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# INSTALLATION INSTRUCTIONS

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## WALL MOUNT ENERGY RECOVERY VENTILATOR WITH EXHAUST

Models:  
**ERVF-A2**  
**ERVF-C2**

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



**Climate Control Solutions**

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

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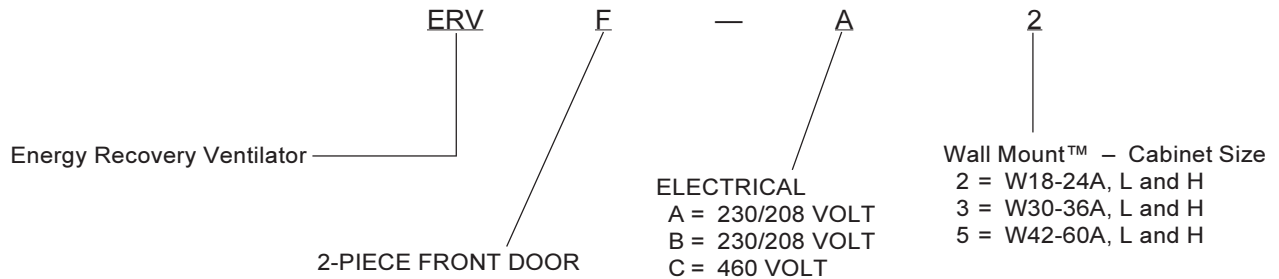
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**BARD MANUFACTURING COMPANY**  
**BRYAN, OHIO USA 43506**

## MODEL NOMENCLATURE LEGEND



## ELECTRICAL SPECIFICATIONS

Model	Voltage	Amps	Control Voltage
ERVF-A2	230/208	2.2	24V
ERVF-C2	460	1.2	24V

## GENERAL DESCRIPTION

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 CO<sub>2</sub>, 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 W\*\*A and W\*\*H series wall mounted units. The package consists of a unique rotary Energy Recovery Cassette that can be easily removed for cleaning or maintenance. The ERVF-\*2 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 62.1 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.*

## GENERAL INFORMATION

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.

## PERFORMANCE AND APPLICATION DATA – ERVF-2

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

Ambient O.D.	VENTILATION RATE 250CFM 62% Efficiency						VENTILATION RATE 225 CFM 63% Efficiency						VENTILATION RATE 200 CFM 63% Efficiency						
DB/WB F	VLT	VLS	VLL	HRT	TRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL	
105	75	11925		1325	7394		822	10727		3441	6758		2168	9540		3060	6010		1928
	70	8100	8100	0	5022	5022	0	7287	7287	0	4591	4591	0	6480	6480	0	4082	4082	0
	65	8100		0	5022		0	7287		0	4591		0	6480		0	4082		0
100	80	17550		10800	10881		6696	15788		9716	9946		6121	14040		8640	8845		5443
	75	11925		5175	7394		3209	10727		4655	6758		2933	9540		4140	6010		2608
	70	6863	6750	113	4255	4185	70	6173	6072	101	3889	3826	64	5490	5400	90	3458	3402	56
	65	6750		0	4185		0	6072		0	3826		0	5400		0	3402		0
	60	6750		0	4185		0	6072		0	3826		0	5400		0	3402		0
95	80	17550		12150	10881		7533	15788		10930	9946		6886	14040		9720	8845		6124
	75	11925		6525	7394		4046	10727		5870	6758		3698	9540		5220	6010		3289
	70	6863	5400	1463	4255	3348	907	6173	4858	1315	3889	3060	829	5490	4320	1170	3458	2722	737
	65	5400		0	3348		0	4858		0	3060		0	4320		0	2722		0
	60	5400		0	3348		0	4858		0	3060		0	4320		0	2722		0
90	80	17550		13500	10881		8370	15788		12145	9946		7651	14040		10800	8845		6804
	75	11925		7875	7394		4883	10727		7084	6758		4463	9540		6300	6010		3969
	70	6863	4050	2813	4255	2511	1744	6173	3643	2530	3889	2295	1594	5490	3240	2250	3458	2041	1417
	65	4050		0	2511		0	3643		0	2295		0	3240		0	2041		0
	60	4050		0	2511		0	3643		0	2295		0	3240		0	2041		0
85	80	17550		14850	10881		9207	15788		13359	9946		8416	14040		11880	8845		7484
	75	11925		9225	7394		5720	10727		8298	6758		5228	9540		7380	6010		4649
	70	6863	2700	4163	4255	1674	2581	6173	2429	3744	3889	1530	2359	5490	2160	3300	3458	1361	2098
	65	2700		0	1674		0	2429		0	1530		0	2160		0	1361		0
	60	2700		0	1674		0	2429		0	1530		0	2160		0	1361		0
80	75	11925		10575	7394		6557	10727		9513	6758		5993	9540		8460	6010		5330
	70	6863	1350	5513	4255	837	3418	6173	1214	4959	3889	765	3124	5490	1080	4410	3458	680	2778
	65	2363		1013	1465		628	2125		911	1339		574	1890		810	1190		510
	60	1350		0	837		0	1214		0	765		0	1080		0	680		0
75	70	6863		6863	4255		4255	6173		6173	6889		3889	5490		5490	3458		3458
	65	2363	0	2363	1465	0	1465	2125	0	2125	1339	0	1339	1890	0	1890	1190	0	1190
	60	0		0	0		0	0		0	0		0	0		0	0		0

