WALL MOUNT ENERGY RECOVERY VENTILATOR WITH EXHAUST AND OUTDOOR AIR SHUT-OFF DAMPER

Models:
WERVPA5  WERVPC5

For Use With Bard 3.5 – 6 Ton Wall Mount Air Conditioners and Heat Pumps
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WALL MOUNT ENERGY RECOVERY VENTILATOR MODEL NOMENCLATURE

**GENERAL DESCRIPTION**

The Wall Mount Energy Recovery Ventilator was designed to provide energy efficient, cost effective ventilation to meet IAQ (Indoor Air Quality) requirements while still maintaining good indoor comfort and humidity control for a variety of applications such as schools, classrooms, lounges, conference rooms, beauty salons and others. It provides a constant supply of fresh air for control of airborne pollutants including CO\(_2\), smoke, radon, formaldehyde, excess moisture, virus and bacteria.

The ventilator incorporates patented rotary heat exchanger technology to remove both heat and moisture. It is designed as a single package which can be easily factory or field installed for new installations or retrofit to the new Bard W series wall-mounted units. The package consists of a unique rotary Energy Recovery Cassette that can be easily removed for cleaning or maintenance. The WERV\*5 has two 15" diameter heat transfer wheels for efficient heat transfer. The heat transfer wheels use a permanently bonded dry desiccant coating for total heat recovery. An outdoor air shutoff damper is an integral feature of the WERV and prevents infiltration when the ERV is turned off.

Ventilation is accomplished with two blower/motor assemblies each consisting of a drive motor and dual blowers for maximum ventilation at low sound levels. The intake and exhaust blowers can be operated at the same speed (airflow rate) or different speeds to allow flexibility in maintaining desired building pressurization conditions. Factory shipped on medium intake and low exhaust. See Figure 8 on page 13 to change speeds. The rotating energy wheels provide the heat transfer effectively during both summer and winter conditions. Provides required ventilation to meet the requirements of ASHRAE 62.1 standard.

**NOTE:** During operation below 5°F outdoor temperature, freezing of moisture in the heat transfer wheel can occur. Consult the factory if this possibility exists.

**ELECTRICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage</th>
<th>Amps</th>
<th>Control Voltage</th>
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</thead>
<tbody>
<tr>
<td>WERVPA5</td>
<td>230/208</td>
<td>2.2</td>
<td>24V</td>
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<tr>
<td>WERVPC5</td>
<td>460</td>
<td>1.2</td>
<td>24V</td>
</tr>
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</table>

**GENERAL INFORMATION**

**NOTE:** This manual covers both factory- and field-installed WERV\* assemblies. For factory-installed WERV\*, skip information pertaining to installation of the WERV\* system.

The ventilator should only be installed by a trained heating and air conditioning technician. These instructions serve as a guide to the technician installing the ventilator package. They are not intended as a step-by-step procedure with which the mechanically inclined owner can install the package. The ventilator housing is shipped in one carton which contains the following:

- Energy recovery ventilator
- Service door
- Rain hood and mist eliminator
- Installation instructions

**UNPACKING**

Upon receipt of the equipment, be sure to compare the model number found on the shipping label with the accessory identification information on the ordering and shipping document to verify that the correct accessory has been shipped.

Inspect the carton housing of each ventilator as it is received and before signing the freight bill, verify that all items have been received and that there is no visible damage. Note any shortages or damage on all copies of the freight bill. The receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent. Concealed damage not discovered until after loading must be reported to the carrier within 15 days of its receipt.
### PERFORMANCE AND APPLICATION DATA – WERVP*5

#### Summer Cooling Performance
(Indoor Design Conditions 75°F/DB/62°WB)

<table>
<thead>
<tr>
<th>Ambient OD</th>
<th>Ventilation Rate 450 CFM</th>
<th>Ventilation Rate 375 CFM</th>
<th>Ventilation Rate 300 CFM</th>
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<tbody>
<tr>
<td></td>
<td>DB/°F</td>
<td>VLT</td>
<td>VLS</td>
</tr>
<tr>
<td>105</td>
<td>75</td>
<td>21465</td>
<td>14580</td>
</tr>
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<td></td>
<td>70</td>
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<td>14580</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>14580</td>
<td>14580</td>
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</tbody>
</table>

