HOUSING QUALITY MATTERS

Maintenance of HRV Ventilation Systems

Hands-On HRV Maintenance & Balancing

Presented by; Chuck Hebert, Mike McKay & Saverio Rizzo

10th ANNUAL
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NORTHERN HOUSING
CONFERENCE

A DECADE OF BUILDING TOGETHER

CMHC SCHL
HOME TO CANADIANS

Important Cautions

- Always unplug HRVs before starting maintenance
  - Keeps you safe from moving parts and electrical shock
  - Avoids drawing dust and debris into duct work & the unit
- Refer to manufacturers' instructions & recommendations
- Use the proper tools and cleaning supplies
  - Avoid damaging plastic parts – they can become brittle over time

HRV Maintenance List

1) Inspect and clean exterior hoods
2) Clean the HRV – filters, drain pans and core
3) Clean interior grilles – bathrooms, kitchen, supply grilles
4) Plug in unit and check all operating modes of controls
5) Inspect and confirm operation of defrost dampers & fans
6) Check insulated duct for problems – moisture or poor taping
7) Inspect and seal all accessible duct joints
8) Repair / replace any defective components
9) Measure and balance air flows

Keep in mind…

Thorough cleaning of filters, core, drain pans, grilles and hoods must be done before starting any measurement of airflows.

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1) Inspect and clean exterior hoods

- Use stiff brush or rag to clean
- Replace broken screens
- Re-caulk / foam hoods

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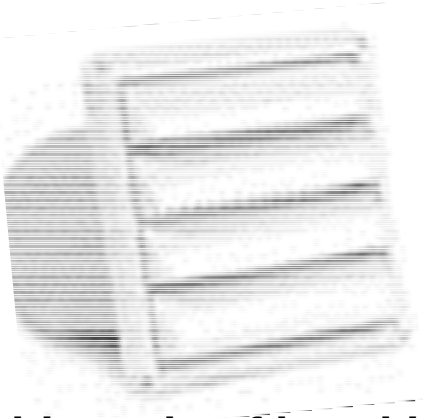
This style of hood has excellent airflow



This style of hood is very restrictive on airflow

This style of hood needs only one penetration

2) Clean filters, drain pans and core

- Unplug unit
- Be careful not to break plastic components
- Use vacuum, damp rags, <u>mild</u> detergents
  - Visually inspect core, if it isn't too dirty just vacuum
  - Otherwise remove and flush out with hose or soak in laundry tub
- Vacuum or wash filters – avoid damaging filters
  - Replace filters as necessary

