Summeraire

CENTRAL VENTILATION SYSTEMS

MODELS:

SHRV40SD

SHRV125SD

SHRV185SD

SHRV240SD

APPLICATION WARNING!!

It is always important to assess how the operation of any Heat Recovery Ventilator (H.R.V.), may interact with vented combustion equipment (i.e. Gas Furnaces, Oil Furnaces, Wood Stoves etc.)

NEVER install an H.R.V. in a situation where its normal operation, lack of operation, or partial failure may result in the back drafting of vented combustion equipment.

HEAT RECOVERY VENTILATOR (HRV) INSTALLATION MANUAL

DO NOT ATTEMPT INSTALLING UNIT WITHOUT FIRST READING THIS ENTIRE MANUAL

Dec/2001

INTRODUCTION

The **SUMMERAIRE** Heat Recovery Ventilator (H.R.V.) is designed to provide fresh air into the house or building while exhausting an equal amount of stale air. During the winter months, it warms the incoming cold air with the heat reclaimed from the exhausted stale air. During the summer months, the cool outgoing air from the air conditioned home is used to cool the incoming fresh air.

DAMPER DEFROST

All "SD" models have electronically controlled damper door defrost. If the outdoor temperature drops below 26°F (3°C) the defrost timer is activated. After waiting approximately 25 minutes (during which time the core unit may experience some frost build-up) the timer activates the damper door mechanism which closes off the fresh air supply port and opens the defrost port. After approximately 4 1/2 minutes the damper door reverses direction and reopens the fresh air port and closes off the defrost port. The cycle repeats until the outdoor temperature again rises above 26°F (-3°C).

LOCATION OF THE H.R.V.

The H.R.V. must be located in a heated space where the surrounding air temperature does not fall below freezing. It is also very important that the unit be mounted level (Horizontal) in order that the proper condensate drainage can occur. Failure to do so will void warranty.

Typically, if the H.R.V. is located in the Mechanical Room, close to an outside wall and the electrical panel. If a basement area is not convenient or does not exist, a utility or laundry room may be used. However, the defrost air port must be ducted outside the mechanical room.

Sufficient clearance to the front of the H.R.V. is required for servicing of the cores and filters. A minimum of 25 inches (65 cm.) clearance is recommended.

MOUNTING THE H.R.V.

The 4 laminated rubber hanging straps supplied for mounting the H.R.V. to the floor joists. The hanger straps should be attached to the unit at the top end corners (mounting screws already located in the H.R.V. case). Securely fasten the other end of the straps to the floor joists with wide head nails (not supplied). The rubber straps are designed to reduce the possibility of noise, resonance or harmonics, therefore, leaving as much space as possible between the H.R.V. and the floor joists is recommended.

CONDENSATE DRAIN HOSE INSTALLATION

There are 2 prepunched holes in the bottom of the H.R.V. to accommodate the drain pan connections. The drain spigots and "O" rings are shipped in a plastic envelope inside the H.R.V. See *Figure #1* for proper placement of the drain spigots and "O" rings, and drainage hoses. The drain line must be located in an area that is not subject to freezing and should be outletted into a floor drain, sink, or stand pipe. Make sure the drain slopes down to provide proper condensate removal.

NOTE: MAKE A "LOOP" IN CONDENSATE DRAIN LINE TO FORM A "TRAP"

