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ES SERIES



OPERATING, MAINTAINING & INSTALLING YOUR HEAT RECOVERY VENTILATOR

FOR MODELS ES100, ES150, ES170 AND ES210

*** LEAVE THIS DOCUMENT WITH THE HOMEOWNER**

Specifications, dimensions and ratings may change without notice
as a result of ongoing product development and improvements.



IMPORTANT

PLEASE READ THIS MANUAL BEFORE YOU INSTALL OR SERVICE UNIT

NOTE

Prior to integrating this unit with any other piece of mechanical equipment, i.e. furnace, air handler, combustion heating appliance, careful consideration must be given to system design and integration to ensure compatibility and proper operation of both appliances. **Do not** connect the duct system of your H/ERV to any clothes dryer or kitchen exhaust fan duct system.

Whether installing this unit as part of an independent system or to integrate it with a central heating/cooling system, use the procedure in this manual to ensure that the air flows of the H/ERV are balanced. Only a properly balanced H/ERV will deliver maximum performance and energy efficiency.

Although this document contains guidelines for proper HRV sizing and installation, your ventilation system should be installed in conformance to the appropriate provincial or state building regulations or National Building Code and/or ASHRAE "Good Engineering Practices".

AVOID RISK OF INJURY, ELECTRIC SHOCK AND FIRE HAZARD

DO NOT install this product in an unconditioned space—15° C/59° F ambient temperature is recommended—or in a space/manner where maintenance and service might pose a risk of personal injury or damage to this product.

For indoor installations only.

Your H/ERV is equipped with a 3-prong plug which will fit an A/C electrical outlet in just one orientation. Do not alter this plug or its cord in any way. Grip the plug firmly when removing it from an electrical outlet—**NEVER** unplug this product by pulling or twisting its power cord.

ALWAYS unplug an H/ERV before you open or remove its cover (door) to clean the inside of the unit or for any other servicing or repairs.

The **cover to this H/ERV** is removable to ensure ease of access to internal components during cleaning and servicing. **USE CAUTION** when opening or removing the cover of this H/ERV to avoid risk of personal injury or damage to the cover.

NEVER attempt to clean the interior of this H/ERV or its components while the unit is plugged in or running.

ONLY qualified persons should attempt repair or service of any electrical/internal component of this product.

NEVER attempt to repair or service any internal component of this H/ERV while the unit is plugged in or running.

DO NOT use your ventilation system to exhaust flammable fumes or gasses.

ALWAYS contact your Nu-Air representative if you have any questions or comments about the operation or maintenance of your Nu-Air H/ERV—we are here to help you!

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1. PERFORMANCE RATINGS & PHYSICAL DATA

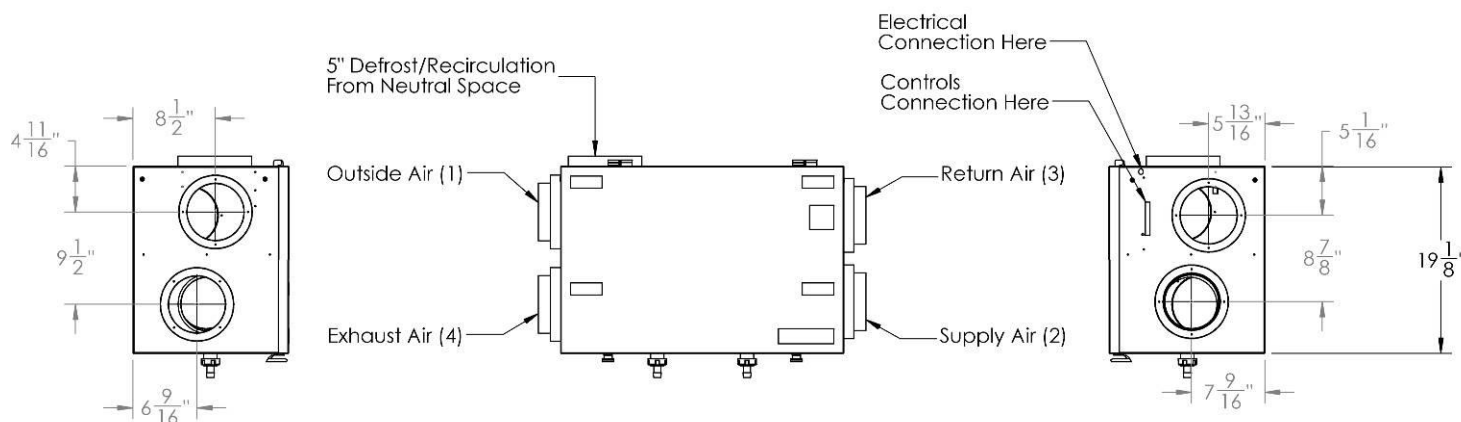
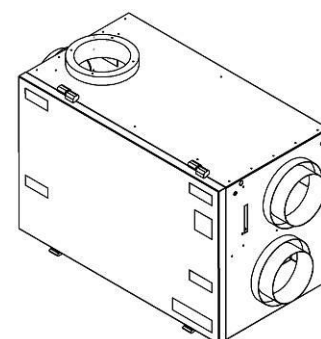
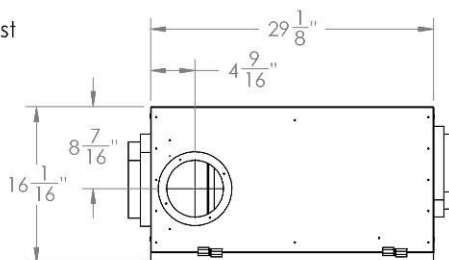
Model: ES170

VENTILATION PERFORMANCE				ENERGY PERFORMANCE				
EXT. STATIC PRESSURE	NET SUPPLY AIR FLOW	GROSS AIR FLOW		SUPPLY TEMP.	NET AIR FLOW	POWER CONSUMED	SENSIBLE RECOVERY EFFICIENCY	APPARENT SENSIBLE EFFECTIVENESS
in wg (Pa)	cfm (l/s)	cfm (l/s)	cfm (l/s)	°F (°C)	cfm (l/s)	Watts		
0.1 (25)	173 (81)	180 (84)	193 (91)	+32 (0)	61 (29)	54	63	75
0.2 (50)	159 (75)	165 (78)	175 (82)	+32 (0)	85 (40)	66	62	72
0.3 (75)	146 (68)	151 (71)	159 (75)	+32 (0)	114 (54)	94	61	70
0.4 (100)	132 (62)	137 (65)	144 (68)					
0.5 (125)	119 (56)	123 (58)	130 (61)	13 (-25)	62 (29)	58	65	78
0.6 (150)	105 (49)	109 (51)	116 (55)					
0.7 (175)	90 (42)	94 (44)	103 (48)					



Notes:

1. Backward curved impellers
2. Temperature activated defrost
3. Cross-flow core
4. Remote connections
5. Defrost damper
6. Filters (2) washable
7. Hanger nuts
8. 1/2" Drains
9. 6" Collars



ELECTRICAL: 120V/1/60 Hz. 128W, 1.1A

Model: ES100

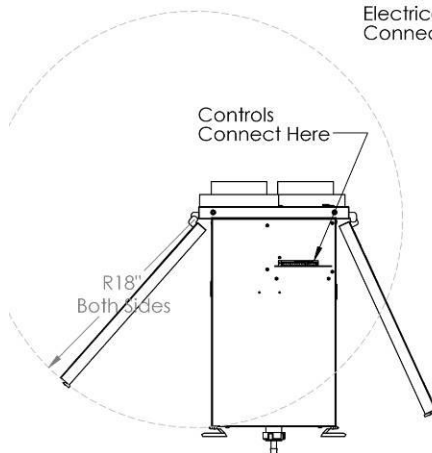
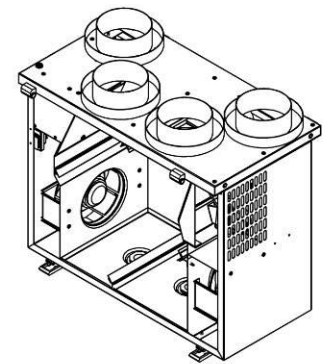
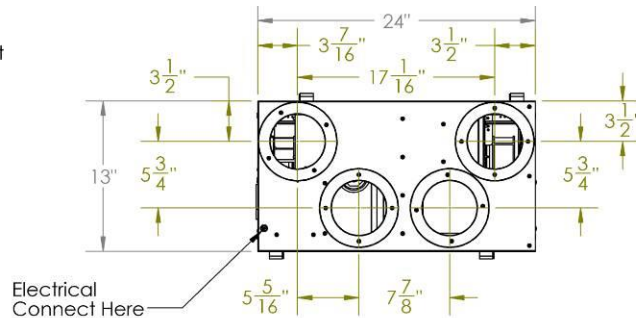
VENTILATION PERFORMANCE

EXT. STATIC PRESSURE	NET SUPPLY AIR FLOW	GROSS AIR FLOW		SUPPLY TEMP.	NET AIR FLOW	POWER CONSUMED	SENSIBLE RECOVERY	APPARENT SENSIBLE
in wg (Pa)	cfm (l/s)	SUPPLY cfm (l/s)	EXHAUST cfm (l/s)	°F (°C)	cfm (l/s)	Watts	EFFICIENCY	EFFECTIVENESS
0.1 (25)	147 (69)	150 (71)	172 (81)	+32 (0)	55 (26)	47	70	79
0.2 (50)	131 (61)	134 (63)	153 (72)	+32 (0)	66 (31)	52	68	76
0.3 (75)	118 (56)	121 (57)	135 (64)	+32 (0)	40 (86)	72	65	73
0.4 (100)	104 (49)	107 (50)	123 (58)	13 (-25)	64 (30)	58	56	80
0.5 (125)	91 (43)	93 (44)	111 (52)	13 (-25)	53 (25)	53	65	82
0.6 (150)	76 (36)	78 (37)	92 (43)					
0.7 (175)	64 (30)	66 (31)	79 (37)					
0.8 (200)	52 (24)	53 (25)	64 (30)					

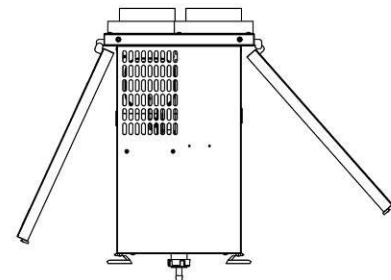
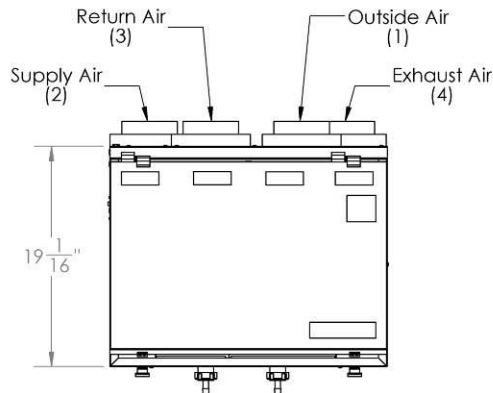


Notes:

1. Backward curved impellers
2. Temperature activated defrost
3. Cross-flow core
4. Remote connections
5. Defrost damper
6. Filters (2) washable
7. Hanger nutserts
8. 1/2" Drains
9. 5" Collars
10. Defrost/Recirculation from neutral space



Unit Reversible
Doors are removable
if required for access
to core and routine
maintenance



ELECTRICAL: 120V/1/60 Hz. 84W, 0.7A

This product earned the ENERGY STAR® by meeting strict energy efficiency guidelines set by Natural Resources Canada and the US EPA. It meets ENERGY STAR requirements only when used in Canada.

