

# Installation, Operation and Maintenance Manual

## SH, VH & SE Series

Heat & Energy Recovery Ventilators



SH 704 • VH 704 • SE 704

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






### United States

10048 Industrial Blvd., Lenexa, KS, 66215  
Tel.: 800.747.1762 • Fax: 800.487.9915

### Canada

50 Kanalfakt Way, Bouctouche, NB, E4S 3M5  
Tel.: 800.565.3548 • Fax: 877.747.8116

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Note	Warning/ Important note	Information	Technical information	Practical tip



## PLEASE READ THIS MANUAL BEFORE INSTALLING UNIT

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 pressure. After installation, the compatibility of the two pieces of equipment must be confirmed by measuring the airflow of the Heat Recovery Ventilator using the balancing procedure found in this manual. It is always important to assess how the operation of any HRV may interact with vented combustion equipment (i.e. Gas Furnaces, Oil Furnaces, Wood Stoves, etc.)



Products are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100% free of defects. Even reliable products will experience occasional failures, and this possibility should be recognized by the user. If these products are used in a life support ventilation system where failure could result in loss or injury, the user should provide adequate back-up ventilation, supplementary natural ventilation or failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

Your ventilation system should be installed in accordance with the local building code that is in effect, in absence of such requirements, it is recommended to check with local authorities having jurisdiction in your area prior to installing this product.

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# Determining your airflow requirement

## Room Count Method

Room classification	Number of rooms	CFM (L/s)	CFM Required
Master bedroom		x 10 L/s (20 CFM)	=
Basement	yes or no	if yes add 10 L/s (20 CFM) if no = 0	=
Bedrooms		x 5 L/s (10 CFM)	=
Living room		x 5 L/s (10 CFM)	=
Others		x 5 L/s (10 CFM)	=
Kitchen		x 5 L/s (10 CFM)	=
Bathroom		x 5 L/s (10 CFM)	=
Laundry room		x 5 L/s (10 CFM)	=
Utility room		x 5 L/s (10 CFM)	=
<b>Total Ventilation Requirements (add last column )</b>			<b>=</b>

1 CFM = 0.47 L/s  
1 L/s = 2.13 CFM

## ASHRAE method

### Ventilation Air requirements

Floor area		Bedrooms									
Ft <sup>2</sup>	m <sup>2</sup>	0-1		2-3		4-5		6-7		>7	
		CFM	L/s	CFM	L/s	CFM	L/s	CFM	L/s	CFM	L/s
< 1500	<139	30	14	45	21	60	28	75	35	90	42
1501-3000	139.1-279	45	21	60	28	75	35	90	42	105	50
3001-4500	279.1-418	60	28	75	35	90	45	105	50	120	57
4501-6000	418.1-557	75	35	90	42	105	50	120	57	135	64
6001-7500	557.1-697	90	42	105	50	120	57	135	64	150	71
>7500	>697	105	50	120	57	135	64	150	71	165	78

\* ASHRAE 62.2-2010 Table 4.1, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings.



**Bathroom:** If the HRV is going to provide the required local exhaust ventilation for each bathroom with each a continuous 20 CFM (10 L/s), this ventilation rate can be considered as part of the whole-building ventilation rate.

# Installation examples

Example only – duct configuration may differ depending on the model.

## FULLY DEDICATED SYSTEM BEST FOR NEW CONSTRUCTION



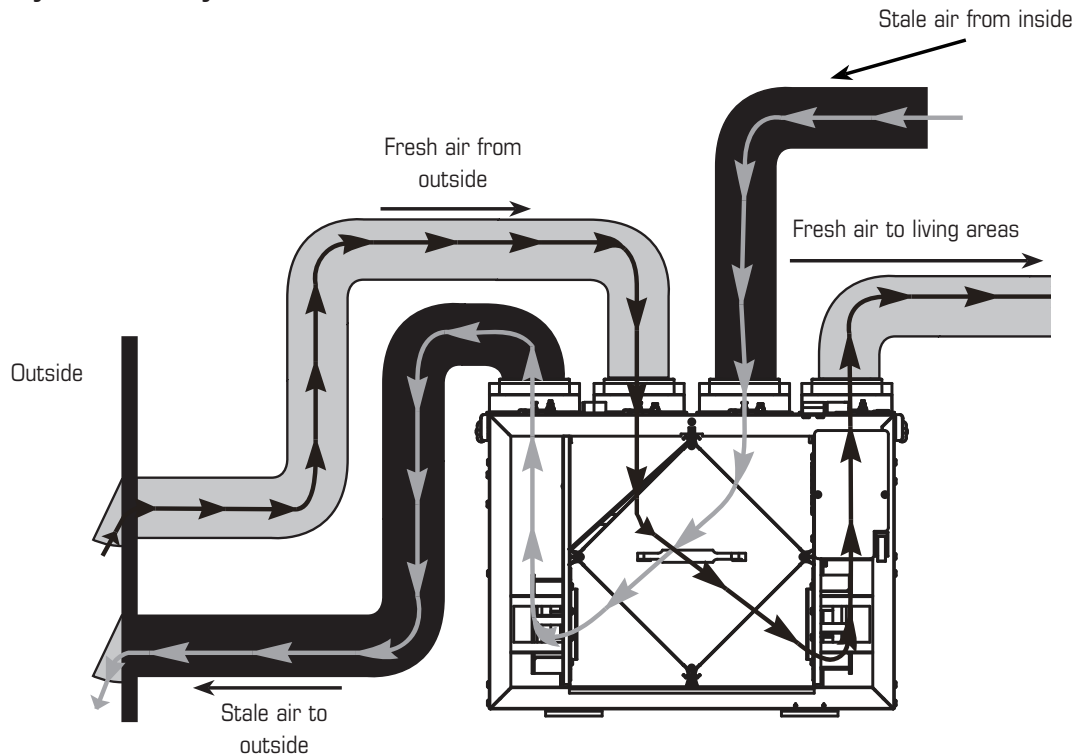
1. Stale air is drawn from key areas of the home requiring local exhaust (bathroom, kitchen, laundry room).
2. Fresh air is distributed directly to habitable rooms in the house (bedrooms, living room)
3. The HRV's airflow must be balanced after installation using the procedure found in the section "AIRFLOW BALANCING"

### Suggested installation for:

- Hydronic baseboard
- Infloor heating
- Electric baseboard
- Mini split heat pump

**Benefits:** Provides the best fresh air distribution in the house; lowest operation cost since the furnace/air handler unit is not needed.

