VHR 704R

Heat Recovery Ventilator

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".

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fantech

Note	Warning/ Important note	Information	Technical information	Practical tip

PLEASE READ THIS MANUAL BEFORE INSTALLING UNIT

For residential use only

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 recommenced to check with local authorities having jurisdiction in your area prior to installing this product.

Table of content

Determining your airflow requirement

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

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)	=
		Total Ventilation Requirements (add last column)	**=**

ASHRAE method

Ventilation Air requirements

Floor area		Bedrooms									
		0-1		2-3		4-5		6-7		>7	
Ft^2	m^2	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.

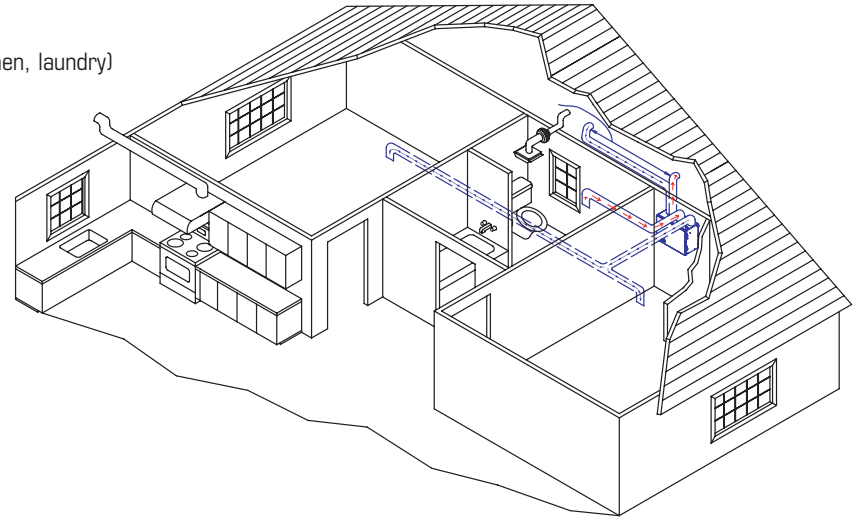
Bathroom: If the HRV is going to provide the required local exhaust ventilation for each bathroom with each a continuous 20 CFM (10 L/s), this ventilation rate can be considered as part of the whole-building ventilation rate.

Installation examples

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

FULLY DEDICATED SYSTEM
BEST FOR NEW CONSTRUCTION

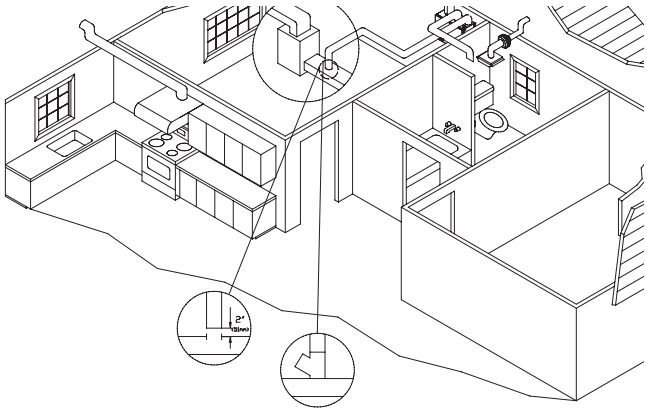
Stale air is drawn from key areas of home (bathroom, kitchen, laundry)
Fresh air supplied to main living areas



PARTIALLY DEDICATED SYSTEM (BETTER)

1. Furnace blower may be required to operate when HRV is on to provide good air distribution.
2. Weatherhood arrangement is for drawing purposes only.
3. Due to the differences in pressure between the HRV and the equipment it is being connected to, the HRV's airflow should be confirmed on site, using the balancing procedure found in the installation manual. If a release is required due to the furnace pulling too much air from the HRV, special care and attention is needed to its design.
4. The VHR 704 should be mounted with its duct connections on top or similar

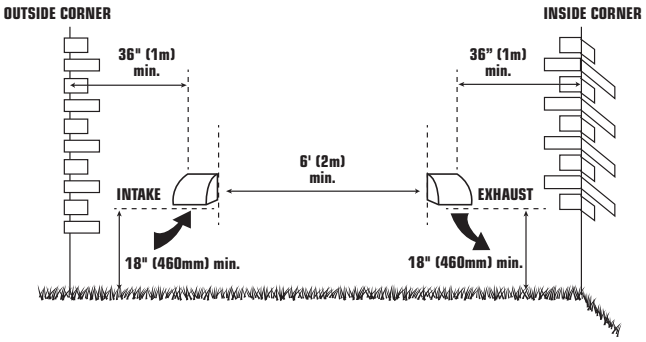
Building Codes and Combustion Appliance Installation Codes do not allow location of return air grilles or any opening such as a "breathing tee" in an enclosed room with spillage susceptible combustion appliances.



