
INSTALLATION INSTRUCTIONS

WALL MOUNT ENERGY RECOVERY VENTILATOR WITH EXHAUST

Models:
ERVF-A3
ERVF-C3

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



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

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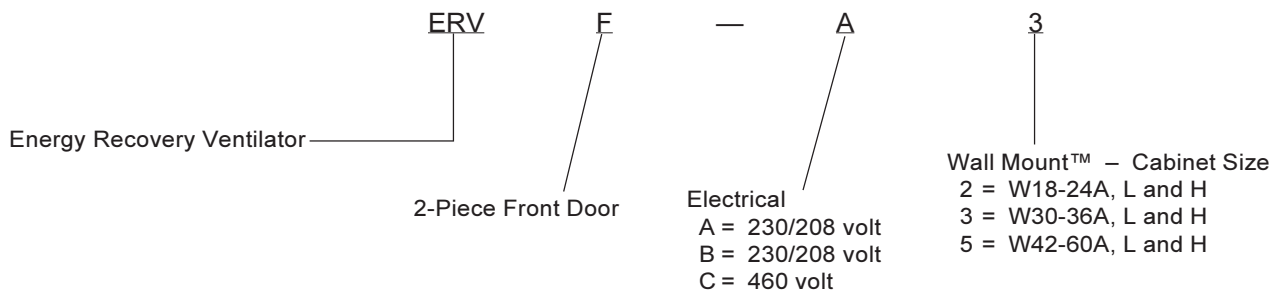
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Tables

Table 1 Ventilation Air (CFM) 12

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MODEL NOMENCLATURE LEGEND



ELECTRICAL SPECIFICATIONS

Model	Voltage	Amps	Control Voltage
ERVF-A3	230/208	2.2	24V
ERVF-C3	460	1.2	24V

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

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 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 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-*3 has two 13 inch diameter heat transfer wheels. 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. 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 6A 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.

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-^{*}3
SUMMER COOLING PERFORMANCE
(INDOOR DESIGN CONDITIONS 75°DB/62°WB)

Ambient O.D.	VENTILATION RATE 400 CFM 63% Efficiency						VENTILATION RATE 325 CFM 64% Efficiency						VENTILATION RATE 250 CFM 65% Efficiency						
DB/WB°F	VLT	VLS	VLL	HRT	TRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL	
105	75	19080		6120	12020		3855	15502		4972	9921		3182	11925		3825	7751		2486
	70	12960	12960	0	8164	8164	0	10530	10530	0	6739	6739	0	8100	8100	0	5265	5265	0
	65	12960		0	8164		0	10530		0	6739		0	8100		0	5265		0
100	80	28080		17280	17690		10886	22815		14040	14601		8985	17550		10800	11407		7019
	75	19080		8280	12020		5216	15502		6727	9921		4305	11925		5175	7751		3363
	70	10980	10800	180	6717	6804	113	8921	8775	146	5709	5616	93	6862	6750	112	4460	4387	73
	65	10800		0	6804		0	8775		0	5616		0	6750		0	4387		0
60	10800		0	6804		0	8775		0	5616		0	6750		0	4387		0	
95	80	28080		19440	17690		12247	22815		15795	14601		10108	17550		12150	11407		7897
	75	19080		10440	12020		6577	15502		8482	9921		5428	11925		6525	7751		4241
	70	10980	8640	2340	6917	5443	1474	8921	7020	1901	5709	4492	1216	6862	5400	1462	4460	3510	950
	65	8640		0	5443		0	7020		0	4492		0	5400		0	3510		0
	60	8640		0	5443		0	7020		0	4492		0	5400		0	3510		0
90	80	28080		21600	17690		13608	22815		17550	14601		11232	17550		13500	11407		8774
	75	19080		12600	12020		7938	15502		10237	9921		6552	11925		7875	7751		5118
	70	10980	6480	4500	6917	4082	2835	8921	5265	3656	5709	3369	2340	6862	4050	2812	4460	2632	1828
	65	6480		0	4082		0	5265		0	3369		0	4050		0	2632		0
	60	6480		0	4082		0	5265		0	3369		0	4050		0	2632		0
85	80	28080		23760	17690		14968	22815		19305	14601		12355	17550		14850	11407		9652
	75	19080		14760	12020		9298	15502		11992	9921		7675	11925		9225	7751		5996
	70	10980	4320	6660	6917	2721	4195	8921	3510	5411	5709	2246	3463	6862	2700	4162	4460	1755	2705
	65	4320		0	2721		0	3510		0	2246		0	2700		0	1755		0
	60	4320		0	2721		0	3510		0	2246		0	2700		0	1755		0
80	75	19080		16920	12020		10659	15502		13747	9921		8798	11925		10575	7751		6873
	70	10980		8820	6917		5556	8921		7166	5709		4586	6862		5512	4460		3583
	65	3780	2160	1620	2381	1360	1020	3071	1755	1316	1965	1123	842	2362	1350	1012	1535	877	658
	60	2160		0	1360		0	1755		0	1123		0	1350		0	877		0
75	70	10980		10980	6917		6917	8921		8921	5709		5709	6862		6862	4460		4460
	65	3780	000	3780	2381	000	2380	3071	000	3071	1965	000	1965	2362	000	2362	1535	000	1535
	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					
	400 CFM 75% Eff		325 CFM 76% Eff		250 CFM 77% Eff	
DB F	WVL	WHR	WVL	WHR	WVL	WHR
65	2160	1620	1755	1333	1350	1039
60	4320	3240	3510	2667	2700	2079
55	6480	4860	5265	4001	4050	3118
50	8640	6480	7020	5335	5400	4158
45	10800	8100	8775	6669	6750	5197
40	12960	9720	10530	8002	8100	6237
35	15120	11340	12285	9336	9450	7276
30	17280	12960	14040	10670	10800	8316
25	19440	14580	15795	12004	12150	9355
20	21600	16200	17550	13338	13500	10395
15	23760	17820	19305	14671	14850	11434