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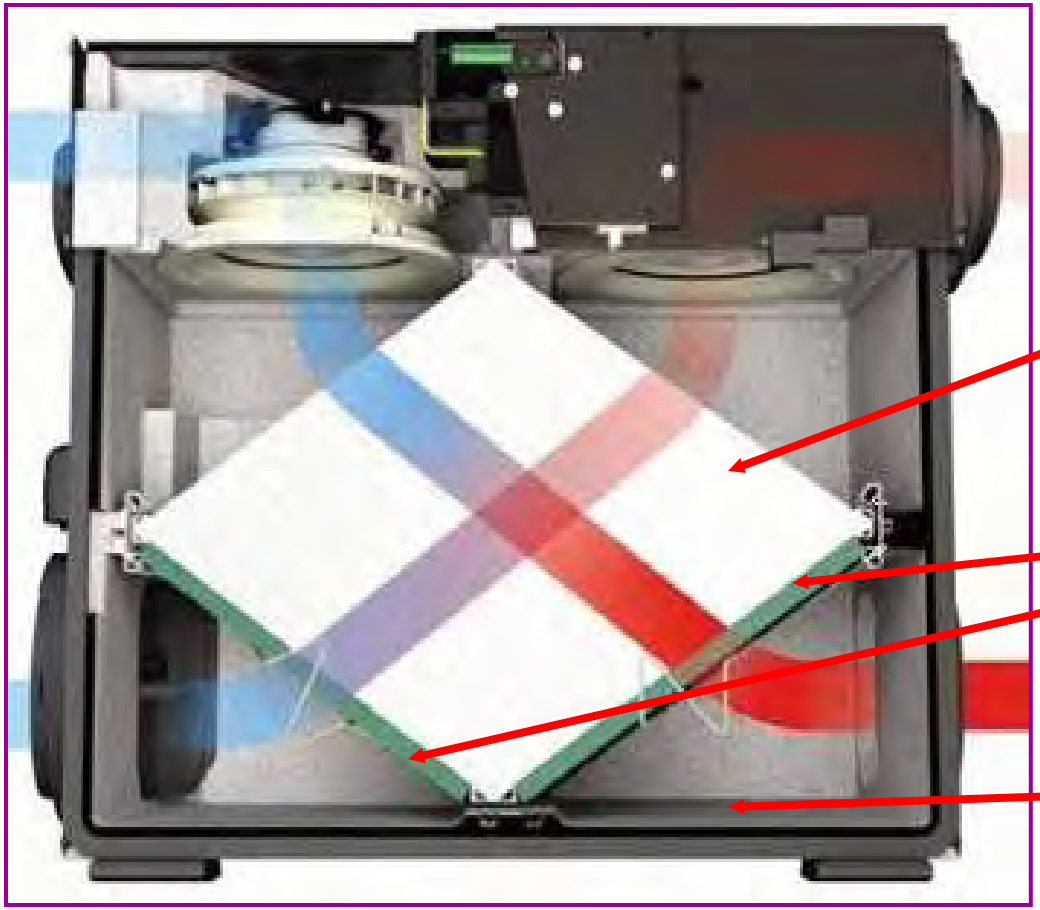
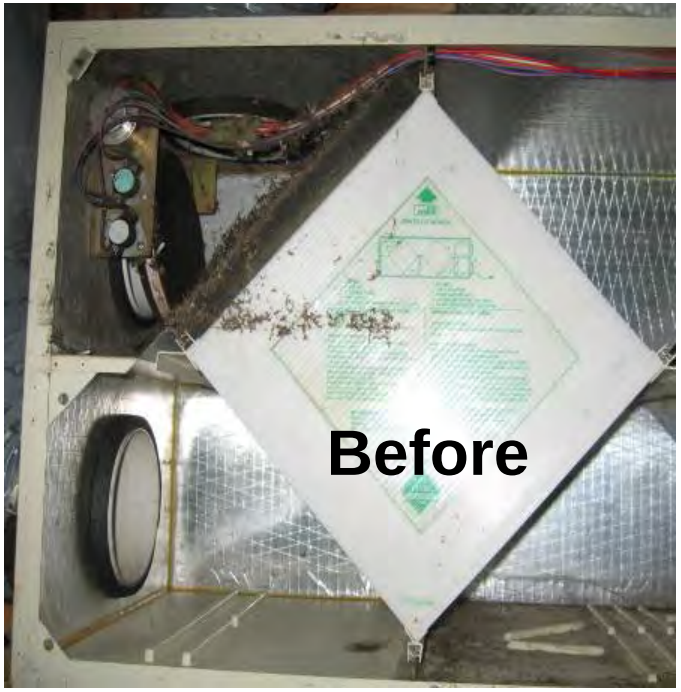


MAINTENANCE OF HRV VENTILATION SYSTEMS



After

Vacuuming

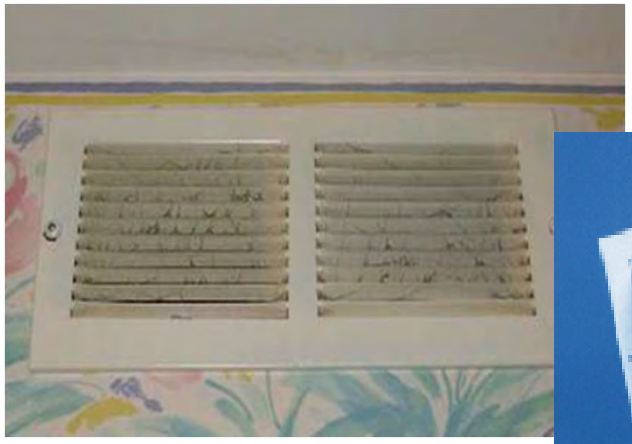
Damp cloth wipe

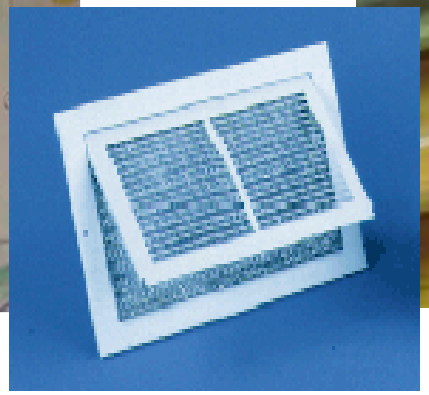
Clean drain line

- Flush out drain line with water – may need bleach as well
- Make sure drain line is properly trapped