Exterior ducting installation

Weatherhood location

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

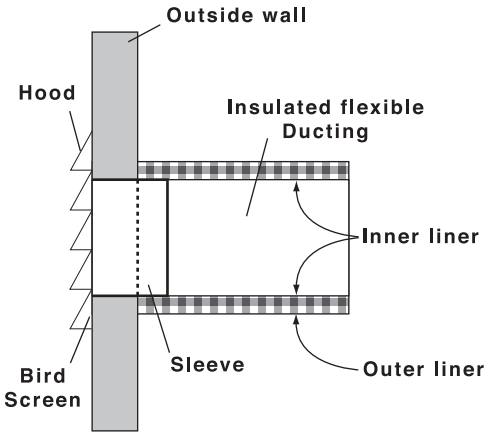


Locating the Intake Weatherhood

- 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



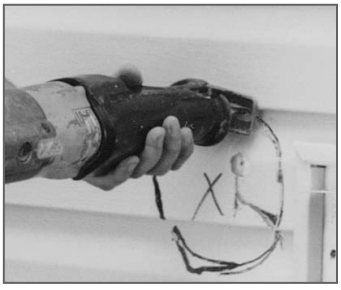
Installing the ducting to the weatherhoods

A well designed and installed ducting system will allow the HRV 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. 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 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 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 should be stretched tightly and be as short as possible.

Twisting or folding the duct will severely restrict airflow.

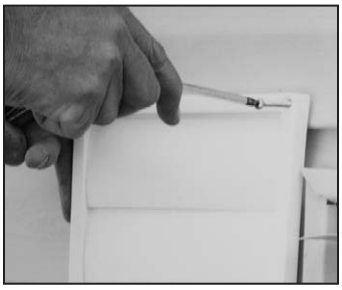
See "Installation Diagram Examples" for installation examples.

Steps for hood installation

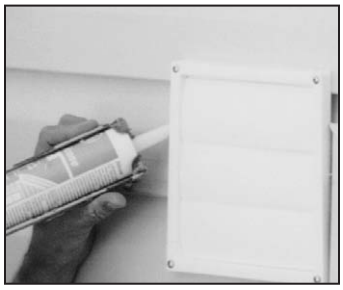


1 Using the duct connection of the outside hood, outline the intake & exhaust holes to be cut. The holes should be slightly larger than the duct connection to allow for the thickness of the insulated flexible duct. Cut a hole for both the intake and exhaust hoods.

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 vapor 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 ducts 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. 45° elbows are preferred to 90° elbows. Use "Y" tees instead of 90° tees 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 to the living areas in the house is recommended whenever possible, although flexible duct can be used in moderation when necessary.

The VHR 704R should be installed with a 5" (125mm) 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 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 grilles location

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 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 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 VHR 704R is 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.

HRV 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.
- Have access to a water drain for the condensate of the unit during defrost.
- Have a certain amount of heat around the unit (attic installation is not recommended).
- 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 must be located in a conditioned 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 may be used.

Attic installations are not normally recommended due to:

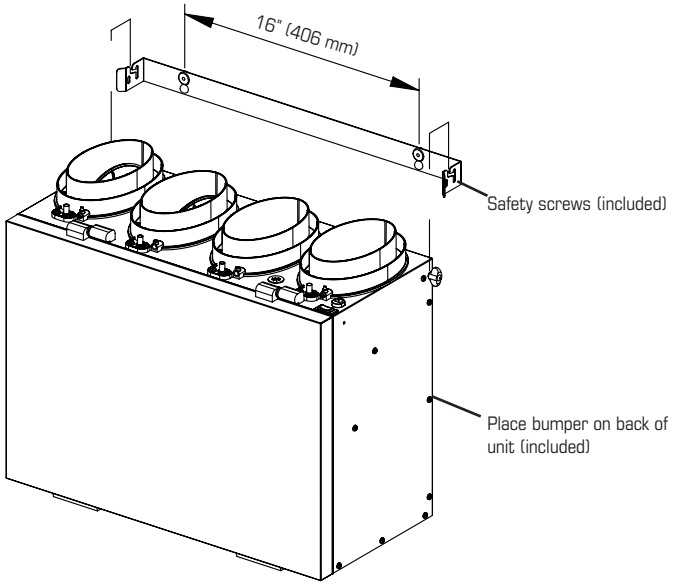
- The complexity of the installation
- Freezing conditions in the attic
- Difficulty of access for service and cleaning
- No drain access