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

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

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-A3	W30A*-A, -B W36A*-A, -B	S26H*-A, -B S31H*-A, -B W30H*-A, -B W36H*-A, -B	230/208 - 1 or 3 phase
ERVF-C3	W30A*-C W36A*-C	S26H*-C S31H*-C W30H*-C W36H*-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 ensure 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.)

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.

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.

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**

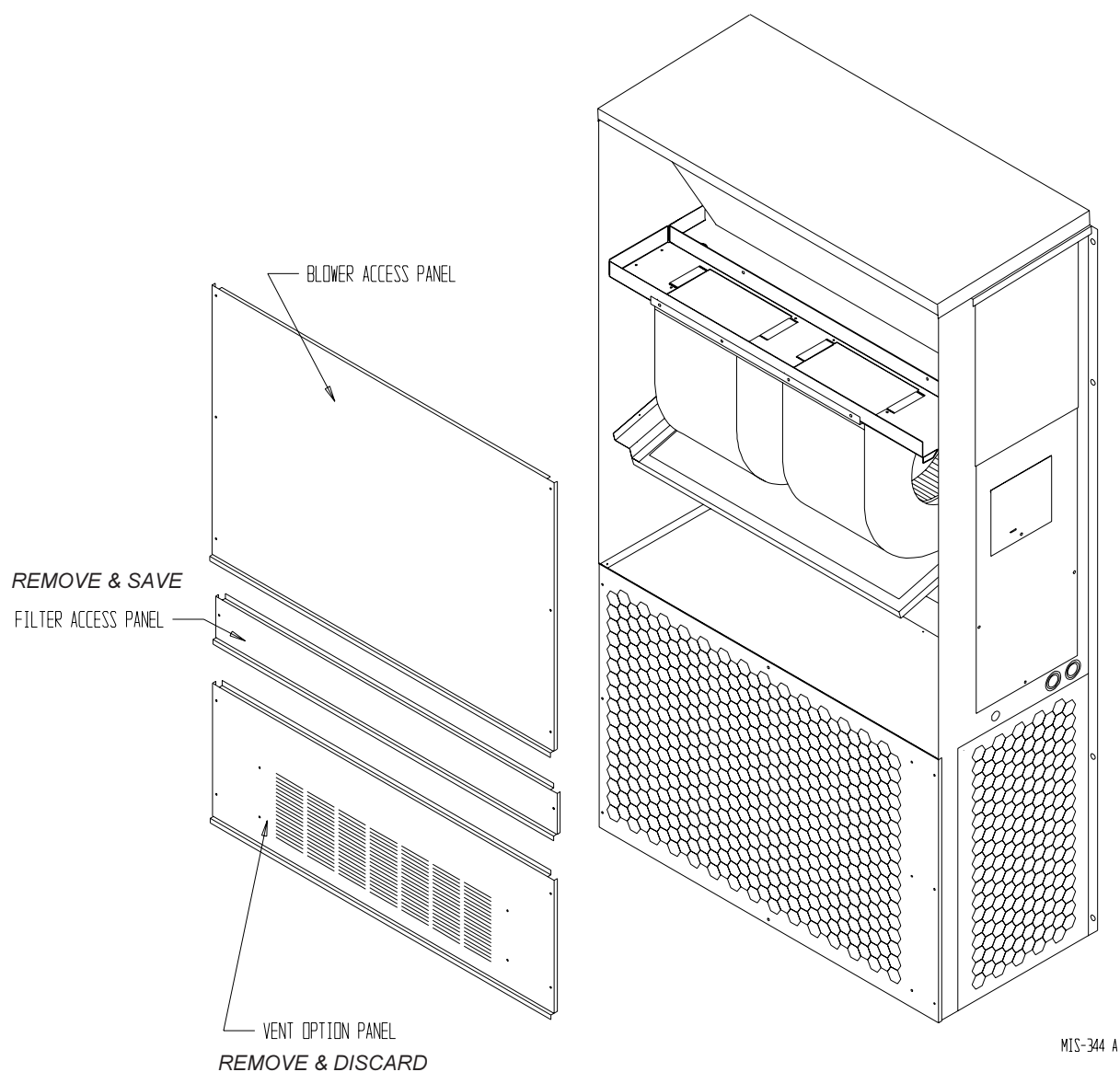


FIGURE 2
REMOVING FILTER AND GRILLE

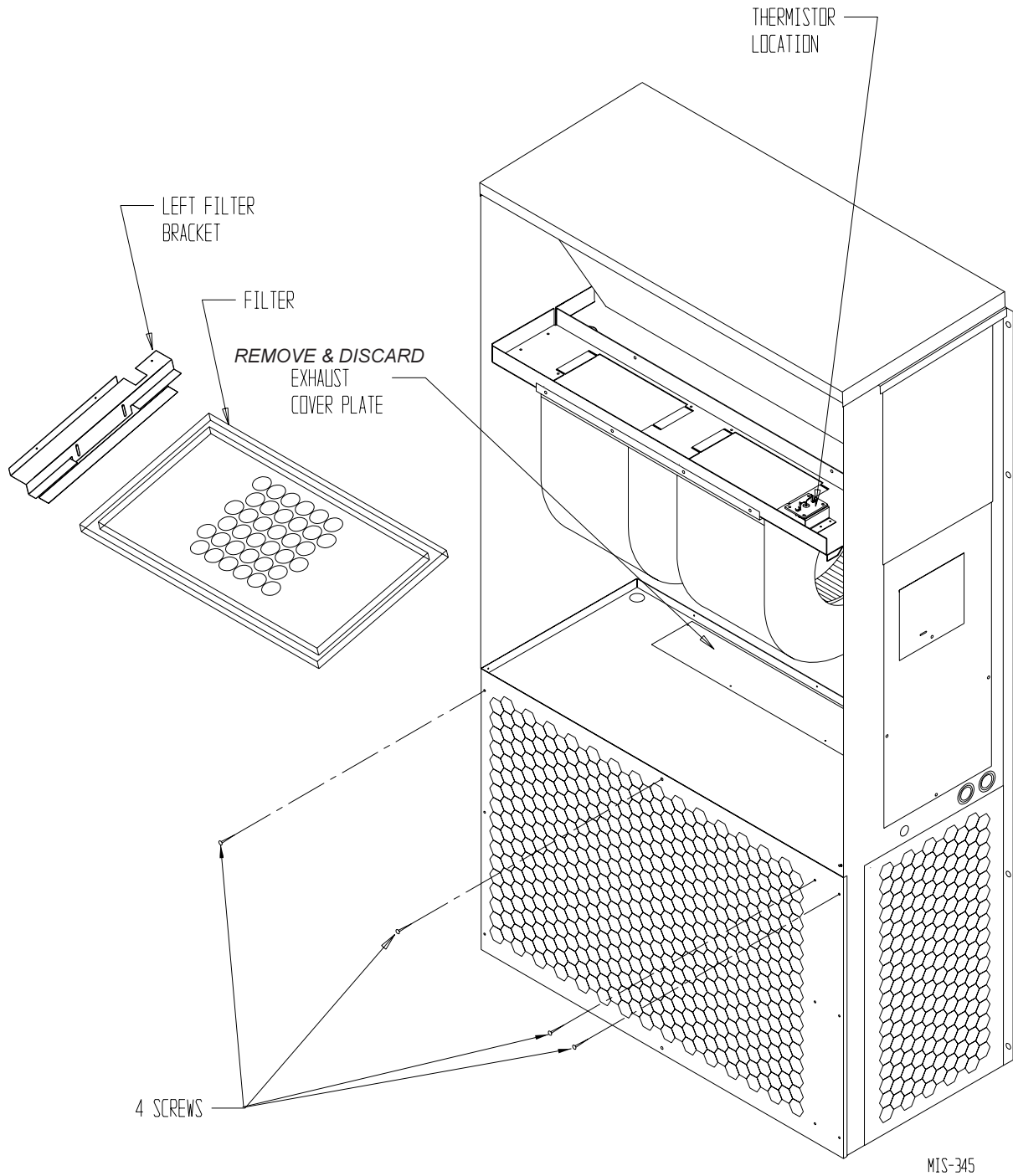
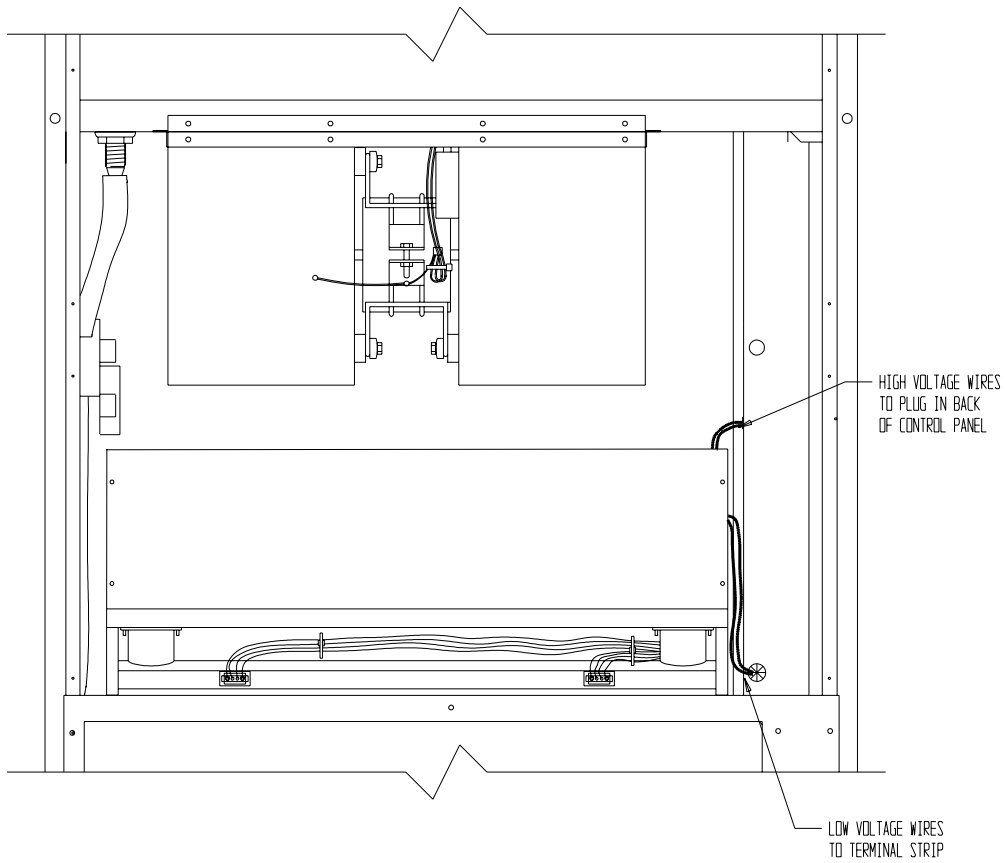
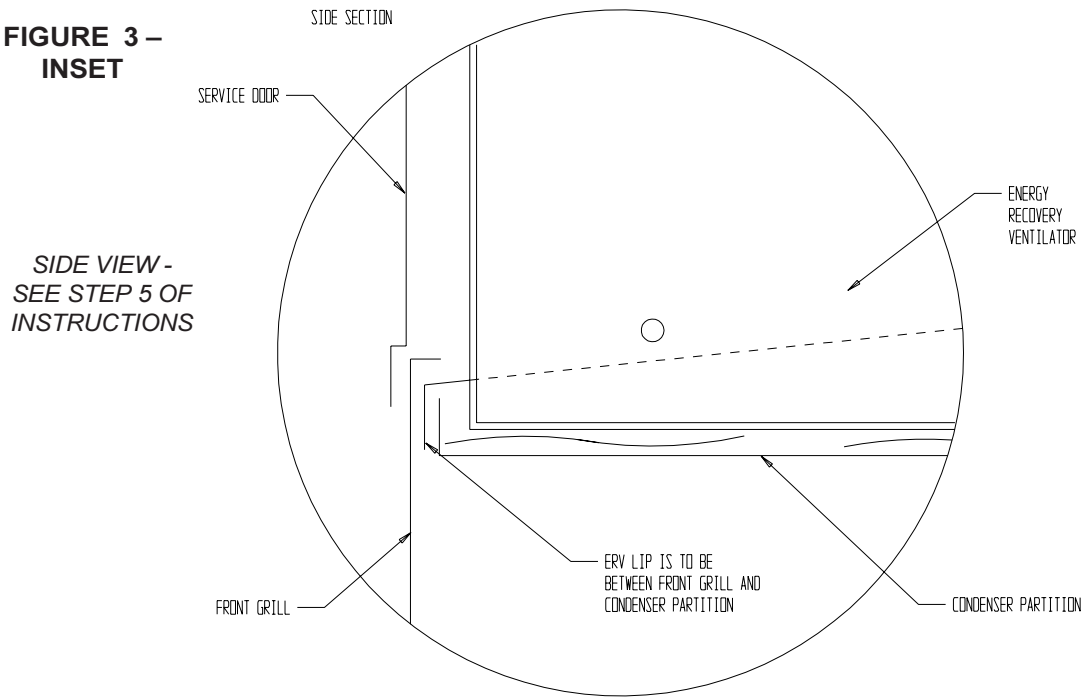