MODEL: ES150

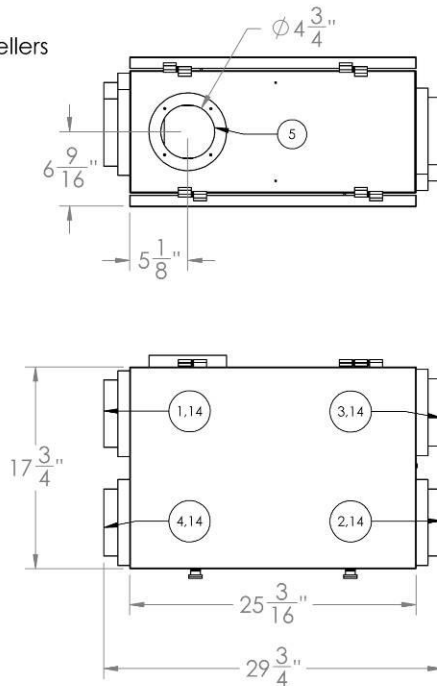
VENTILATION PERFORMANCE

EXT. STATIC PRESSURE	NET SUPPLY AIR FLOW	GROSS AIR FLOW		SUPPLY TEMP.	NET AIR FLOW	POWER CONSUMED	SENSIBLE RECOVERY	APPARENT SENSIBLE EFFECTIVENESS
in wg (Pa)	cfm (l/s)	SUPPLY cfm (l/s)	EXHAUST cfm (l/s)	°F (°C)	cfm (l/s)	Watts	EFFICIENCY	EFFECTIVENESS
0.1 (25)	143 (67)	144 (68)	174 (82)	+32 (0)	64 (30)	50	71	80
0.2 (50)	124 (58)	125 (59)	150 (71)	+32 (0)	96 (45)	80	64	73
0.3 (75)	109 (51)	110 (52)	135 (64)	+32 (0)	116 (55)	90	63	70
0.4 (100)	100 (47)	101 (48)	122 (58)					
0.5 (125)	92 (43)	93 (44)	104 (49)	13 (-25)	60 (28)	69	64	82
0.6 (150)	78 (37)	79 (37)	93 (44)					
0.7 (175)	63 (30)	64 (30)	86 (41)					
0.8 (200)	46 (22)	47 (22)	72 (34)					

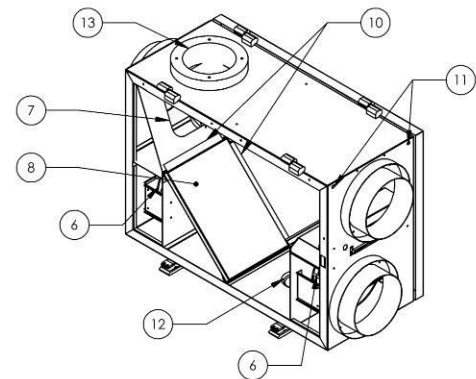


Notes:

1. Outside air
2. Supply air
3. Return air
4. Exhaust air
5. 5" Recirculation port
6. Backward curved impellers
7. Defrost damper
8. Cross flow core
9. Remote connections
10. Washable filters (2)
11. Hanger nutserts (4)
12. 1/2" Drains (2)
13. 5" Collar
14. 6" Collars (4)



Unit is Reversible
 2 Doors are removable
 if required for access
 to core and routine
 maintenance



ELECTRICAL: 120V/1/60 Hz. 100W, 0.9A

This product earned the ENERGY STAR® by meeting strict energy efficiency guidelines set by Natural Resources Canada and the US EPA. It meets ENERGY STAR requirements only when used in Canada.

MODEL: ES210

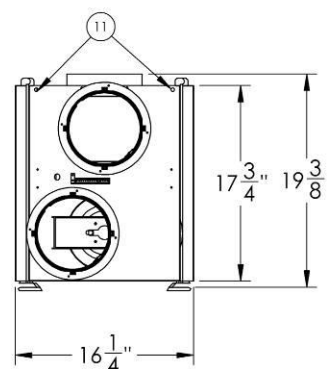
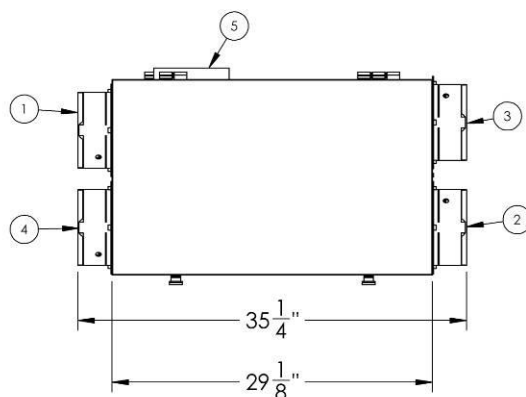
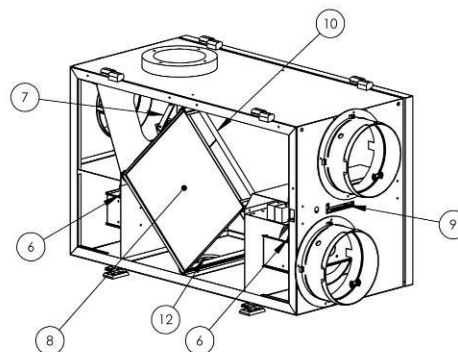
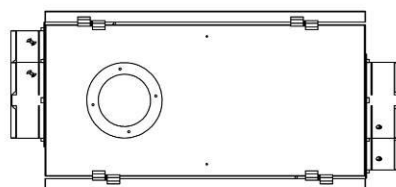
VENTILATION PERFORMANCE

EXT. STATIC PRESSURE	NET SUPPLY AIR FLOW	GROSS AIR FLOW		SUPPLY TEMP.	NET AIR FLOW	POWER CONSUMED	SENSIBLE RECOVERY EFFICIENCY	APPARENT SENSIBLE EFFECTIVENESS
in wg (Pa)	cfm (l/s)	SUPPLY cfm (l/s)	EXHAUST cfm (l/s)	°F (°C)	cfm (l/s)	Watts		
0.1 (25)	227 (107)	230 (108)	282 (133)	+32 (0)	65 (31)	72	70	81
0.2 (50)	203 (96)	206 (97)	262 (124)	+32 (0)	97 (46)	82	66	74
0.3 (75)	194 (92)	196 (93)	244 (115)	+32 (0)	107 (51)	86	65	73
0.4 (100)	177 (84)	179 (84)	222 (105)					
0.5 (125)	162 (77)	164 (78)	206 (97)	13 (-25)	91 (43)	89	62	77
0.6 (150)	149 (70)	150 (71)	188 (89)					
0.7 (175)	130 (62)	132 (62)	165 (78)					
0.8 (200)	115 (54)	116 (55)	144 (68)					
0.9 (225)	91 (43)	92 (43)	125 (59)					
1.0 (250)	77 (36)	77 (37)	98 (46)					



Notes:

1. 7" Outside air collar
2. 7" Supply air collar
3. 7" Return air collar
4. 7" Exhaust air collar
5. 5" Recirculation port
6. Backward curved impellers
7. Defrost damper
8. Cross flow core
9. Remote connections
10. Washable filters (2)
11. Hanger nuts (4)
12. 1/2" Drains (2)



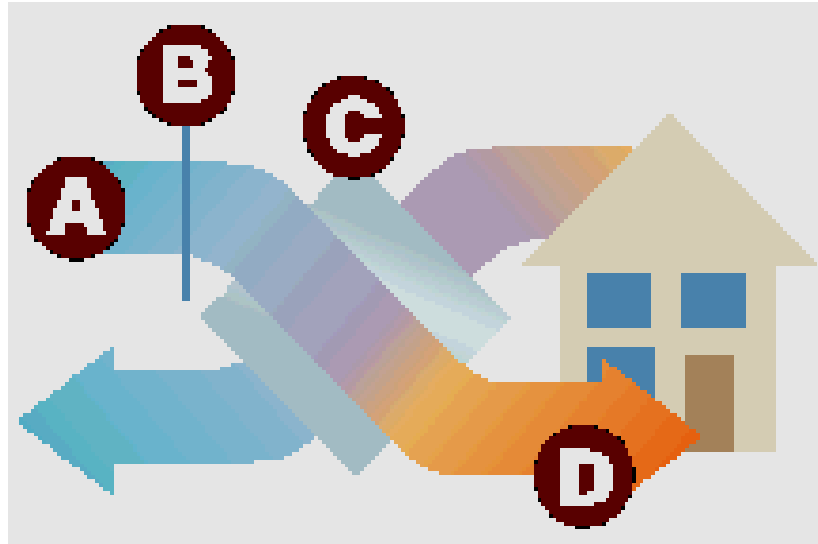
Unit is reversible, 2 doors are removable if required for access to core and routine maintenance

ELECTRICAL: 120V/1/60 Hz. 156W, 1.0 A

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2. HOW THE NU-AIR SYSTEM WORKS

- A. Powerful, centrifugal blowers bring fresh air into your home while an equal amount of stale, humid air is exhausted to the outside. This is **NU-AIR**'s balanced central ventilation system.
- B. Incoming fresh air is filtered before flowing through the heat exchange core.
- C. Stale, humid air flows through the cross-flow heat exchanger and transfers the heat to the incoming fresh air.