## HRV ducting for fully Dedicated System



## Installation examples (Cont'd)

DIRECT CONNECTION of the FRESH air to living area to the RETURN PLENUM of the AIR HANDLER (Stale air drawn from key areas of home)

### PARTIALLY DEDICATED SYSTEM (BETTER)



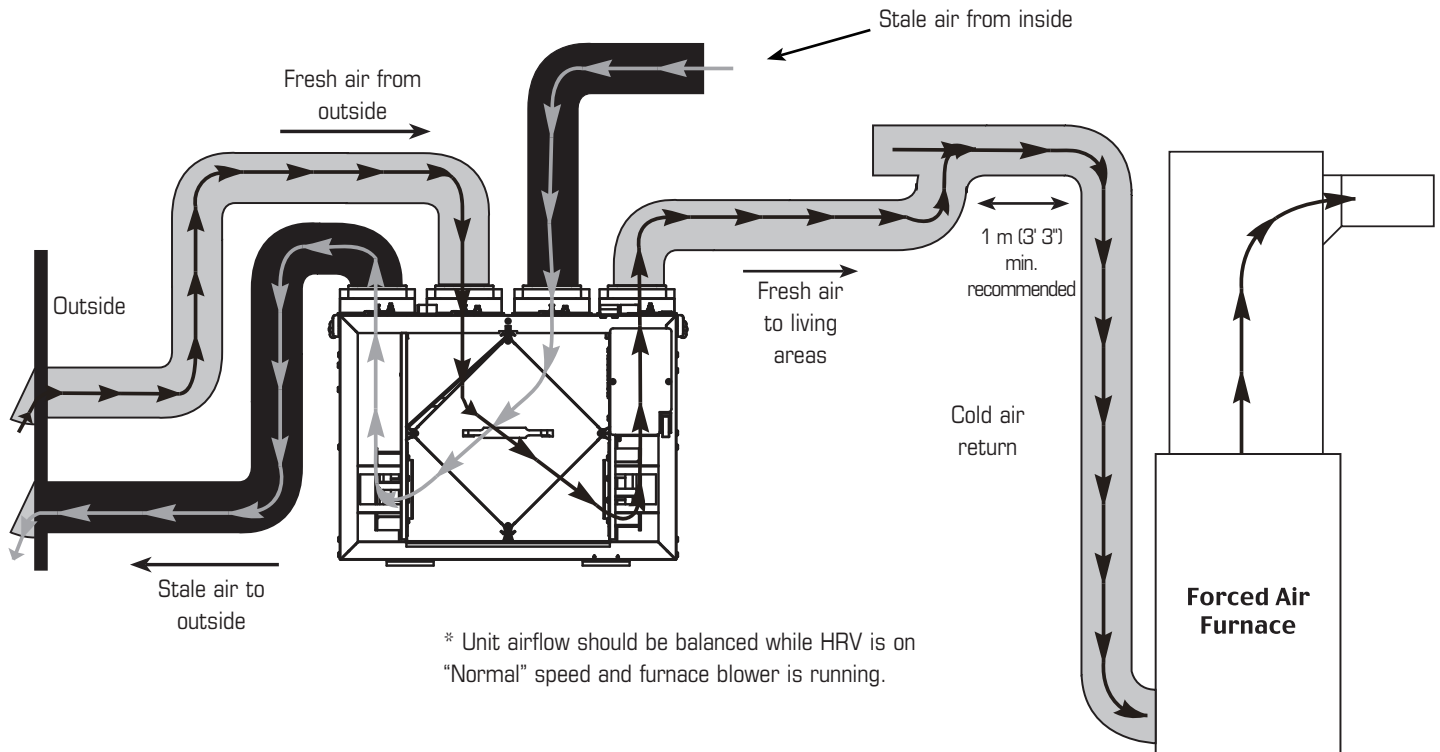
1. Furnace blower must operate when ventilation from HRV is required. The furnace should be set to run continuously or interlocked with HRV
2. Stale air is drawn from key areas of the home (bathroom, kitchen, laundry room).
3. Fresh air is supplied to the return air plenum of the furnace.
4. Due to the difference in pressure between the HRV and the equipment it is being connected to the HRV's airflow must be balanced on site, using the procedure found in the section "AIRFLOW BALANCING"

#### Suggested installation for:

- Central furnace (air handling unit or central air conditioners)
- When ducting fresh air to living area is not possible or practical, i.e. expensive or when the central AHU will operate year-round.

**Benefits:** Conditions the fresh air prior to distributing it throughout the house

### HRV/ Furnace ducting for Partially Dedicated System



Fantech heat recovery ventilators (HRV) that use a supply fan shutdown for frost prevention do not include an outdoor air motorized damper. If you are using a simplified installation, i.e. connecting the HRV supply air duct to a furnace's return air duct, the HRV must operate continuously. When the HRV is turned off, no warm exhaust air will flow through the HRV but the furnace's fan will continue to draw in outdoor air directly into the furnace. If it's cold outside, cold air will be introduced, without re-heating, directly into the furnace.

## Installation examples (Cont'd)

DIRECT CONNECTION of both the HRV SUPPLY AIR STREAM and EXHAUST AIR STREAM to the FURNACE COLD AIR RETURN

### SIMPLIFIED INSTALLATION (GOOD) (RETURN/RETURN METHOD) - OPTION 1



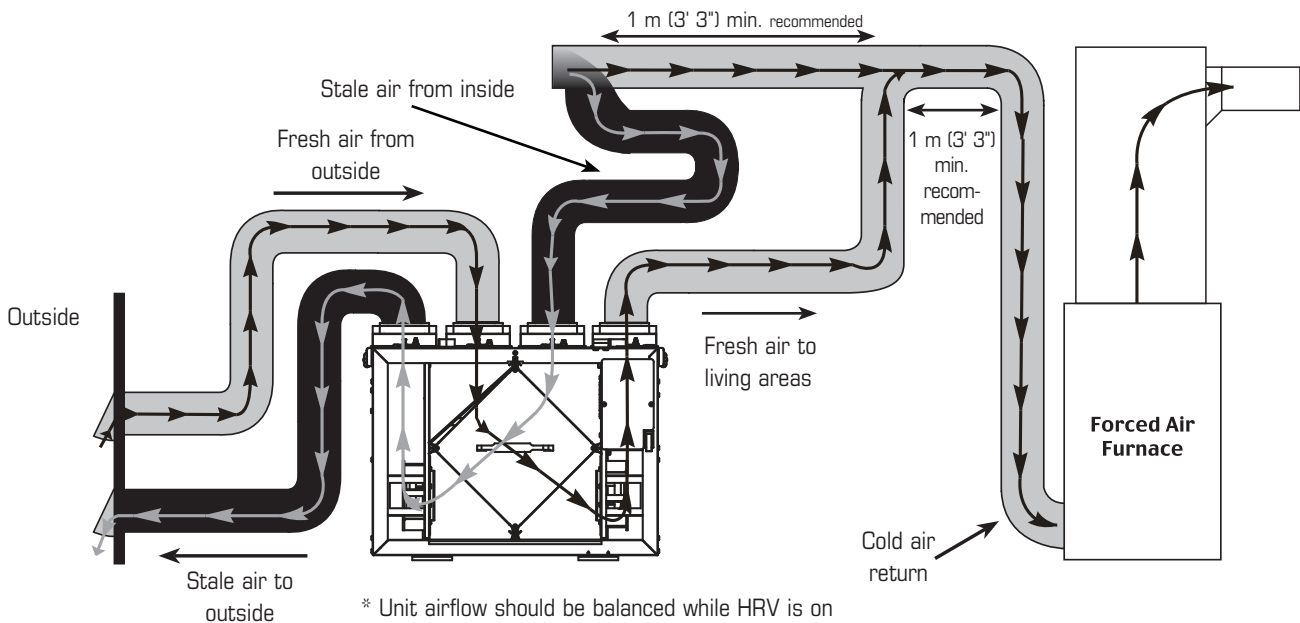
1. Furnace blower must operate when ventilation from HRV is required. The furnace should be set to run continuously or interlocked with HRV.
2. A minimum separation of 1 m (3'3") is recommended between the two direct connections.
3. In order to prevent exhausting any fresh air, the HRV's exhaust air connection should be upstream of the HRV's supply air connection when ducting to the furnace's cold air return.
4. Due to the difference in pressure between the HRV and the equipment it is being connected to the HRV's airflow must be balanced on site, using the procedure found in the section "AIRFLOW BALANCING"

