INSTALLATION INSTRUCTIONS

WALL MOUNT ENERGY RECOVERY VENTILATOR WITH EXHAUST

Models:
WERV-A2B
WERV-A3B
WERV-C2B
WERV-C3B

For Use With Bard 1-1/2 Thru 3 Ton Wall Mount™ Air Conditioners and Heat Pumps

Bard Manufacturing Company
Bryan, OH 43506
Since 1914. . .Moving ahead, just as planned.

Manual: 2100-307B
Supersedes: 2100-307A
File: Volume III, Tab 19
Date: 12-01-03
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:

1. Energy Recovery Ventilator
2. Service Door
3. Rain Hood and Mist Eliminator
4. 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.

The Wall Mount Energy Recovery Ventilator was designed to provide energy efficient, cost effective ventilation to meet I.A.Q. (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 CO₂, smoke, radon, formaldehyde, excess moisture, virus and bacteria.

The ventilator incorporates patented rotary heat exchanger 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 WA and WH 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-3B has two 13 inch diameter heat transfer wheels, and the WERV-2B has one 13 inch wheel for efficient heat transfer. The heat transfer wheels use a permanently bonded dry desiccant coating for total heat recovery.

Ventilation is accomplished with (2) blower/motor assemblies each consisting of a drive motor and dual blowers for maximum ventilation at low sound levels. Air is exhausted at the same rate that fresh air is brought into the structure thus not pressuring the building. The rotating energy wheels provide the heat transfer effectively during both summer and winter conditions. Provides required ventilation to meet the requirements of ASHRAE 62-1989 standard.

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

### ELECTRICAL SPECIFICATIONS

<table>
<thead>
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<th>Voltage</th>
<th>Amps</th>
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### GENERAL INFORMATION

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### GENERAL DESCRIPTION

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### PERFORMANCE AND APPLICATION DATA – WERV-*2B

#### SUMMER COOLING PERFORMANCE
**INDOOR DESIGN CONDITIONS 75°DB/62°WB**

<table>
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<tr>
<th>Ambient O.D.</th>
<th>VENTILATION RATE 250CFM 62% Efficiency</th>
<th>VENTILATION RATE 225 CFM 63% Efficiency</th>
<th>VENTILATION RATE 200 CFM 63% Efficiency</th>
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**LEGEND:**
- VLT = Ventilation Load – Total
- VLS = Ventilation Load – Sensible
- VLL = Ventilation Load – Latent
- HRT = Heat Recover – Total
- HRS = Heat Recovery – Sensible
- HRL = Heat Recovery – Latent
- WVL = Winter Ventilation Load
- WHR = Winter Heat Recovery

#### WINTER HEATING PERFORMANCE
**INDOOR DESIGN CONDITIONS 70° F DB**

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<th>Ambient O.D.</th>
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**Manual 2100-307**
Page 2
## PERFORMANCE AND APPLICATION DATA

### SUMMER COOLING PERFORMANCE

#### (INDOOR DESIGN CONDITIONS 75°F/62°F WB)

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<th>VENTILATION RATE</th>
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BASIC INSTALLATION (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.

**CAUTION**

Be sure the correct model and voltage Energy Recovery Ventilator is used with the correct air conditioner or heat pump to insure correct voltage compatibility.

2. Remove the existing exterior blower access and service access panels on the Bard Wall Mount unit. Save the blower access panel and discard service access panel. (See Figure 1.)

3. Remove and save existing unit return air filter and left side filter support bracket by removing two screws from left side of unit. Remove and save top four (4) screws from front grille. (See Figure 2.)

4. Remove and discard the exhaust cover plate. (See Figure 2.)

5. Install ventilator by inserting the ventilator into the unit to the far left side clearing the right filter bracket. 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 3.)

**IMPORTANT NOTE:** Position front lip of ventilator under front grille and on top of condenser partition. (See Figure 3 inset.) This is important to ensure proper drainage of any water entering damper assembly.

6. Open control panel to gain access to unit low voltage terminal block. (Insure all power is OFF prior to opening the control panel.)

7. Route two (2) low voltage electrical leads through the 7/8" bushing in control panel (Figure 3) into low voltage box.

8. Temporarily connect leads with fork terminal to corresponding points on terminal strip to terminals C and C. (See Figure 4 on Page 7 and wiring diagram.)

**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 separate section on Control Wiring.

9. Remove female plug of high voltage wiring harness from the heat recover assembly and snap into unit control panel from the inside of the control panel in the hole provided. Wire to terminal block. (See Figure 4 and wiring diagram.)