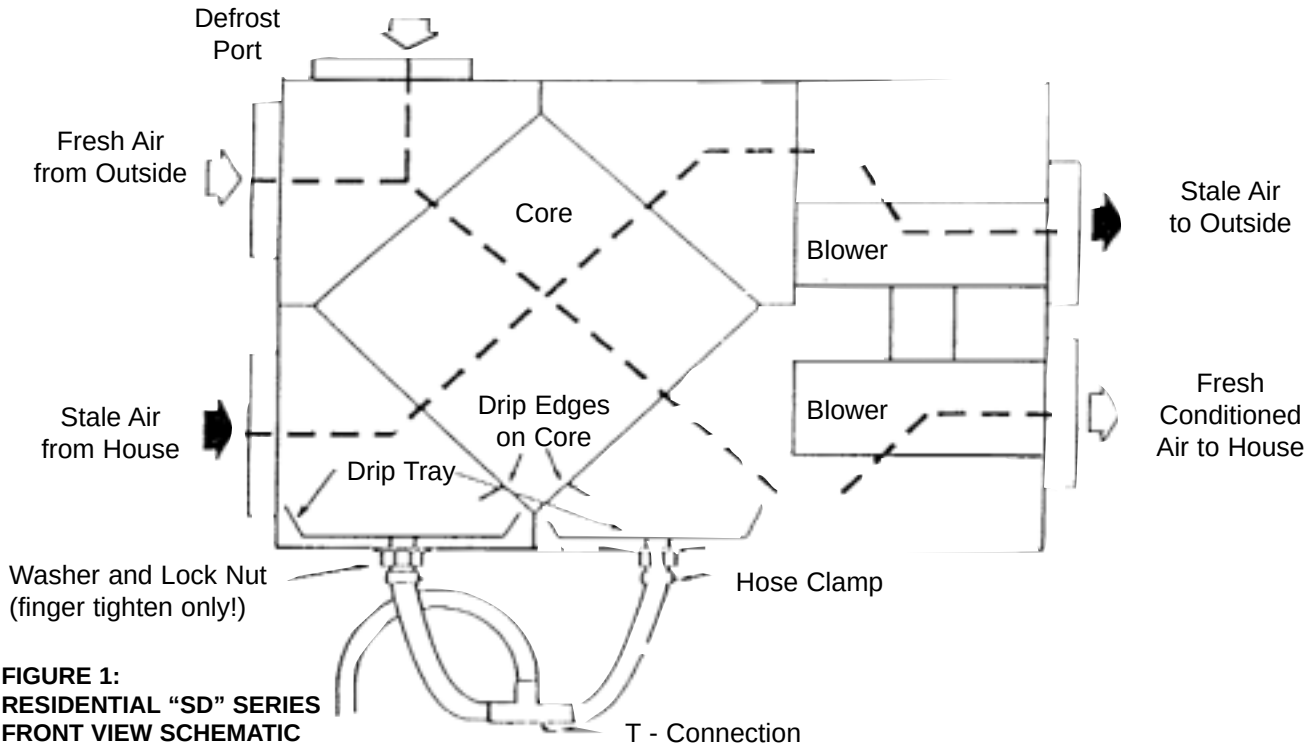


FIGURE 1:
RESIDENTIAL "SD" SERIES
FRONT VIEW SCHEMATIC

THE DUCTWORK SYSTEM

A well designed ducting system will allow the H.R.V. to operate at its' maximum efficiency. Air flow will be restricted by undersized ducting, use of too many elbows, tees, bends, etc. Always try to keep duct runs as short as possible. When in doubt about size of a duct's diameter, always install the next larger size.

NOTE: Fully insulated ducting with an integral vapour barrier must be used on all runs passing through unheated areas in order to avoid condensation problems and energy losses from the air streams.

Four 6 inch (15 cm.) ports on the H.R.V. are for the attachment to the ductwork system. See *Figure #1* for the function of these ports.

1. OUTSIDE WEATHERHOODS

The weatherhoods must have built-in "bird" screens, with 1/4" (0.635 cm) minimum mesh, to prevent foreign objects from entering into the ductwork. **DO NOT** use smaller mesh as it will be very susceptible to plugging up. Flapper and dampers at the vents must not be used as they will restrict air flow. The preferred location of the outside weatherhoods is:

- no less than 6 feet (2 metres) apart from each other
- at least 18 inches (46 cm.) above ground level
- away from sources of contaminates, such as automobile exhaust fumes, gas meters, garbage cans, barbecues, etc.
- not exposed to prevailing winds

The outside perimeter of the weatherhood must be caulked weather tight.

2. DUCTING FROM THE UNIT TO THE WEATHERHOODS

Install 6 inch (15 cm.) diameter insulated flexible ducts with an integral single piece vapour barrier. Ducting must meet UL Class 1 fire rating.

Minimum RSI value of the insulation should be equal to 0.75 (R4), or meet local building code requirements.

The inner and outer liners of the flexible insulated duct must be clamped to the sleeve of the weatherhood (as close to the outside as possible) and the appropriate port on the H.R.V. To keep the insulation and the outer liner in place, a clamp and/or duct tape must be used. It is very important that the fresh air intake line be given special attention to make sure it is well sealed. A good bead of high quality caulking (preferably acoustical sealant) will seal the inner flexible duct to both the H.R.V. port and the weatherhood prior to clamping.

To minimize air flow restriction, the flexible insulated ducting used to connect the 2 outside weatherhoods to the H.R.V. should be stretched tightly and be as short as possible.

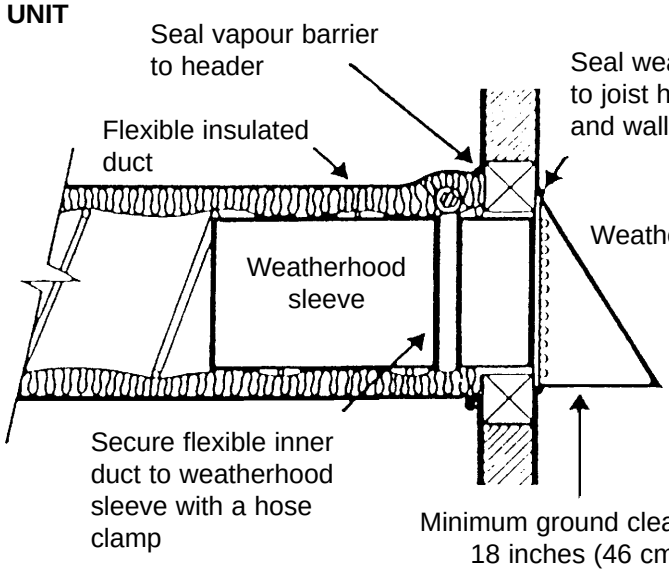
See *Figure #2* for the recommended connection of flexible insulated ducts to both the outside weatherhoods and the H.R.V.