### WINTER HEATING PERFORMANCE (INDOOR DESIGN CONDITIONS 70° F DB)

Ambient O.D.	VENTILATION RATE					
	250 CFM 74% Eff		225 CFM 75% Eff		200 CFM 75% Eff	
DB F	WVL	WHR	WVL	WHR	WVL	WHR
65	1350	999	1214	911	1080	810
60	2700	1998	2429	1822	2160	1620
55	4050	2997	3643	2733	3240	2430
50	5400	3996	4858	3643	4320	3240
45	6750	4995	6072	4554	5400	4050
40	8100	5994	7287	5465	6480	4860
35	9450	6993	8501	6376	7560	5670
30	10800	7992	9716	7287	8640	6480
25	12150	8991	10930	8198	9720	7290
20	13500	9990	12145	9108	10800	8100
15	14850	10989	13359	10019	11880	8910

#### 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

## 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.

Model	For Use With the Following Units		Electrical
ERVF-A2	W18A*-A W24A*-A, -B	W18H*-A W24H*-A, -B	230/208 - 1 or 3 phase
ERVF-C2	W24A*-C	W24H*-C	460 - 3 phase



## 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.

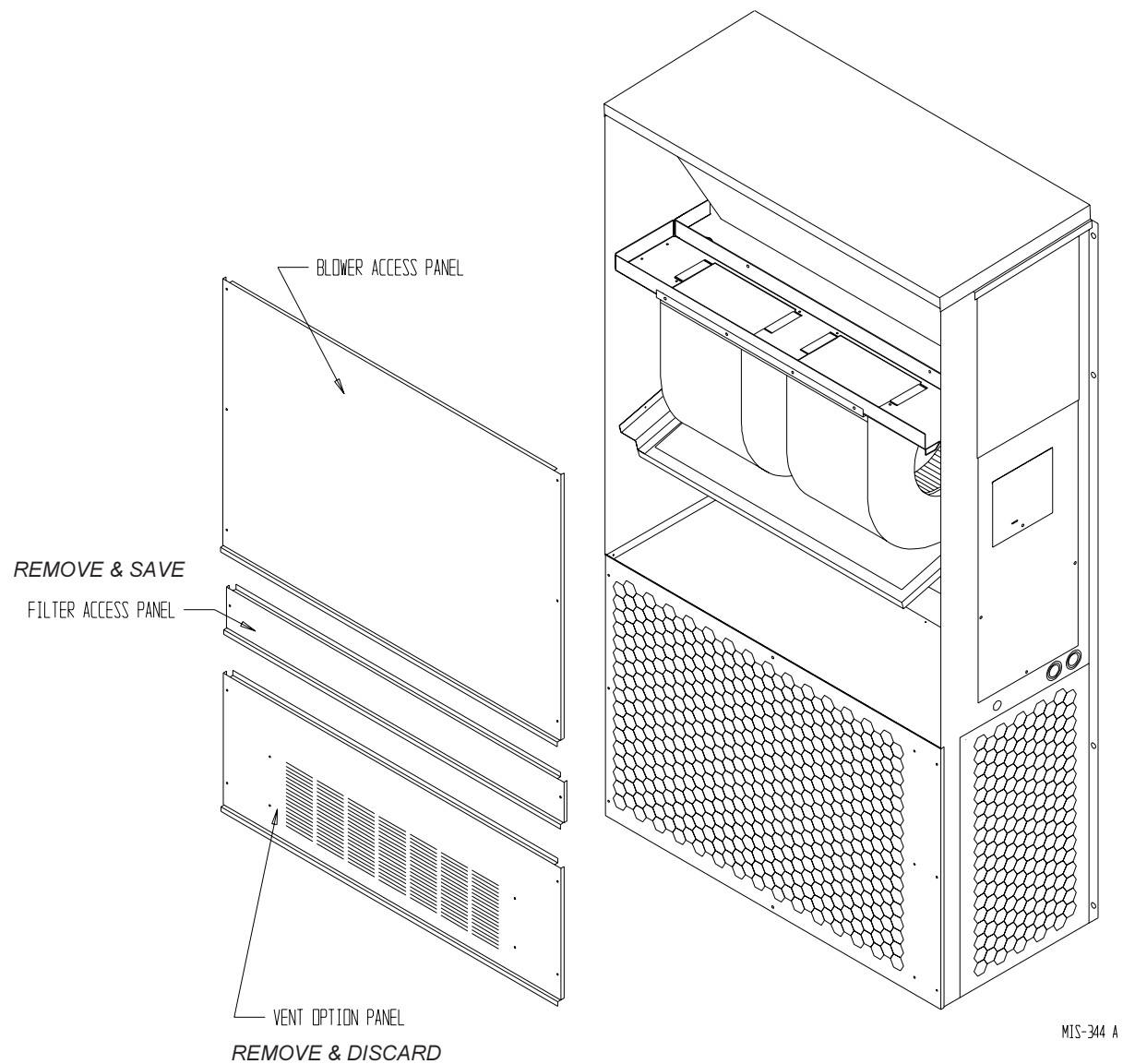
2. Remove the existing exterior blower access, filter access and vent access panels on the Bard Wall Mount unit. Save the blower access and filter access panels and discard vent option access panel. (See Figure 1.)
3. Remove and save existing unit return air filter and left side filter support bracket 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.)
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 four (4) 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, R, G and A or O1 depending whether a heat pump or air conditioner. (See Figure 4.)  
  