FIGURE 3

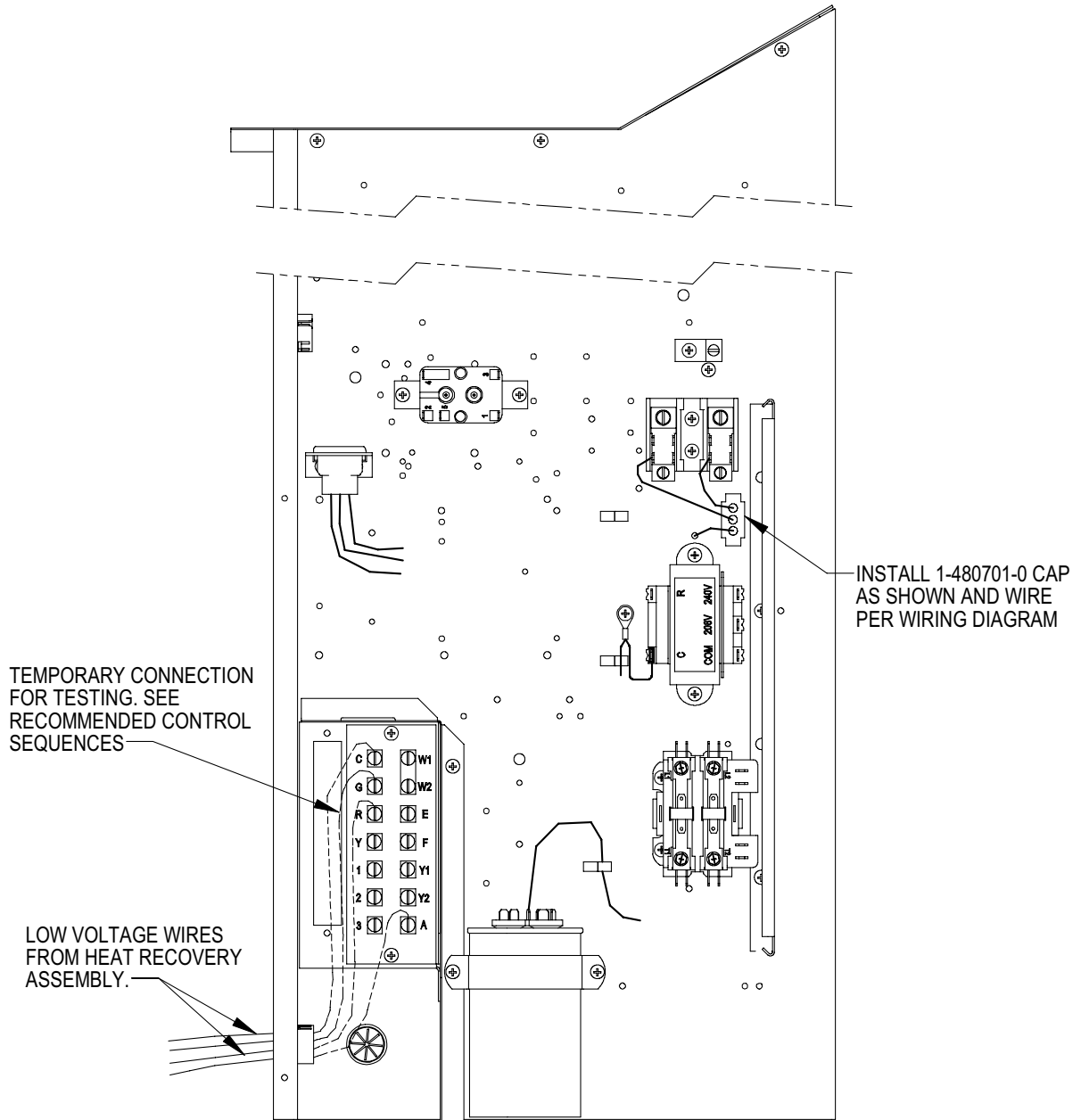


**FIGURE 3 –
INSET**



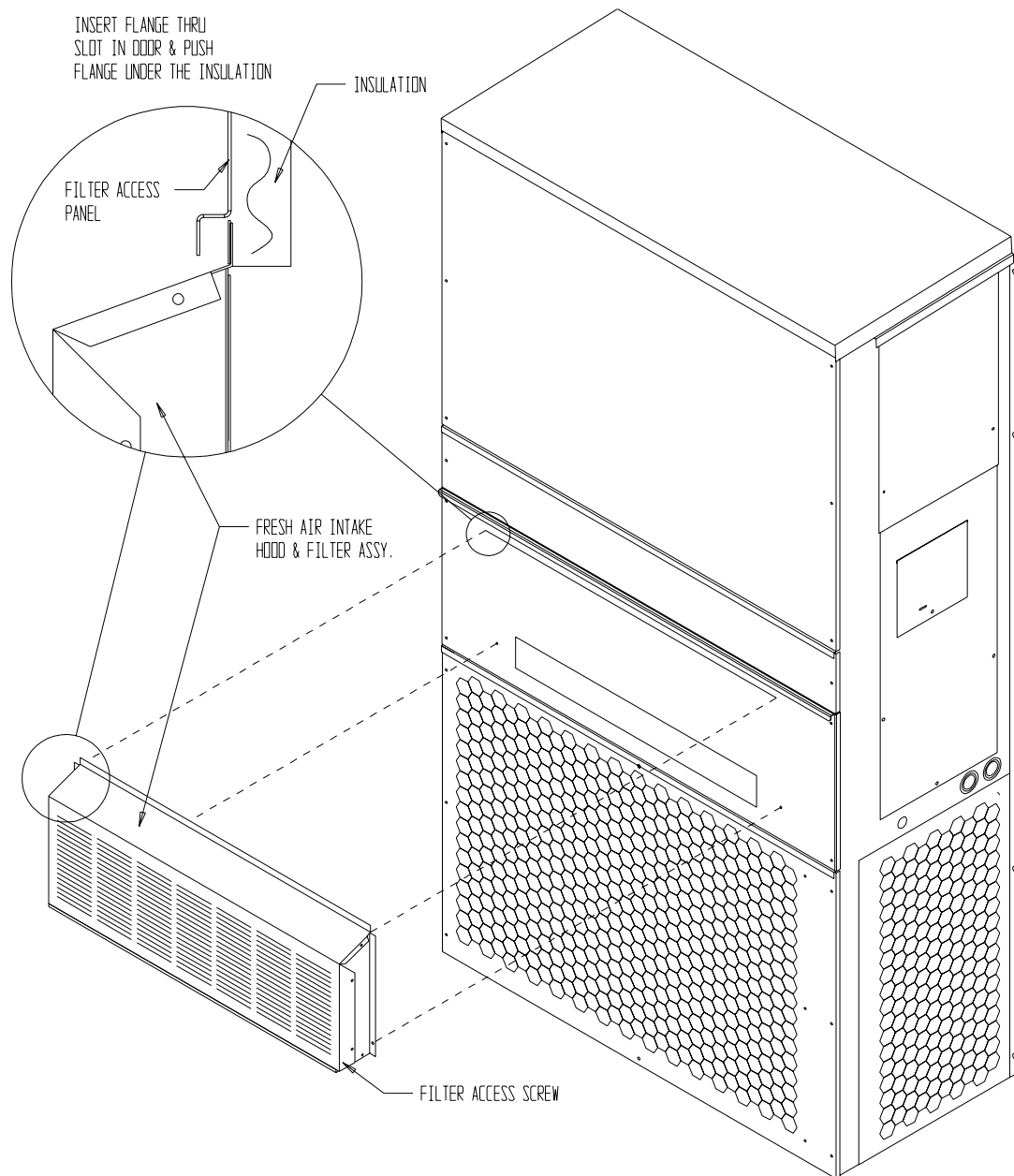