3) Clean interior grilles

- Use vacuum or damp cloth – be careful not to damage wall or paint finish
- Check all exhaust – bathrooms & kitchen
- Check all supply – bedrooms, living areas





4) Check all controls

- Plug unit back in and close door
  - Some units have a door interlock switch or button. With caution, tape it over to allow unit to run with door open
- Check that fans run at different speeds and that controls can turn unit on and off
  - Listen for fan speed changes

Each manufacturer has their own controls
Typically they are not compatible with other units

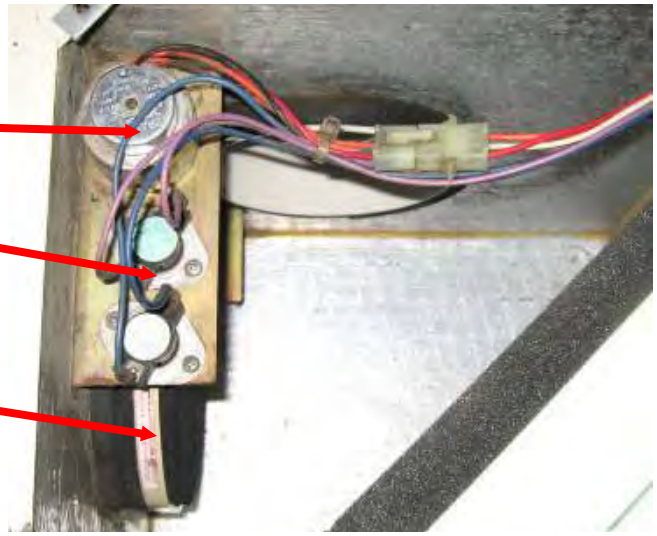
5) Check dampers & fans

Most HRVs have a defrost damper

- In cold weather it will periodically close off the fresh air and open a path to re-circulate warm air to defrost the core
- Check manufacturer's instructions to test the HRV defrost
- Confirm the damper opens and closes and seals properly
- Do not to damage the damper

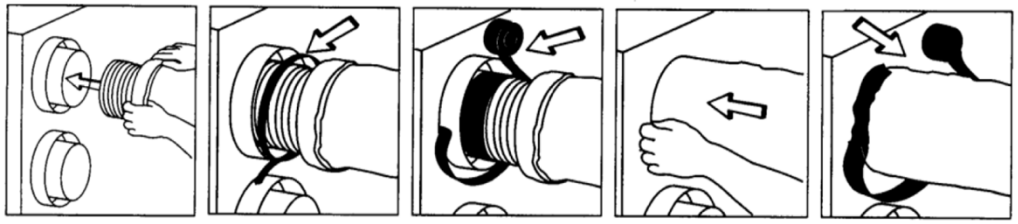
Defrost components

- Damper motor
- Temperature sensor
  - Usually at fresh air intake
- Damper
  - Sometimes a spring return
  - Timer control
    - Usually in control box