- D. Warm fresh air is distributed to each room of the house through an independent ductwork system.

3. INSTALLATION

3.0.1. Installation Supplies, Standard Issue Items:

The HRV comes equipped with:

- Filters
- Anti-Vibration Straps
- Heat Recovery Core
- Drain Hose Assembly
- Balancing dampers are NOT REQUIRED. ES Series HRVs from Nu-Air are equipped with a system which allows the installer to adjust each motor in both high and low speed.
- Removable terminal blocks for timers, remote controls, furnace interlock. A 4-wire terminal block for 12 VDC ES Series controls and a 10-wire terminal block for 24 V controls are provided with the unit. To use these, gently remove the block from the HRV, fit the wire into place and secure it in its trap, using a fine-tipped flat-headed screwdriver.

3.1. Installer's Responsibilities

Installers are responsible for the performance of the ventilation system and for ensuring that all codes and standards are met.

- Do not mount the fresh air supply near a source of contaminated air such as automotive exhaust, gas or propane exhaust, garbage containers or oil tanks.
- Do not connect a dryer exhaust to an HRV.
- Combustion appliances such as furnaces and hot water heaters must not draw combustion air directly from an HRV.
- Do not connect a kitchen range hood to any part of this system.
- Do not install in attics or other unconditioned spaces (min. 16° C, 61° F).
- Do not install in enclosed garages.
- Try to maintain straight duct runs as much as possible, using as few joint fittings as possible.

- Keep use of flexible ducting to a minimum.
- Be sure to observe local codes regarding running and insulating ducts in unconditioned spaces. Poorly insulated ducts run in unconditioned spaces will hamper the efficiency of the HRV.

Sizing the System

For residential applications you should have a minimum ventilation capacity of 10 cfm (5 L/s) per room. The chart that accompanies the flow grid calibrates pressure readings to airflow. Refer to ASHRAE Standard 62 for acceptable ventilation rates in commercial buildings.

Calculating TVC (Total ventilation Capacity) for Residential Applications:

- 20 cfm for the master bedroom
- 20 cfm for an unfinished basement
- 10 cfm for each other room in the house

Add these together to arrive at your TVC.

This method is called the “Room Count Method” and is part of CSA F326 (Residential Mechanical Ventilation Systems). 0.3 air change per hour is no longer used.

Areas typically serviced by Fresh Air: Bedrooms, Living Rooms, Dining Areas, and Recreation Areas.

Areas typically serviced by Exhaust Air: Laundry Rooms, Kitchens, Bathrooms, other wet rooms.

Note

Kitchen exhaust grills should be equipped with a grease filter and must be located at least 3 ft. horizontally in all directions from the surface of the range extended to the ceiling.

3.2. Installation System Options

Before installing your HRV, please read these instructions for correct installation. The **Nu-Air** HRV is a self-contained system that is ready to be installed.

There are **three** commonly used and approved methods of installation.

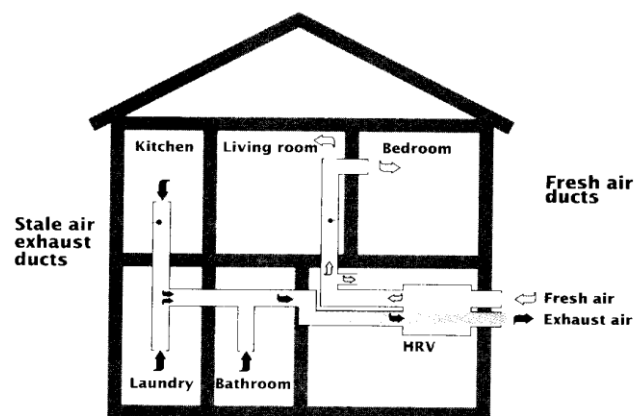
3.2.1. The Fully Ducted System

This system uses an independent duct system for supply and exhaust air. The HRV is controlled independently of all other equipment.

The best results are achieved when:

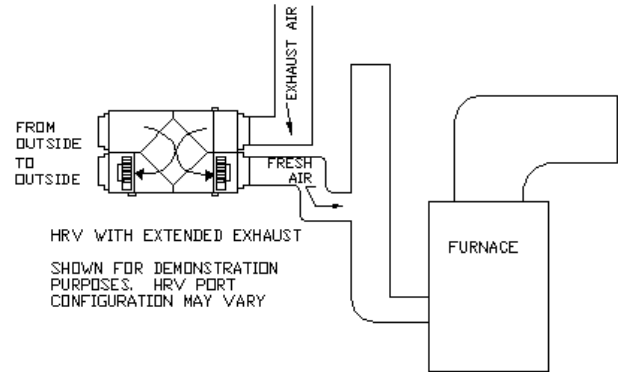
- Each room of the space is serviced with a vent mounted in the ceiling or high on an interior wall (within 12" of the ceiling).
- Vents are located deep within a room, where they will not short circuit or create an uncomfortable draft.

An HRV with direct ductwork



3.2.2. The Extended Exhaust System

This system uses the HRV in conjunction with a forced air furnace distribution system. In this system the HRV supply air to the house is introduced into the return duct of the forced air furnace. Separate, additional ductwork is used to transfer stale air from the wet rooms to the HRV.



3.2.3. Extended System, Continuous Ventilation

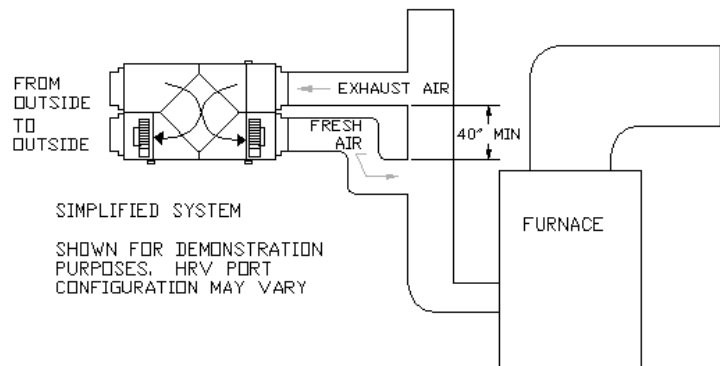
The furnace fan may not need to run continuously with this system. Check local code requirements. For improved supply air distribution during continuous ventilation mode, the furnace may be interlocked to the HRV. See Section 4.4 for wiring instructions and Section 10.12 for interlock settings.

3.2.4. Extended System, Intermittent Ventilation

If the HRV is operated intermittently, the furnace fan should be interlocked with the HRV for good distribution of supply air during high-speed ventilation conditions.

3.2.5. The Simplified System

This system uses the furnace's return plenum for both supply air distribution and exhaust air collection. The exhaust air connection must be a minimum of 40 inches upstream of the supply air connection to avoid short-circuiting of the fresh air.



3.2.5.1. Simplified System - Continuous Ventilation & Intermittent Operation

For proper supply air distribution with this system, and to prevent short circuiting in the return air duct, the furnace fan must run during ventilation mode. Interlock the furnace and HRV in accordance with Sections 4.4 (wiring) and 10.12 (settings).

INSTALLATION NOTES:

1) When selecting an installation option, consideration should be given to the increased electrical consumption of the furnace fan. The way that your Heat/Energy-recovery ventilator is installed may make a significant difference to the electrical energy that you will use. To minimize the electricity use of the Heat/Energy-recovery ventilator, a stand-alone fully ducted installation is recommended. If you choose a simplified installation that operates your furnace air handler for room-to-room ventilation, an electrically efficient furnace that has an electronically commutated (EC) variable speed blower motor will minimize your electrical energy consumption and operating cost.

2) In cases where the HRV is coupled with a central air handling system, the HRV fresh air supply duct to the return air plenum shall be connected at a sufficient distance upstream of the plenum connection to the furnace. This allows proper mixing and ensures appropriate air temperature at the furnace heat exchanger in cold weather. For fuel-fired mid and high efficiency furnaces a minimum temperature of 15.5° C (60° F) is recommended at the heat exchanger (check the furnace manufacturer's specifications).

3) To ensure quiet operation of ENERGY STAR qualified HRV/ERVs, each product should be installed using sound attenuation techniques, such as using a flexible connector between the unit and the rigid-pipe supply and return ducts.

4) Installing a user-accessible control with your product will improve comfort and may significantly reduce the product's energy use. Most building codes require a centrally located control with an on/off switch.

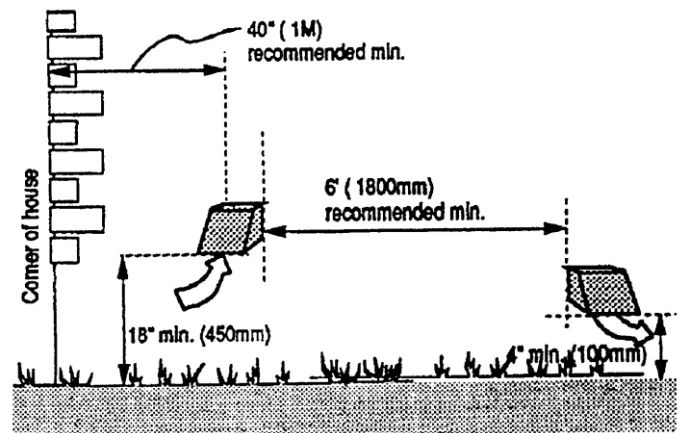
3.3. Ducting to The Outside

Between the weather hoods and the HRV you must use fully insulated ducting with an integrated **vapour** barrier. Insulated ducting with an integrated **vapour** barrier must also be used on all runs passing through unheated areas. This will help avoid condensation problems and energy losses.

The minimum RSI value of insulation should equal that of the local building codes.

