

# Honeywell

## TrueFRESH Compact Ventilation System

### Honeywell VNT5070 Ventilator

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#### General Product Description

##### 1.1. Product Overview & Description

- Indoor air in homes often contains significantly more unhealthy pollutants than outdoor air, making it a significant contributor to poor indoor air quality. Air ventilation can be used to improve indoor air quality by exchanging stale indoor air with fresh outside air. This is usually accomplished through two air streams; one air stream brings in fresh outside air while the second air stream exhausts stale indoor air to the outdoors. It is desirable to maintain the same amount of incoming air flow to outgoing air flow, which is referred to as balanced ventilation.
- Heat Recovery Ventilators (HRV's) meet the demand for balanced ventilation while transferring sensible heat from one air stream to the other through a heat exchanger core. Similarly, Energy Recovery Ventilators (ERV's) transfer both sensible and latent heat between air streams.
- The HRV is equipped with a non-moisture transfer cross-flow core, while the ERV is equipped with enthalpic cross-flow cores.
- The compact HRV and ERV are offered at a 70 CFM nominal airflow configuration primarily for small space applications such as apartments, condominiums, and tightly built new homes and are designated VNT5070H1000 and VNT5070E1000, respectively.
- Both the HRV and ERV are equipped with a variable speed blower in each air stream. This allows for independent adjustment of the airflow rate in either air stream.
- Ventilation modes include Off, Continuous, and Intermittent modes. In the **Off** mode the ventilator will remain off and will not respond to any ventilation request; in **Continuous** mode the ventilator is powered and is continuously exchanging stale indoor air with fresh outdoor air on low speed ventilation, except when there is a request for high speed ventilation from a remote control; in **Intermittent** mode the ventilator is on standby until there is a call for ventilation from a remote device, at which time the ventilator will run at high speed while the remote request is present.
- The on-board function controller allows for selection of ventilation modes and blower speed settings.
- Honeywell ventilators are rated at 120VAC, 60Hz, 0.85 Amps power requirements.
- Honeywell ventilators are listed CSA C22.2 #113-10 (Canada & US).
- The 70 CFM HRV and ERV ventilators are HVI-certified.

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#### 1.2. Market Objectives

HRV and ERV solutions are installed as an energy efficient way of bringing fresh air into the home and exhausting stale air from the home. Many contractors install ventilators today to either satisfy building codes or to help protect the home and its residents from poor indoor air quality. Installing ventilation products today can be expensive, tedious and time consuming. The main objectives for this product are to offer ventilation products into the market that are easier to install, duct, and, balance at a competitive price that differentiate Honeywell from other manufacturers.

#### 1.3. Model Number (Order Specification Number) Listing

Honeywell OS Number	Ventilator Type	UPC Code
VNT5070H1000	HRV	085267990165
VNT5070E1000	ERV	085267905640

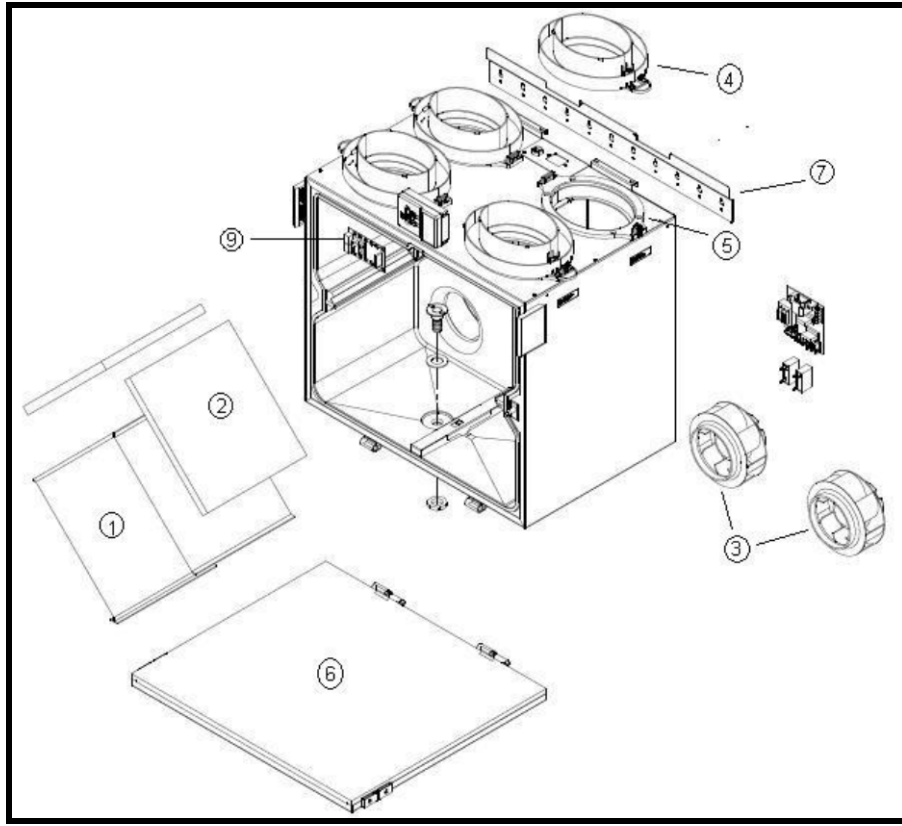
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#### 1.4. Merchandise (Replacement) Part Numbers



Item #	Honeywell OS Number	Product Description	UPC
1	50063805-001	Polypropylene HRV Core – used with VNT5070H1000	085267106894
1	50063805-002	Enthalpy ERV Core – used with VNT5070E1000	085267120913
2	50063805-003	Replacement Filters	085267175920
3	50063805-004	Replacement Motor Blower 133mm	085267345224
4	50063805-005	5" Oval Collars	085267356305
5	50063805-006	5" Oval Keeper	085267369879
6	50063805-007	Access Door	085267378628
7	50063805-008	Mounting Bracket	085267390521
8	50063805-009	Matrix Hood w/ 5 to 6 inch transition kit	085267398152
9	50063805-010	VNT5070 LVC Replacement Control Board	085267041454

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## 2. General Product Specification

### 2.1. Theory of Operation



**Cross-flow Core VNT5070 Series**

An HRV transfers only sensible heat while an ERV transfers both sensible heat and latent heat (moisture exchange) between air streams. In cold climates, both HRVs and ERVs can be effective at removing moisture from the indoor space by exhausting moisture laden air and replacing it with dry air from outdoors.