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 ERVF assembly into female connector at back of control panel. (See Figures 3 & 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 and filter access panels at top of unit and secure with sheet metal screws.
16. Replace the vent option 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 between the door and insulation to prevent bowing of the door.
17. Apply Certification label, included with Installation Instructions, next to unit Serial Plate.
18. Ventilator is now ready for operation.

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

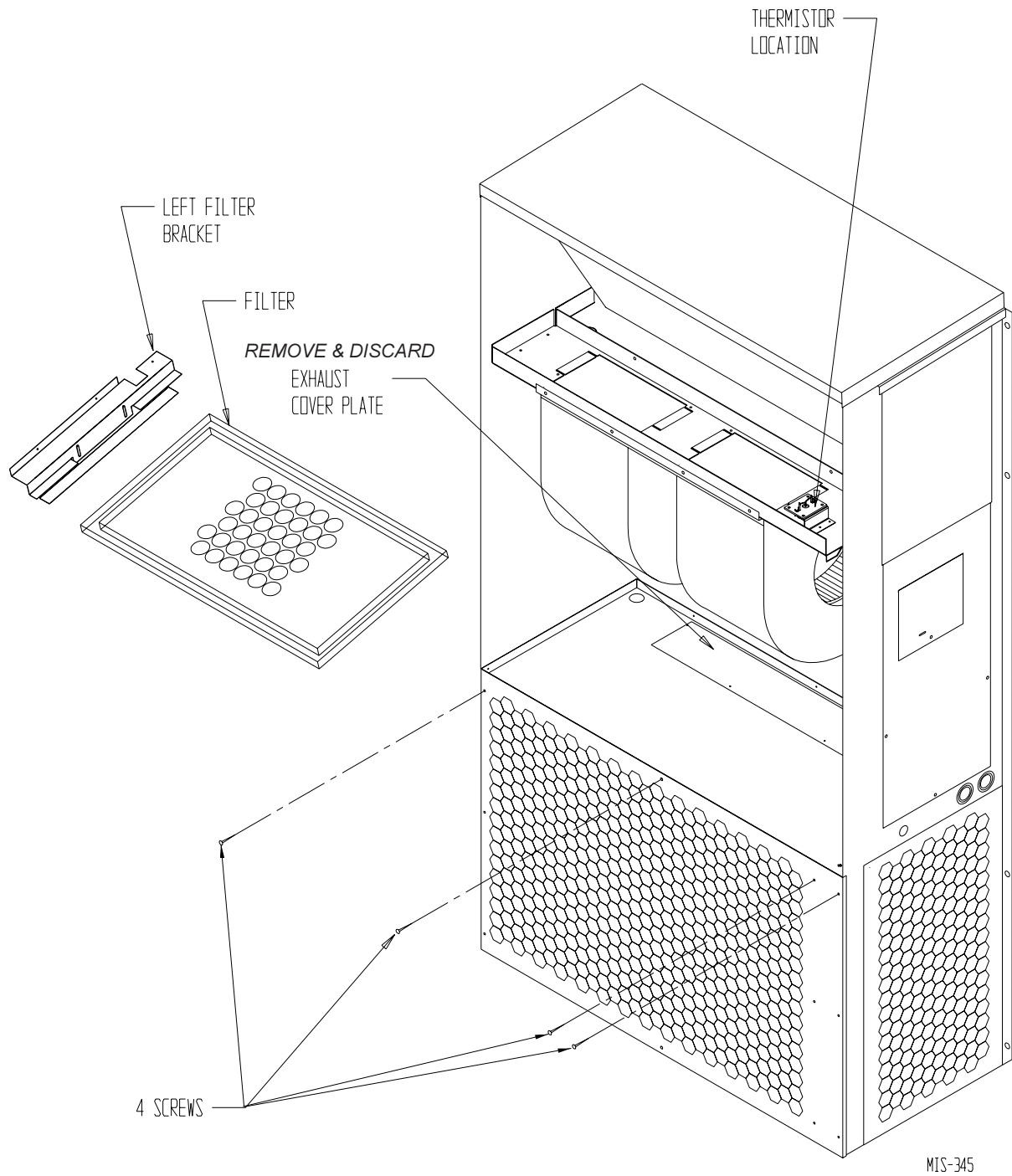
## BASIC INSTALLATION (FACTORY INSTALLED MODELS)

1. Remove blower access, filter access and vent option panels. Remove filter bracket from shipping location and install on left side. Remove filter located above air circulation blowers. Install filter.
2. Remove air intake hood from shipping location and install air intake hood on vent option panel. Refer to the Control Wiring Section for suggested control schemes. After wiring, replace all panels.