#### Suggested installation for:

- When bathroom and kitchen already have local exhaust system
- May be suitable for retrofitting

**Benefits:** Least expensive installation type

### HRV/ furnace for Simplified Installation – Option 1



\* Unit airflow should be balanced while HRV is on "Normal" speed and furnace blower is running.



Fantech heat recovery ventilators (HRV) that use a supply fan shutdown for frost prevention do not include an outdoor air motorized damper. If you are using a simplified installation, i.e. connecting the HRV supply air duct to a furnace's return air duct, the HRV must operate continuously. When the HRV is turned off, no warm exhaust air will flow through the HRV but the furnace's fan will continue to draw in outdoor air directly into the furnace. If it's cold outside, cold air will be introduced, without re-heating, directly into the furnace.

## Installation examples (Cont'd)

DIRECT CONNECTION of the HRV SUPPLY AIR STREAM to the SUPPLY AIR SIDE on the FURNACE & EXHAUST AIR STREAM to the FURNACE COLD AIR RETURN

### SIMPLIFIED INSTALLATION (GOOD) OPTION 2



1. Furnace blower must operate when ventilation from HRV is required. The furnace should be set to run continuously or interlocked with HRV.
2. Due to the differences in pressure between the HRV and the equipment it is being connected to, the HRV's airflow must be balanced on site, using the procedure found section "AIRFLOW BALANCING".

#### Suggested installation for:

- When bathroom and kitchen already have local exhaust system
- May be suitable for retrofitting

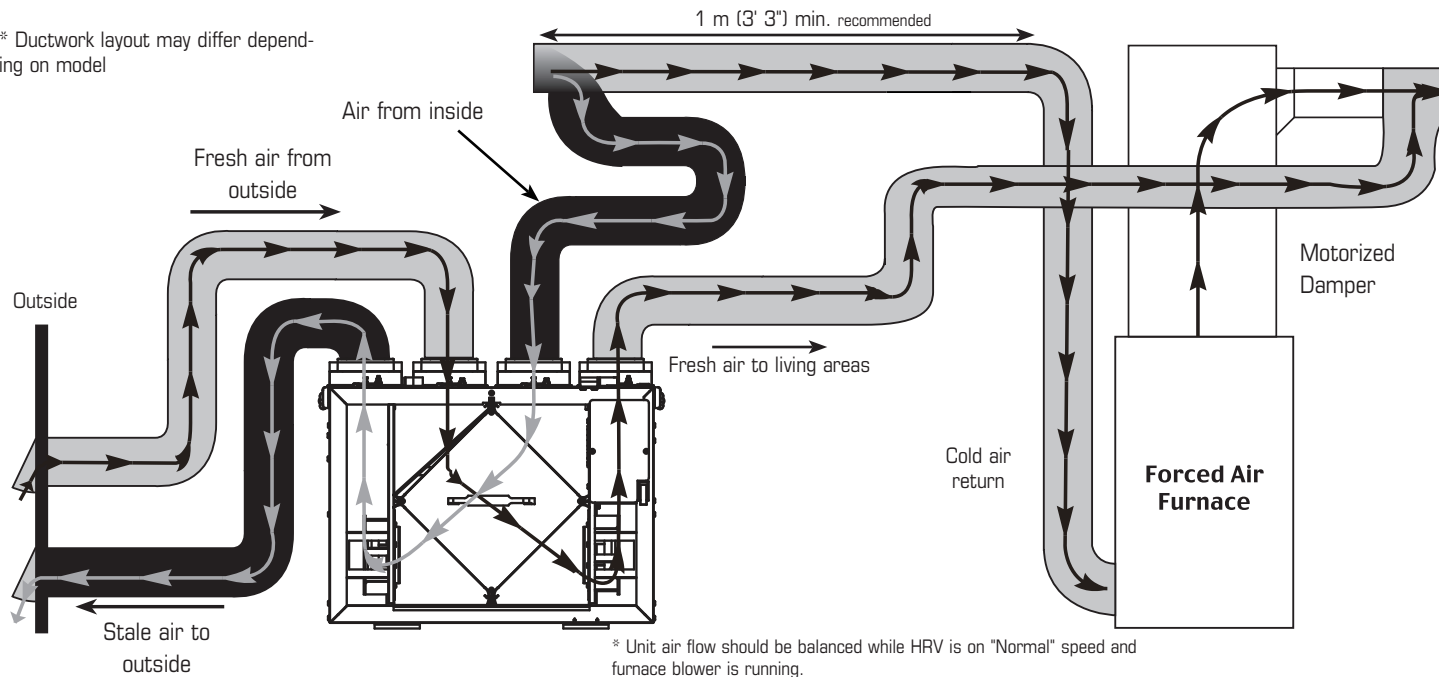
**Benefits:** Least expensive installation type



In the case of a simplified installation, Option 1 is recommended.

### HRV/Furnace ducting for Simplified Installation - Option 2

\* Ductwork layout may differ depending on model



**Fantech heat recovery ventilators (HRV) that use a supply fan shutdown for frost prevention do not include an outdoor air motorized damper. If you are using a simplified installation, i.e. connecting the HRV supply air duct to a furnace's return air duct, the HRV must operate continuously. When the HRV is turned off, no warm exhaust air will flow through the HRV but the furnace's fan will continue to draw in outdoor air directly into the furnace. If it's cold outside, cold air will be introduced, without re-heating, directly into the furnace.**



# Exterior ducting installation

## Weatherhood location

- Decide where your intake and exhaust hoods will be located.