MIS-489

FIGURE 4



MIS-2641

FIGURE 5



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

MIS-2642

FIGURE 6

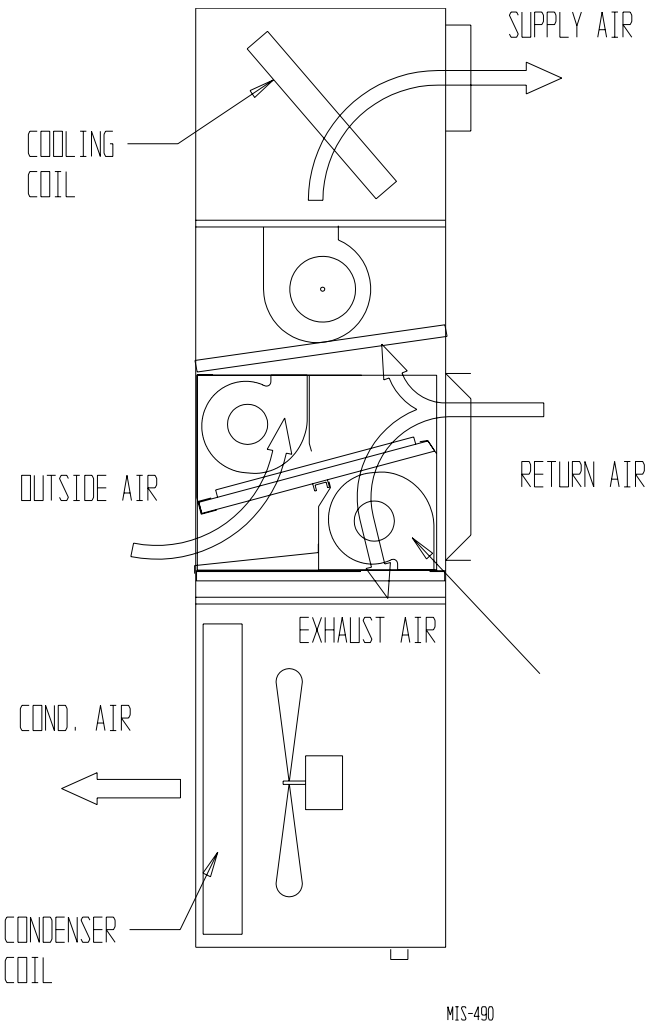
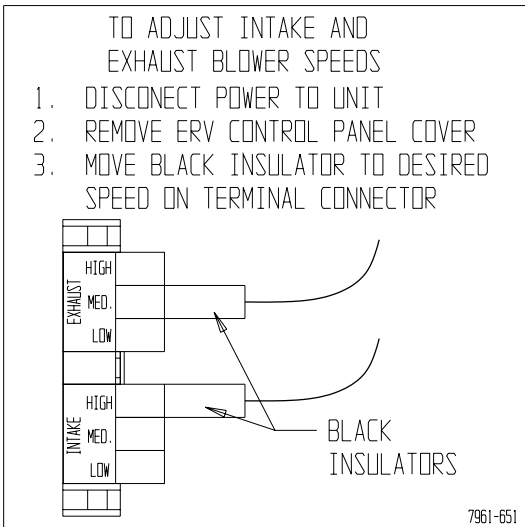