3.3.1. Weather Hood Installation

1. Insulated flex duct slides over the galvanized sleeve of the weather hood.
2. Use sheathing tape (red) to join the inner duct to the hood's sleeve.
3. Tape the **vapour** barrier to back of the hood without compressing the insulation. Caulk or foam seal around the collars and hoods to eliminate air and water leaks.
4. Locate the hoods for easy access to the bird screen for cleaning purposes.
5. Be sure to use exterior sealant along the top and side edges of the hoods, tooling the sealant to ensure a good seal.



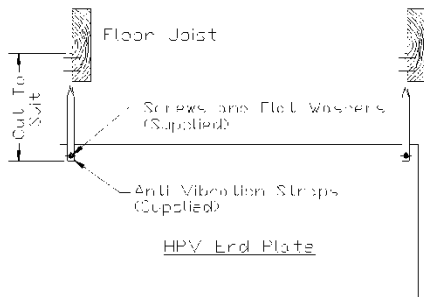
Make the insulated duct that connects the weather hoods to the HRV as short as possible to minimize airflow restrictions. Avoid sharp bends and stretch out the inner lining of the flex duct as much as possible to reduce static pressure and maximize airflow. For runs over 12', increasing flex diameter 1" to next size up will reduce pressure drop in the duct.

3.3.1.1. Locating the Weather Hoods

There should be a minimum of 6' (feet) of separation between the fresh air and exhaust hoods. Supply hoods should be a minimum of 18" (inches) above the ground level. Exhaust hoods should be at least 4" (inches) above the ground level. Holes through the wall should be 1" larger than the collar on the hood, to allow for insulation. Fresh air hoods must be 3' away from any other appliance exhaust vent or furnace vent.

In addition ASHRAE Standard 62-99 recommends the following. Ventilation systems should be designed to prevent the reintroduction of exhaust contaminants, condensation or freeze-ups and growth of microorganisms. Make-up air inlets and exhaust air outlets shall be located to avoid contamination of the makeup air. Contaminants from sources such as cooling towers, sanitary vents, vehicular exhaust, and street traffic should be avoided. Consult local code requirements for minimum distances.

3.4. Mounting & Noise Control



For maximum efficiency, the HRV should be installed in a heated area. The HRV is designed to be hung from the ceiling by way of the anti-vibration straps supplied. Avoid hanging the HRV directly below a bedroom or other quiet area.

Connecting To Other Equipment - Residential Applications

Interconnection with a forced air furnace duct system is permissible (see Section 4.4); however, your **Nu-Air** HRV is not intended to be connected to any other equipment or appliances.

Flexible ducting may be desired in some installations for noise abatement. **To ensure effective air flow, use only as much flexible ducting as necessary and keep it taut.**



3.5. Ductwork

An engineer or other qualified person should design the duct system.

- Duct runs should be straight with minimum bends and elbows.
- Ensure joints are tight-fitting and sealed with duct tape or sealer.
- Use galvanized duct whenever possible. Although flexible duct can be used, its use should be restricted to areas indicated (to outside hoods and in unheated spaces).
- All ducting must be supported every 3' or less.
- Be sure to seal all pipe joints with foil tape or a duct sealant.
- When possible, form elbow joints so that they are as straight as possible.

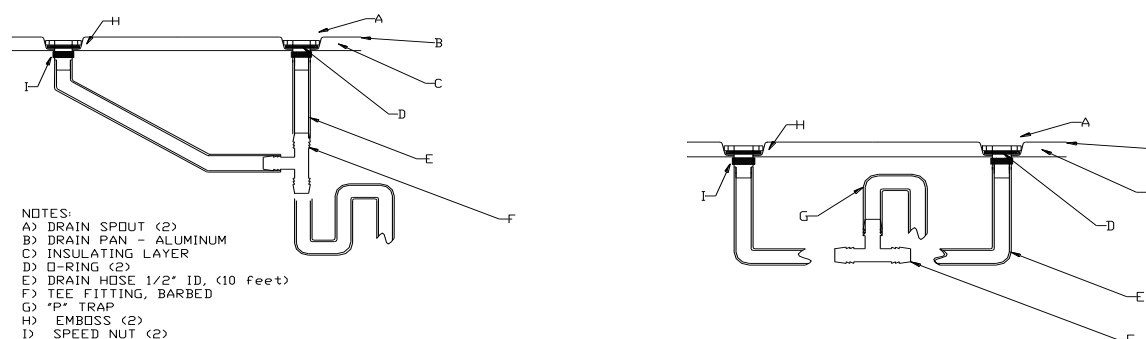


3.6. Drain Connections

Access to a drain or sump is required to handle the HRV condensate. Care should be taken to run the condensate tube where it cannot freeze.

For best results, **Nu-Air** recommends the following steps be followed when installing drain kits on residential HRV's.

1. Apply the rubber O-ring supplied to the flange of each drain spout (A)
2. Insert the drain spouts through the holes in the drain pan (B)
3. Use the provided nut to tightly secure the drain spout
4. Cut two lengths of drain hose (E) long enough to avoid kinking
5. Attach the hose to the drain spout by sliding it over the spout until it is tight to the bottom of the speed nut. Repeat for the other side
6. Secure the hose to the spout with the plastic tie wraps (D)
7. Install the Tee (F) in either of the two ways shown in the drawings below
8. Attach the free end of the hose to the left fitting. Repeat for the other side
9. Use the remaining hose to form a "P" trap and terminate at the top of the tee
10. Pour approximately one cup of water into the drain assembly to form an air seal. This prevents gasses from being drawn into the HRV/ERV



Note for Single-Drain Units

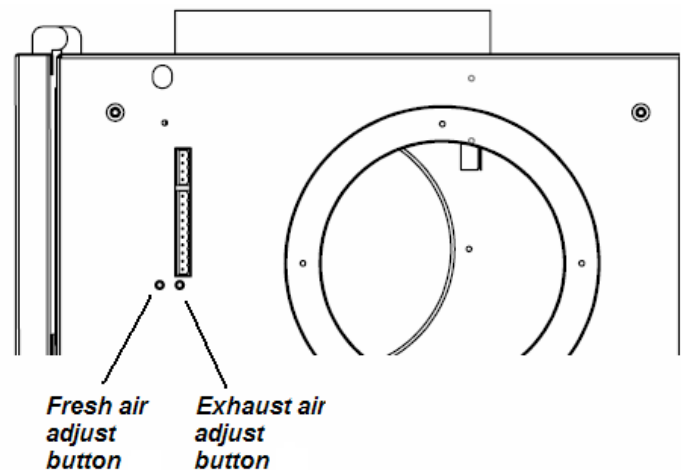
Your unit might be equipped with just one drain and one drain plug. For these models, use the drain hose to form a P-shape after connecting the hose to the drain plug (the arc of the P should be wide enough so as not to cause a kink in the drain hose). Fix the P-shape with one of the (two) plastic cable-ties provided, taking care not to pinch the hose when tightening the cable-tie.

3.7. **Balancing the System: High and Low Speed**

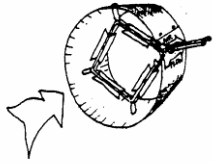
Balanced air flow between the supply and exhaust air streams is essential to the performance of an HRV or ERV. With the ES Series, changing motor speeds or balancing is quick and simple with two buttons recessed slightly into the unit's cabinet. **NO BALANCING DAMPERS ARE REQUIRED.** Be sure to close windows and doors, and turn off all exhaust fans/appliances during the balancing procedure.

For **High-Speed Adjustment/Balancing**, use the following procedure:

1. Use any means to initiate high speed (e.g. ES-M1, R—Hi jumper wire, or engage 24V R—Hi control).
2. Press and hold either the FRESH air or EXHAUST air pushbuttons (not both) for 3 Seconds. Releasing the push-button places the unit in SPEED ADJUST MODE.
3. Now press the corresponding pushbutton to adjust the fresh air fan or the exhaust fan, thereby changing the air flow. Each press will reduce motor speed until the default minimum is reached, at which point the motor will return to its peak speed. Allowing a brief pause between presses (about 0.5 seconds), you will press the adjust button about 70 times before reaching minimum speed. During the balancing procedure, you can switch between adjusting the fresh air motor or exhaust air motor.
4. To exit balancing/speed adjust mode, stop pressing buttons for 10 seconds. This will place the unit back in operating mode with the new speeds saved to the circuit board's memory.



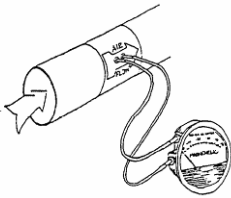
Low-Speed Adjustment/Balancing. If low speed adjustment is desired, use a jumper wire (R—Lo) or remote control to put the unit into low speed and follow steps 2-4.



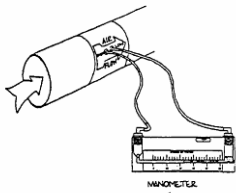
The equipment recommended for balancing your system is easy to use, reliable and cost efficient.

Once the HRV system is installed and the vapour barrier is completed, ensure the following:

- Close all windows, doors and fireplace dampers
- Turn off any exhaust systems such as dryers, range hoods, bath fans and central vacuums.
- With multiple-speed forced air furnaces in Extended or Simplified systems, the furnace should operate at continuous low speed.



To balance the HRV, you will need a device to measure air flow. It is recommended to use either a magnehelic gauge or an air meter, both of which are available from Nu-Air. Depending on the device you are using, follow one of the two procedures below:



Magnehelic Gauge:

1. Disconnect the flex connector from the rigid duct before any branch ducts and Compress the flex duct and insert the flow grid. Tape the joint between the flow grid and ductwork.
2. Set the HRV on high speed. Mount the magnehelic gauge level and plumb. Join the hoses from the flow grid to the magnehelic gauge. The needle of the magnehelic gauge should read positively. Switch hose connections if the needle falls below zero.
3. Record reading from gauge and adjust the motor speed to the desired CFM.
4. Repeat the procedure for the next duct. Adjust motor speeds until air flow readings are equal or within 10% of each other.

Air meter (Nu-Air Part Number 100460):

The 460 air meter is available from Nu-Air wholesalers and can be used to quickly balance the HRV in less than five minutes.