## Locating the Intake Weatherhood

- Should be located upstream (if there are prevailing winds) from the exhaust outlet.
- At a minimum of 2m (6') away from dryer vents and furnace exhaust (medium or high efficiency furnaces), driveways, oil fill pipes, gas meters, or garbage containers.
- At a minimum height of 460mm (18") above the ground, or above the level of expected snow accumulation.
- At a minimum distance of 1m (3') from the corner of the building.
- Do not locate in the garage, attic, crawl space, or underneath deck.

## Locating the Exhaust Weatherhood

- At least 460mm (18") above ground or above the depth of expected snow accumulation
- At least 1m (3') away from the corner of the building
- Not near a gas meter, electric meter or a walkway where fog or ice could create a hazard
- Do not locate in a garage, workshop or other unheated space

## Installing the ducting to the weatherhoods

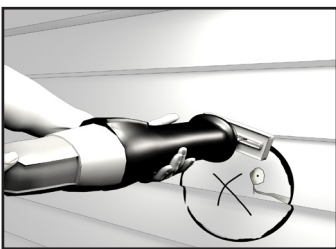
A well designed and installed ducting system will allow the HRV/ERV to operate at its maximum efficiency. The inner liner of the flexible insulated duct must be secured to the sleeve of the weatherhood (as close to the outside as possible) and to the appropriate duct connection on the HRV/ERV. The insulation should remain full and not crushed. The outer liner, which acts as a vapor barrier, must be completely sealed to the outer wall and the HRV/ERV using tape and/or caulking. A good bead of high quality caulking (preferably acoustical sealant) will seal the inner flexible duct to both the HRV/ERV duct connection and the weatherhood prior to securing them.

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

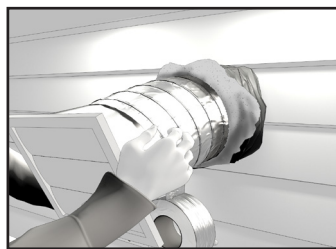
Twisting or folding the duct will severely restrict airflow.

See "Installation Diagram Examples" for installation examples.

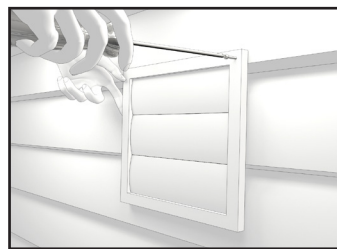
## Steps for hood installation



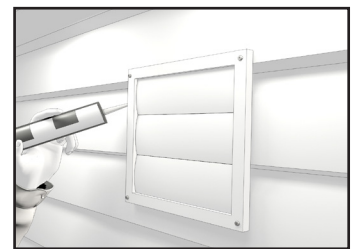
**1** Using the duct connection of the outside hood, outline the intake & exhaust holes to be cut. The holes should be slightly larger than the duct connection to allow for the thickness of the insulated flexible duct. Cut a hole for both the intake and exhaust hoods.



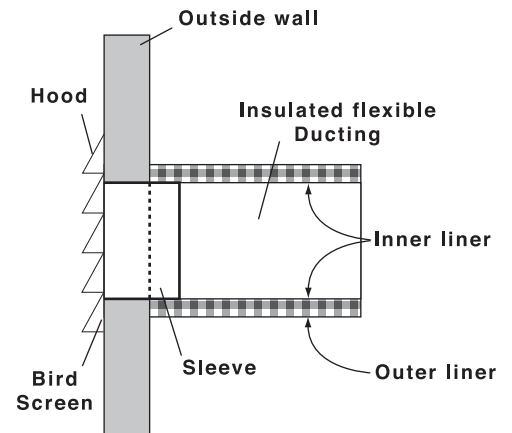
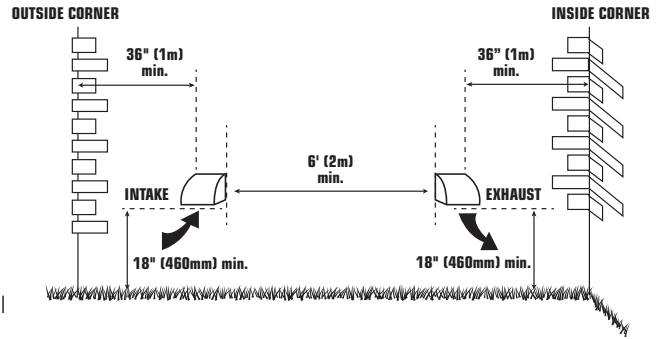
**2** Pull the insulated flexible duct through the opening until it is well extended and straight. Slide the duct's inner vinyl sleeve over the hood duct connection and secure. Pull the insulation over the duct and pull the vapour barrier over the sleeve. Secure with appropriate tape or sealant.



**3** Push the hood into the opening and then attach the hood to the outside wall with mounting screws. Repeat the installation procedure for both the supply and exhaust hoods.



**4** Using a caulking gun, seal around both hoods to prevent any leaks.



# Installing duct to/from inside



- Building Codes and Combustion Appliance Installation Codes do not allow location of return air grilles or any opening such as a "breathing tee" in an enclosed room with spillage susceptible combustion appliances.
- The fresh air inlet from the HRV needs to respect a minimum distance from the furnace return drop to ensure proper air mixing and temperature at the furnace core. See furnace manufacturer for appropriate specifications.

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 90° elbows whenever possible.

All duct joints must be fastened with screws or duct sealant and wrapped with a quality tape to prevent leakage. Aluminum foil duct tape is recommended. Galvanized ducting from the HRV/ERV to the living areas in the house is recommended whenever possible, although flexible duct can be used in moderation when necessary.



The SH704 & VH704 should be installed with a 4" (100mm) duct system that has less than 80 ft (25m) of equivalent duct length on the supply and on the exhaust side. If longer runs are required, increasing the duct diameter or following the instructions below might help.

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. All air movement devices have a performance curve.

The amount of air (CFM) that an HRV/ERV 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..

## Supply air ducting

In homes without a forced air furnace, fresh air should be supplied to all habitable rooms including, bedrooms and living areas. It should be supplied from high wall or ceiling locations. Grilles that diffuse the air comfortably such as Fantech Contour Grilles are recommended. To avoid possible noise transfer through the ductwork system, a short length (approximately 12", 300 mm) of nonmetallic flexible insulated duct should be connected between the HRV/ERV and the supply/exhaust 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 homes with a forced air furnace, you may want to connect the HRV/ERV to the furnace ductwork (see information below).