During times when outdoor air is warmer than indoor air, the sensible heat transfer will result in cooling the incoming air into the home. When the outdoor air is cooler than the indoor air, the sensible heat transfer will result in warming the incoming air into the home.

For ERVs only, when the outdoor absolute humidity is higher than the indoor humidity, the latent heat transfer will result in less humid incoming air as compared to an HRV core (still some moisture gain). When outdoor absolute humidity is lower than the indoor humidity, the latent heat transfer will result in more humid incoming air as compared to an HRV core.

Sensible (HRV) cores are typically made of materials that are impervious to moisture such as aluminum, steel, or plastic. Latent (ERV) cores are often made of material which allows moisture transfer from one air stream to the other without air leakage. In balanced ventilation, the exhaust air flow and the fresh air flow are essentially the same, thus having no impact on the indoor pressures.

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#### 2.2. Product Construction & Accessories

The Honeywell compact ventilator is comprised of the following components (also see exploded view in section 1.7):

- HRV Core / ERV Core
- Filters
- Variable-speed blower - 133mm
- Defrost Thermistor
- Snap-fit 5-inch Oval Plastic Duct Collars
- Access Door
- Fan speed controller (LVC)
- High voltage control board (HVC)
- Cabinet Housing
- Mounting Bracket
- ERV Drainless Kit
- 20-40-60 Minute Ventilation Timer
- Matrix Hood w/ transition kit
- Accessories

##### 2.2.1. HRV / ERV Core

The heat recovery (HRV) core is a cross flow heat exchanger constructed of polypropylene plastic. Minimal transfer of moisture, or mixing of air streams, takes place across the core. The energy recovery (ERV) core is a cross flow heat exchanger constructed of a moisture permeable layer sandwiched or staggered between aluminum layers. Transfer of both sensible heat (temperature exchange) and latent heat (moisture exchange) occurs between air streams. It is not recommended to install HRVs and ERVs unprotected into applications where risk of moisture freezing may occur.

The cores are removable through the front access door. Periodic cleaning is recommended to maintain maximum efficiency. Both HRV and ERV cores can be cleaned by using vacuum or warm water. All cores are labeled to indicate proper orientation in the housing. All cores are date coded for tracking purposes.

##### 2.2.2. Filters

Two washable filters are installed on each upstream side or face of the core to clean the air before it enters the core. Each filter is held in place by a track system built into the cabinet. Filters are nominally 5/8" thick.

##### 2.2.3. Variable Speed Blowers

Two variable-speed blower motors, one in each air stream, provide airflow across the core (upstream of the core) by forcing air through the HRV and ERV core. The AC blower motors allow for speed control through voltage variation and are programmable over a wide range of airflows.

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#### 2.2.4. Defrost Cycle

The ventilators are equipped with an automatic “supply fan shut down” defrost feature to eliminate any ice build up on the heat recovery core or energy recovery core. The automatic defrost cycle is initiated by a temperature sensor located in the fresh air intake. The exhaust fan speed is adjusted proportionally based on outdoor air temperature – low speed at cold temperatures -5°C (23°F) and high speed at very cold temperatures -20°C (-4°F) to ensure appropriate defrosting. When the temperature sensor measures -5°C (23°F), the ventilator will initiate a defrost cycle by turning off the supply fan while continuing to operate the exhaust fan proportionally based on the outdoor temperature.

A defrost cycle is automatically initiated once every hour based on a minimum outdoor temperature of -5°C (23°F). The defrost cycle consists of 5 minutes with the supply fan off, followed by 35 minutes of continuous normal operation. The cycle will automatically repeat as long as the outdoor temperature is -5°C (23°F) or colder. The actual speed of the exhaust fan during defrost is dependent on the speed setting for the Continuous ventilation mode.

#### 2.2.5. 5-inch Oval Plastic Duct Collars

The duct collars are designed in a two-piece configuration with integrated airflow measuring pressure taps: a 5-inch oval diameter plastic base (keeper) affixed to the metal cabinet and a 5-inch oval duct collar which snap-fits into the plastic keeper. This configuration permits easy flex duct (or rigid duct) assembly to collars and easy duct sealing during installation. Duct collars are constructed of polymer impact resistant plastic material (Styron 478-AMST).

#### 2.2.6. Access Door

The front access door is constructed of lightweight steel and powder-coated paint. The door is hinged on the bottom and latched on the sides which lets the door swing downward when opened. Additionally, the door is secured with two screws to the cabinet for shipping purposes – the screws are removed and disposed during installation. The door also has a recessed embossed area to accept the Honeywell logo label in the lower right-hand corner.

#### 2.2.7. Fan speed controller (Low Voltage Control)

The fan speed controller is mounted to the ventilator by an L-bracket which ships loose with the ventilator. At installation, the L-bracket is secured to the cabinet top between the front-facing duct collars and then the speed controller attaches to the L-bracket by key-way slots in the bracket.

The controller allows for 1) selection of ventilation modes and 2) blower speed selection to adjust continuous airflow rates and balance the ventilator. Selections are made via a 3-position slide switch. Adjustments are made via two momentary push buttons.

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**Ventilation mode:** OFF, CONT or INTER.

Off mode: The ventilator will remain off and will not respond to any ventilation request.

