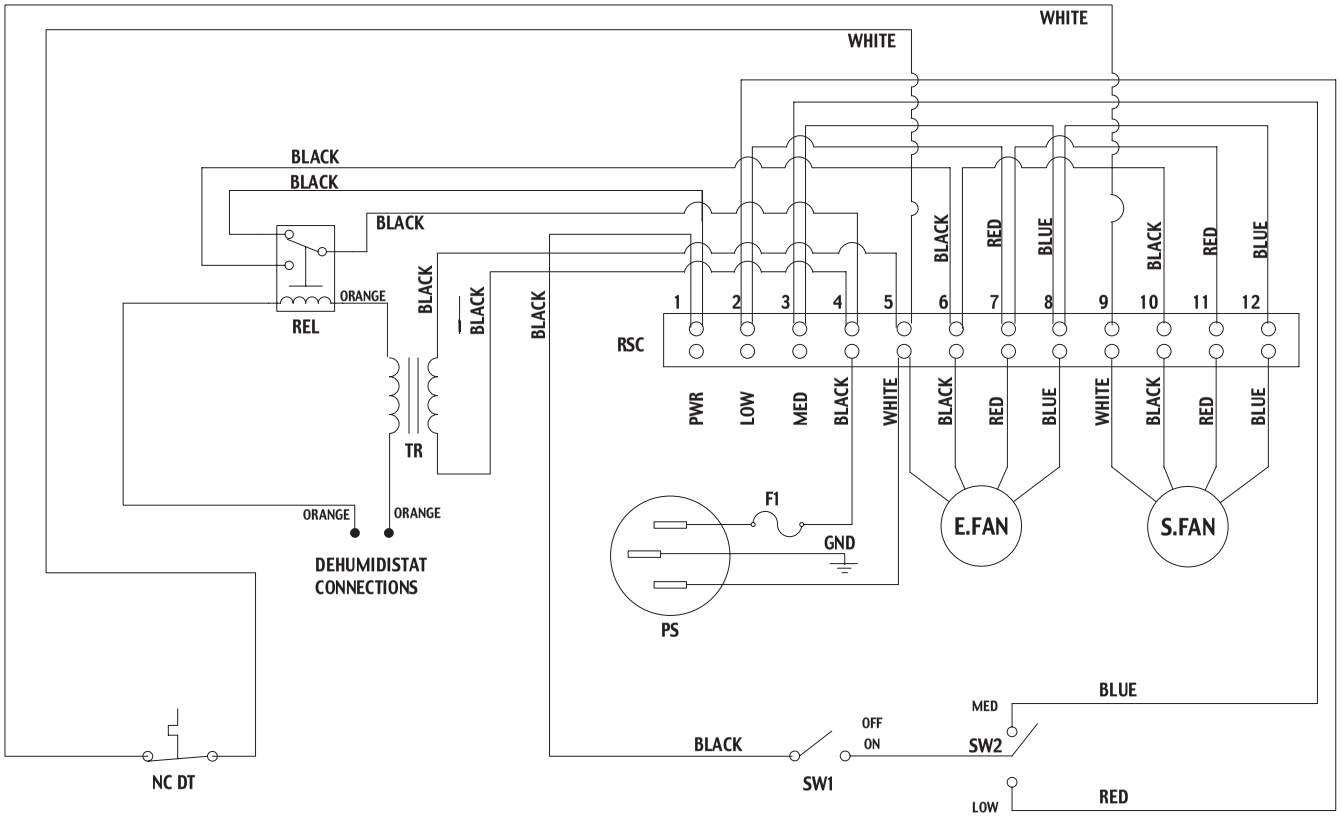
Heat Pipe Core
The heat pipe core needs to be visually checked for cleanliness every six (6) months. If it needs to be cleaned, it is recommended to use commercial condenser coil cleaners.

Blower
The blowers need to be kept clean for proper operation of the electric motors and also to give good airflow performance. This inspection should also be done every six (6) months.

Electric Motor
The electric motors need to be inspected and generally maintained every six (6) months. It is preferable to oil the motor at every maintenance check with 30 weight motor oil.

The drain and drain line
Units with drain lines should have their line and connection checked regularly.





SYMBOL	DECRIPTION	SYMBOL	DESCRIPTION
TR	TRANSFORMER	S.FAN	SUPPLY FAN
RSC	REMOTE SWITCH CONNECTIONS	E.FAN	EXHAUST FAN
REL	RELAY	P.S.	POWER SWITCH (120 VAC)
NC DT	NORMALLY CLOSED DEFROST THERMOSTAT / ALLTEMP	F1	FUSE
SW1	SWITCH / SINGLE POLE – DOUBLE THROW		
SW2	SWITCH / SINGLE POLE – DOUBLE THROW		

NOTE :

PRIMARY VOLTAGE: 120 VOLTS

AMPERAGE: 13.4 AMPS

POWER CONSUMPTION: 1600 WATTS

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ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED.

PROJECT/PROJET

KHP 10000 Fantech

TITLE/TITRE

WIRING DIAGRAM

DRAWING NO./ NO. DU DESSIN

001\01650-1

ARTICLE NO.

P00039

DATE

MAY 29 2003

DRAWN BY/DESSINE PAR

SERGE SC

SCALE/ECHELLE

NTS

SHEET

1 OF 4

WIRING DIAGRAM

TROUBLESHOOTING

Problem	Causes	Solutions
Air is too dry	Dehumidistat control is set too low	Increase the desired level of humidity. Change ventilation mode from continuous mode to standby.
	Unit airflow not balanced	Balance Unit
Air is too humid	Dehumidistat control is set too high	Reduce the desired level of humidity. Combine this step with use of continuous exchange mode.
	Storing too much wood for heating	Store a majority of your wood outside. Even dried, a cord of wood contains more than 20 gallons of water.
	Slow combustion heating only	Combine with central heating.
	Poor air circulating near windows	Open curtains or blinds. Bay or bow windows may require mechanical method.
	Basement door is closed	Open the door or install a grill on the door.
Persistent condensation on window	Improper adjustment of control	Reduce the desired level of humidity. Combine this with the use of continuous

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