3. SUPPLY DUCTING - GENERAL

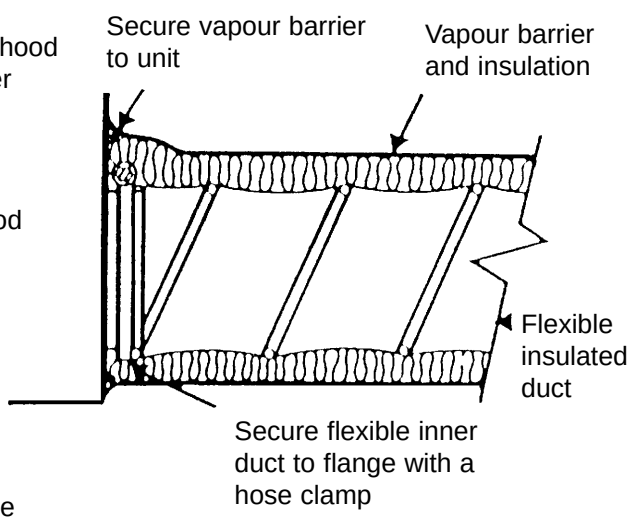
Main supply and return lines to/from H.R.V. must be 6 inch (15 cm.) minimum. Branch lines to the individual rooms may be as small as 4 inch (10.2 cm.), but 5 inch (13 cm) lines are preferred whenever possible.

FIGURE 2:

A. WEATHERHOOD INSTALLATION UNIT



B. SEALING THE INSULATED DUCTING TO THE



To minimize airflow losses in the ductwork system, all ducts should be as short as possible, 45° elbows are preferred to 90° elbows. Use "TY's" instead of 90° tees whenever possible.

All duct joints must be fastened with screws, rivets or duct sealant and wrapped with a quality duct tape to prevent leakage. Aluminum foil tape is preferred.

To avoid possible noise transfer through the ductwork system, a short length approximately 12 inches (30 cm.) of non-metallic flexible insulated duct may be connected between the H.R.V. and the supply/exhaust ductwork system.

If a standard steel grille is used, the preferred wall grille size is 6" x 12" (15.24 x 30 cm.) and the floor grille size is 4" x 10" (10.2 x 25 cm.) Smaller grille sizes may restrict air flow.

4. STALE AIR RETURN SYSTEM

The stale air return system is used to draw air from the points in the house where the worst air quality problems occur. It is recommended that the return air lines are brought back from the bathroom, kitchen, and laundry rooms. Additional return air lines from strategic locations (i.e. greenhouse, atriums, swimming pools, sauna, etc.) may be installed. Note that the installation schematics show balancing dampers and/or adjustable grilles on all return air lines coming back to the unit. These are installed to help balance the "draw" from the different areas of the house.

NOTE: C.S.A. Standard F326 requires air to be exhausted from each room.

Install a damper just prior to the H.R.V. to balance the stale air exhausted out of the house with the fresh air supply entering the house.

We recommend the use of High mounted wall returns with grilles. The exhaust air line from the kitchen should never be connected to a range hood. Instead, an exhaust air grille should be mounted high on the wall as required by local codes. The gyproc/drywall and studs of the wall can be used as ducting for high wall returns. When using wall cavities as ducting, they should be lined with galvanized metal or polyethene. The wall plate and the floor must be cut out to accept either galvanized metal or polyethene. The wall and the floor must be cut out to accept either ducting or the proper sized sheet metal boot.

5. DUCTS AND GRILLES

Ducting from the H.R.V. to the different areas in the house should be galvanized metal. Flexible metal ducting is not recommended due to its' higher air flow resistance.

DUCT SIZE AND DESIGN MUST MEET LOCAL CODES.

To minimize airflow losses in the duct work system, all ducts should be as short as possible and with as few bends or elbows as possible. 45° elbows are preferred versus 90°.

All duct joints must be fastened with screws or rivets and wrapped with duct tape to prevent leakage.

To avoid possible noise transfer through the ductwork system, a short length - 24 inches (60 cm.) of non-metallic (i.e. flexible insulated) duct must be connected between the H.R.V. and the Supply/Exhaust ductwork system.

INSTALLATION EXAMPLES

Figure #3 has proven to be an excellent method for both retrofit and new home installations where a forced air furnace is available.

Figure #4 is often installed in new or existing homes that do not have a forced air ducting system to distribute the fresh air throughout the house.

Figure #5 shows an example of optional installations.

6. HEAT RECOVERY VENTILATOR AIR FLOW BALANCING (See Air Flow Balancing Page)

It is necessary to have volume balanced air flows in an H.R.V. The volume of air brought in from outside must equal the volume of air exhausted by the H.R.V. If the air flows are not properly balanced, then the H.R.V. may not operate at its' maximum efficiency and a negative or positive air pressure may occur in the house.

AN EXCESSIVE POSITIVE PRESSURE may drive moist air into the external walls of the building where it may condense (in cold weather) and degrade structural components.