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

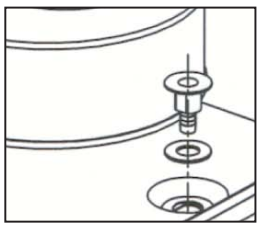
1. Attach bracket to wall
2. Lift unit & slide nuts into slots on bracket
3. Tighten screws to secure unit to bracket
4. Ensert the safety screws & place wall bumpers to level off the unit.

* Optional chain hanging kit available.

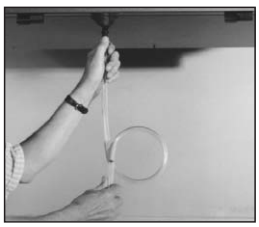
Installing drain line

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.



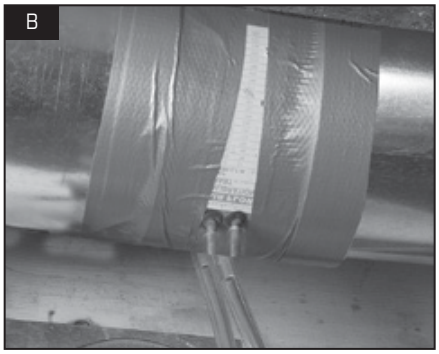
2 Install the drain hose, making a "P" trap



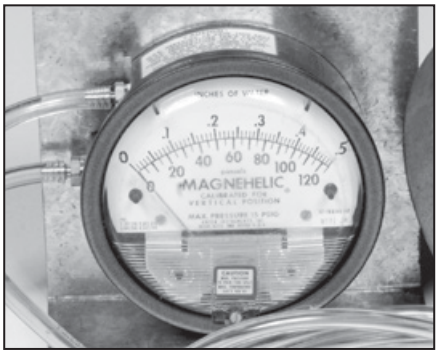
Airflow adjustment & balancing

Fantech's superior design and use of EBM Motors results in a steep fan curve that usually does not require 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.

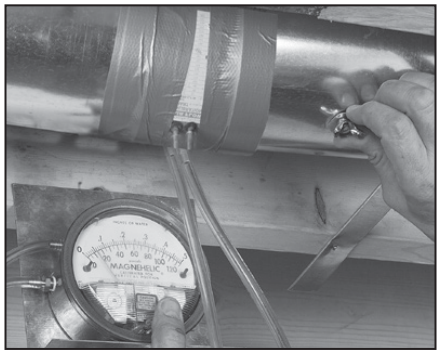
Airflow grid method



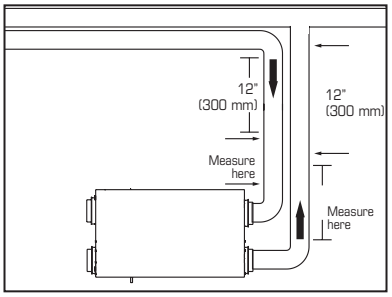
1 For this flow measuring station, cut the duct and place the flow measuring station between each section of duct. Make sure that the flow measuring station's air direction arrow points in the direction of the airflow. Secure the flow measuring station with duct tape.



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.

Balancing steps

Use balancing chart located on the door of the HRV

STEP #1: Identify the desired airflow using the provided chart. From the desired airflow (left column) identify the pressure reading needed by simply following the line. In the event where multiple choices are available for the same airflow, we recommend using the pressure reading from the lowest speed on the chart. Make sure to set the unit at the correct speed before performing the next step.

STEP #2: Measure the pressure reading by connecting a manometer on the LOW and HIGH pressure ports located on the duct connection. Refer to **Illustration #1.** If the pressure reading is LOWER than the desired value, adjust the balancing dampers by turning the adjustable arm counter clockwise until the correct corresponding pressure value is reached. Refer to **Illustration #2** Do the same for both the SUPPLY and EXHAUST airflows. If the pressure reading is HIGHER than desired when the damper is fully opened, please check the distribution system for any anomalies that could increase the resistance in the distribution system.