1. Drill a 1/4" hole in both the supply and exhaust ducts on the warm-side of the machine at least 12" away from the HRV and any elbows, tees, etc.
2. Set the HRV on high speed.
3. Take a pressure reading in each duct and record the results.
4. Go back to the duct having the higher reading, and adjust the airflow down until the pressure reads to within 10% of the other air flow.
5. Use tape to reseal the holes.
6. To convert pressure readings to airflow (cfm or L/s) refer to the instructions and table included with the air meter.



4. CONTROLS

Your machine is equipped for remote controls. Options include humidity sensing, off-on control, intermittent and continuous modes, recirculation as well as high speed control from the dehumidistat or timer(s). You can also interlock the furnace blower to the HRV. Various means of controlling the system are described below.

4.1. Main Board Features

The following sections outline some of these features and explain the board in greater detail. A qualified technician must do any service work done within the electrical panel of the HRV.

Powerful Transformer

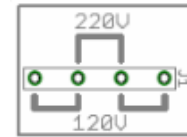
A virtually unlimited number of ES Series controls can be connected in either series or parallel. Up to six (6) WIN-20 Timers can be connected in parallel.

Circuit Protection

Field mis-wiring of 24 V controls, may cause the board fuse to trip. If this happens, remove the control wires and allow fuse to reset (may take a few minutes). Check manual for proper wiring connections.

220 V/50 Hz compatibility

Factory adjusted jumper setting for 220V/50Hz geographic areas.



Variable Low- and High-Speed Motor Control

As discussed and illustrated in Section 3, speed adjustment of each motor in both low and high speed is possible using the FRESH and EXHAUST air pushbutton switches, located on the side of the unit.

12-Volt and 24-Volt Control Options

Because the ES Series comes complete with both a 12 V (4-wire) and a 24 V (up to 10 wires) terminal block, your ES Series unit can be controlled by a variety of control means and strategies.

Intelligent Defrost Cycles

Your unit will adjust defrost frequency and duration, based on outdoor temperature: -5° C (23° F) -15° C (5° F), -20° C (-4° F) and -27° C (-17° F).

5th Port, Recirculation and Defrost.

A temperature sensor is located in the fresh air stream before the core. When the outdoor air temperature is measured at -5° C (23° F), a timed defrost cycle is initiated. For example, at -15° C (5° F) ES150 will run normally for approximately 37 minutes and then shut off the exhaust air fan for 6 minutes, meanwhile closing a damper to incoming outside air. Closure of the damper allows the unit to then draw air from a neutral space through its (top) 5th port and circulate this warm indoor air (not from exhausted areas) through the heat recovery core to defrost it. Timed cycles repeat until the temperature rises above - 5° C (23° F). Defrost has priority over all functions, i.e. commands from all remote controls will start/resume after a defrost cycle.

Neutral Pressure Defrost, Clean Recirculation

In defrost and cycle modes, ES Series H/ERVs do not induce indoor negative pressure nor do they recycle exhaust air; rather, they redistribute ambient room air. This feature makes your ES Series HRV ideal for drawing air from super-heated areas, e.g. where a fireplace or woodstove operates, and distributing this heat to other areas of the home. Consult Section 4.2 for ES recirculation controls.

Backdraft Protection

When the machine is set to **Standby**, the damper automatically closes off the fresh air port to prevent the potential of unwanted drafts while the machine is not in operation.

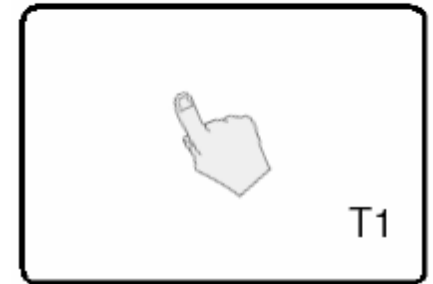
Selectable Furnace Interlock

The installer may choose between interlock whenever the HRV/ERV is on or only when the HRV/ERV is operating in high speed (see illustration 10.12).

4.2. ES Series Controls (12 VDC)

Mix and Match Controls. Because the ES Series circuit board is equipped with separate, removable terminal blocks to accommodate both ES Series and Windsor Series controls, both types of control may be used in the same installation.

All ES Series Controls (sold separately) connect to the 12V (4-wire) removable terminal block. See Section 10.14 for the wiring diagram which applies to ALL ES Series controls.



Selecting operation with ES Controls is easy: Just tap the touch-pad!

ES Series Mx and Tx controls are equipped with a touch pad and 3 LED's. The touch pad is used to select mode of operation or turn the appliance off. The LED's indicate which mode of operation the HRV/ERV is operating in.

→ES Series controls can be used in any combination and in virtually any number, and can be wired in *series or in parallel*. The user may toggle through and select any function, even if this interrupts a current mode or cycle.

4.2.1. ES-T1 – 20/40/60 Minute Timer

This timer is used to make the unit operate in high speed for 20, 40 or 60 minutes and is typically installed in bathrooms, kitchens and workspaces. You may toggle between functions or even cancel a high speed run by tapping the touch pad.

4.2.2. ES-M1 Control

1. No LED: HRV/ERV is OFF
2. Stby: Unit is in standby, ready for a command
3. Lo: Unit operates in low speed continuously with high speed override from timers or sensors.
4. Hi: Unit operates in high speed continuously



4.2.3. ES-M2 Control

1. No LED: HRV/ERV is OFF
2. Stby: Unit is in standby, ready for a command
3. Lo: Unit operates in low speed continuously
4. 20 Lo/40 Stby: Unit cycles between 20 minutes continuous low and 40 minutes standby.

4.2.4. ES-M3 Control

1. No LED: HRV/ERV is OFF
2. Stby: Unit is in standby, ready for a command
3. Lo: Unit operates in low speed continuously
4. 20 Lo/40 Rec.: Unit cycles between 20 minutes continuous low and 40 minutes recirculation.

4.2.5. ES-M4

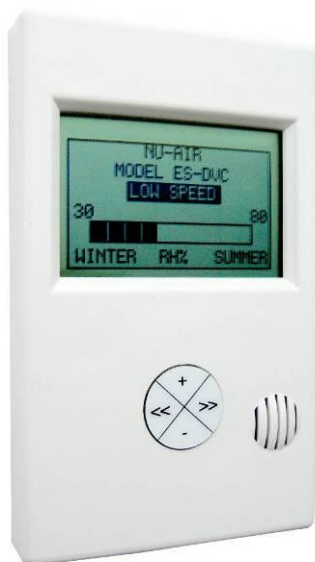
1. No LED: HRV/ERV is OFF
2. Stby: Unit is in standby, ready for a command
3. Lo: Unit operates in low speed continuously
4. Rec.: Unit operates in full-time recirculation (Lo) with no outdoor air exchange.

4.2.6. ES-M5

1. No LED: HRV/ERV is OFF
2. Stby: Unit is in standby, ready for a command
3. Lo: Unit operates in low speed continuously
4. Rec.: Unit operates in full-time recirculation (Hi) with no outdoor air exchange.

4.2.7. ES-DVC

The ES-DVC offers a complete package of control options in one control unit.



Features:

LCD Screen

- 4 touch-sensitive navigation pads
- Intuitive user interface
- Attractive low-profile case
- Bilingual text settings: select English or French in just a few seconds
- On-board humidity sensor
- 5% increment RH bar: accurately read and set relative humidity levels
- Built-in timer
- 90-day runtime filter alert
- Programming option for non-recirculation units

Functions:

Off, Standby, Continuous low speed, Continuous high speed, Intermittent high speed (with humidity call) Continuous recirculation, 20 Lo/40 standby, 20 Lo/40 recirculation, 15-30-45-60-minute timer

4.3. Windsor Series Controls & Other 24 V Control Options

All Windsor Series and other 24V controls (sold separately) connect to the 24V (10-wire) removable terminal block. See Section 10 for wiring diagrams.

Mix and Match Controls. Because the ES Series circuit board is equipped with separate, removable terminal blocks to accommodate both ES Series and Windsor Series controls, both types of control may be used in the same installation.

4.3.1. Standard Dehumidistat (Part # DSTAT-1)

With this basic control the system is designed to operate on a low speed for continuous ventilation. The dehumidistat will switch the HRV to high speed when the relative humidity of the air around it exceeds its set point. When the indoor humidity falls below the set point, the machine drops out of high speed. The standard dehumidistat can be complemented with Win-20 timers or ES Series controls. See Section 10.15 for wiring diagram.

4.3.2. Windsor Control (Part # WIN-1)

The Windsor Dehumidistat Control provides the same humidity control as the Standard Dehumidistat, with the added functionality of a **3-position switch** from which the operator can select three operating modes. See Section 10.16 for wiring diagram.

1. OFF - disables all functions.
2. STANDBY - HRV is on standby (intermittent). High speed ventilation on demand from the dehumidistat, or remote timers. i.e. Automatically resumes Standby mode after demand is met.
3. CONTINUOUS - continuous low speed ventilation. HRV cycles to high speed on demand from the dehumidistat or timers. i.e. Automatically resumes Continuous mode after demand is met.

Also, the Windsor Control has a two position switch from which you can choose:

Constant - locks the motors in High speed

Standard – normal operating mode enables functions 2 and 3 above.

While it offers several convenient features and operating modes, the Windsor Control can be combined with the ES –T1 20/40/60 or WIN-20 timer to further customize system functions.

4.3.3. Windsor Timer (WIN-20)

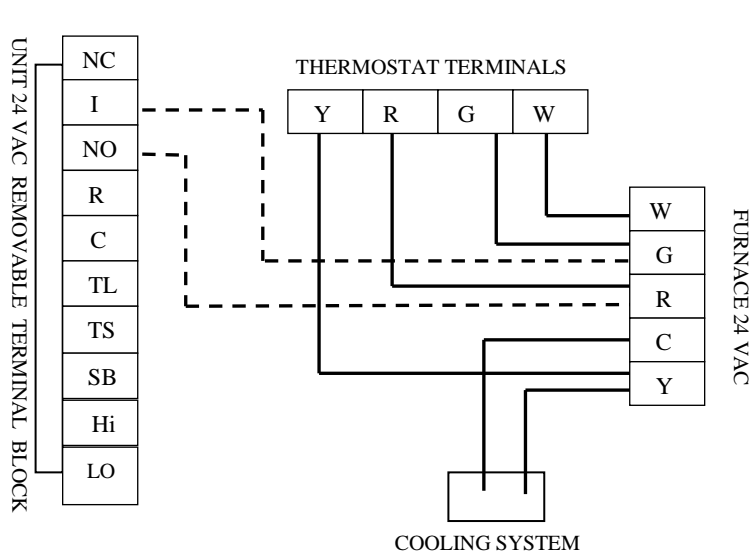
Install in bathrooms, kitchens, workstations or other locations where high-speed ventilation control is needed. The machine will run at high speed for twenty (20) minutes and then return to its previous operating condition. **Up to six (6) timers** can be connected in parallel. See Section 10.17 for wiring diagram.