#### Winter Heating Performance
(Indoor Design Conditions 70°F DB)

<table>
<thead>
<tr>
<th>Ambient OD</th>
<th>Ventilation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>450 CFM</td>
</tr>
<tr>
<td></td>
<td>DB/°F</td>
</tr>
<tr>
<td>65</td>
<td>2430</td>
</tr>
<tr>
<td>75</td>
<td>4860</td>
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<td>65</td>
<td>5720</td>
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<tr>
<td>70</td>
<td>9720</td>
</tr>
<tr>
<td>45</td>
<td>14580</td>
</tr>
<tr>
<td>35</td>
<td>17010</td>
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<td>30</td>
<td>19440</td>
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<tr>
<td>25</td>
<td>21870</td>
</tr>
<tr>
<td>20</td>
<td>24300</td>
</tr>
<tr>
<td>15</td>
<td>26730</td>
</tr>
</tbody>
</table>

**LEGEND:**
- VLT = Ventilation Load – Total
- VLS = Ventilation Load – Sensible
- VLL = Ventilation Load – Latent
- HRT = Heat Recovery – Total
- HRS = Heat Recovery – Sensible
- HRL = Heat Recovery – Latent
- WVL = Winter Ventilation Load
- WHR = Winter Heat Recovery

**NOTE:** All performance data is based on operating intake and exhaust blower on the same speed.

**NOTE:** Sensible performance only is shown for winter application.
BASIC FIELD INSTALLATION

1. Unpack the ventilator assembly which includes the integral ventilator with attached electrical harness and miscellaneous hardware.

**WARNING**

Open and lock unit disconnect switch before installing this accessory to prevent injury or death due to electrical shock or contact with moving parts. Turn thermostat to OFF.

2. Remove exhaust blower assembly from back of ventilator and discard shipping plate (see Figure 1).

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![FIGURE 1](image)

Remove Blower Assembly and Discard Shipping Plate

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<table>
<thead>
<tr>
<th>Model</th>
<th>For Use With the Following Units</th>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>WERVPC5</td>
<td>W42AA/W42HA-C, W48AA/W48HA-C, W60AA/W60HA-C, W72AB-C</td>
<td>460 - 3 phase</td>
</tr>
</tbody>
</table>

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**CAUTION**

Be sure the correct model and voltage energy recovery ventilator is used with the correct air conditioner or heat pump to ensure correct voltage compatibility.
3. Disconnect unit power.

4. Remove the existing exterior filter access and service access panels on the Bard wall mount unit (see Figure 2). Save the filter access panel and discard service access panel.

FIGURE 2
Remove Access Panels
5. Remove and save existing unit air filter (see Figure 3). Remove and discard the exhaust cover plate and remove center screw from condenser grille.

FIGURE 3
Remove Air Filter and Exhaust Cover Plate
6. Install exhaust blower assembly in exhaust opening as shown in Figure 4 and secure with four (4) screws. Position 4-pin connector so it is accessible.

7. Install ventilator into the unit to the left side. Once the ventilator is fully inserted, slide the ventilator to the right until it is tight against the back of the control panel (see Figure 5).

**IMPORTANT NOTE:** Position front lip of ventilator over front grille and on top of condenser partition (see Figure 5 inset). This is important to insure proper drainage of any water entering damper assembly.

8. Remove access panel and plug in exhaust blower as shown in Figure 5. Replace access panel.

9. Remove outer and inner control panel covers. Ensure all power is OFF prior to opening the control panel.

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**FIGURE 4**

Install Exhaust Blower Assembly

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INSTALL FILL PLATE
(LINE UP WITH EXISTING HOLES IN CONDENSER PARTITION)

INSERT LOWER BLOWER ASSEMBLY THROUGH FILL PLATE WITH 45° MITERED CORNER FACING CONDENSER AND ATTACH USING (4) SCREWS
10. Remove female plug of high voltage wiring harness (3-pin plug) from the heat recovery assembly and snap into the unit control panel (from inside control panel) in the hole provided. Wire to top of compressor contactor per wiring diagram (see Figure 6 on page 9). Connect high voltage plugs back together (see Figure 5).