BALANCING CHART (example only)

Airflow		Normal Speed		Reduced Speed	
CFM	L/s	ΔIn W.G. Pressure reading	ΔPa	ΔIn W.G. Pressure reading	ΔPa
110	52	0.36	91		
100	47	0.46	114		
90	42	0.55	137		
80	38	0.64	161		
70	33	0.74	184	0.13	32
65	31	0.78	195	0.16	40
60	28	0.83	207	0.19	48
55	26	0.87	219	0.22	55
50	24	0.92	230	0.25	63

EXAMPLE

- Because the house is tightly sealed, adjusting one airflow may affect the other airflow as well. It is recommended to check each airflow again to make sure the value did not dramatically change during the balancing procedure. Make adjustments as necessary.
- The pressure reading from the duct connection refers to the total pressure loss from the distribution system. A well designed distribution system should have a total pressure loss between 0.4" (100Pa) and 0.6" (150Pa). The pressure reading can therefore be used as troubleshooting of the distribution system. If pressure reading is higher than 0.6" (150Pa), we recommend that you inspect the system and check for closed grilles, blocked exterior hoods or twisted flexible duct.

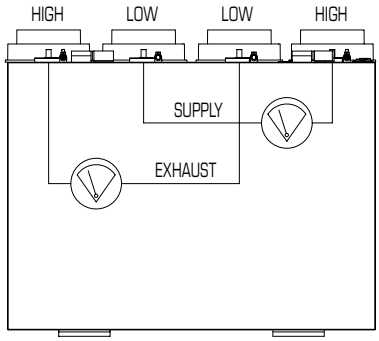


Illustration #1

STEP #3: Secure the adjustable arm by tightening the set screw as shown in **Illustration #3**.