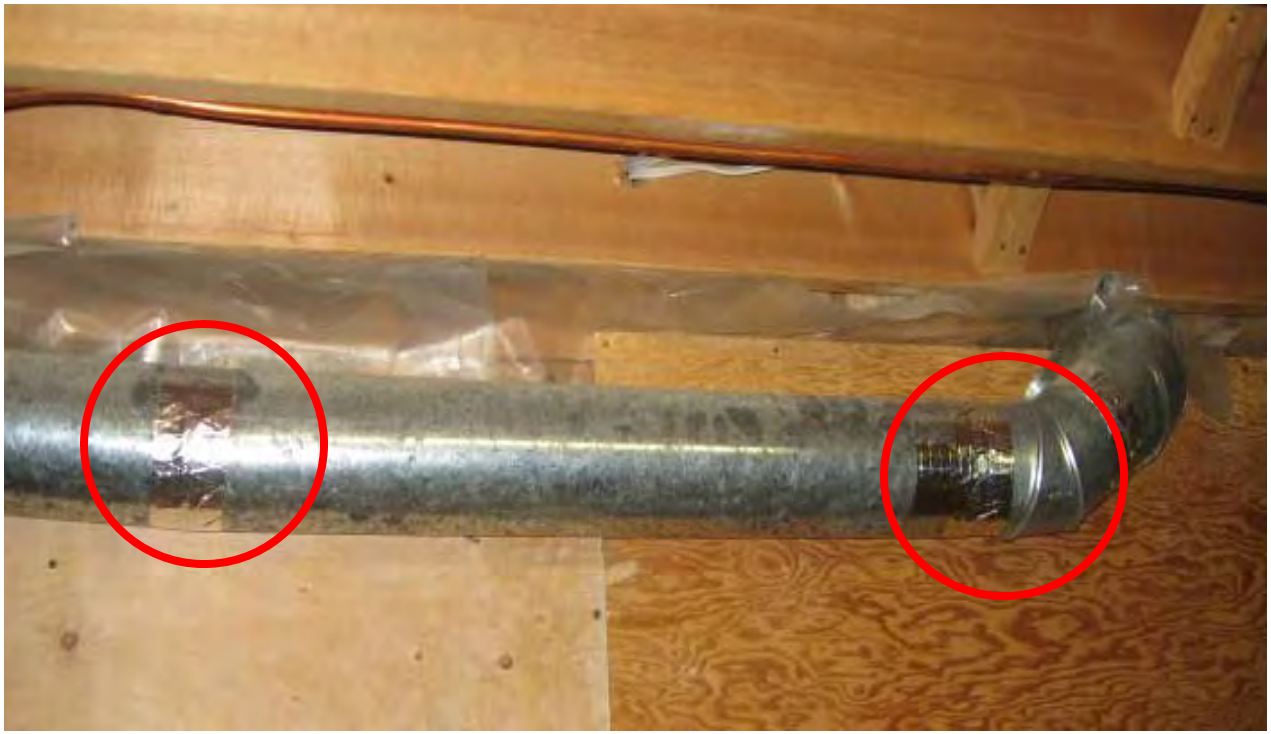
6) Check insulated duct

- Insulated duct needs to be well sealed at the unit and at exterior hoods
  - Tears, rips or holes in vapour barrier will cause condensation in the duct – check for wet insulation
  - Both the fresh air duct from outside and the exhaust duct to outside need to be insulated
  - Seal both the inside liner and the outer vapour barrier really well against air leakage
  - Replace wet, soggy duct



7) Inspect & seal all duct joints

- Tape or seal all duct joints that are accessible
  - Use foil tape or mastic



8) Repair defective components

Most common repairs:

- Worn out filters
- Defective damper motors or broken dampers
- Defrost temperature sensor not working
- Fan motors seized up
- Defective control boards or relays
- Broken drain fittings or blocked drain lines
- Insulated flex duct is wet
- Damaged exterior hoods

9) Measure and balance air flows

- Find a good location to do balancing
  - In a straight run, install a piece of flex duct where flow grid can be easily installed
  - Some units have balancing taps on the door of the unit
  - Some units are balanced with dampers, some have fan speed adjustment
- Always follow manufacturers procedures

Signs of Poor Balancing

- Excessive cold air from fresh air duct
- Frost on fresh air pipe to the house / furnace
- Frozen door locks
- High energy bill complaints
- Backdrafting of chimneys
- Poor moisture removal
- Some HRVs will turn themselves off