AN EXCESSIVE NEGATIVE PRESSURE may have several undesirable side effects. In some geographic locations, Radon gas may be drawn into the home through basement/ ground contact areas. Radon is believed to be a cause of lung cancer. As well, an excessive negative pressure may cause the back of drafting of vented combustion equipment if an adequate combustion air supply is not provided.

READ THE APPLICATION WARNING AT THE START OF THIS MANUAL!

FIGURE 3:

INDIRECT connection of the SUPPLY air stream
to the furnace return air duct system

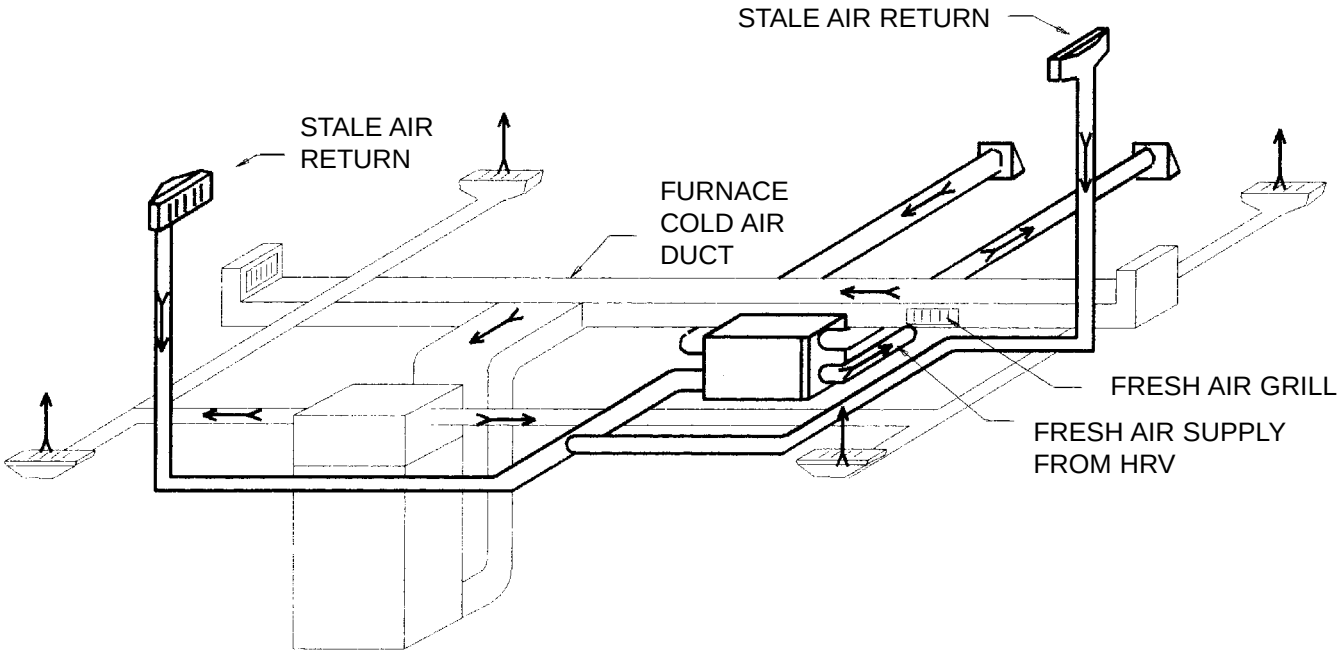


FIGURE 4:

DEDICATED duct system for both SUPPLY and EXHAUST

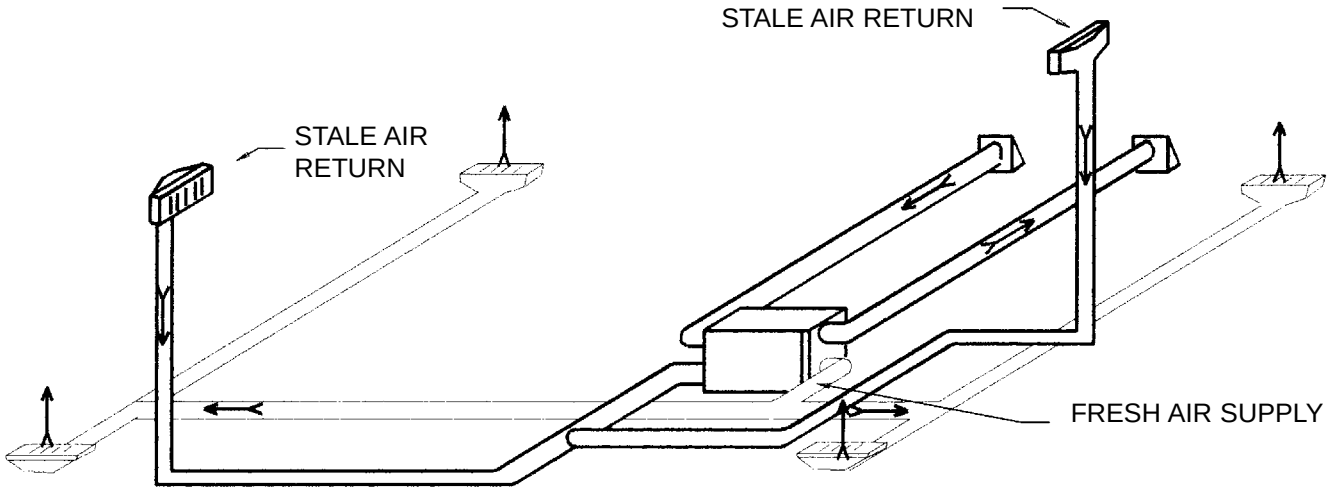
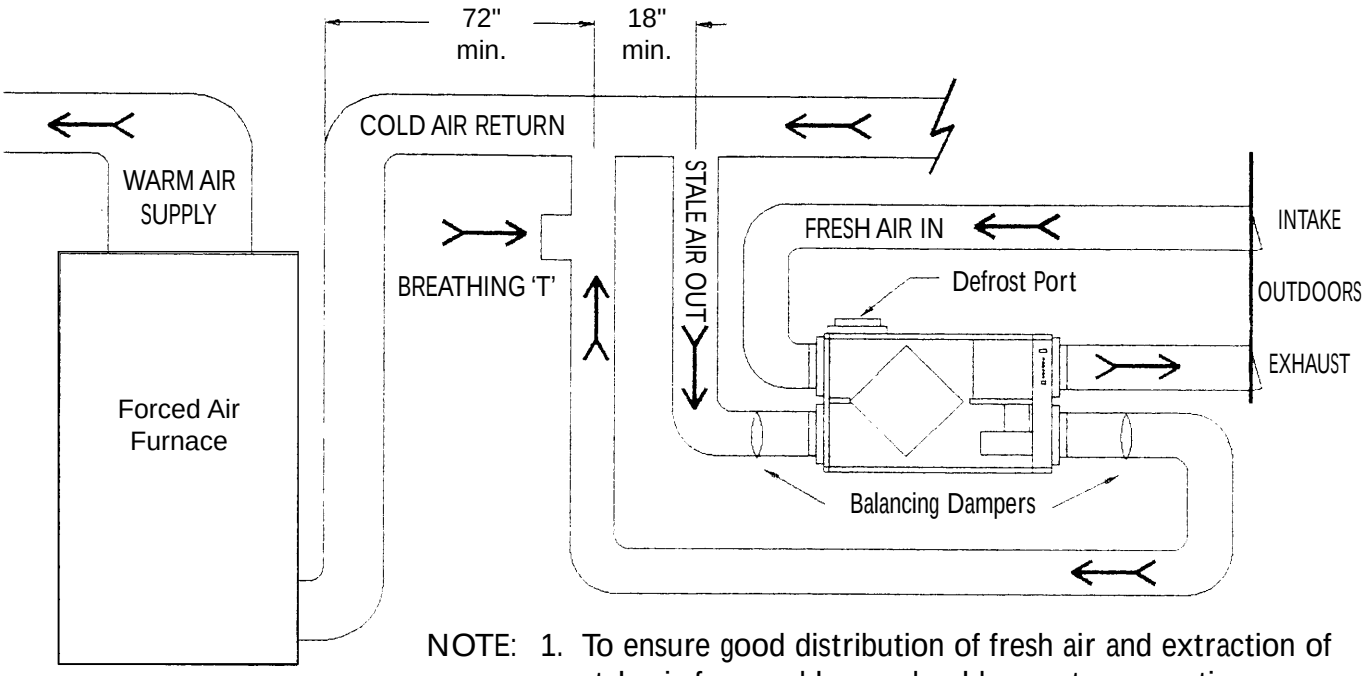


FIGURE 5: Heat Recovery Ventilator DIRECT CONNECTION to Furnace COLD AIR return duct.



NOTE:
1. To ensure good distribution of fresh air and extraction of stale air, furnace blower should operate on continuous OR be interlocked electronically.
2. Breathing 'T' required to ensure efficient operation of Heat Recovery Ventilator
3. See installation manual for correct installation clearances of outside weatherhoods.
4. See installation manual for installation guidelines for balancing dampers.

PROCEDURE

PRIOR TO BALANCING - MAKE SURE:

- All sealing of the ductwork system has been completed
- All of the H.R.V. components are in place and functioning properly.
- Balancing dampers are fully open
- UNIT IS ON HIGH speed
- Air flows in branch lines to specific areas of the house should be adjusted first, prior to balancing the unit

- After taking readings of both the stale air to the H.R.V. duct and the fresh air to the house duct, the duct with the lower C.F.M. reading should be left alone, while the duct with the higher reading should be dampered back to match the lower reading.
- return unit to appropriate fan speed for normal operation

Six inch (15 cm.) diameter flow collars connected to an inclined or digital manometer, magnehelic etc. with a range of 0 to 2.5 inches of water are recommended for accurate air flow measurements. To avoid air flow turbulence and incorrect readings, the flow stations should be located at a point at least 10 duct diameters downstream, (i.e. 6 inch duct requires 10 x 6" = 60 inches away) from the nearest elbow, tee, bend, valve or flow restriction. This requirement applies to both the stale air to the exchanger duct and the fresh air to house duct.