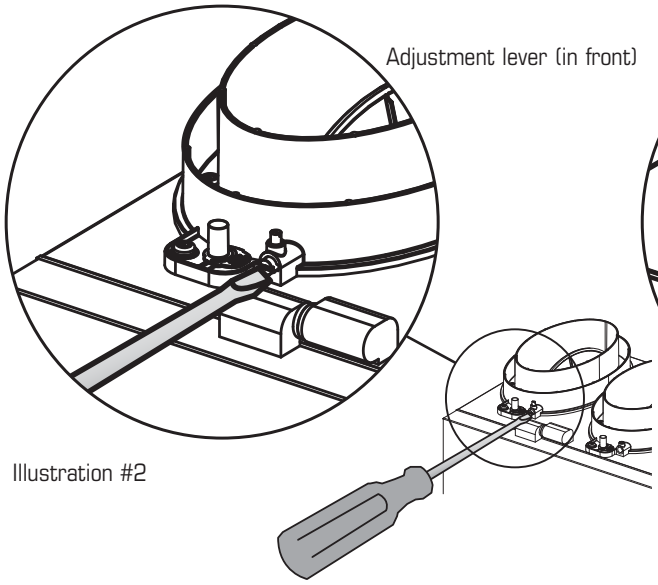


Illustration #2

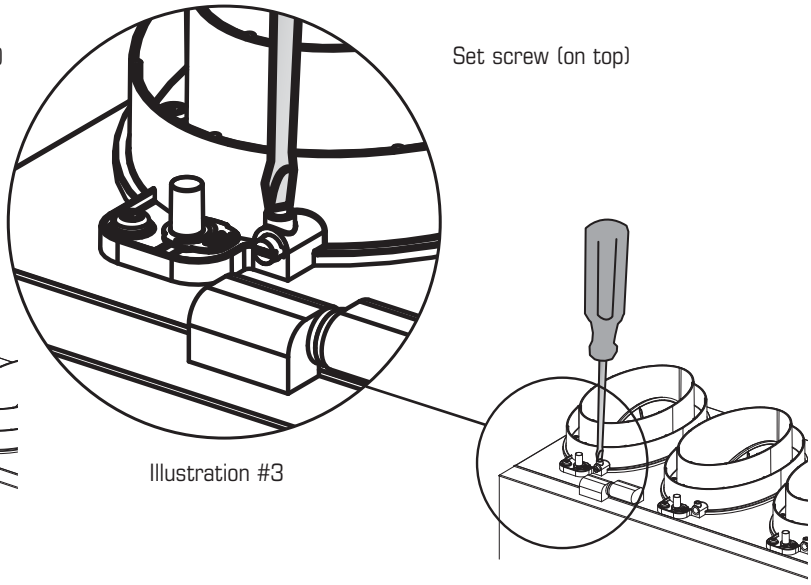


Illustration #3

Maintenance

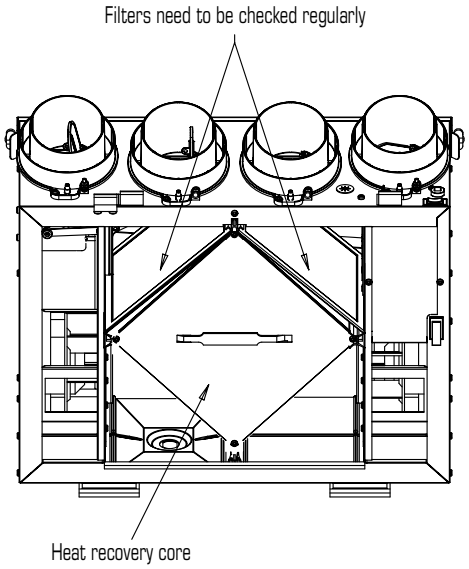
MAKE SURE UNIT IS UNPLUGGED BEFORE ATTEMPTING ANY MAINTENANCE WORK

The following components should also be inspected regularly and well maintained.

- To prevent electrical shock, check that the unit is unplugged before doing any repairs or maintenance.
- A yearly inspection is recommended to ensure the efficiency and trouble-free use of your system. Run through the system and verify the different operating modes.

Filters

The filters (2) need to be checked and cleaned every three months or when they appear dirty. Wash in warm sudsy water (mild detergent) or use a soft brush vacuum. The filters should be replaced when they can no longer be cleaned properly.



The motor – The motors are factory balanced and lubricated for life. They require no maintenance

The unit – The inside of the unit should be vacuumed yearly. Be careful not to damage any of the mechanical components and electrical connections.

Outside hood – The outside hoods need to be checked every season to make sure there no leaves or insects blocking the airflow. Check regularly that they're are no pollutants near the intake hood. Make sure they are clear of any snow accumulation during the winter months.

Heat recovery core

The heat recovery core needs to be checked and cleaned every six months. The core can be cleaned using a mild soap and water. Rinse thoroughly. Handle with care. Hot water and a strong detergent will damage the heat recovery core.

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

Clean Core and Filters Every 3-6 Months.

Unplug unit before doing any repairs or maintenance

a) Open access door.

b) Carefully grip handle of core and pull out. Core will slide out of the channel.

c) Once removed from the cabinet remove filters.

d) Wash core in warm soapy water (do not use dishwasher).

e) Install clean core by:

- a) First mounting the bottom flange of the core guide into the bottom channel approximately 1/4" (6mm).
- b) Mount the left or right side flange of the core guide approximately 1/4 " (6mm) followed by the other side.
- c) Mount the top flange of the core guide into the top channel approximately 1/4" (6mm).
- d) With all four corners in place and the core straight and even, push hard in the centre of the core until the core stops on the back of the cabinet.

f) Install the clean filters.

Low voltage control system

* All controls are low voltage. 18 to 24 gauge wire is recommended.

To avoid window condensation:

- It is not necessary to change the humidity control every day. Monitor the average weekly temperature or experiment with various settings until you find a level that is comfortable for you. Adjust the control when needed.
- A dehumidistat is ideal for use in energy efficient houses where indoor humidity (during the heating season) is higher than outdoor levels. High humidity is a major cause of structure damage and IAQ problems such as mold and mildew.

2 wire installation

ECO-Touch
Programmable Touch Screen Wall control

- ECO mode automatically chooses the best operating settings based on current indoor conditions.
- Manual operation selections for Ventilation Mode and Fan Speed are possible.
- MAX mode exchanges indoor air for outdoor air at maximum speed for 20, 40 or 60 minutes.
- Schedule programming based on built-in light sensor.

2 wire installation

MDEH 1 – The wall mount MDEH 1 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.

4 wire installation

MDEH 2 – The wall mount MDEH 2 offers the same features of the MDEH 1 plus additional off/on control for the HRV. Dial illuminates when in override mode.