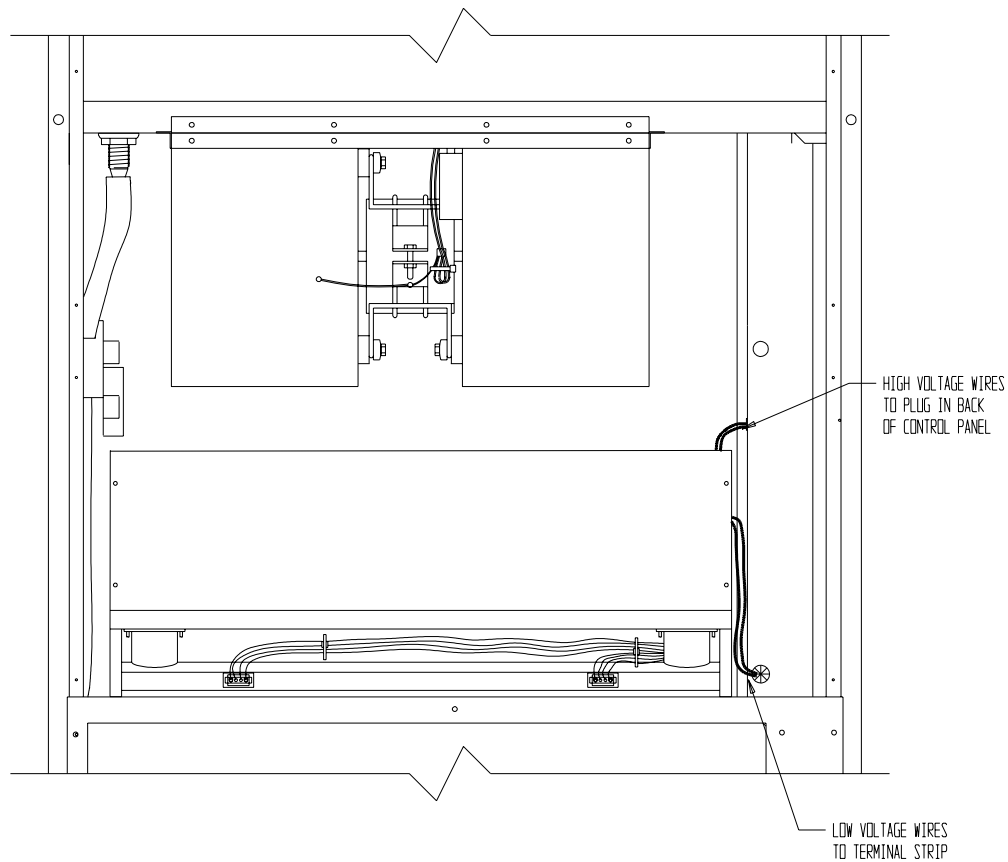
**FIGURE 1  
REMOVING ACCESS PANELS**



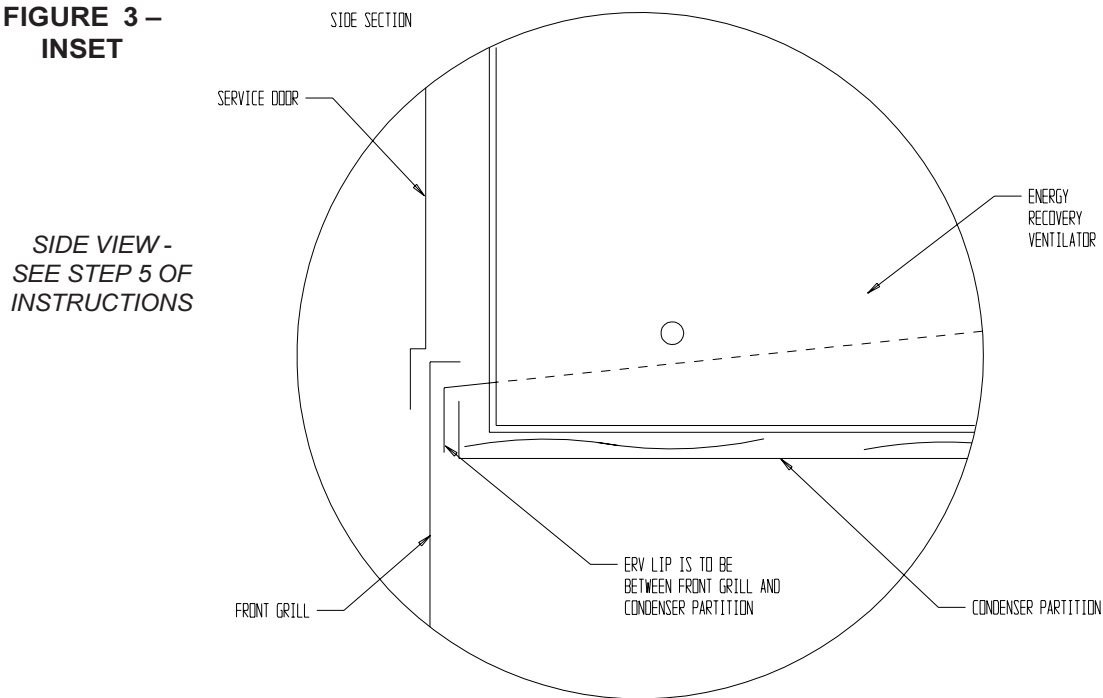
**FIGURE 2**  
**REMOVING FILTER AND GRILLE**