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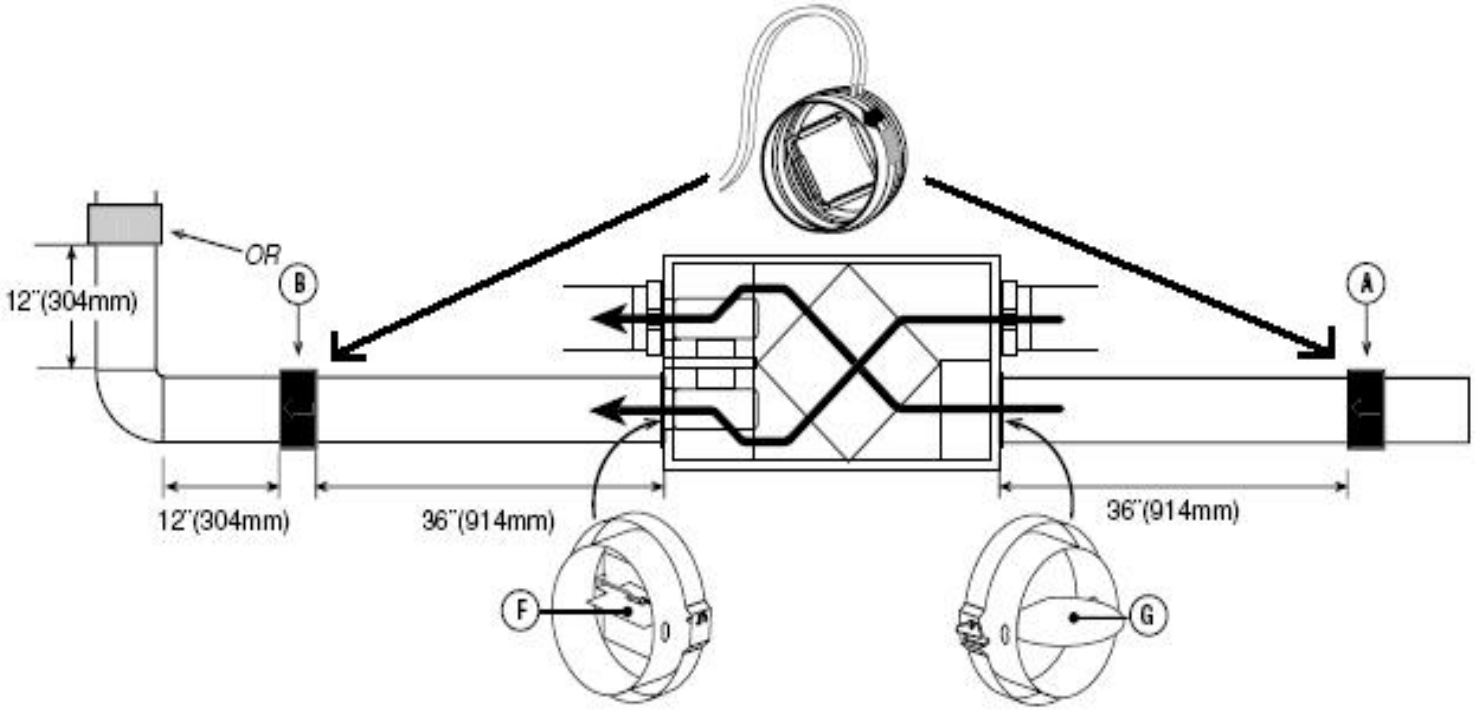
Balancing Procedure - With airflow stations



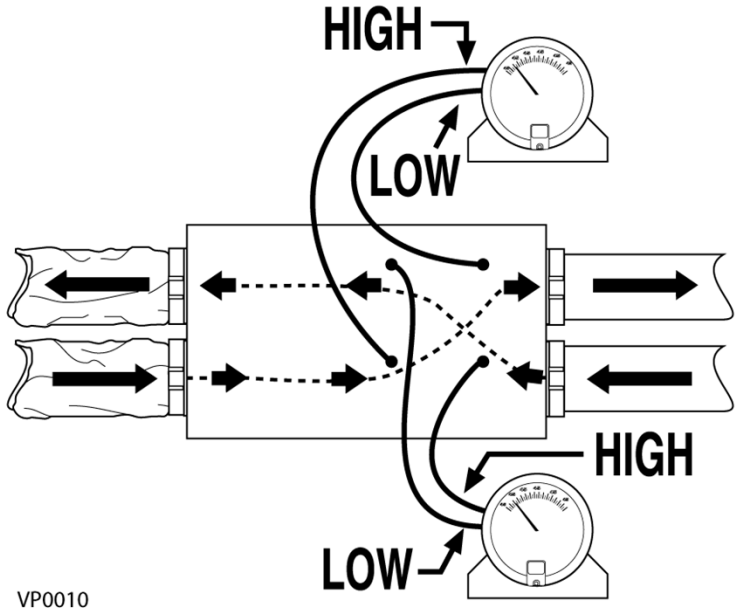
- Balance airflows within +/-10% for proper operation
- Use the pressure / flow table found on the flow measuring station to compare and balance flows

Other Balancing Procedures

Individual manufacturers have different balancing methods (probe and door balancing)

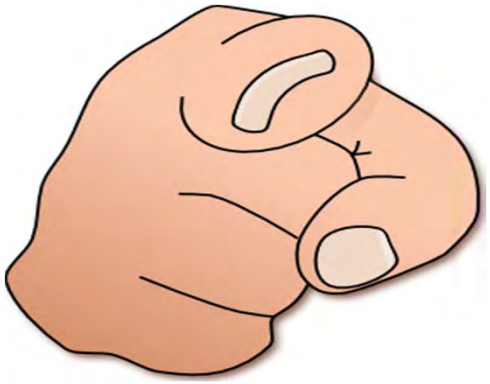
Door Balancing

- Take pressure readings across the core for the supply and exhaust flow
- Use the pressure / flow table found on each unit to compare and balance air flows



MAINTENANCE OF HRV VENTILATION SYSTEMS

Now its your Turn.....