6. DETAIL CHECK LIST TO BE CARRIED OUT PRIOR TO BALANCING

- All sealing of the ductwork systems has been completed
- All of the H.R.V. components are in place and functioning properly
- Air/vapour barrier in the house has been completed
- Fireplace damper(s) must be shut and doors and windows tightly closed
- Clothes dryer off (if vented to outdoors)
- Furnace/hot water tank (if applicable) should be turned off
- Turn off all other exhaust fans
- Set H.R.V. speed control on HIGH
- H.R.V. system must be complete and all filters and register dampers set to their operating position
- Air flows in branch lines to specific areas of the house should be adjusted first, prior to balancing the unit
- Set main balancing dampers to the fully open position
- **After taking readings of both the stale air to the H.R.V. duct and the fresh air to house duct, the duct with the lower velocity reading should be left alone, while the duct with the higher reading should be dampened down to match the lower reading**
- To balance system, reduce excessive air flows by adjusting balance damper in duct with higher flow until air flow falls within designation limitations
- Once flows are balanced, lock dampers in position. The low speed setting must be less than the M.V.C. (minimum ventilation capacity) and the high speed at or above the M.V.C.
- While air flows are required to be balanced within 10% of each other, by using the above procedure, it should be possible to achieve a near balanced condition at the time of adjustment
- upon completion of balancing, return unit to appropriate fan speed for normal operation

Certain installations may require you to perform a House Pressure Test. Where the possibility exists for excessive pressurization or depressurization of the house due to operation of ventilation equipment, a house pressure test must be performed. This test is most important where fuel fired devices are installed that are susceptible to spillage.

NOTE: IT IS YOUR RESPONSIBILITY TO DETERMINE IF THE "HOUSE PRESSURE TEST" IS REQUIRED!

ENGINEERING DATA

CORE

Engineered core using polypropylene for superior heat transfer. Eliminates mold growth and the odours associated with mold. No cut hands when servicing and washing the core.

MOTOR(S)

High efficiency PSC on all models.

BLOWERS

Model SHRV40SD has one centrifugal blower and one motor per air stream.

All other Residential models; each of two air streams has one centrifugal blower driven by a common motor.

When typically installed @ .2 in W.G., (50 pa.) the H.R.V. delivers:

SHRV40SD	83 C.F.M.
SHRV125SD	157 C.F.M.
SHRV185SD	222 C.F.M.
SHRV240SD	284 C.F.M. @ .4" W.G. (100 pa.)

DUCT CONNECTION SIZES

FOUR (4) - 6" (15 cm.) diameter

MOUNTING THE H.R.V.

Four (4) - 10/24 (10.5 mm.) threaded inserts at each corner of the case are designed to accept four (4) laminated reinforced straps (supplied with the unit).

CASE

20 gauge prepainted galvanized steel for corrosion protection complete with foil faced fiberglass insulation to prevent condensation.

CONTROLS

* Lighted power switch
* 4 speed blower control
* Auto/Off control
* Defrost light indicates when unit is in defrost mode. (This automatically occurs when outdoor temperature drops below 26°F) (-3°C)
* Built-in Dehumidistat
* External 24 VAC terminals to allow various optional remote controls to be added to the H.R.V.

The Electronic Control board incorporates a “Self Test” feature. Each time the H.R.V. power switch is turned on, the H.R.V. begins operating at “HIGH” speed and all of the GREEN “LED” lights illuminate. The “Self Test” feature operates over a 10 second period. During this time, the GREEN “LED” lights extinguish starting from the top until they stop at “LOW SPEED” which stays illuminated, at the same time the fan speed reduces to “LOW SPEED”.

CODES and STANDARDS

All models are C.S.A. Certified

All models are H.V.I. Certified to C.S.A. CAN 439 Performance Standard.