**FIGURE 3**



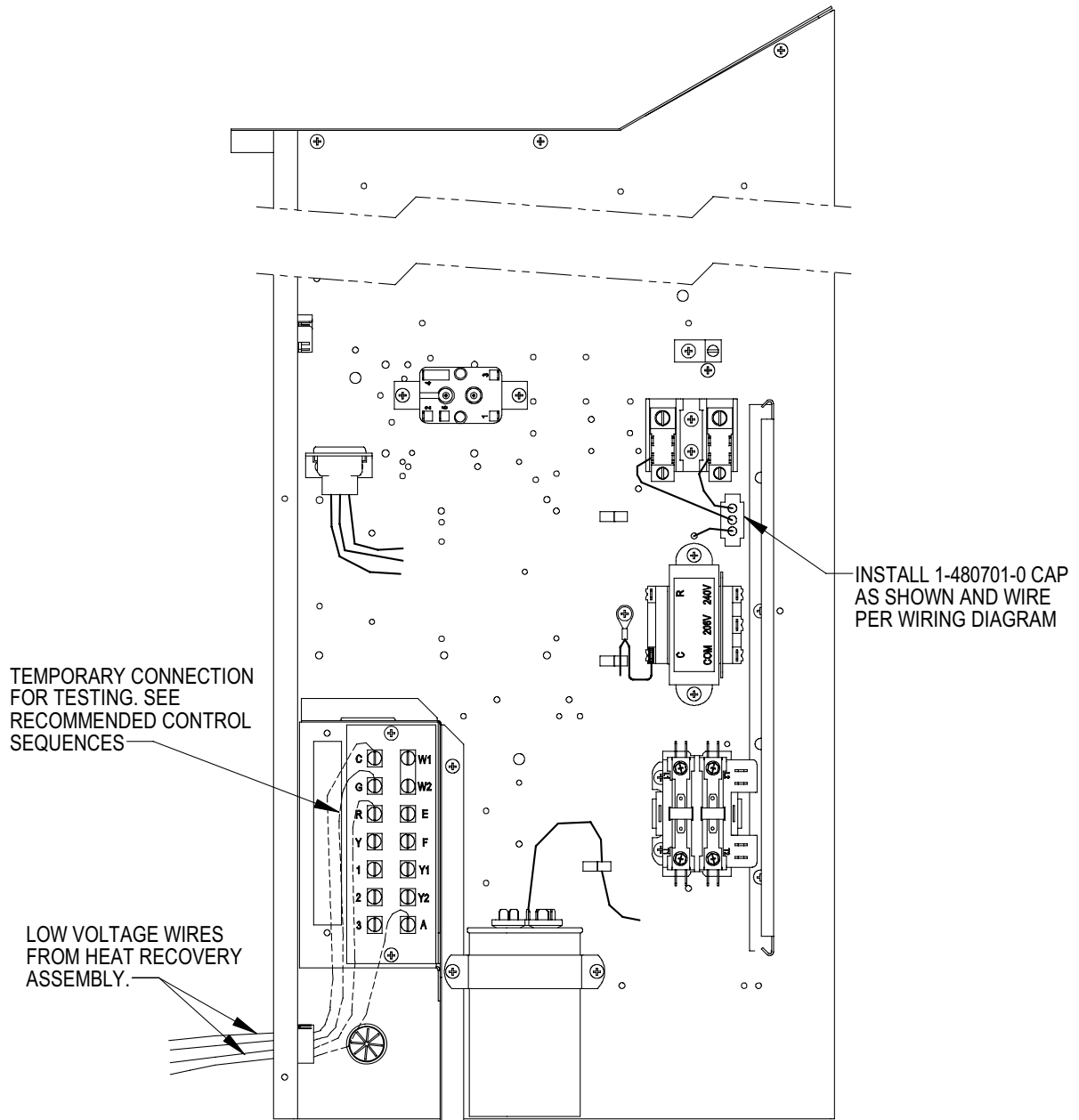
**FIGURE 3 –  
INSET**



MIS-489

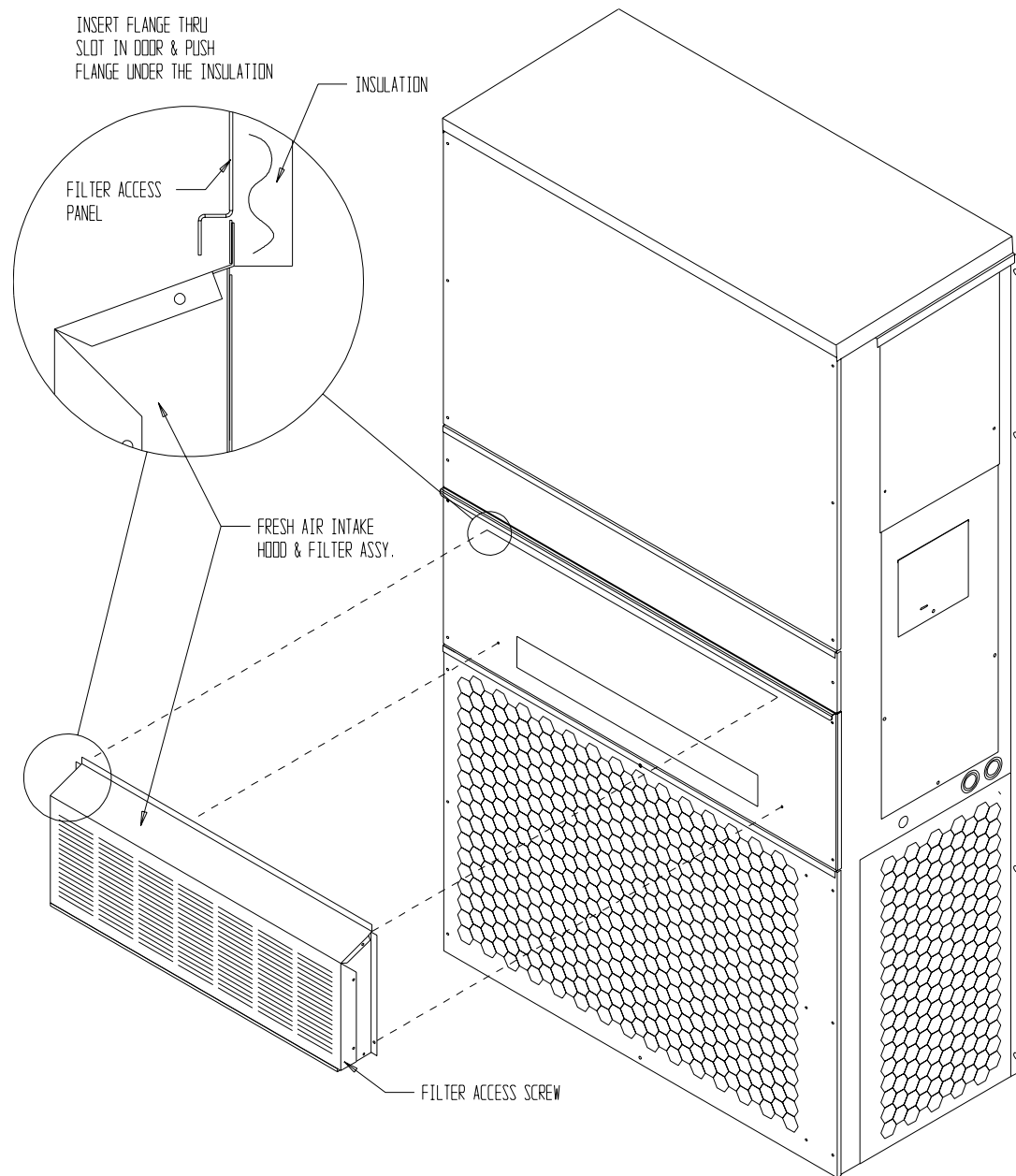


FIGURE 4