4.3.4. Remote On/Off Switching and Spring Wound Timers

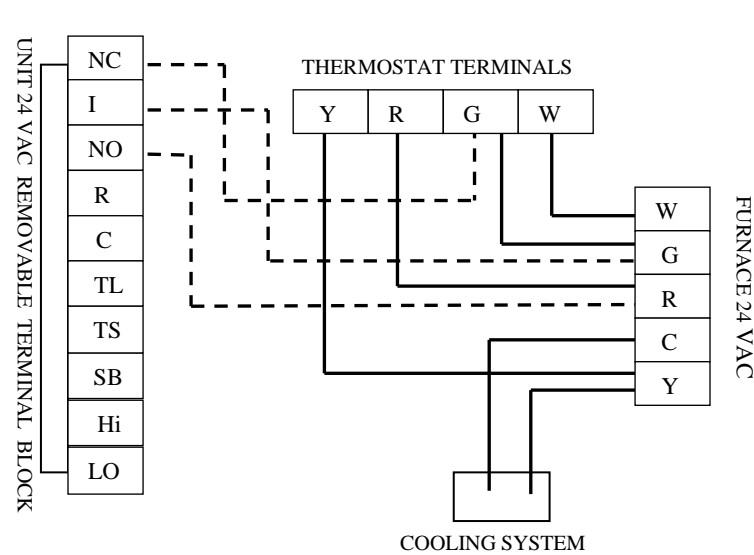
Basic RNC control can be achieved using a standard, DEDICATED light switch. Mechanical (spring-wound) timers, CO₂, or occupancy sensors may also be used. See Section 10.18 for wiring diagram.

4.4. Furnace Interlock

For simplified (return/return) duct systems, it is mandatory that the HRV be interlocked with the furnace blower such that the furnace fan runs when the HRV is on to distribute supply air throughout the space. For extended exhaust systems, furnace interlock is recommended. Refer to local building codes.



STANDARD FURNACE INTERLOCK



ALTERNATE FURNACE INTERLOCK

If the standard interlocking method has the unwanted effect of bringing on the AC, i.e. thermostats that do not isolate "G" from "Y", use the alternate method shown above.

5. START-UP

- Ensure the controls are connected in accordance with Sections 4, 10.
- For electrical hook-up, plug into a 120 volt receptacle.
- Ensure that the machine is piped to an adequate drainage source, i.e. through the drain hose supplied.

6. OPERATING HINTS

When a **dehumidistat** is used, set it at the desired level. Look for signs of excessive humidity or dryness. *Let your windows be your guide.*

- Winter Operation – 40% - 50% is recommended. Lower settings may be necessary in colder zones to keep windows free of condensation.
- Spring/Fall Operation- 50% - 60% is recommended
- Summer Operation – For air conditioned homes run the HRV as recommended for winter operation, i.e. continuous low speed or use a 20/40 setting. In homes without air conditioning, there is no need to run the HRV during the day when windows are open. If the HRV is connected to the bathroom(s) or kitchen, use the standby setting. The normal dehumidistat summer setting is 65%-80%.

7. MAINTENANCE

CAUTION: *Disconnect power before servicing.*

7.5. Filters

Dirty filters can reduce ventilation efficiency, result in unbalanced airflow and damage or shorten the life of the motors. Vacuum every three months. Polyester filters should typically be replaced every 1-3 years. Permanent electrostatic filters are available from your **Nu-Air** dealer. Filters remove easily by opening the front cover.

7.6. Fans

When cleaning the filters, take the opportunity to vacuum any interior surfaces including the fan blades. No other service is required as these fans are designed to operate continuously without lubrication.

7.7. Condensate Drain

Twice per year wipe clean the condensate drain pan. Check the condensate drain and tubing to ensure they are free flowing. The tubing must have an "S" or loop that traps a quantity of water to prevent air from entering the HRV via this tubing.

7.8. Heat/Energy Recovery Core

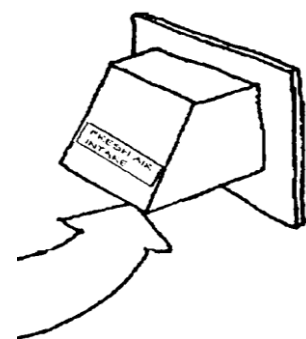
Polypropylene or aluminum core (located behind the cover) should be removed and cleaned at least once a year, using a mild detergent in cold water. To remove the cover of the machine, unlatch the two latches; slide the door to right to release from hinges. Fiber-media ERV core must not be washed, rather vacuumed at the interval stated above.

7.9. Exterior Hoods

Regularly check the outside vents and clean any obstructions such as grass, leaves or other debris. Do not replace the screen with mesh smaller than 1/4" as this will restrict airflow. During winter operation, ensure snow and frost does not build up and restrict or block openings.

7.10. Grills & Duct Work

Clean the grills when they are dusty or greasy with soap and water. Check for punctures in the insulation jacket on the fresh air and exhaust air ducts. Repair any punctures using foil tape.



8. ANNUAL SERVICING:

Your HRV should undergo annual general servicing by an accredited contractor. This servicing should include the following:

- a) The six maintenance items above.
- b) A general check for proper operation. Controls and electrical connections should be inspected.
- c) Verification that intake and exhaust air flows are properly balanced.
- d) Re-balancing as necessary.

9. TROUBLE SHOOTING

SYMPTOM	EXPLANATION	ANSWER
The humidity level seems too low.	<ul style="list-style-type: none"> • HRV air flows incorrectly balanced. • Dehumidistat control set too low. • Lifestyle of the resident(s). 	<ul style="list-style-type: none"> • Balance air flow(s). • Increase dehumidistat. • Humidifiers may need to be added.
The humidity level seems too high.	<ul style="list-style-type: none"> • HRV air flows incorrectly balanced. • HRV not properly sized for the application • High humidity areas not ventilated properly. • Lifestyle of resident(s). • Dehumidistat is not working. 	<ul style="list-style-type: none"> • Balance airflow. • Set dehumidistat. • Cover pools etc. when not in use. • Avoid hanging clothes to dry, storing wood and venting clothes dryer inside.
The house is dry but the basement wet.	<ul style="list-style-type: none"> • High humidity during summer months 	<ul style="list-style-type: none"> • Install a programmable timer on 12-hour cycle. On at night. Off during the day. • Partially close some grills upstairs, open grills in basement.
The Controls or Dehumidistat are not working.	<ul style="list-style-type: none"> • Incorrect connection of outside low voltage wiring between HRV and dehumidistat. 	<ul style="list-style-type: none"> • Check control wiring for short • Check wall switch for correct connection. • Check wires are connected to proper terminals at the HRV
There is Frosting up of the HRV and/or duct(s).	<ul style="list-style-type: none"> • HRV air flows incorrectly balanced. • HRV defrost system is not working. 	<ul style="list-style-type: none"> • Balance HRV. • Check integral damper function (where present). Install back draft dampers as needed. • Check defrost system. • Note minimal frost build up is expected on cores before unit initiates defrost cycle function.
The supply air feels cool.	<ul style="list-style-type: none"> • HRV air flows incorrectly balanced. • Improper location of supply grills. • Extremely cold outside temperatures. • Moving air feels cooler than it actually is. 	<ul style="list-style-type: none"> • Balance HRV. • Locate grills high on walls or in ceiling. • If supply air is installed into return line of furnace, furnace fan must run continuously on low speed.
The outside duct has ice build up or condensation.	<ul style="list-style-type: none"> • Improperly installed vapour barrier around insulated duct. 	<ul style="list-style-type: none"> • Tape all joints. • Ensure that vapour barrier is completely sealed and insulated.
There is water in the bottom of HRV.	<ul style="list-style-type: none"> • Drain pans are plugged. • Incorrect connections of HRV's drain lines. • HRV is not level. • Drain lines plugged. • HRV heat exchange core improperly installed. 	<ul style="list-style-type: none"> • Look for kinks in the line. • Check water drain connections. • Ensure that water drains from pan.
There is poor air flow(s)	<ul style="list-style-type: none"> • HRV airflow incorrectly balanced. • Filters need to be cleaned. • Mesh on outside hoods needs to be cleaned. • Grills are closed. • Present dampers are closed. • Low power supply. • Wrong-size ducting. • Under-sized HRV. • HRV is not working. 	<ul style="list-style-type: none"> • Tape all joints. • Use proper air flow measuring equipment. • Open grills. • Remove obstructions in duct(s), hoods(s), and grill(s). • Balance air flows. • Clean filter. • Have a professional look at the system.