FIGURE 5
Plug Exhaust Blower Into Control Panel

CAUTION: HOLE IN WERV MUST BE USED TO INSURE CLEARANCE FROM CONDENSER COIL TUBING

WHEN INSTALLING WERV POSITION SO THAT HOLE IN FROM LIP IS CENTERED OVER HOLE IN CONDENSER GRILLE TO INSERT A SELF DRILLING SCREW

SERVICE DOOR

HEAT RECOVERY VENTILATOR

CONDENSER PARTITION

LIP OF ERV IS TO BE BETWEEN THE CONDENSER GRILL AND SERVICE DOOR

FRONT GRILLE

SIDE SECTION VIEW

MIS-3747
11. Plug low voltage plug (12-pin plug) from the heat recovery unit into the front side of the control panel (see Figures 5 and 6).

**NOTE:** These 24 volt control wires control the starting and stopping of the energy recovery ventilator and can be independently controlled by an energy management control or timer. See section on Control Wiring on page 12 for suggested control schemes.
12. Replace inner and outer control panel covers.

13. Ventilator checkout
   A. Resupply power to unit.
   B. Energize the “A” occupancy 24 volt signal on the low voltage terminal strip (jumper “R” to “A”).
   C. Ventilator heat transfer wheels should rotate slowly (49 RPM). Intake and exhaust blowers should run and indoor comfort blowers should run.
   D. De-energize the “A” terminal. The energy recovery wheels, fresh air, exhaust air and indoor comfort blowers should stop.
   E. This completes ventilator checkout.

14. Re-install the blower access and filter access panels at top of unit and secure with sheet metal screws.

15. Replace the vent option access panel with the new panel provided. Attach air intake hood with screws provided (see Figure 7). Be sure to insert the top flange of the air intake hood into and through the slot in the service door and between the door and insulation to prevent bowing of the door.

16. Apply Certification label, included with installation instructions, next to unit serial plate.

17. Ventilator is now ready for operation.

FIGURE 7
Attach Hood and Replace Access Panel
BASIC INSTALLATION
(Factory-Installed Versions)

1. Remove blower access door and service door.
   Room filter located above air circulation blower.
   Install filter.

2. Remove and install air intake hood (see Step 15 of
   Basic Field Installation on page 11).

3. Refer to Control Wiring section for suggested
   control schemes for the WERVP.

4. After wiring, replace all panels.

CONTROL WIRING

The WERVP comes from the factory with the low
voltage control wires connected to the wall mount
low voltage terminal strip. Care must be taken when
deciding how to control the operation of the ventilator.
When designing the control circuit for the ventilator,
the following requirements must be met.

Control Requirements

1. Indoor blower motor must be run whenever the
   WERVP is run.

2. Select the correct motor speed tap in the WERVP.
   Using Table 1, determine the motor speed needed
to get the desired amount of ventilation air needed.
   For instance, do not use the high speed tap on
   a WERVPA5 if only 300 CFM of ventilation air is
   needed. Use the low speed tap instead. Using the
   high speed tap would serve no useful purpose and
   significantly affect the overall efficiency of the air
   conditioning system. System operating cost would
   also increase.

3. Run the WERVP only during periods when the
   conditioned space is occupied. Running the
   WERVP during unoccupied periods wastes energy,
decreases the expected life of the WERVP and can
result in a large moisture buildup in the structure.
The WERVP removes 60-70% of the moisture in
the incoming air, not 100% of it. Running the
WERVP when the structure is unoccupied allows
moisture to build up in the structure because
there is little or no cooling load. Thus, the air
conditioner is not running enough to remove the
excess moisture being brought in.