MIS-2641

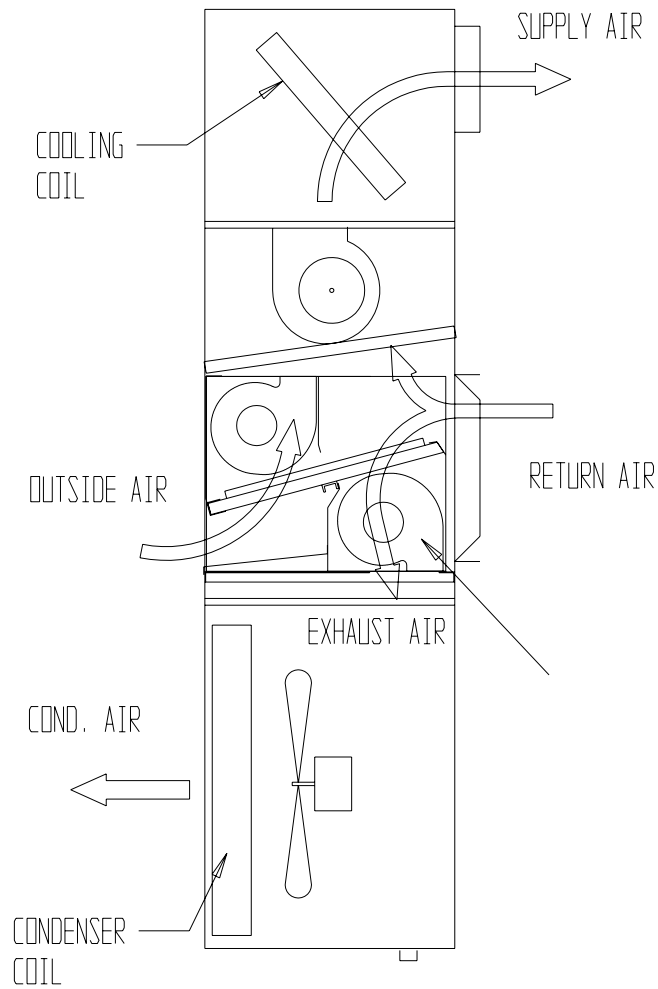
**FIGURE 5**



REPLACE SERVICE ACCESS PANEL  
AND INSTALL FRESH AIR INTAKE  
HOOD ASSY. AS SHOWN.