H.R.V. TROUBLESHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
Humidity level too high	• H.R.V. air flows improperly balanced • H.R.V. initially undersized • Dehumidistat set too high • H.R.V. undersized to handle Hot Tub indoor pools etc. • Lifestyles of occupants • H.R.V. not operating or malfunctioning	Balance H.R.V. Set Dehumidistat Cover Pools, Hot Tubs etc. when not in use. Avoid hanging clothes to dry, storing wood and venting clothes dryer inside
H.R.V. and/or Ducts Frosting Up	• H.R.V. air flows improperly balanced • Backdraft dampers not installed or working when the H.R.V. is turned off • Malfunction with H.R.V. defrost system	Note minimal frost build up is expected on cores prior to unit initiating defrost cycle function Balance H.R.V. Install backdraft dampers
Supply Air Feels Cool	• H.R.V. air flows improperly balanced • Poor location of Supply grilles • Outdoor temperature extremely cold	Balance H.R.V. Locate grilles high on walls or under baseboards. If supply air is installed into return air of furnace, furnace fan may need to run constantly to distribute ventilation air comfortably.
Water in Bottom of H.R.V.	• Drain pans plugged • Improper connection of H.R.V. • H.R.V. is not level • Drain lines obstructed. • H.R.V. heat exchange core not installed properly	Ensure “O” rings on drain spigot seats properly. Look for kinks in line. Check water drain connections. Make sure water drains properly from the pan(s).
Too Low Humidity Levels	• H.R.V. air flows improperly balanced • Dehumidistat control set too low • Lifestyle of occupants	Balance H.R.V. Set Dehumidistat higher. Humidity may have to be artificially added.
Remote Switch not operating	• Improper connection to external 24V • Improper connection of external low voltage wiring between H.R.V. and Remote switch • External low voltage is shorted out by a staple, nail, etc.	Check 24V board on H.R.V. to ensure unit is able to change to High speed. Check external wiring for short. Check wall switch for proper connection
Condensation or ice build up in insulated duct to outside	• Incomplete vapour barrier around insulated duct	Tape all joints Ensure that vapour barrier is completely sealed.
Air Flows Are Poor	• H.R.V. air flow improperly balanced • Filter/core plugged up • 1/4" mesh on outside hoods plugged • House grilles closed • Dampers closed • Poor power supply • Improperly sized ducting • Under sized H.R.V. • Improper speed control setting • Malfunction with H.R.V.	Tape all joints Use proper air flow measuring equipment. Remove obstructions in duct(s), hoods, and grilles. Balance air flows.

◯ *DEFROST*

◯ *AUTO/OFF*

◯ *HIGH*

◯ *MED/HIGH*

◯ *MEDIUM*

◯ *LOW*

⊖ DEHUMIDISTAT

⊖ DEHUMIDISTAT

⊖ PUSH BUTTON

⊖ PUSH BUTTON

⊖ *REMOTE CONTROL*

⊖ RED

⊖ BLACK

WHITE

⊖ GREEN

This Summeraire Heat Recovery Ventilator is equipped with our Super Master "Control Board."

CONSTANT RUN SPEED

Select constant run speed desired by pushing "Select" button until green L.E.D. illuminates beside desired speed (unit automatically switches to high speed when activated by "Control."

NOTE: When unit is "activated" to high speed - green L.E.D. will flash - when "Control" has bee satisfied unit will switch back to preselected "Constant Run Speed" and "High Speed" L.E.D. will go off

AUTO OFF PURPOSE

Some H.R.V. applications may dry the home out too much.

If this is the case, select "Auto/Off' mode.

When "Activation" device/control has been satisfied, unit will shut off (does not operate on "constant run" speed).

NOTE: If "Auto/Off" mode is used, a remote dehumidistat should be installed to more accurately sense the humidity levels in the home.

DEFROST

When "Defrost" L.E.D. is illuminated, unit is operating in defrost cycle.

Defrost cycle has priority over all operating modes

EXTERNAL 24 VOLT CONNECTIONS

DEHUMISTAT/MANUAL CRANK TIMERS

Connections for remote dehumidistat (optional).

PUSH BUTTON (max. of 6)

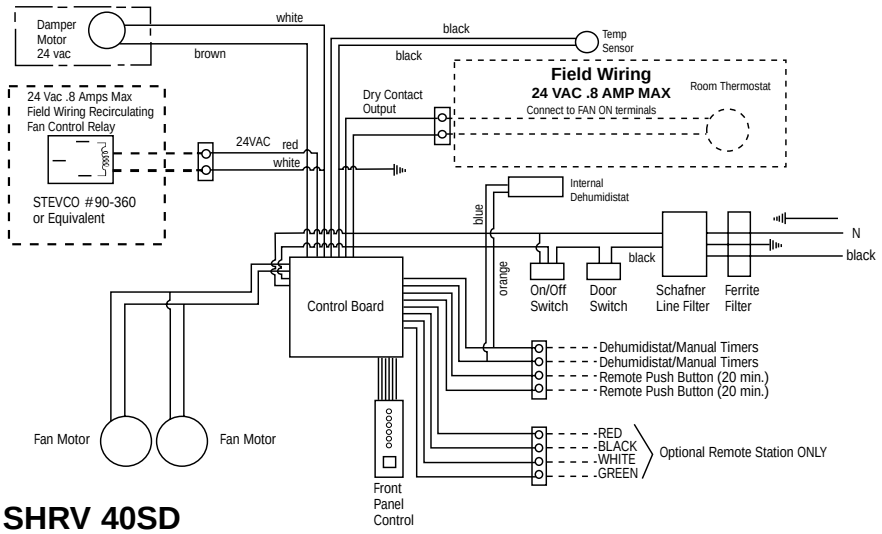
Connections for remote push button switches (optional)
20 minute timer relay is built into master control board.