10. Plug male plug from WERV assembly into female connector at back of control panel. (See Figures 3 and 4.)

11. Replace inner and outer control panel cover.

12. Ventilator checkout
   
   A. Resupply power to unit.
   
   B. Energize the evaporator blower by switching thermostat to the manual fan position with Heat/Cool in OFF position.
   
   C. Ventilator heat transfer wheels should rotate slowly (49 RPM). Intake and exhaust blowers should run.
   
   D. De-energize the evaporator blower. Energy recovery heat transfer wheels and fresh air and exhaust air blowers should stop.
   
   E. This completes ventilator checkout.

14. Disconnect the wires temporarily connected in Step 8.

15. Reinstall the blower access panel at top of unit and secure with sheet metal screws.

16. Replace the lower service access panel with the new panel provided. Attach air intake hood with screws provided. (See Figure 5.) Be sure to insert the top flange of the air intake hood into and through the slot in the service door and
BASIC INSTALLATION (FACTORY INSTALLED MODELS)

1. Remove blower access door and service door. Room filter located above air circulation blowers. Install filter. Remove filter bracket from shipping location and install on left side.

2. Remove air intake hood from shipping location and install air intake hood on service panel. Refer to the Control Wiring Section for suggested control schemes. After wiring, replace all panels.

FIGURE 1
REMOVING ACCESS PANELS
FIGURE 2
REMOVING FILTER AND GRILLE

LEFT FILTER BRACKET

FILTER

REMOVE AND DISCARD EXHAUST COVER PLATE

4 SCREWS

MIS-345
FIGURE 3

SERVICE DOOR

SIDE VIEW – SEE STEP 5 OF INSTRUCTIONS

ENERGY RECOVERY VENTILATOR

HIGH VOLTAGE WIRES TO PLUG IN BACK OF CONTROL PANEL

LOW VOLTAGE WIRES TO TERMINAL STRIP

FRONT GRILLE

CONDENSER PARTITION

WERV LIP IS TO BE BETWEEN FRONT GRILLE AND CONDENSER PARTITION

ENERGY RECOVERY VENTILATOR

FIGURE 3 – INSET
FIGURE 4

INSTALL 1-480701-0 CAP AS SHOWN AND WIRE PER WIRING DIAGRAM

LOW VOLTAGE WIRES FROM HEAT RECOVERY ASSEMBLY
FIGURE 5

INSERT FLANGE THRU SLOT IN DOOR AND PUSH FLANGE UNDER THE INSULATION

INSULATION

SERVICE DOOR

FRESH AIR INTAKE HOOD AND FILTER ASSEMBLY

FILTER ACCESS SCREW

REPLACE SERVICE ACCESS PANEL AND INSTALL FRESH AIR INTAKE HOOD ASSEMBLY AS SHOWN
CONTROL WIRING
The WERV comes from the factory with the low voltage control wires not wired into 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 WERV is run.
2. Select the correct motor speed tap in the WERV. Using Table 1 of the WERV Installation Instructions 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 WERV-A3B if only 200 CFM of ventilation air is needed. Use the low speed tap. 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 WERV only during periods when the conditioned space is occupied. Running the WERV during unoccupied periods wastes energy, decreases the expected life of the WERV, and can result in a large moisture buildup in the structure. The WERV removes 60 to 70% of the moisture in the incoming air, not 100% of it. Running the WERV when the structure is unoccupied allows moisture to build up in the structure because there is little or now cooling load. Thus, the air conditioner is not running enough to remove the excess moisture being brought in. Use a control system that in some way can control the system based on occupancy.

** IMPORTANT **
Operating the WERV during unoccupied periods can result in a build up of moisture in the structure.

RECOMMENDED CONTROL SEQUENCES
Several possible control scenarios are listed below:
1. Use a programmable electronic thermostat with auxiliary terminal to control the WERV based on daily programmed occupancy periods. Bard markets and recommends the White-Rodgers 1F95-80 (Bard Part No. 8403-035) programmable electronic thermostat for air conditioner applications, and the White-Rodgers 1F94-80 (Bard Part No. 8403-034) programmable electronic thermostat for heat pump applications. (See Figure 7.)
2. Use a motion sensor in conjunction with a mechanical thermostat to determine occupancy in the structure. Bard markets the CS2000 for this use. (See Figure 8 and Figure 9.)
3. Use a DDC control system to control the WERV based on a room occupancy schedule to control the WERV.
4. Tie the operation of the WERV into the light switch. The lights in a room are usually on only when occupied.
5. Use a manual timer that the occupants turn to energize the WERV for a specific number of hours.
6. Use a programmable mechanical timer to energize the WERV and indoor blower during occupied periods of the day.