Continuous mode: The ventilator is powered and is continuously exchanging stale indoor air with fresh outdoor air on low speed ventilation, except when there is a request for high speed ventilation from a remote control.

Intermittent mode: The ventilator will remain off until there is a call for ventilation from a remote device. A call for ventilation will cause the ventilator to run at high or low speed for as long as the remote request is present.

**Speed Control or Balance mode:** Allows the contractor to set speed of the motors for balancing purposes.

Slide switch in bottom position: The speed of the fresh air motor (left) is adjusted by pressing either of the two momentary push button switches.

Slide switch in the top position: The speed of the exhaust air motor (right) is adjusted by pressing either of the two momentary push button switches.

Slide switch in the middle position: The fresh and stale air blower speeds are adjusted simultaneously.

**Programming Instructions:** for speed and balance adjustments.

- To enter program mode: Press both up and down buttons for 5 seconds. Program mode is activated when unit goes into high speed and indicator light changes to amber. In program mode, the slider switch becomes the motor selector for both motors. The bottom position selects the fresh air motor speed (left blower). The top position selects the stale air motor speed (right blower).
- To exit program mode: Leave ventilator alone for 5 minutes or press and release both the up and down buttons simultaneously.
- To increase or decrease fan speed: press and hold up or down button to continually change power to motor(s) or press and release up or down button to incrementally fine tune power to motor(s). Each blink of the LED indicates a speed change - there are a total of 30 speed levels available for each motor. A solid LED indicates upper or lower limits have been reached. Using the continuous adjustment method, the speed level will change one increment every 2 seconds.
- To lock program mode: Lock the programming section by exiting the program mode with the following sequence: Press and hold both up and down buttons until LED is green, then release.



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- To unlock program mode: Un-lock the programming section by exiting the program mode with the following sequence: Press and hold both up and down buttons until LED is green, then release.
- To Reset program to default factory setting: In continuous mode, press and hold both up and down buttons until the LED goes from Green to Amber and then Green again.

#### 2.2.8. High voltage control board (HVC)

The incoming power is routed through the high voltage control board located inside of the right motor mounting bracket (directly below the ventilator power receptacle). Power is distributed from the main board to the left blower motor and to the low voltage controller board. Honeywell approved, bilingual warning labels shall be affixed to both motor mounting brackets. – Ref section 3.10 Product Warning Requirements.

#### 2.2.9. Cabinet Housing

The cabinet housing is constructed of lightweight steel panels and is screwed fastened together. The cabinet strength shall allow for hanging and supporting of the cabinet. The cabinet shall be free of any sharp edges and burrs. Cabinet shall be insulated such that no condensation will form on cabinet exterior under conditions of -40°F outdoor air and 70°F indoor air; with ambient conditions at 70°F and 50% RH. The cabinet is provided with a drain feature to allow drainage of moisture within the ventilator.

#### 2.2.10. Wall Mounting Bracket

A ventilator mounting bracket is provided (22" long) which allows mounting the ventilator to the wall. The mounting bracket must be anchored to a minimum of two wall studs to ensure adequate hanging support of the ventilator. If two wall studs are not available, then use alternative support means such as a plywood board affixed to the wall, or a cross-member, to support the wall bracket - to be explained further in the installation manual. Alternatively, hanging straps (optional accessory) can be fastened to both ends of the ventilator which can then be suspended from the ceiling. The hanging straps are adjustable through a center pull-strap and dual cam-locking slide mechanisms. This permits height and leveling adjustments of the ventilator.

#### 2.2.11. ERV Drainless Kit

A drainless ERV option is available only for use in areas where the temperatures remain above freezing ( $\geq 32^{\circ}\text{F}$ ). A rubber cap-plug is provided in the ERV Installation kit which can be placed over the drain plug in lieu of the provided drain hose. See the Installation Manual for proper drainless drain-plug installation.

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#### 2.2.12. Ventilator 20-40-60 Minute Timer

A Honeywell 20-40-60 timer is available as an accessory or merchandise item, and will provide remote-control, high-speed ventilation for the designated time period selected. The timer is provided with a Honeywell face-plate, p/n 50057789-001. The timer is rated for 50mA @ 12 VDC; 100,000 cycles; and 95% relative humidity. Refer to wiring diagram section 3.11 for wiring diagram details.

#### 2.2.13. Matrix Hood with 5 to 6 inch Transition Kit

The Matrix hood is a one-hole venting solution through the envelope instead of the conventional two-hole venting solution. The two air streams are stacked together in an over-under configuration and pass through a single hole in the envelope. The Matrix hood operating limit is 115 CFM due to static pressure limitations and also the potential of cross-contaminations on both the supply and exhaust air. A galvanized 5-inch oval to 6-inch round transition kit is also provided with the matrix hood.

#### 2.2.14. Accessories

Accessories parts furnished:

Installation Kit:

- 4 oval 5-inch oval collars
- 1 Condensation Drain Line – ½" ID
- 1 Drain Adapter with nut & rubber gasket
- 12 hex-head screws (#10 x 1")
- 1 120 VAC power cord
- Drainless kit - rubber cap-plug (ERV-only)
- Wall mounting bracket