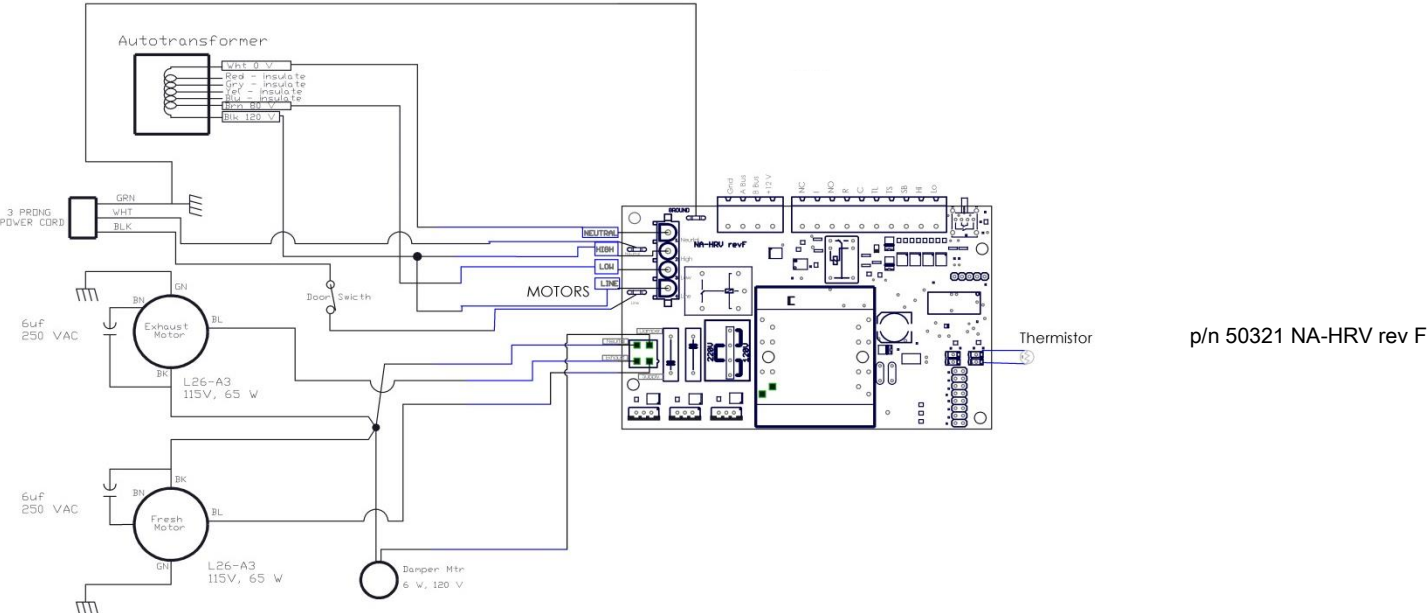
IMPORTANT!

QUALIFIED TECHNICIANS SHOULD DO ALL OTHER SERVICING.

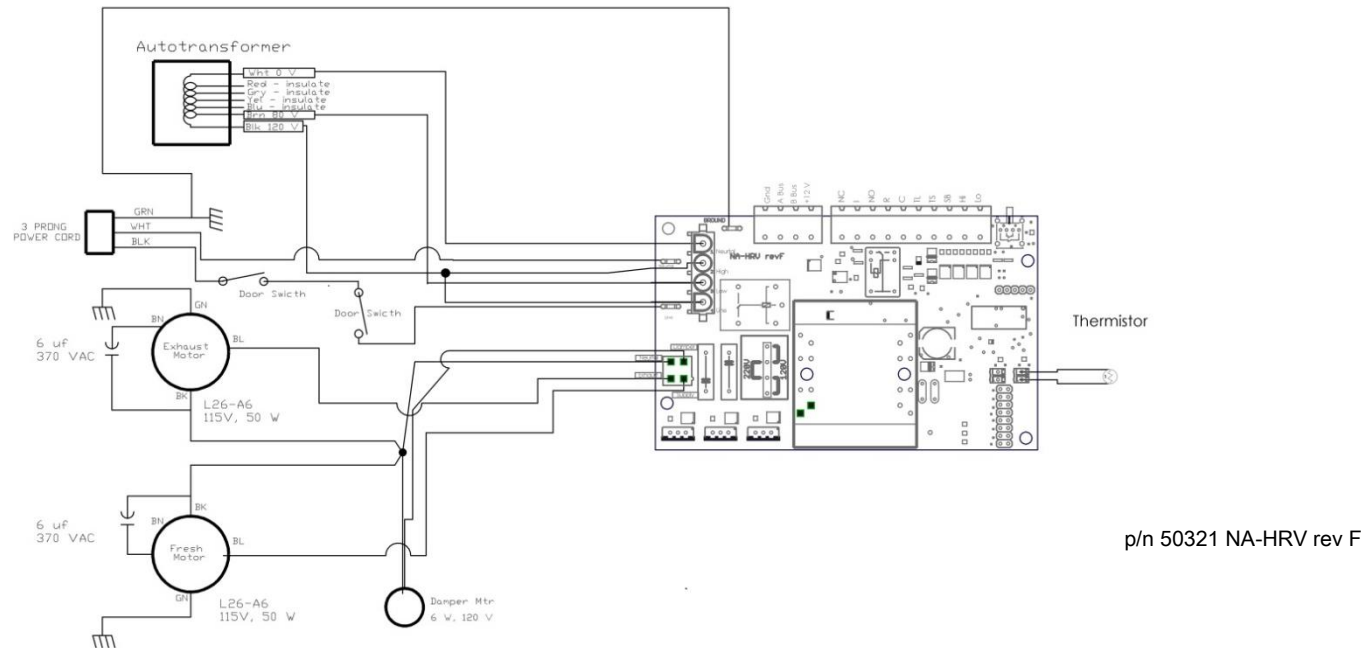
10. ELECTRICAL SCHEMATICS

10.11. ES Series Wiring Diagrams

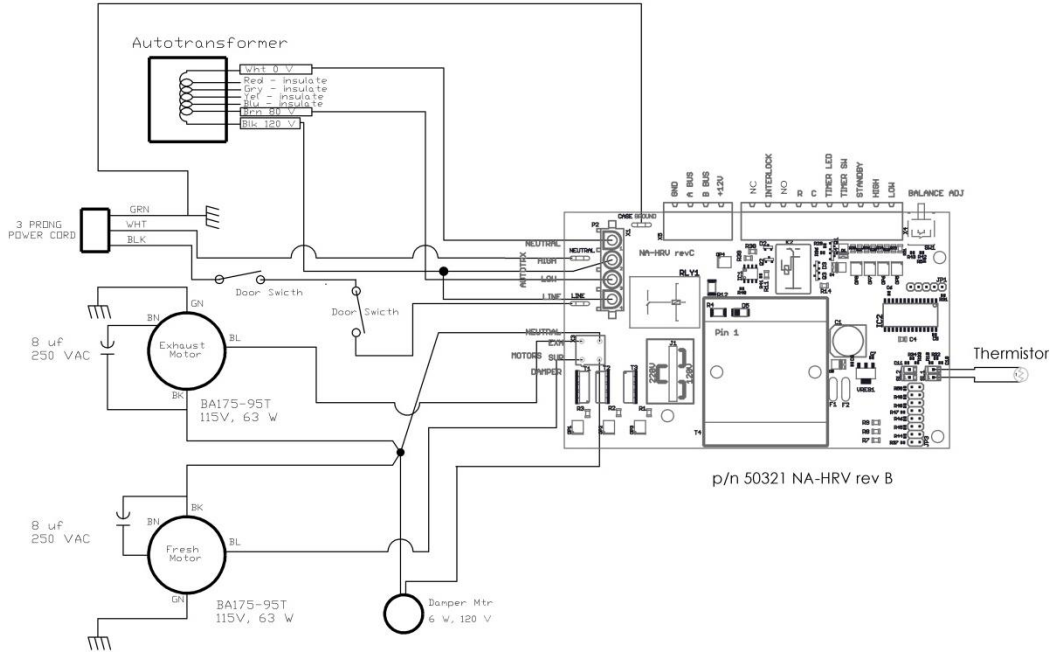
ES170



ES100/ES150

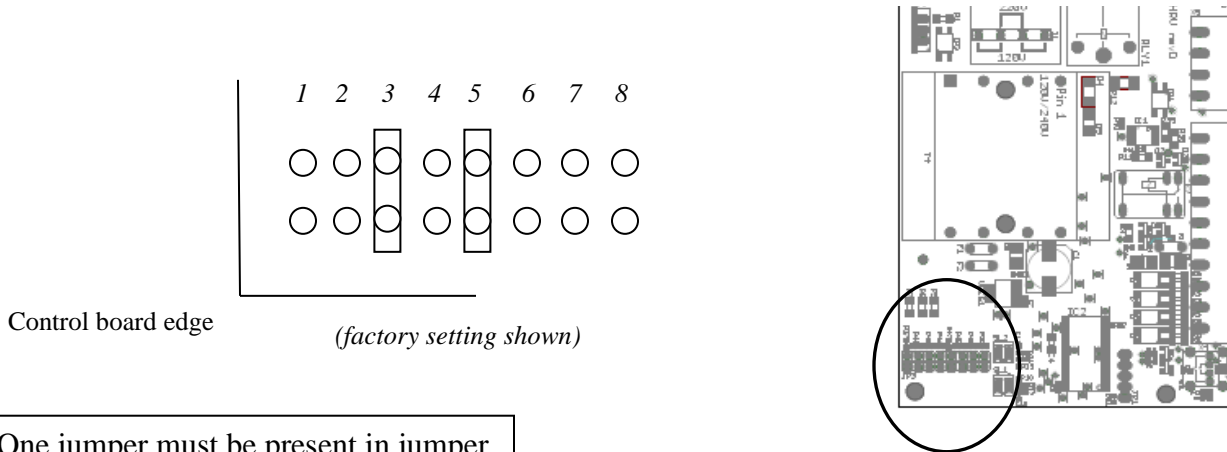


ES210



10.12. Altering Furnace Interlock Settings

Depending on local Building Codes, you may choose to interlock whenever the HRV/ERV is operating at any speed, or just high speed. Position 5: interlock at any HRV speed; Position 6: interlock at HRV high speed only.



One jumper must be present in jumper range 1-4 and in jumper range 5-8.

Do not alter jumper set 3.

10.13. Unit Control Board: Status LEDs & Remote Control Connections

The ES Series control board is divided into two “sections” comprising a 12V RS485 control standard and a 24V standard. With this feature, the user may use ES Series 12V controls and/or Windsor Series 24V controls or 2-wire, 24V switch.

From mid-April, 2013 onward, all control boards are equipped with status lights to indicate mode of operation.

CONDITION	LED AND STATUS
NO LED	UNIT/TRANSFORMER IS NOT POWERED
UNIT OFF	Red is off, Green is blinking slow, every 1 s. Also indicates processor is programmed and running.
STANDBY	Green is OFF. Red led is blinking slow, every 1 s.
EXHCHANGE LOW SPEED	Green ON. Red blinking slow, every 1 s.
EXCHANGE HIGH SPEED	Green ON. Red blinking fast.
DEFROST	Green ON, Red ON.
RECIRCULATION LOW SPEED*	Red led ON, Yellow blinking slow, every 1s.
RECIRCULATION HIGH SPEED*	Red led ON, Green led blinking fast.