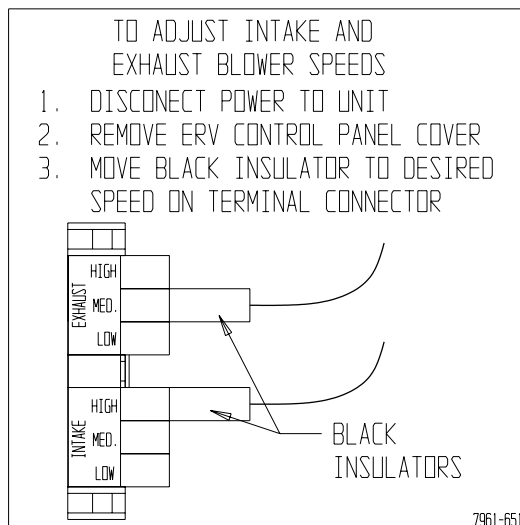
MIS-2642

**FIGURE 6**



MIS-490

**FIGURE 6A**



MIS-2120

## CONTROL WIRING

The ERVF 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 ERVF is run.
2. Select the correct motor speed tap in the ERVF. Using Table 1 of the ERVF 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 ERVF-A2 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 ERVF only during periods when the conditioned space is occupied. Running the ERVF during unoccupied periods wastes energy, decreases the expected life of the ERVF, and can result in a large moisture buildup in the structure. The ERVF removes 60 to 70% of the moisture in the incoming air, not 100% of it. Running the ERVF 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. Use a control system that in some way can control the system based on occupancy.

### **\*\*\* IMPORTANT \*\*\***

Operating the ERVF 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 ERVF based on daily programmed occupancy periods. Bard markets and recommends the Bard Part No. 8403-060 programmable electronic thermostat for air conditioner and heat pump applications.
2. Use a motion sensor in conjunction with a mechanical thermostat to determine occupancy in the structure. Bard markets the CS2000A for this use.
3. Use a DDC control system to control the ERVF based on a room occupancy schedule to control the ERVF.
4. Tie the operation of the ERVF 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 ERVF for a specific number of hours.
6. Use a programmable mechanical timer to energize the ERVF and indoor blower during occupied periods of the day.

## VENTILATION AIRFLOW

The ERVF-A2 and ERVF-C2 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

VENTILATION AIR (CFM)			
Model	High Speed (Black)	Medium Speed (Blue)	Low Speed (Red)
ERVF-A2 ERVF-C2	250	225	200

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 6A.

## **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.

# 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 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 Steps 5 through 8.
5. Disconnect all power to unit. Remove the lower service door of the wall mount unit to gain access to the energy recovery ventilator.

6. Remove the front access panel on the ventilator. Unplug amp connectors to cassette motors. Slide energy recovery cassette out of ventilator.
7. Use a shop vacuum with brush attachment to clean both sides of the energy recovery wheels.
8. 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.*

9. 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.

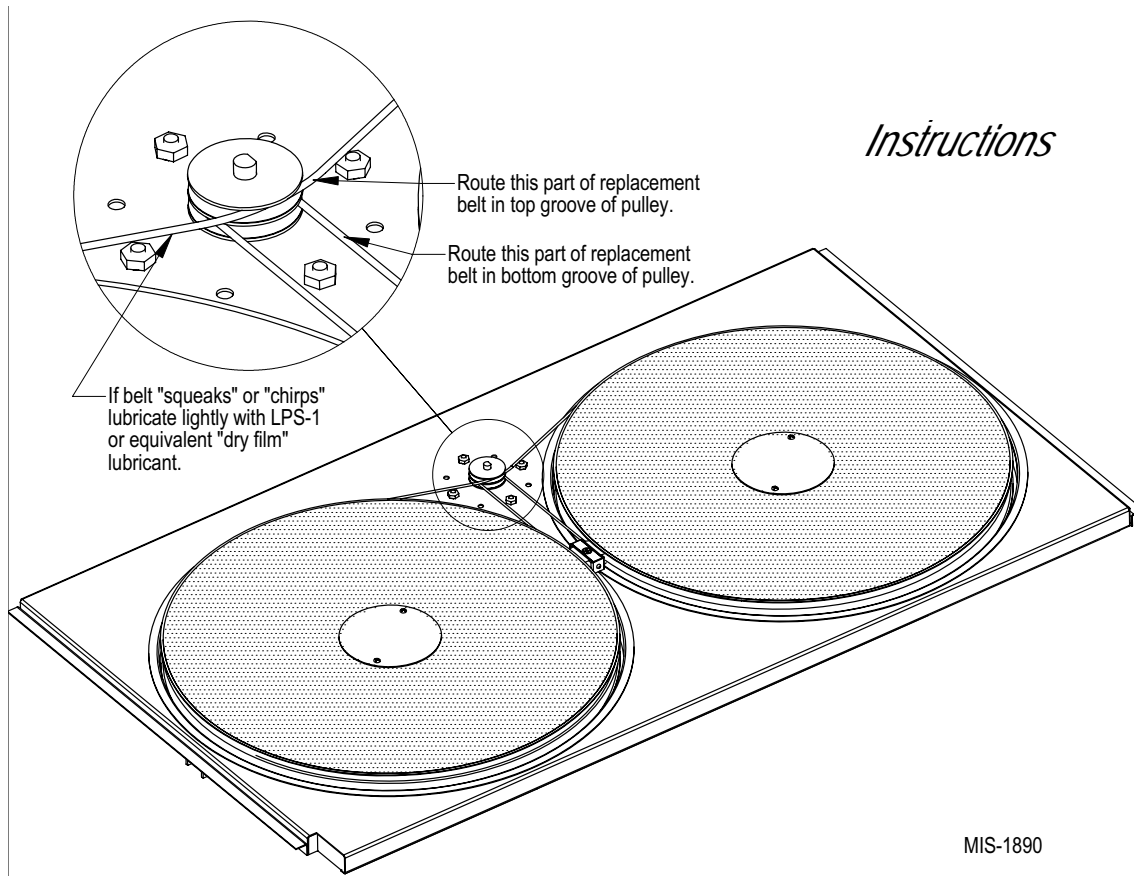
2. To maintain peak latent (moisture) removal capacity, it is recommended that the energy recovery wheels be sprayed with a diluted nonacid based evaporator coil cleaner or alkaline detergent solution such as 409.