Product Literature

- Professional Installation Guide

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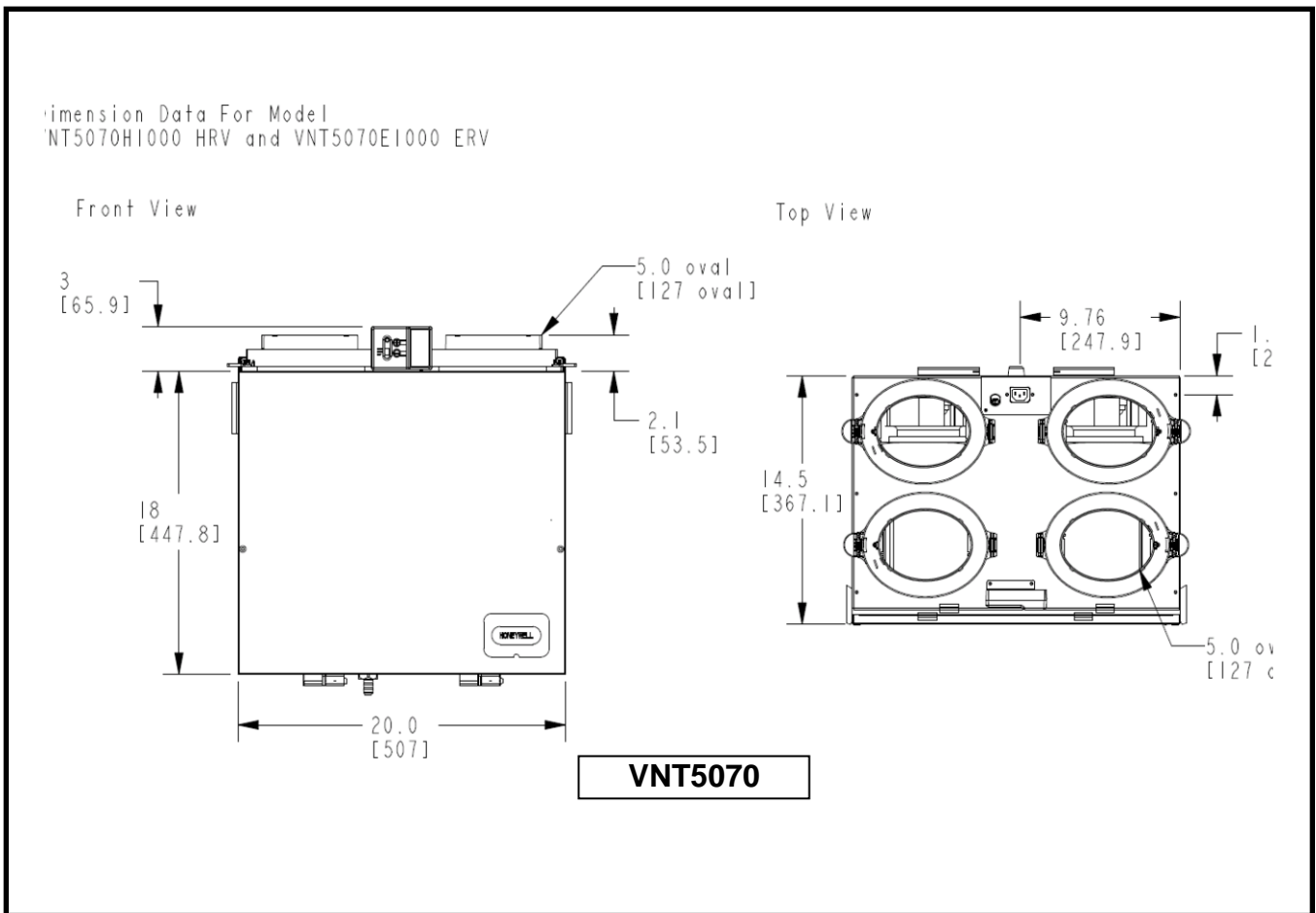
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#### 2.3. Product Dimensions

The dimensions provided below are relative to facing the front access door:

Honeywell OS #	Dimensions (Inches)		
	Length	Width	Height
VNT5070H1000	20	18	14.5
VNT5070E1000	20	18	14.5



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#### 2.4. Product Specification

MATERIAL SPECIFICATION / RATING	
Description	Specification
Steel thickness	0.036 (20 Gauge)
Paint Type	Powder-coat
Control Case	PS5540 Polystyrene, Rated UL94 HB
Blower Fans	PA 6/6 +30% GF, Rated UL94 V0
HRV Core	Corrugated Polypropylene, Rated UL94 HF-1
ERV Core	Aluminum sheet stacked cross flow to corrugated-aluminum-wrapped-in moisture-transfer-membrane.
Cabinet Liner	Molded Expanded Polystyrene (EP) Rated UL 94, HF-1
Door Insulation	Polyethylene Foam, Rated ASTM E84: Flame Spread: 25 / Smoke Development:47
Door Gasket	Closed-cell Polyolefin Foam; RoHS Compliant
Drain Fittings	PS5540 Polystyrene, Rated UL94 HB
Filters	Fiberbond Polyester material, UL Class 2 rated.
Plastic Collars	Styron 478-AMST Polymer, Rated UL94 HB
Hanging Straps & Capacity	Nylon 140 NP / 1", Chafe tab on ends of straps Break Strength: Average 360 Lbs +/- 15% Rings: steel / coating: copper (rust deterrent)
Mounting Bracket	0.036 (20 Gauge) Galvanized metal

ELECTRICAL SPECIFICATION	
Description	Specification
Electrical Connection – AC grounded power cord	18AWG / SJT / CSA/UL / 5 feet ± 3 inches / NEMA 5-15 plug
Electrical input Voltage	120 VAC / 60 Hz / 1-PH. Tolerance +10/- 15%
Electrical input Current	0.85 Amps Max.
Control circuit output voltage	5 VDC nominal
Motor Brand & Model	ECO-FIT / 2RREu15 192x40R code B16-A8
Motor rating *	Totally enclosed IP44 with thermal overload protection
Motor Operating Temp.	-40°F/ +122°F
Motor power consumption	33 Watts

\* Meets CSA 22.2 #113-10, clause 8.3.5 – Backup protection - totally enclosed motor.