3 wire installation

RTS 3 - The RTS 3 is designed to provide an intermittent boost to the Heat/Energy recovery ventilator. Depressing the fan control button will energize the HRV system into high speed from a low or standby mode. The ventilator can be set to continue on high for 20, 40, or 60 minutes by pressing the control button one, two or three times. Pressing the button a fourth time will cancel the timing function.

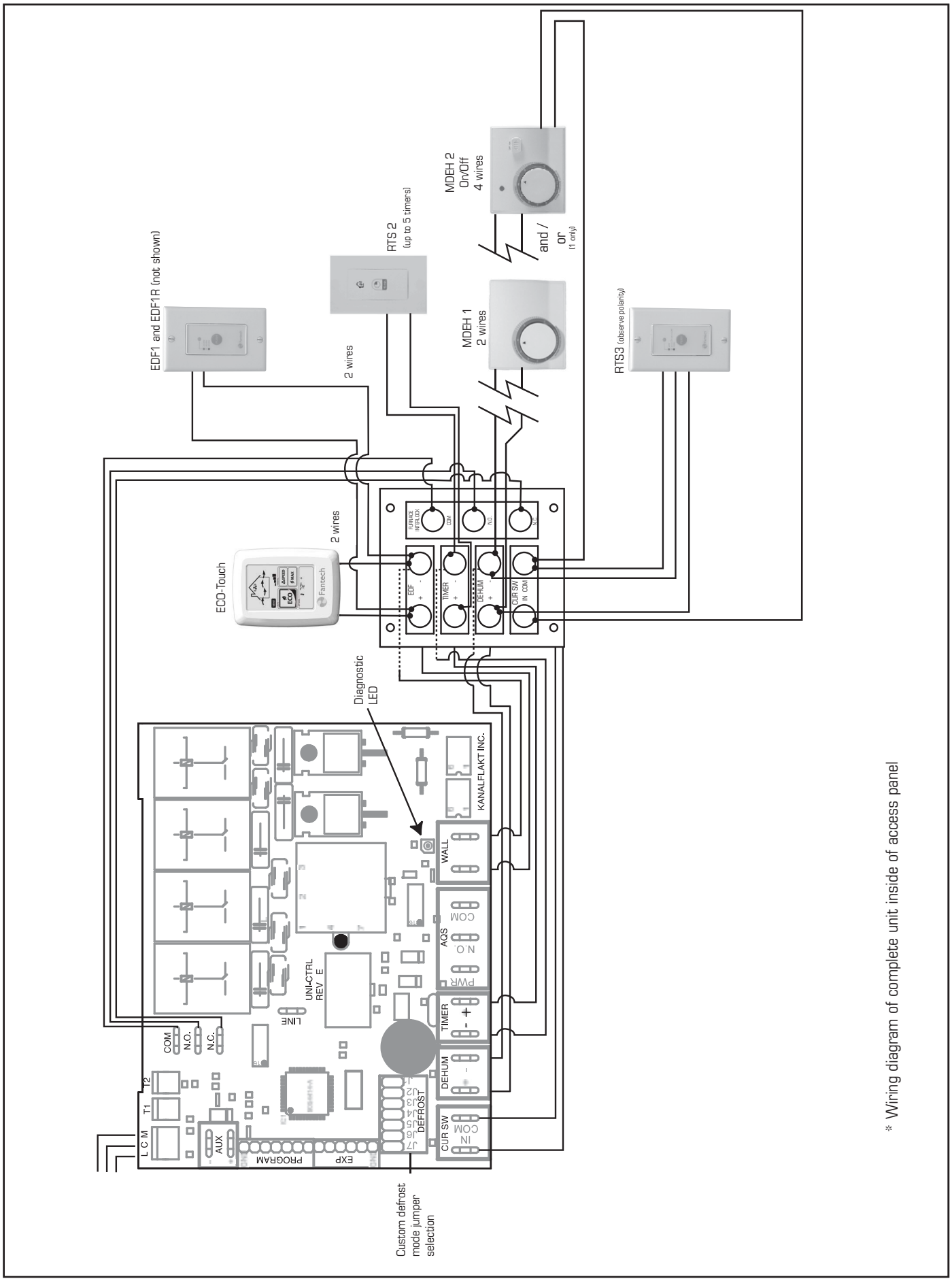
2 wire installation

EDF 1 - The EDF 1 is designed to provide 3 modes of operation to the Heat/Energy recovery ventilator. Pressing the "Push" button once initiates the unit to run at a continuous low speed of operation (green). Depressing the button twice allows the ventilator to run for 20 minutes and then turns off for 40 minutes (yellow). Touch the button a third time and the system will run continuous on high (red). The ventilation system will stay on the last function selected until it is changed.