REMOTE CONTROL

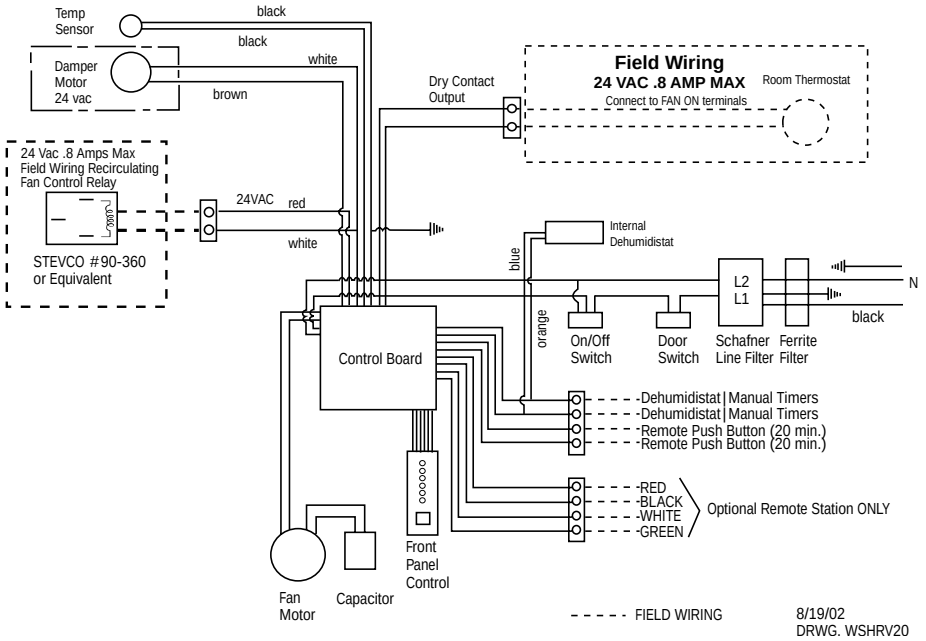
To connect optional deluxe remote control station

Colour coded terminals are matched inside remote control station.

Install 4 conductor thermostat wire to connect (same colour code).



Wiring Diagram SHRV 40SD



Wiring Diagram SHRV125SD, 185SD, 240SD

Summeraire

THIS HEAT RECOVERY VENTILATOR IS EQUIPPED WITH

INTEGRAL BALANCING DAMPERS

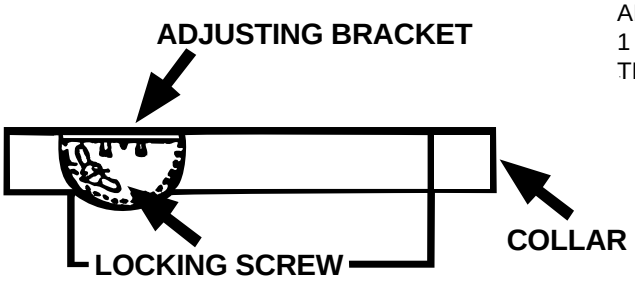
Air Flow Balancing is very important for proper operation of a Heat Recovery Ventilator. If the Supply Air (from the Outside) is greater than the Exhaust air (Stale Air from the House), the imbalance can result in the Core of the H.R.V. freezing up. If the Exhaust Air (from the House) is greater than the Supply air (from the Outside), combustion appliance back drafting could bring exhaust fumes into the House. A Balanced HR.V. system will ensure optimum performance of the H.R.V., retain a satisfied customer, and avoid costly call backs.

BALANCING PROCEDURE

1. Insure house is tightly closed (all windows and doors) and NO exhaust systems (dryers, and all exhaust fans, including range top exhaust fans) should be in operation. Close fireplace damper if applicable. Clothes dryer OFF, if vented to outdoors.

   Air flows in branch lines to specific areas of the house should be adjusted prior to Balancing the H.R.V.

   Heat Recovery Ventilation system must be complete with filters and register dampers set to their operating position. Seal all duct work systems.
2. The Forced Air Furnace, if used for circulation should be operating at its' operating speed.
3. Install "Air Flow Measuring Device(s)" ("Flow Stations" preferred) in Supply and Exhaust ducts of the H.R.V. at a point at least 10 duct diameters down stream (i.e. 6" duct requires 10 x 6" away) from the nearest elbow, tee, valve, or flow restriction. This requirement applies to both the Exhaust (stale) Air to the H.R.V., and the Supply Air to the House duct. This will avoid air flow turbulence and incorrect readings.
4. Activate H.R.V. to HIGH Speed.
5. Insure Integral Balancing Dampers are in the OPEN position.
6. Connect the plastic tubing from the Air Flow Station to the Magnehelic (range 0-.25" w.c.) gauge.
7. After taking readings of both the Fresh Air to the House duct and the Stale air to the H.R.V. duct, the duct with the lower velocity reading should be left alone, while the duct with the higher reading, should be dampened down to match the lower setting. Once these air Flows are Balanced, Lock the Integral Balancing Dampers in selected position using the screw located in the externally mounted bracket. The Low Speed setting must be less than the M.V.C (minimum ventilation capacity) and High Speed at or above the M.V.C.
8. After completing the Balancing procedure, return to the appropriate fan speed for normal operation.



INTEGRAL BALANCING DAMPER
1 INSTALLED IN EXHAUST - STALE AIR TO OUTDOORS COLLAR - BLUE -
1 - INSTALLED IN THE FRESH TO THE HOUSE COLLAR - RED