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#### 2.5. Performance Specification

PERFORMANCE SPECIFICATION		
Honeywell OS #	VNT5070 H1000	VNT5070 E1000
HVI-certified	Yes	Yes
EPA Energy Star Tier 1 (1.0 CFM/Watt for Canada only.)	Yes	No
SRE @ 32°F (0°C) & 40 CFM* (H1000) SRE @ 32°F (0°C) & 41 CFM* (E1000)	64%	65%
SRE @ 32°F (0°C) & 65 CFM* (H1000) SRE @ 32°F (0°C) & 64 CFM* (E1000)	59%	64%
SRE @ (-13°F (H1000) +5°F (E1000)) *	55%	54%
TRE @ 95°F & 41 CFM*	N/A	43%
Core Type	Cross-flow (Sensible)	Cross-flow (Enthalpic)
Core Size (in.)	10"x10"x9"	10"x10"x9"
Exhaust Air Transfer Ratio @ 0.4 IWC	1.0%	1.1%
Airflow Range (CFM)	0 to 100 CFM	0 to 100 CFM
Net Supply Airflow @ 0.20 IWC (CFM)	93	97
Net Supply Airflow @ 0.40 IWC (CFM)	75	80
Net Supply Airflow @ 0.60 IWC (CFM)	56	62
Airflow Curves	See Appdx.	See Appdx.
Operating Ambient Temp. Range **	34° to 140° F	34° to 140° F
Operating Humidity Range (%RH)	95	95
Storage / Shipping Temp. Range	-30° to 150° F	-30° to 150° F
Ventilator weight (lbs.)	32.5	33.25
Box shipping weight. (lbs.)	40	40.75
Box Dimensions (L x W x H inches)	23.5x16.25x21.5	23.5x16.25x21.5
Units per pallet	3	3
Palletized shipping weight (lbs)	147	149.25
Ship Pallet Dimensions (L x W x H inches)	40x32x27.5	40x32x27.5

\*Tested per CSA C439 and listed in HVI 911 directory.

\*\* NOTE: Installation of HRV/ERV is not recommended in unconditioned spaces (attic or crawlspace). The unconditioned space temperature must always be above 0°C (32°F). Installation in unconditioned spaces requires all ducts to be fully insulated.

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### 3. Product Requirements

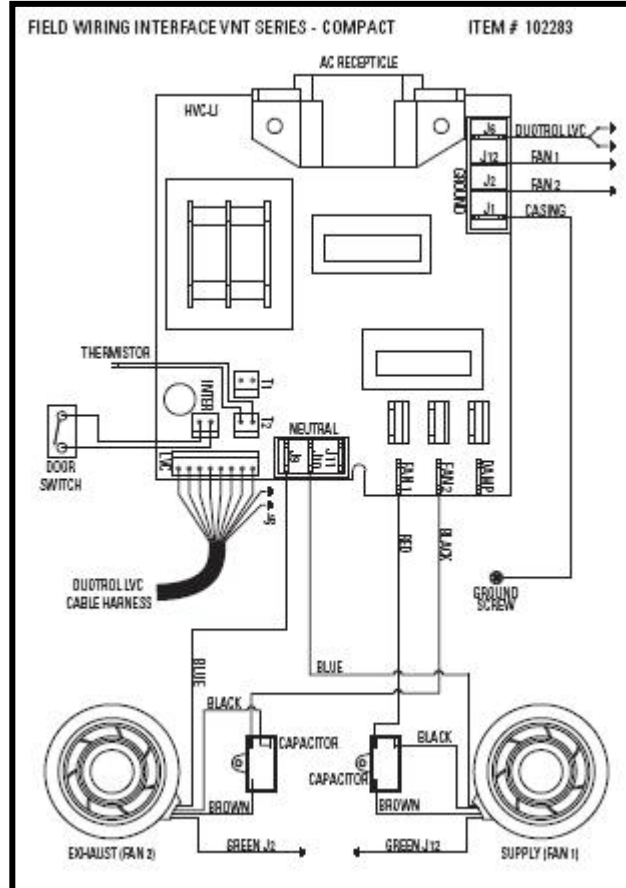
#### 3.1. Product Wiring & Control

##### Ventilator Power

Honeywell ventilators are rated at 120VAC, 60Hz, 0.85 Amps (maximum) power requirements. The ventilator is powered by a 5-foot (nominal) power cord, 18AWG wire with NEMA 15-5 receptacle plug. A dedicated 120 VAC receptacle near the ventilator is recommended; use of extensions cords is not recommended.

##### Blower Motor Wiring Diagram

The high-voltage (120 VAC) board is located behind the motor mount panel and is accessed with a Phillips #2 screwdriver. The blower motor wiring diagram is also located inside the HVC enclosure (shown below).



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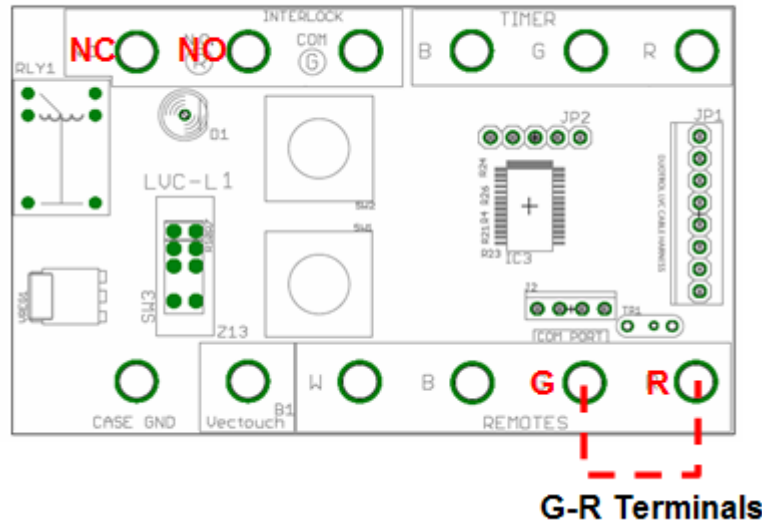
#### VNT5070 series Blower Motor Wiring Diagram

#### Remote Control - Low Voltage Wiring

The ventilator can be wired externally to low-voltage devices such as thermostats, controllers, dehumidistats, boost controls, etc. allowing for remote control of the ventilator.