- We will be splitting into three groups and you get the chance to look at and balance an HRV unit yourself!

HRV Maintenance Checklist

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- ☐ Clean the HRV – filters, drain pans, core, etc…
- ☐ Clean interior grilles – bathrooms, kitchen, supply grilles
- ☐ Plug in unit and check all operating modes of controls
- ☐ Inspect and confirm operation of defrost dampers & fans
- ☐ Check insulated duct for problems – moisture or poor taping
- ☐ Inspect and seal all accessible duct joints
- ☐ Measure and balance air flows
- ☐ Repair / replace any defective component
- ☐ Educate occupants about on-going maintenance and operation

Residence/Occupant _____ Lot # _____

Maintained By _____ Date _____

Supply Air Flow High _____ Exhaust Air Flow High _____

HRV Maintenance Supply List

- ☐ Vacuum cleaner
- ☐ Mild soap and water
- ☐ Rags
- ☐ Stiff brush
- ☐ Hose or bucket to clean core
- ☐ Water to flush drain line
- ☐ Foil duct tape
- ☐ Balancing kit (complete with pressure gauge)
- ☐ Common hand tools (pliers, screwdrivers, utility knife, *etc…*)
- ☐ Old toothbrush or soft brush for cleaning fan blades

HRV Troubleshooting		
Symptom	**Cause**	**Solution(s)**
Humidity levels too low	Humidistat control set too low	Set humidistat higher
	Lifestyle of Occupants	May have to add humidity artificially
	Continuous ventilation set at "Medium"	Set continuous ventilation at "Low"
Humidity levels too high	Humidistat control set too high	Set humidistat lower
	Lifestyle of Occupants	Avoid hanging clothes to dry, storing wood and venting clothes dryer inside
	HRV undersized initially	Properly size system & components
	HRV undersized to handle hot tub, indoor pool or similar	Cover pools, spas, similar when not in use
	HRV not operating or malfunctioning	Check HRV for proper operation
	Humid summer days	
Remote switch not operating	Improper connection of 24V control board	Check HRV 24V board to ensure unit is able to jump to high speed
	Improper connection to external low voltage wiring between HRV & switch	Check external wiring for short
	External low voltage wire shorted by staple, nail, *etc…*	
	Malfunction with 24V transformer in HRV	Check 24V transformer
HRV and/or ducts frosting	HRV airflows improperly balanced	Balance HRV
	Malfunction in the HRV's defrost system	Repair or replace defrost system/HRV
	Minimal frost build up is expected on core before defrost cycle function initiates	
Supply air feels cool	HRV airflows improperly balanced	Balance HRV
	Poor location of supply air grilles	Locate grilles high on walls or at ceiling
	Outdoor temperature extremely cold	Install HRV with higher sensible effectiveness Install a larger duct heater
	If supply air is installed into furnace return air the furnace fan is to be interlocked to run continuously with the HRV to distribute ventilation air	
Excess water in bottom of HRV	Drain pans plugged	Check drain nozzle connection
	Improper connection of HRV drain lines	Check water drain connections
	Drain lines obstructed	Look for kinks or clogs in the lines
	HRV isn't level	Adjust & level HRV
	HRV heat exchange core not installed properly	Check heat exchange core installation
Condensation or ice build up in insulated duct outside	Incomplete vapour barrier or insulation around flex insulated duct	Seal all joints and insure insulation is complete & vapour barrier continuous
	HRV airflows improperly balanced	Balance HRV
Poor airflows	Filters and/or core are plugged	Clean filters and core
	Outside hood mesh obstructed	Check and clean outside hoods
	House grilles/dampers closed	Open grilles & dampers as required for balanced delivery of ventilation air
	HRV airflows improperly balanced	Balance HRV
	Poor power supply	Check power supply
	Improperly sized ducting	Install properly sized ducting as per design. Designs to be by qualified person, i.e. HRAI certified or similar
	Undersized HRV	Properly size system & components
	Malfunction with HRV	Check HRV for proper operation

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