## Exhaust air ducting

The stale air exhaust system is used to draw air from the points in the house where the worst air quality problems occur. Due to its lower capacity, the SH704, VH704 and SE704 are designed to vent from a single source point only and to the bathroom that is closest to the unit or directly out of the furnace return. Additional source points may be drained from if designed properly or installed on a separate Fantech fan bath kit to ventilate additional areas. Fantech bath kits are listed below and are ideal for both new construction and retro fit.

# Installation



- 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, 60Hz. (power cord is 3 feet long)
- Mount the unit as level as possible in order to allow proper condensate drainage. (SH704 & VH704 only)
- Have access to a water drain for the condensate of the unit during defrost. (SH704 & VH704 only)
- Have a certain amount of heat around the unit (attic installation is not recommended for SH704 and VH704).
- Installations close to the living space, such as closets, should be design and to minimize noise or vibration transfers.
- Have access for future maintenance. (10" is recommended for removal of core)

## Location

The HRV/ERV 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 or an area close to the outside wall where the weatherhoods will be mounted. If a basement area is not convenient or does not exist, a utility room or laundry, closet, above drop ceiling or attic (SE704) and garage may be used.

**Attic installations** are not normally recommended due to:

- The complexity of the installation
- Freezing conditions in the attic
- Difficulty of access for service and cleaning
- No drain access

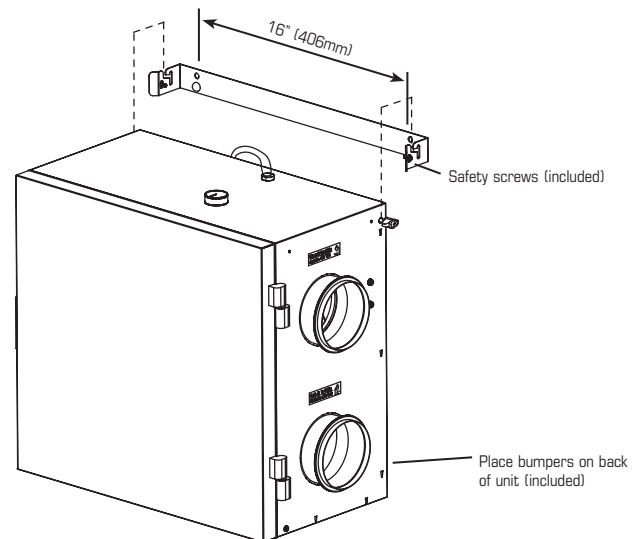
**Connecting appliances to the HRV** is not recommended. These include:

- Clothes dryer
- Range top
- Stovetop fan
- Central vacuum system
- Bathroom exhaust fans unless they are specifically designed for this purpose

These appliances may cause lint, dust or grease to collect in the HRV, damaging the unit.



Connecting any of these types of appliances to the HRV will void your warranty.



## Mounting – Wall Mount

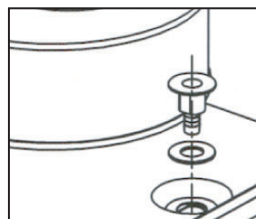
1. Attach bracket to wall
2. Lift unit & slide nuts into slots on bracket
3. Tighten screws to secure unit to bracket
4. Insert the safety screws & place wall bumpers to level off the unit.

\* Optional chain hanging kit available.

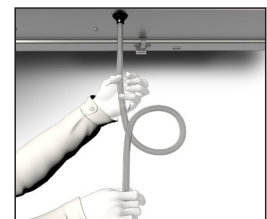
## Installing drain line- (SH704 & VH704 ONLY) - Drainline not included in kit

Through normal operation and during its 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.

### 1 Install the drain nipple.



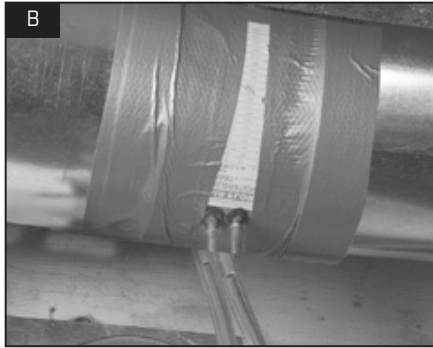
### 2 Install the drain hose, making a "P" trap



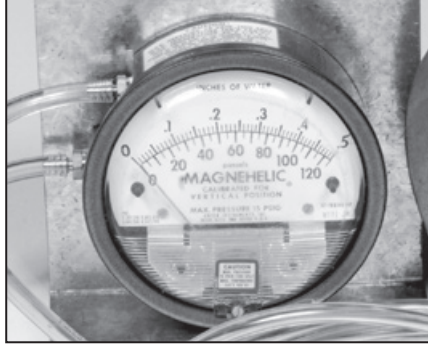
# Airflow adjustment & balancing

Commissioning the system after installation is recommended which include confirming the proper operation of the system and how it interacts with other components within the home.

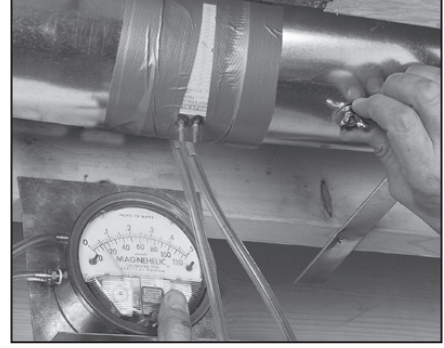
## Airflow station grid method



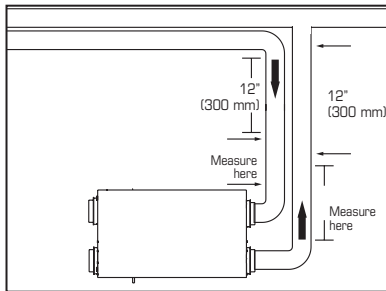
**1** For this flow measuring station, cut the duct and place the flow measuring station between each section of duct. Make sure that the flow measuring station's air direction arrow points in the direction of the airflow. Secure the flow measuring station with duct tape.



**2** Before taking the reading, make sure that the megnehelic gauge is level and at 0. Refer to the flow measuring station's chart to determine your unit's airflow velocity.