Ventilator modes and functions are shown in speed controller diagram and described in the table below:

#### Interlock Terminals



Ventilator Modes	G-R terminals Open – No Call	G-R terminals Shorted – Vent Call
<b>CONT Mode</b>	BALANCED (LO)-speed	HI-speed
	Interlock terminals: NO = ○ (open) NC = ● (closed)	Interlock terminals: NO = ○ (open) NC = ● (closed)
<b>INT Mode</b>	STANDBY mode	HI-speed
	Interlock terminals: NO = ○ (open) NC = ● (closed)	Interlock terminals: NO = ● (closed) NC = ○ (open)
<b>OFF</b>	OFF	OFF

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**CONT mode** - a ventilation call from a wall control boosts the ventilator from low speed to high speed.

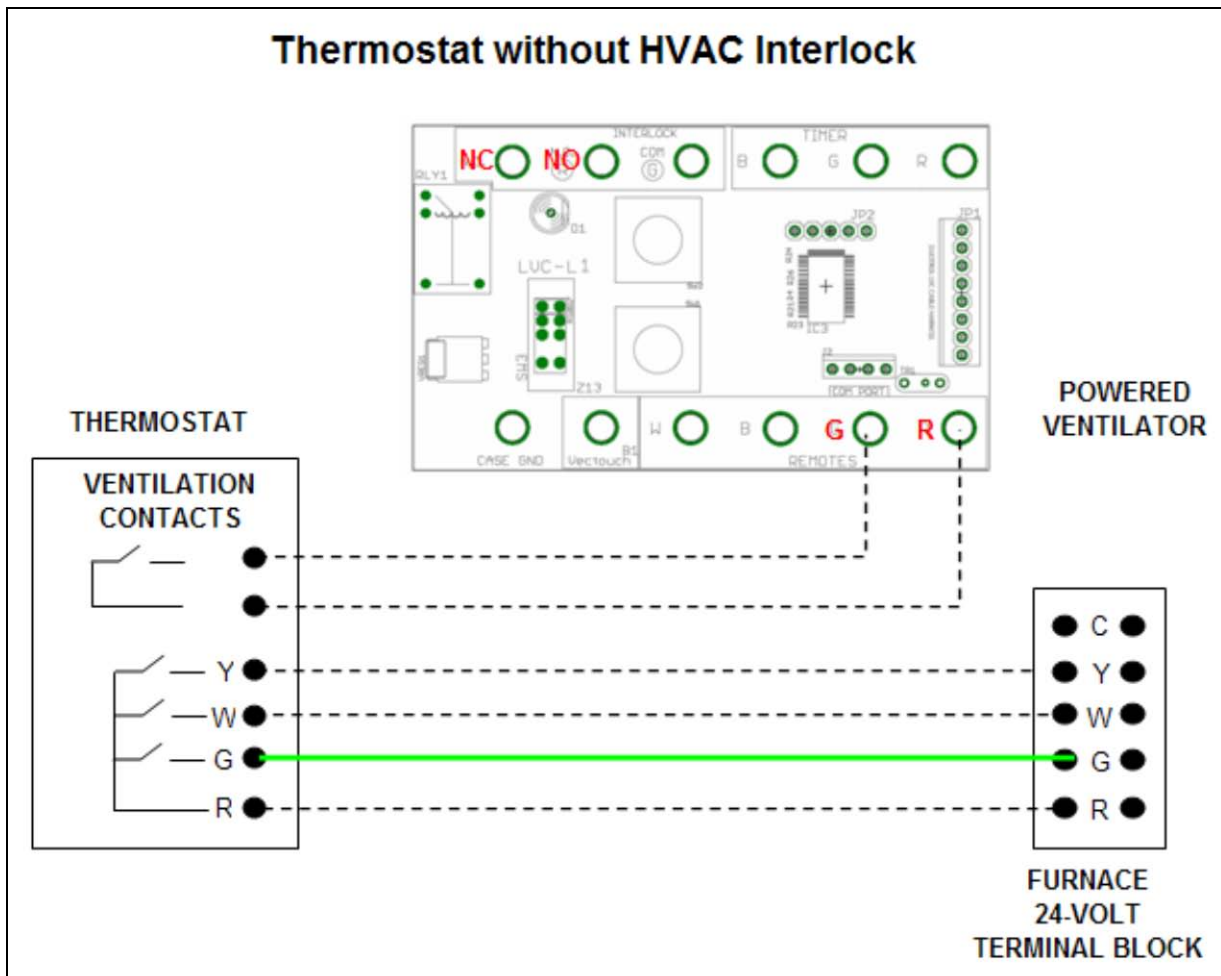
- Interlock panel NO-COM relay contacts are always closed, i.e. continuously calling forced air furnace blower.

**INT mode** - a ventilation call from a wall control turns the ventilator ON to HI-speed.

- Interlock panel NC-COM relay contacts are closed in OFF position.
- Interlock panel NO-COM relay contacts are closed in HI-speed position.

#### 1) Wiring Diagram - without HVAC Interlocked

The ventilator is **NOT** interlocked with any HVAC equipment (e.g. dedicated duct system) and is used in conjunction with a conventional HEAT/COOL thermostat (or other wall control) with ventilation contacts. Ventilator mode: INT.