   TABLE 1
   Ventilation Air (CFM)

<table>
<thead>
<tr>
<th>Model</th>
<th>High Speed (Black)</th>
<th>Medium Speed (Blue)</th>
<th>Low Speed (Red)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WERVPA5</td>
<td>450</td>
<td>375</td>
<td>300</td>
</tr>
<tr>
<td>WERVPC5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recommended Control Sequences

Several possible control scenarios are listed below:

1. Use a programmable electronic thermostat with
   auxiliary terminal to control the WERVP based
   on daily programmed occupancy periods. Bard
   markets and recommends Bard Part No. 8403-
   060 programmable electronic thermostat for air
   conditioner and heat pump applications (see Figure
   10 on page 14).

2. Use a CO₂ sensor in conjunction with a mechanical
   thermostat to keep CO₂ at required levels. Bard
   recommends using Bard CO₂ controller 8403-067
   (see Figure 11 on page 15).

3. Use a motion sensor in conjunction with a
   mechanical thermostat to determine occupancy
   in the structure. Bard recommends Bard Model
   CS9B*-**** CompleteStat for this application (see
   Figure 11 on page 15).

4. Use a DDC control system to control the WERVP
   based on a room occupancy schedule to control
   the WERVP.

5. Tie the operation of the WERVP into the light
   switch. The lights in a room are usually on only
   when occupied.

6. Use a manual timer that the occupants turn to
   energize the WERVP for a specific number of hours.

7. Use a programmable mechanical timer to energize
   the WERVP and indoor blower during occupied
   periods of the day.

important

Operating the WERVP during unoccupied
periods can result in a buildup of moisture
in the structure.
VENTILATION AIRFLOW

The WERVPA5 and WERVPC5 are equipped with a 3-speed motor to provide the capability of adjusting the ventilation rates to the requirements of the specific application by changing motor speeds (see Table 1).

![WARNING]

Open disconnect to shut all power OFF before changing motor speeds. Failure to do so could result in injury or death due to electrical shock.

The units are set from the factory with the exhaust blower on the low speed and the intake blower on medium speed. Moving the speed taps located in the control panel can change the blower speed of the intake and exhaust (see Figure 8).

**FIGURE 8**

Speed Tap Label

1. Disconnect power to unit
2. Remove ERY control panel cover
3. Move black insulator to desired speed on terminal connector

**FIGURE 9**

Airflow Diagram
FIGURE 10
Heat Pump Wiring

1. Program thermostat for continuous blower during occupied periods.
2. Only needed if dehumidification is used.
3. Install jumper between "G" and "A" only when thermostat without "occupancy signal" is used. ERV will operate when blower is energized.
4. Factory installed jumper. Remove jumper and connect to N.C fire alarm circuit if emergency shutdown required.

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FIGURE 11
Heat Pump Wiring With CO₂ Controller and CompleteStat

1. Thermostat With Humidity
   Part #8403-060
   Optional CO Controller
   Bard part #8403-067

   24 VAC INPUT
   CO2 OUTPUT
   TEMP. OUTPUT

Wall Mount Heat Pump

1. ONLY NEEDED IF DEHUMIDIFICATION IS USED
2. FACTORY INSTALLED JUMPER. REMOVE JUMPER AND CONNECT TO N.C FIRE ALARM CIRCUIT IF EMERGENCY SHUTDOWN REQUIRED.

MIS-3752
ENERGY RECOVERY VENTILATOR
MAINTENANCE

General Information
The ability to clean exposed surfaces within air moving systems is an important design consideration for the maintenance of system performance and air quality. The need for periodic cleaning will be a function of operating schedule, climate and contaminants in the indoor air being exhausted and in the outdoor air being supplied to the building. All components exposed to the airstream, including energy recovery wheels, may require cleaning in most applications.

Rotary counterflow heat exchanges (heat wheels) with laminar airflow are “self-cleaning” with respect to dry particles. Smaller particles pass through; larger particles land on the surface and are blown clear as the flow direction is reversed. For this reason, the primary need for cleaning is to remove films of oil-based aerosols that have condensed on energy transfer surfaces. Buildup of material over time may eventually reduce airflow. Most importantly, in the case of desiccant-coated (enthalpy) wheels, such films can close off micron-sized pores at the surface of the desiccant material, reducing the efficiency with which the desiccant can absorb and desorb moisture.