2 wire installation

RTS 2 - The 20-minute remote timer is typically installed in areas where contaminated such as moisture and odors, are produced. Simply push the button and the HRV will activate to high speed for 15 minutes. Up to 5 electronic timers can be installed throughout the building at a distance of up to 500 feet (152 meters) from the HRV.

Electrical connections



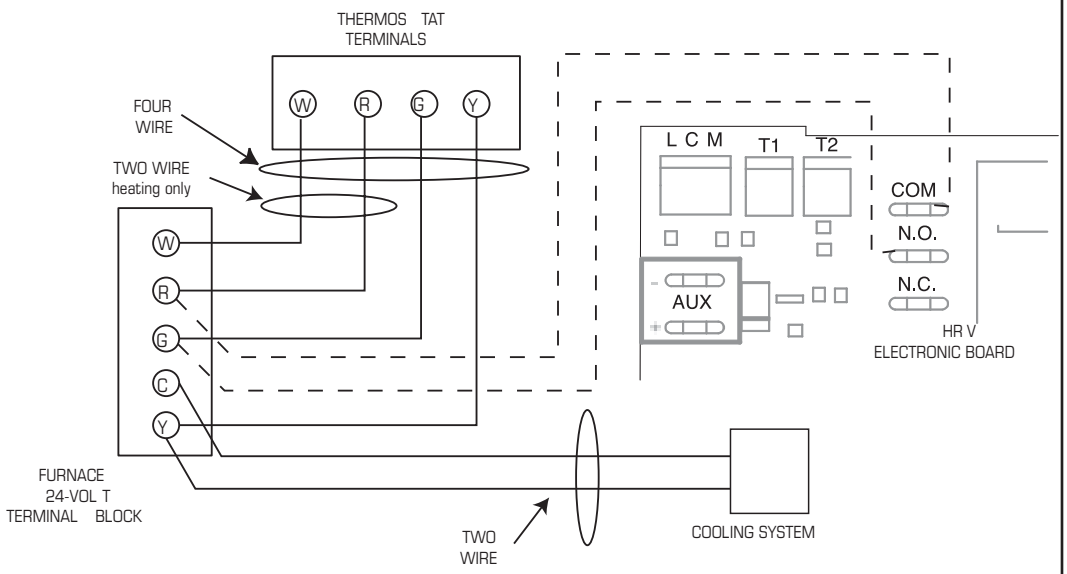
Electrical connections (Cont'd)

ELECTRICAL CONNECTION TO FURNACE

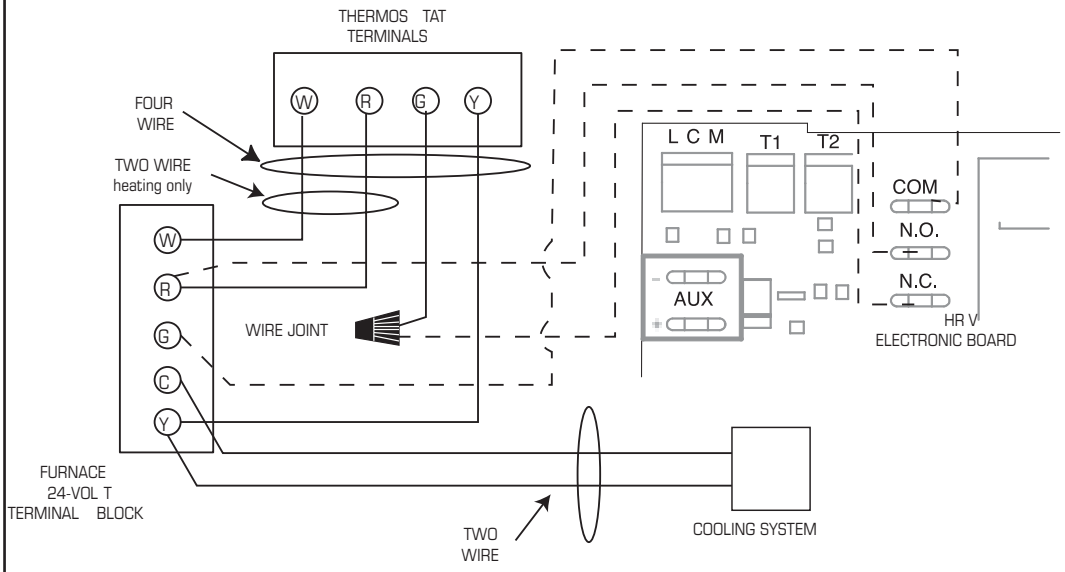
FOR A FURNACE CONNECTION TO A COOLING SYSTEM:

On some older thermostats, energizing the R and G terminals at the furnace has the effect of energizing Y at the thermostat and thereby turning on the cooling system. If you identify this type of thermostat, you must use the "Alternate Furnace Interlock Wiring".

Standard Accessory Control Contact



Alternative Accessory Control Contact



NEVER CONNECT A 120 VOLT AC CIRCUIT TO THE TERMINALS OF THE ACCESSORY CONTROL CONTACTS. ONLY USE THE LOW VOLTAGE CLASS 2 CIRCUIT OF THE FURNACE BLOWER CONTROL.

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.
	HRV out of balance	Have contractor balance HRV airflows
Air is too humid	Dehumidistat control is set too high	Reduce the desired level of humidity. Combine this with the use of continuous exchange mode.
	Sudden change in temperature	Wait until outside temperature stabilizes (winter). Heating will also improve situation.
	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.
	Dryer vent exhaust is inside home	Make sure the dryer vent is exhausting outside.
	Poor air circulation near windows	Open curtains or blinds.
	HRV out of balance	Have contractor balance HRV airflows
	Well sealed basement door is closed	Open the door or install a grill on the door.
	Failed damper system may be stuck in recirculation mode	Check defrost damper. If damper is always blocking incoming fresh air, have contractor verify damper system.
Persistent condensation on window	Improper adjustment of dehumidistat control	Reduce the desired level of humidity. Combine this step with use of continuous exchange mode.
	HRV out of balance	Have contractor balance HRV
	Poor air circulation near windows	Open curtains or blinds.
Poor Air Flows	1/4" (6mm) mesh on the outside hoods is plugged	Clean exterior hoods or vents
	Filters plugged	Remove and clean filter
	Core obstructed	Remove and clean core
	Indoor grilles closed or blocked	Check and open grilles
	Inadequate power supply at site	Have electrician check supply voltage
	Ductwork is restricting airflow	Check duct installation
	Improper speed control setting	Increase the speed of the HRV (i.e. change unit control from REDUCED to NORMAL speed)
	HRV airflow improperly balanced	Have contractor balance HRV airflows
	Ducting has fallen down or been disconnected from HRV	Have contractor reconnect ducting
Supply air feels cold	Poor location of supply grilles, the airflow may irritate the occupant	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) Turn down the HRV supply speed. 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
	Outdoor temperature extremely cold	If supply air is ducted into furnace return, the furnace fan may need to run continuously to distribute ventilation air comfortably
HRV and/or Ducts frosting up	HRV air flows are improperly balanced	Have HVAC contractor balance the HRV airflows
	Malfunction of the HRV defrost system	Note: minimal frost build-up is expected on cores before unit initiates defrost cycle functions
Condensation or Ice Build Up in Insulated Duct to the Outside	Incomplete vapor barrier around insulated duct	Tape and seal all joints
	A hole or tear in outer duct covering	Tape any holes or tears made in the outer duct covering Ensure that the vapor barrier is completely sealed.
LED is flashing	Everything is in good operations	
LED is not flashing	No Power is being transmitted to the Control Board	Make sure unit is plugged. Transformer may need replacing.

Note: It is best to get the unit checked by a certified HVAC Contractor/Technician.

HRV maintenance chart

Maintenance Required	Recommended Frequency	Date Maintenance Performed					
Check and Clean Filters	Every 3 months or if dirty						
Check Heat 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 Lifetime Limited Warranty.
- The warranty is limited to 5 years on parts and 7 years on fans 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.
- The fans found in all Fantech HRVs 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.

* 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.

Notes

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Fantech reserves the right to make technical changes.
For updated documentation please refer to www.fantech.net

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