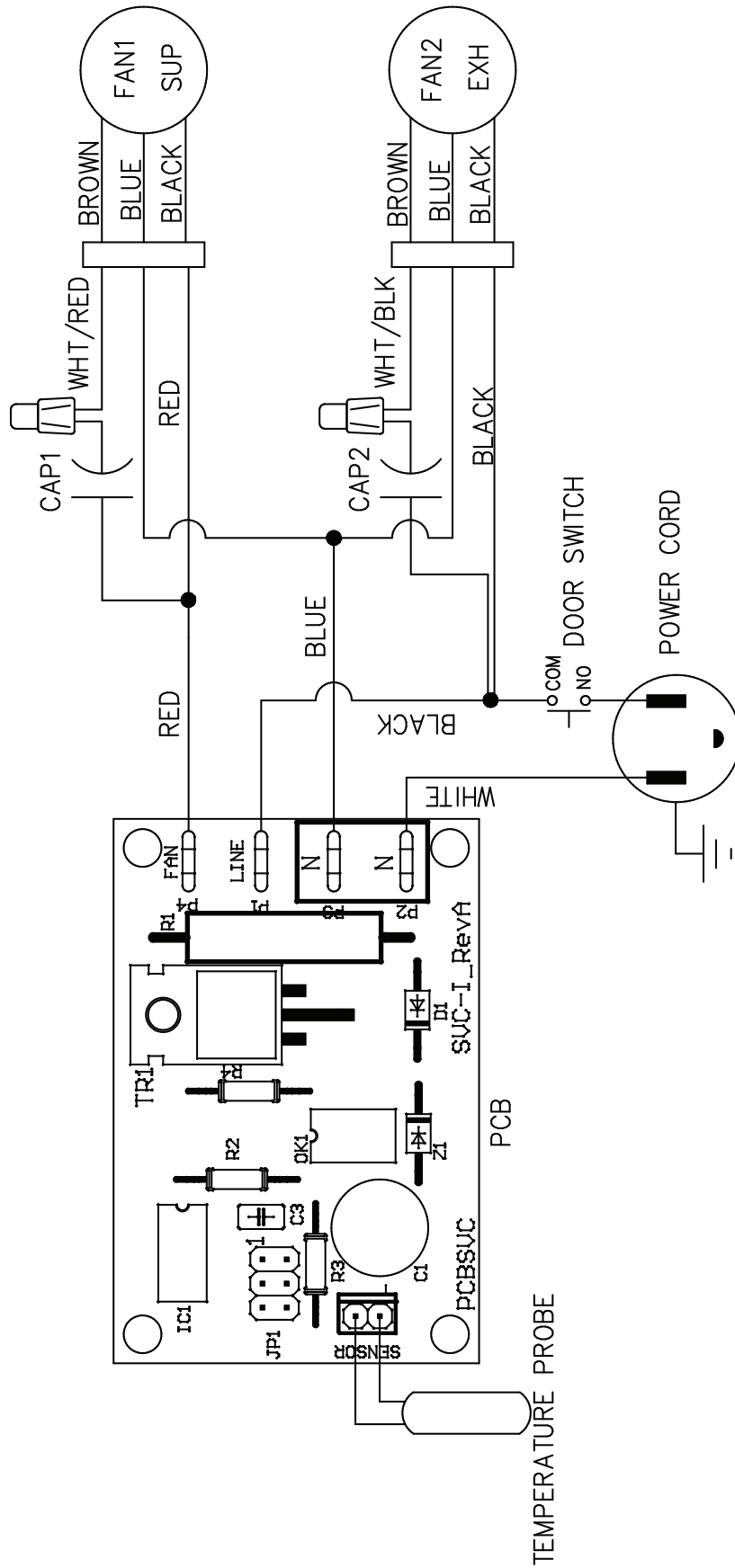
**3** Adjust the "Supply Air Out" damper until you reach the desired velocity. Follow the previous steps to adjust the "Exhaust Air Out" damper, if needed.



- To avoid airflow turbulence and incorrect readings, the airflow velocity should be measured on steel ducting a minimum of 12" (300 mm) from the unit or elbow and before any transition.