Frequency
In a reasonably clean indoor environment such as a school, office building or home, experience shows that reductions of airflow or loss of sensible (temperature) effectiveness may not occur for 10 or more years. However, experience also shows that measurable changes in latent energy (water vapor) transfer can occur in shorter periods of time in commercial, institutional and residential applications experiencing moderate occupant smoking or with cooking facilities. In applications experiencing unusually high levels of occupant smoking, such as smoking lounges, nightclubs, bars and restaurants, washing of energy transfer surfaces, as frequently as every 6 months, may be necessary to maintain latent transfer efficiency.

Cleanability and Performance
In order to maintain energy recovery ventilation systems, energy transfer surfaces must be accessible for washing to remove oils, grease, tars and dirt that can impede performance or generate odors. Washing of the desiccant surfaces is required to remove contaminant buildups that can reduce absorption of water molecules. The continued ability of an enthalpy wheel to transfer latent energy depends upon the permanence of the bond between the desiccant and the energy transfer surfaces.

Bard wheels feature silica gel desiccant permanently bonded to the heat exchange surface without adhesives; the desiccant will not be lost in the washing process. Proper cleaning of the Bard energy recovery wheel will restore latent effectiveness to near original performance.

Maintenance Procedures

NOTE: Local conditions can vary and affect the required time between routine maintenance procedures; therefore, all sites (or specific units at a site) may not have the same schedule to maintain acceptable performance. The following timetables are recommended and can be altered based on local experience.

Quarterly Maintenance
1. Inspect mist eliminator/prefilter and clean if necessary. This filter is located in the fresh air intake hood on the front of the unit. This is an aluminum mesh filter and can be cleaned with water and any detergent not harmful to aluminum.
2. Inspect wall mount unit filter and clean or replace as necessary. This filter is located either in the unit, in a return air filter grille assembly or both. If in the unit it can be accessed by removing the lower service door on the front of the unit. If in a return air filter grille, by hinging the grille open to gain access.
3. Inspect energy recovery ventilator for proper wheel rotation and dirt buildup. This can be done in conjunction with Item 2 above. Energize the energy recovery ventilator after inspecting the filter and observe for proper rotation and/or dirt buildup.
4. Recommended energy recovery wheel cleaning procedures follow: Disconnect all power to unit. Remove the lower service door of the wall mount unit to gain access to the energy recovery ventilator.
5. Remove the front access panel on the ventilator. Unplug amp connectors to cassette motors. Slide energy recovery cassette out of ventilator.
6. Use a shop vacuum with brush attachment to clean both sides of the energy recovery wheels.
7. Reverse shop vacuum to use as a blower and blow out any residual dry debris from the wheel.

NOTE: Discoloration and staining of the wheel does not affect its performance. Only excessive buildup of foreign material needs to be removed.
8. If any belt chirping or squealing noise is present, apply a small amount of LPS-1 or equivalent dry film lubricant to the belt.

Annual Maintenance

1. Inspect and conduct the same procedures as outlined under Quarterly Maintenance.

2. To maintain peak latent (moisture) removal capacity, it is recommended that the energy recovery wheels be sprayed with a diluted nonacid-based evaporator coil cleaner or alkaline detergent solution such as 409.

NOTE: Do not use acid-based cleaners, aromatic solvents, temperatures in excess of 170°F or steam. Damage to the wheel may result.

Do not disassemble and immerse the entire heat wheel in a soaking solution, as bearing and other damage may result.

3. Rinse wheel thoroughly after application of the cleaning solution and allow to drain before reinstalling.

4. No re-lubrication is required to heat wheel bearings of the drive motor, or to the intake and exhaust blower motors.

5. If any belt chirping or squealing noise is present, apply a small amount of LPS-1 or equivalent dry film lubricant to the belt.
FIGURE 13
Hub Assembly with Ball Bearings

- Screw #6 x 32 x 3/4
- Dust Cover
- Screw #10 x 32
- Washer
- Nut #10 x 24
- Spacers
- Hub Plate
- Bearing
- Heat Exchanger Wheel
- Hub Plate with Bolts
- Shaft (oil with 20 wt. non detergent oil)
- Lock Washer
- Nut 1/4 x 20