*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.*

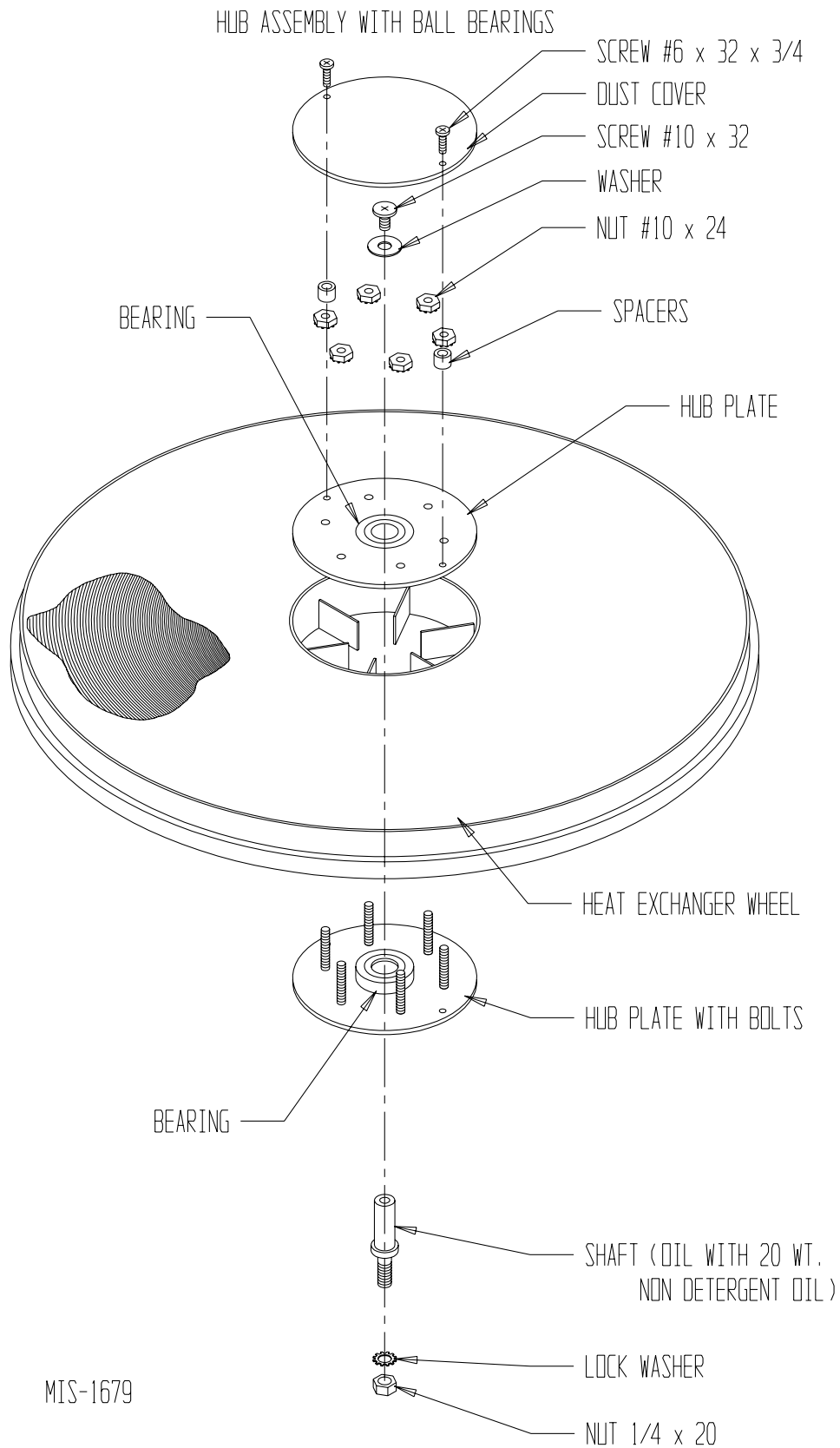
3. Rinse wheel thoroughly after application of the cleaning solution, and allow to drain before reinstalling.
4. No re-lubrication is required to heat wheel bearings of the drive motor, or to the intake and exhaust blower motors.
5. If any belt chirping or squealing noise is present, apply a small amount of LPS-1 or equivalent dry film lubricant to the belt.

**FIGURE 7  
BELT REPLACEMENT INSTRUCTIONS  
(2 WHEEL CASSETTE ONLY)**



MIS-1890

**FIGURE 8**  
**HUB ASSEMBLY WITH BALL BEARINGS**



MIS-1679