VENTILATION AIR FLOW
The WERV-A2B, WERV-A3B, WERV-C2B and WERV-C3B are equipped with a 3 speed motor to provide the capability of adjusting the ventilation rates to the requirements of the specific application by simply changing motor speeds.

** TABLE 1 **

<table>
<thead>
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<th>Model</th>
<th>High Speed (Black)</th>
<th>Medium Speed (Blue)</th>
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<td>WERV-C3B</td>
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The units are wired from the factory on Low speed. The speed can be changed by rotating the speed switch on the side of the WERV on the desired speed on the 240 volt models. The speed can be changed on the 460 volt models by disconnecting the red wire and reconnecting the black or blue wire on the intake or exhaust blower motor. If desired, the fresh air motor can be wired on one speed and the exhaust motor on another if needed for a specific requirement.

** WARNING **
Open disconnect to shut all power OFF before doing this. Failure to do so could result in injury or death due to electrical shock.
FIGURE 7

AIR CONDITIONER

1F95-80

WALL MOUNT AIR CONDITIONER

△ REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 KW OR MORE

PROGRAM T-STAT FOR CONTINUOUS BLOWER DURING OCCUPIED PERIODS

HEAT PUMP

1F94-80

WALL MOUNT HEAT PUMP

△ PROGRAM T-STAT FOR CONTINUOUS BLOWER DURING OCCUPIED PERIODS
FIGURE 8

HEAT PUMP CONNECTION DIAGRAM

Optional Continuous Blower Relay Part # 6055-002

Thermostat 18741-002
Subbase 4246-281

1P-10-45
Or
18741-125
01274-1181

UNIT

Warm Air
Or
Heat

Bard Ventilation Package (Optional)

Remote Motion Detector (Optional)
Normally Open Contacts

⚠️ Remove this wire when employing optional continuous blower relay.

⚠️ This relay energizes the indoor blower relay when the room is occupied to provide continuous fresh air through the Bard ventilation package.

Recommended Switch Settings Shown Below

This system may be customized to individual installations. Refer to C42000 Technical Reference Manual for customization options.

Function Switches

<table>
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Temperature Switches

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FIGURE 9

AIR CONDITIONER CONNECTION DIAGRAM

OPTIONAL CONTINUOUS BLOWER RELAY PART #B201-992
SEE NOTE

TELEMETRY WRITTEN OR IF 56
CR

TELEMETRY G7404

UNIT

BARD VENTILATION PACKAGE (OPTIONAL)

REMOTE
NOTION
DETECTOR
OPTIONAL I
NORMAL
OPEN
CONTACTS

REMOVE THIS WIRE WHEN EMPLOYING OPTIONAL CONTINUOUS BLOWER RELAY.

THIS RELAY ENGAGES THE INDOOR BLOWER RELAY WHEN THE ROOM IS OCCUPIED
TO PROVIDE CONTINUOUS FRESH AIR THROUGH THE BARD VENTILATION PACKAGE.

RECOMMENDED SWITCH SETTINGS SHOWN BELOW

THIS SYSTEM MAY BE CUSTOMIZED TO INDIVIDUAL INSTALLATIONS. REFER
TO OSCORO TECHNICAL REFERENCE MANUAL FOR CUSTOMIZATION OPTIONS.

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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 blow 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 adsorb 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 ten 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 six months, may be necessary to maintain latent transfer efficiency. Similar washing cycles may also be appropriate for industrial applications involving the ventilation of high levels of smoke or oil based aerosols such as those found in welding or machining operations, for example. In these applications, latent efficiency losses of as much as 40% or more may develop over a period of one to three years.

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 contaminate buildups that can reduce adsorption 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 10**

**BELT REPLACEMENT INSTRUCTIONS**

(2 WHEEL CASSETTE ONLY)

- **Route this part of replacement belt in top groove of pulley.**
- **Route this part of replacement belt in bottom groove of pulley.**
- If belt “squeaks” or “chirps” lubricate lightly with LPS-1 or equivalent “dry film” lubricant.
FIGURE 11
HUB ASSEMBLY WITH BALL BEARINGS

- Screw #6 x 32 x 3/4
- Dust Cover
- Screw #10 x 32
- Washer
- Nut #10 x 24
- Bearing
- Spacers
- Hub Plate
- Heat Exchanger Wheel
- Hub Plate with Bolts
- Bearing
- Shaft (Oil with 20 WT. Non Detergent Oil)
- Lock Washer
- Nut 1/4 x 20

MIS-1679