*Where available.

10.14. ES Series Control Wiring

Using a 3 mm flat head screwdriver, connect 4-conductor wire to the 12V (4-wire) removable terminal block for: ES-T1, ES-M1, ES-M2, ES-M3, ES-M4, ES-M5, ES-DVC

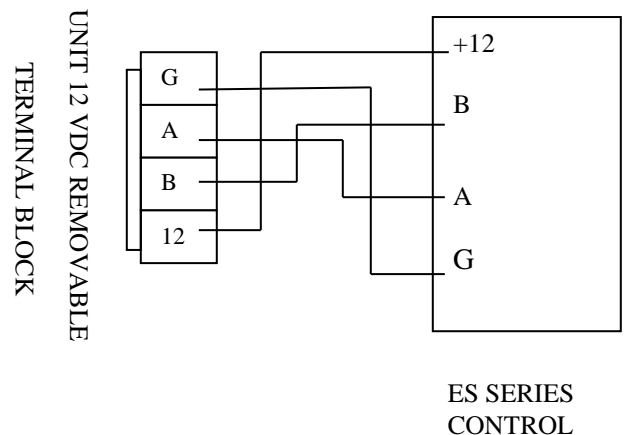


DO NOT cross the +12V/12 and ground (GND/G) wires.

For ES controls, doing so with power connected to the H/ERV will short-circuit and destroy the ES wall control processor.

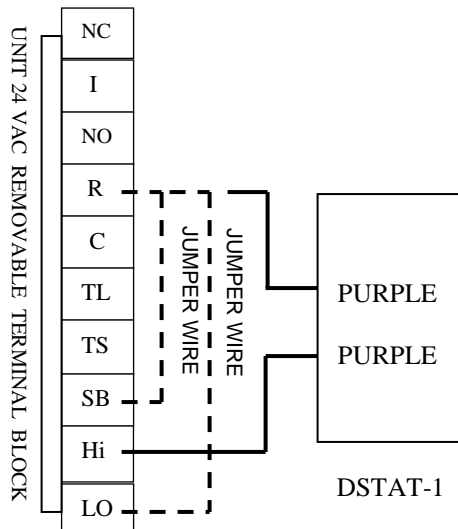
Notes:

1. ES controls can be connected in **SERIES** or **PARALLEL**.
2. ES Controls can be used in installations where any of the 24V control options discussed in this document are employed.
3. If you are using **ONLY** an **ES-T1** to control your unit, you must connect a jumper wire between R and SB on the 24V (10-wire) removable terminal block. In this situation you can add continuous low speed operation by connecting a jumper wire between R and LO. Consult local building code in case a centrally located control with an on/off switch is required.



10.15. DSTAT-1 Control Wiring

Connect 2-conductor wire to the 24V (10-wire) removable terminal block.



For intermittent high speed operation, connect Nu-Air PN DSTAT-1 to R and Hi terminals.

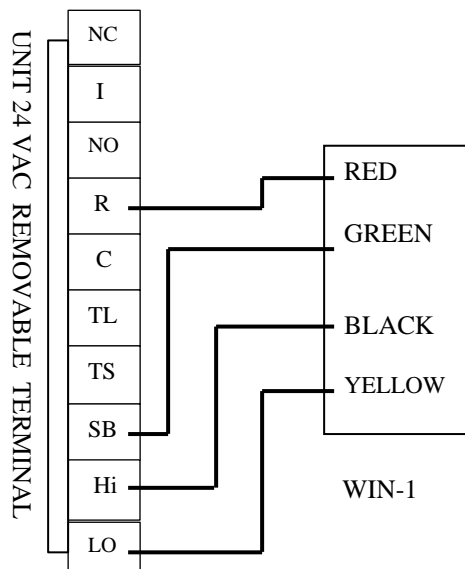
For continuous low speed, connect jumper wire to R and LO terminals.

For two-wire switching, and where local building regulations permit, Nu-Air recommends a jumper wire between R and SB to engage the unit in **standby mode** when intermittent operation is desired.

*It is not necessary to connect jumper wires R-SB **and** R-LO (low speed overrides standby).

10.16. WIN-1 Control Wiring

Connect 4-conductor wire to the 24V (10-wire) removable terminal block.



Choose from the following operating modes:

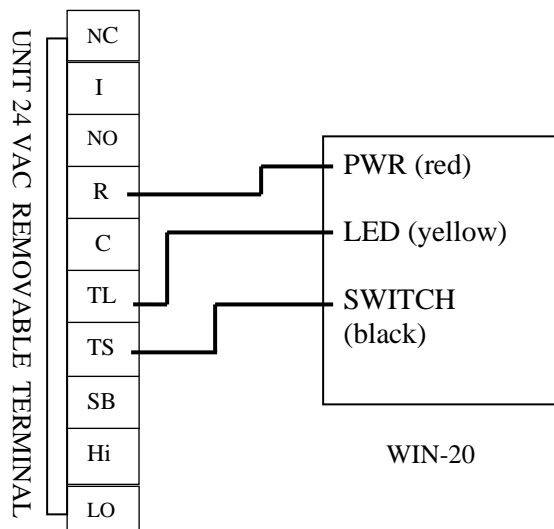
1. Off
2. Standby
3. Continuous low speed
4. Intermittent high speed
5. Continuous high speed (CONSTANT)

Notes:

1. WIN-1 can be combined with ES Series controls or up to 6 WIN-20 controls.

10.17. WIN-20 Control Wiring

Connect 3-conductor wire to the 24V (10-wire) removable terminal block.



Up to 6 Win-20 timers may run off of one system.

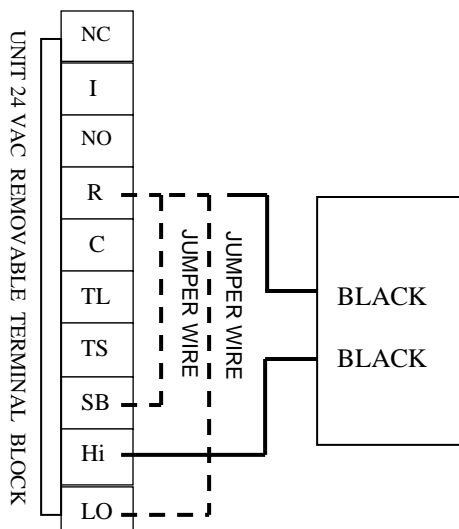
WIN-20 can be combined with ES Series controls or 24V controls discussed in this document.

Notes:

1. If you are using **ONLY** a **WIN-20** to control your unit, you must connect a jumper wire between R and SB on the 24V (10-wire) removable terminal block. In this situation you can add continuous low speed operation by connecting a jumper wire between R and LO. Consult local building code in case a centrally located control with an on/off switch is required.

10.18. Remote On/Off (Two-Wire) Switching

Use 2-conductor wire to the 24V (10-wire) removable terminal block.



For intermittent high speed operation, connect dedicated (RNC) wall switch, CO₂ sensor, etc. to R and Hi terminals.

For continuous low speed, connect jumper wire to R and LO terminals.

For two-wire switching, and where local building regulations permit, Nu-Air recommends a jumper wire between R and SB to engage the unit in **standby mode** when intermittent operation is desired.

*It is not necessary to connect jumper wires R-SB **and** R-LO (low speed overrides standby).

11.WARRANTIES

Your *NU-AIR* ES Series Heat Recovery Ventilator Transferable Warranty For Canada and United States

For ES Series HRVs.

Should your **NU-AIR** ES Series Heat Recovery Ventilator (HRV) cease to function within five (5) years of the date of original purchase (effective April 17, 2005) due to defective material or workmanship of the product, **NU-AIR** Ventilation Systems Inc. will supply a new or rebuilt part FOB Factory to replace the defective part. Delivery, installation, and labour cost are not covered by this warranty.

Lifetime HRV Core Warranty

If the recovery plastic core in your **NU-AIR** Heat Recovery Ventilator fails due to a defect in material or workmanship **NU-AIR** Ventilation Systems Inc. will supply a new core FOB Factory to replace the defective part. Delivery and labour costs are your responsibility.

Nu-Air warrants its ERV core to be free from manufacturing defects for a period of five (5) years.

Warranty Limitations

The above warranty does not cover damage to the unit while in your possession (other than damages caused by defective parts or material) due to the following: 1) improper installation or unreasonable use of unit; 2) failure to provide reasonable and necessary maintenance. If the unit is put to commercial use or application other than residential use, warranty is for a period of one (1) year.



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IMPORTANT

READ AND FILL OUT REGISTRATION CARD IMMEDIATELY

THIS IS YOUR WARRANTY REGISTRATION CARD

In order to properly validate your warranty, you must fill out and return this card. Failure to register unit will require you to present proof of purchase should the unit require service.

This information provides us the means of proving the date you purchased the product and also enables us to notify you in the unlikely event of a service notification or recall of the product.

IMPORTANT

LISEZ ET REMPLISSEZ CETTE CARTE D'INSCRIPTION

IMMÉDIATEMENT

VOICI VOTRE CARTE D'INSCRIPTION DE LA
GARANTIE

Afin de valider votre garantie, vous devez remplir et renvoyer cette carte. A défaut d'inscrire votre produit, vous devrez présenter une preuve de la date d'achat si le produit nécessite des réparations.

Les renseignements ci-joints nous fourniront la preuve de votre date d'achat du produit et nous permettront également de communiquer avec vous si, pour une raison fortuite, nous devons vous faire parvenir un avis de réparation ou de rappel du produit.

PRODUCT WARRANTY REGISTRATION

CARTE D'INSCRIPTION DE LA GARANTIE DE VOTRE PRODUIT

FIRST NAME

NOM DU PRÉNOM _____

LAST NAME

NOM DE FAMILLE _____

ADDRESS

ADRESSE _____

CITY

VILLE _____

PROVINCE

PROVINCE _____

POSTAL CODE

CODE POSTAL _____

DATE PURCHASED

DATE D'ACHAT _____

MO/MOIS DAY/JOUR YEAR/AN

TELEPHONE

TÉLÉPHONE (_____) _____

DEALER'S NAME

NOM DU VENDEUR _____

MODEL NUMBER

NO. DU MODÈLE _____

SERIAL NUMBER

NO. DE SÉRIE _____