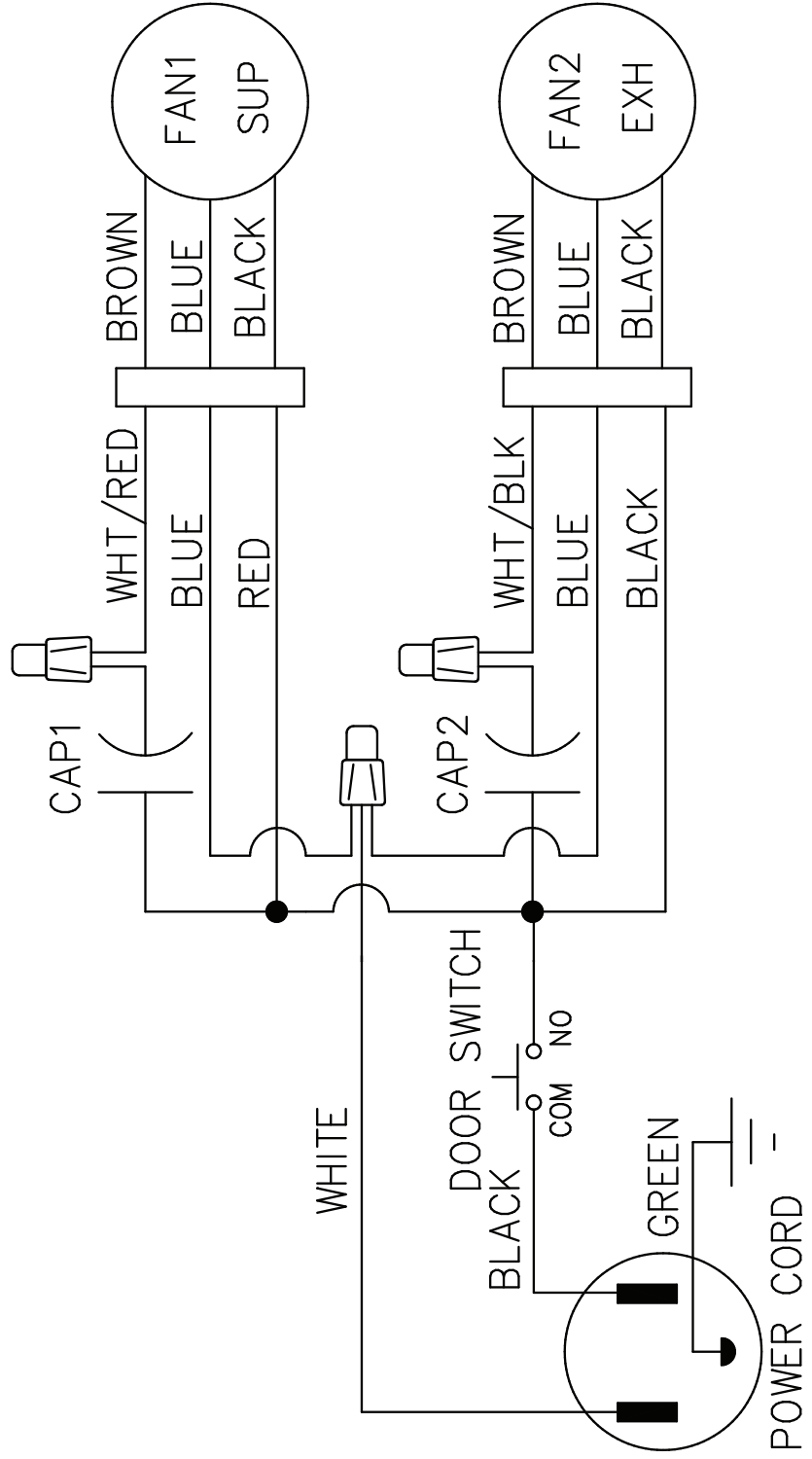
# Electrical connections

SH704 & VH704



# Electrical connections (Cont'd)

SE 704N



# Troubleshooting

Problem	Causes	Solutions
Air is too dry	Insufficient water vapour generated	Install humidifier
Air is too humid	Sudden increase in humidity by cooking or bathing Sudden change in temperature Storing too much wood for heating Dryer vent exhaust is inside home Poor air circulation near windows HRV not operating (during winter)	Ventilate at the source of the problem using a HRV or additional fan Wait until outside temperature stabilizes (winter). Heating will also improve situation. Store a majority of your wood outside. Even dried, a cord of wood contains more than 20 gallons of water. Arrange outside vent for dryer. Open curtains or blinds. Bay or bow windows may require mechanical method. Check power to the unit
Persistent condensation on window	Poor air circulation near windows	Open curtains or blinds. Bay or bow windows may require mechanical method.
Poor Air Flows	1/4" (6mm) mesh on the outside hoods is plugged Filters plugged Core obstructed Indoor grilles closed or blocked Dampers are closed (if installed) Poor power supply at site Ductwork is restricting HRV/ERV	Clean exterior hoods or vents Remove and clean filter Remove and clean core Check and open grilles Have electrician check supply voltage Check duct installation
Supply air feels cold	Poor location of supply grilles, the airflow may irritate the occupant  Outdoor temperature extremely cold	Locate the grilles high on the walls or under the baseboards, install ceiling mounted diffuser or grilles so as not to directly spill the supply air on the occupant (eg. Over a sofa) Use superior grilles such as Fantech CG grille A small duct heater (1kw) 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
HRV / ERV and / or Ducts Frosting up	HRV/ERV air flows are improperly balanced Malfunction of the HRV defrost system Outdoor temp. extremely cold	Have HVAC contractor balance the HRV/ERV airflows Note: minimal frost build-up is expected on cores before unit initiates defrost cycle functions Install duct heater
Condensation or Ice Build Up in Insulated Duct to the Outside	Incomplete vapour barrier around insulated duct A hole or tear in outer duct covering	Tape and seal all joints Tape any holes or tears made in the outer duct covering Ensure that the vapour barrier is completely sealed.
Condensation or Ice Build Up in Insulated Duct to the Outside	Incomplete vapour barrier around insulated duct A hole or tear in outer duct covering	Tape and seal all joints Tape any holes or tears made in the outer duct covering Ensure that the vapour barrier is completely sealed.

# Maintenance chart

Maintenance Required	Recommended Frequency	Date Maintenance Performed					
Check and Clean Filters	Every 3 months or if dirty						
Check Heat/Energy Recovery Core	Every 6 months						
Check Drain Pan and Lines	Every 3 months						
Vacuum the Inside of the Unit	Annually						
Clean and Un-block Outside Hoods	Annually						
Clean and Inspect Duct Work	Annually						
General Servicing by a Qualified Contractor	Annually						

\* Schedule may be altered to meet your own needs. More frequent servicing may be required depending on the severity of your home's indoor and outdoor environments.

Contractor	Telephone Number	Date Serviced

## Limited Warranty

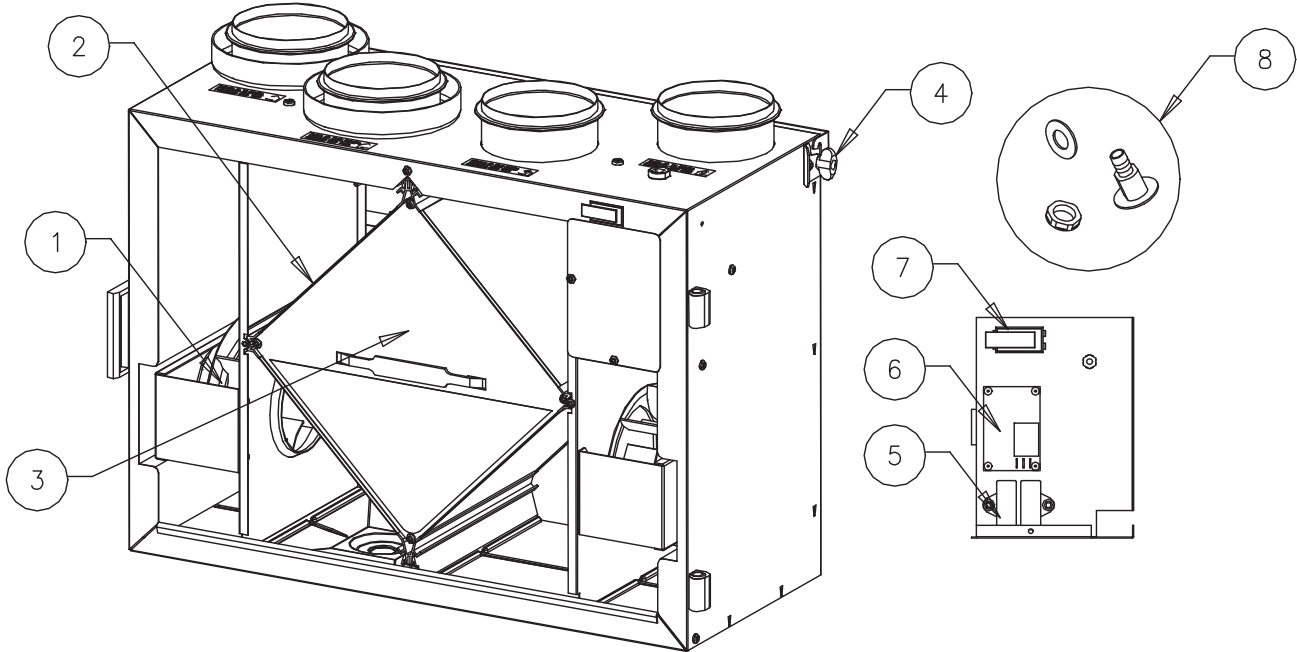
- The heat recovery aluminum core has a limited lifetime warranty and the enthalpy energy recovery core has a 5 year limited warranty.
- The motors found in all Fantech HRV/ ERVs require no lubrication, and are factory balanced to prevent vibration and promote silent operation.
- The limited warranty 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 5 years on parts and 7 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.