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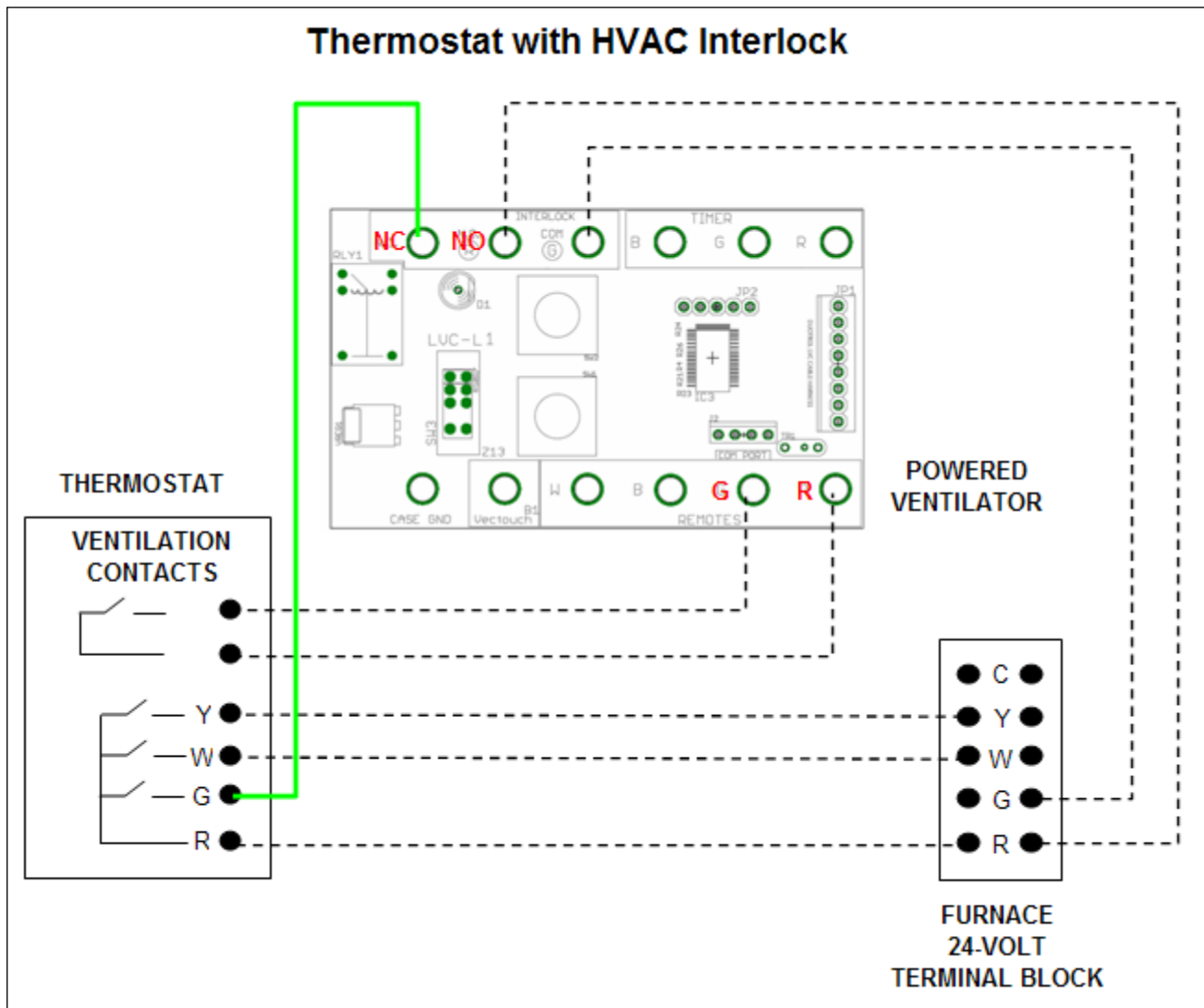
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#### 2) Wiring Diagram – HVAC Interlocked:

The ventilator **IS** interlocked with the forced air system and is used in conjunction with a conventional HEAT/COOL thermostat (or other wall control) with ventilation contacts. Ventilator mode: INT.

In normal operation, a fan demand from the wall control (thermostat) will pass through the ventilator NC terminal and continue to the HVAC G terminal, thereby turning on the HVAC fan.

When the ventilator is activated, a relay opens the NC connection to the thermostat and closes the NO connection on the ventilator. This creates a new circuit from the HVAC R terminal to the HVAC G terminal, thereby turning on the HVAC fan.



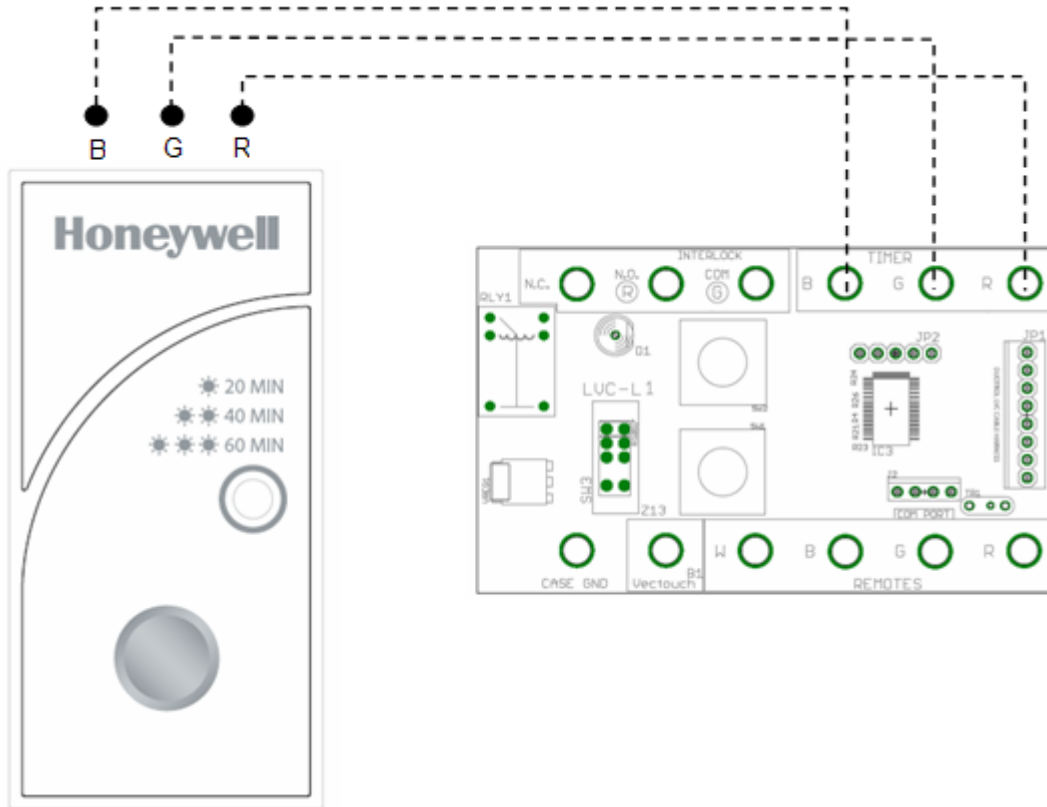
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#### 3) Honeywell 20-40-60 Timer Control Wiring