# Parts list

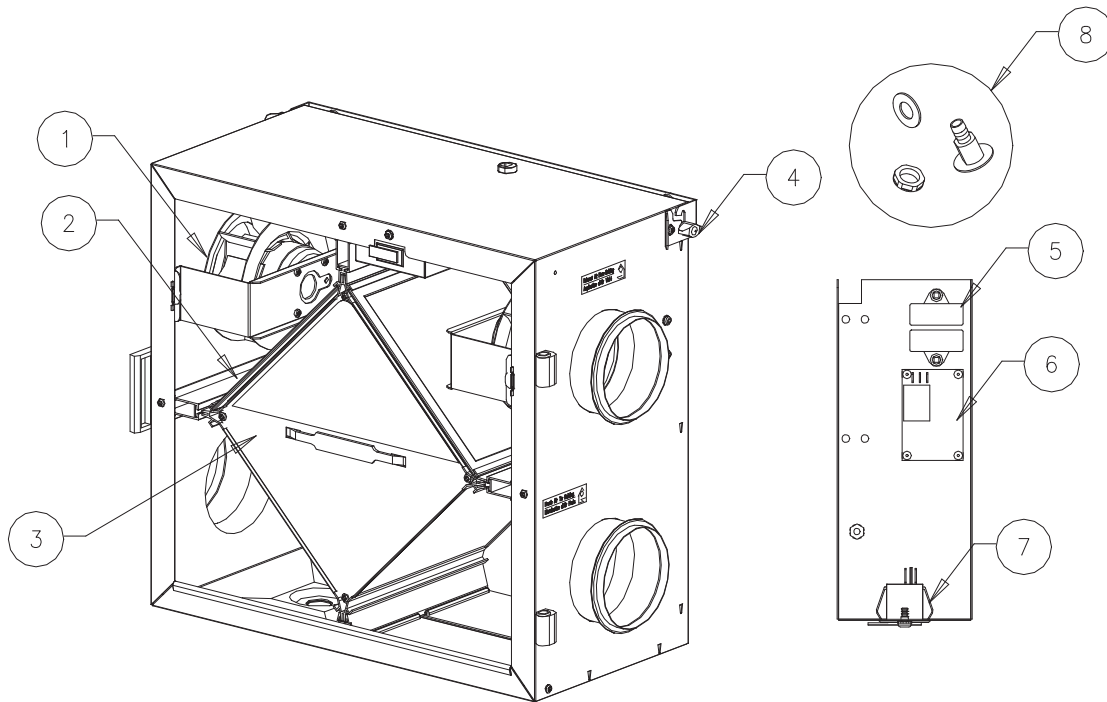
## VH704



BOM #	Description	VH704 (40358)
1	Motor, RZE 133-BH94-18	404378
2	Electrostatic Filters Kit 8" x 8.3"	405116
3	Heat Recovery Cell 8.5" x 8.5" x 8"	404350
4	Wing Screw 10-32	412070
5	Capacitors 2uF	412315
6	PCB	412072
7	Door Switch	410867
8	Kit Drain Plug	40315
	Temperature Probe	40286
	Door Assembly (Plastic hinges)	420438
	Door Assembly (Metal hinges)	426617
	Kit, Wall Bracket	409722
	Kit, Chain	404261

# Parts list

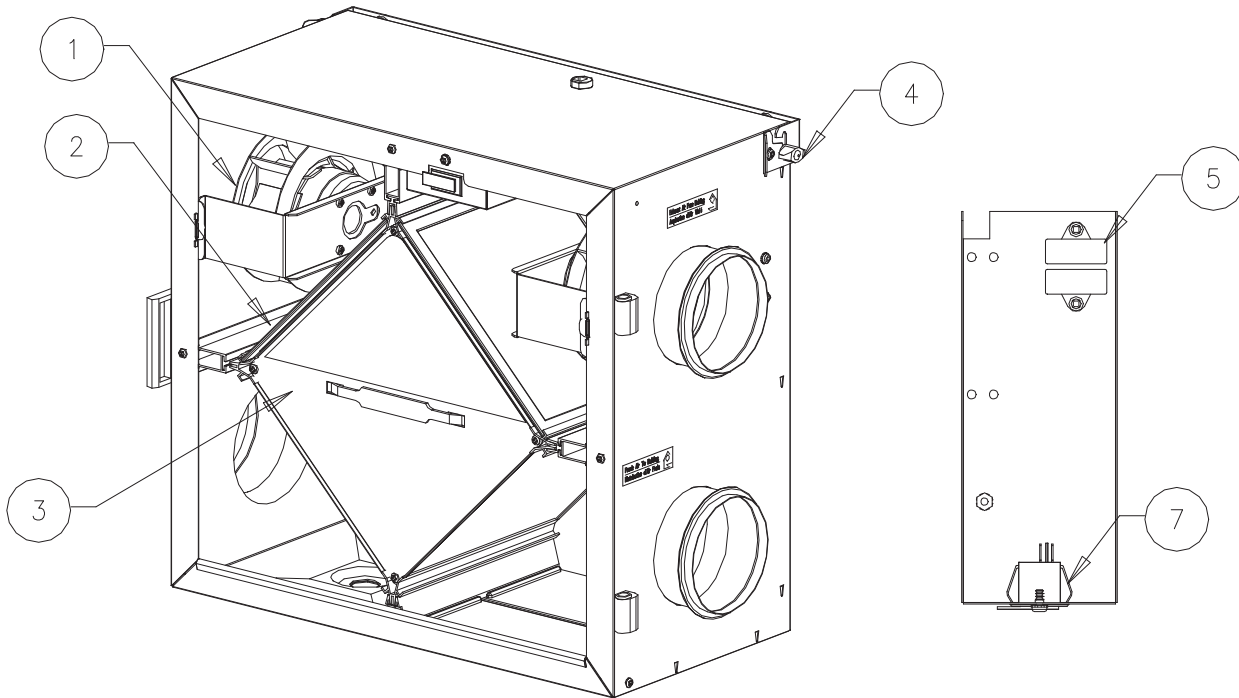
## SH704



BOM #	Description	SH704 (40356)
1	Motor, RZE 133-BH94-18	404378
2	Electrostatic Filters Kit 8" x 8.3"	405116
3	Heat Recovery Cell 9" x 9" x 8"	403120
4	Wing Screw 10-32	412070
5	Capacitors 2uF	412315
6	PCB	412072
7	Door Switch	410867
8	Kit Drain Plug	40315
	Temperature Probe	40286
	Kit, Wall Bracket	409721
	Kit, Chain	404261
	Door Assembly	405536

# Parts list

## SE704



BOM #	Description	SE704 (40357)
1	Motor, R2E 133-BH94-18	404378
2	Electrostatic Filters Kit 8" x 8.3"	405116
3	Energy Recovery Cell	422731
4	Wing Screw 10-32	412070
5	Capacitors 2uF	412315
7	Door Switch	410867
	Kit, Wall Bracket	409721
	Kit, Chain	404261

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