The Honeywell 20-40-60 remote timer control temporarily provides high-speed ventilation for a designated time period.



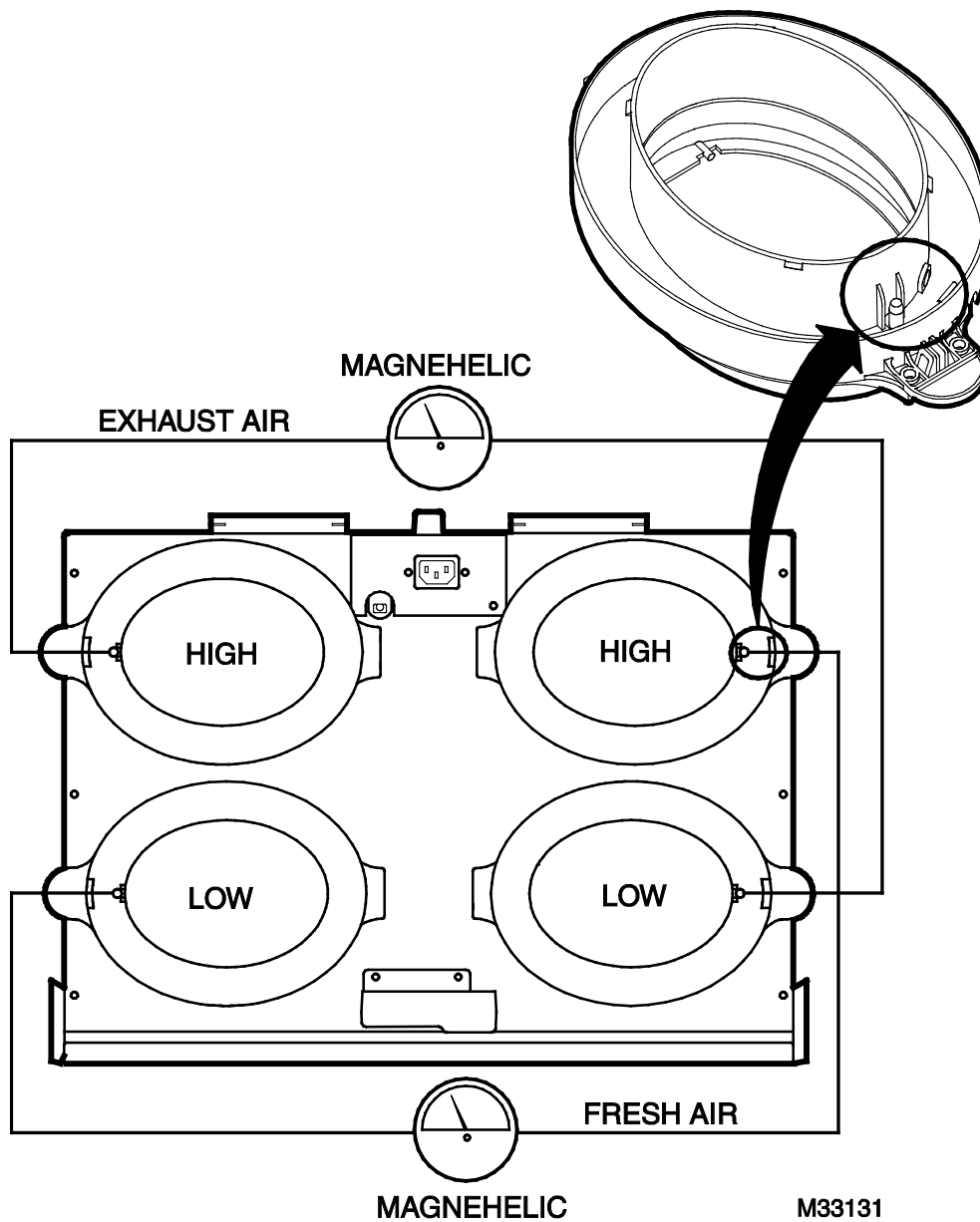
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#### 3.2. Airflow Balancing

The VNT5070 ventilators are provided with pressure ports located on the duct collars and are used to balance the ventilator during installation. Pressure measurements are made across the high and low ports of each airstream (Fresh & Exhaust) and then compared to an airflow correlation table (decal on the unit) to find the corresponding air flow rates.



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Pressure/Pression		Fresh Air / Air Frais		Exhaust Air / Air Vicié	
Pa	In. WG	L/s	CFM/PCM	L/s	CFM/PCM
50	0.20	44	93	43	90
62	0.25	41	87	40	85
75	0.30	39	83	37	79
87	0.35	37	79	36	77
100	0.40	35	74	36	76
112	0.45	33	69	34	71
125	0.50	30	65	32	67
137	0.55	29	61	28	60
150	0.60	26	56	24	51
162	0.65	24	50	22	47
175	0.70	22	46	19	41
187	0.75	19	41	17	36
199	0.80	17	36	15	31