FIGURE 6A



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-A3 if only 250 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.
2. Use a motion sensor in conjunction with a mechanical thermostat to determine occupancy in the structure. Bard markets the CS2000A for this use. (See Figure 9 and Figure 10.)
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-A3 and ERVF-C3 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-A3 ERVF-C3	400	325	250

* * * IMPORTANT * * *

Operating the ERVF during unoccupied periods can result in a build up of moisture in the structure.

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.

RECOMMENDED CONTROL SEQUENCES

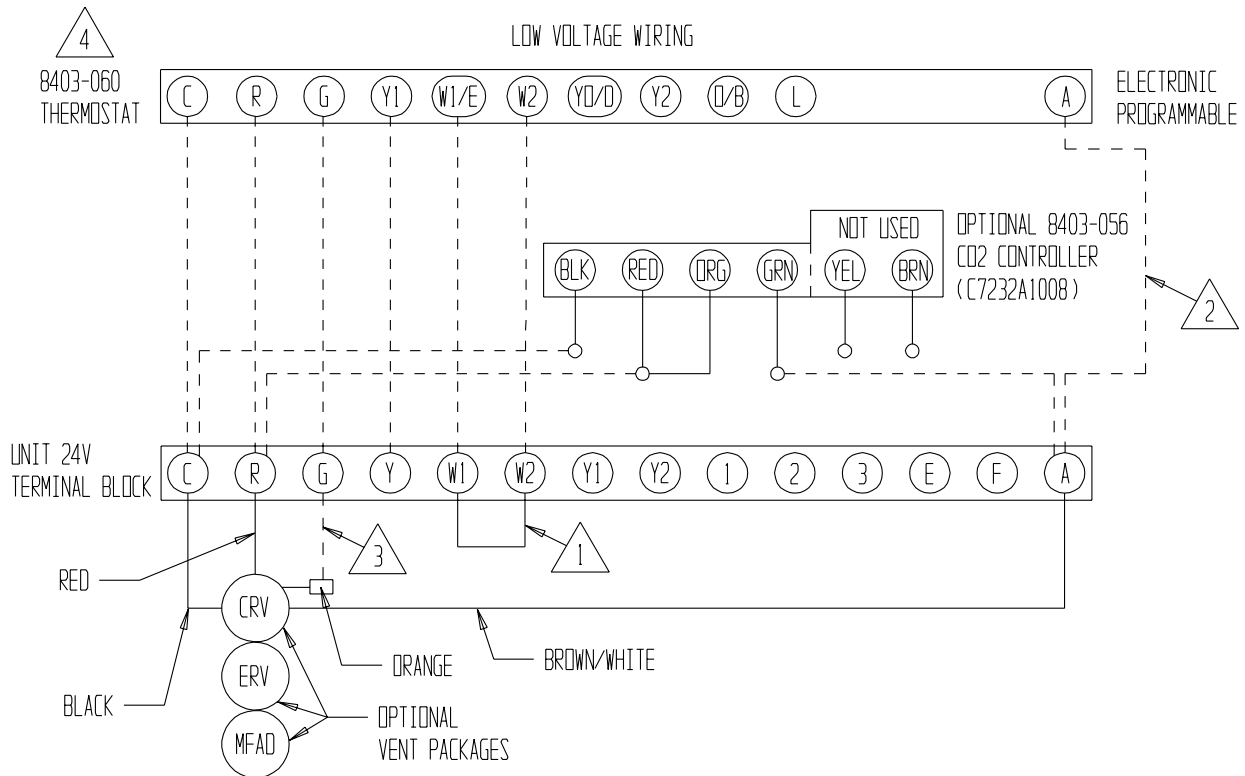
Several possible control scenarios are listed below:

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. (See Figures 7 & 8.)

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 CONNECTION



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

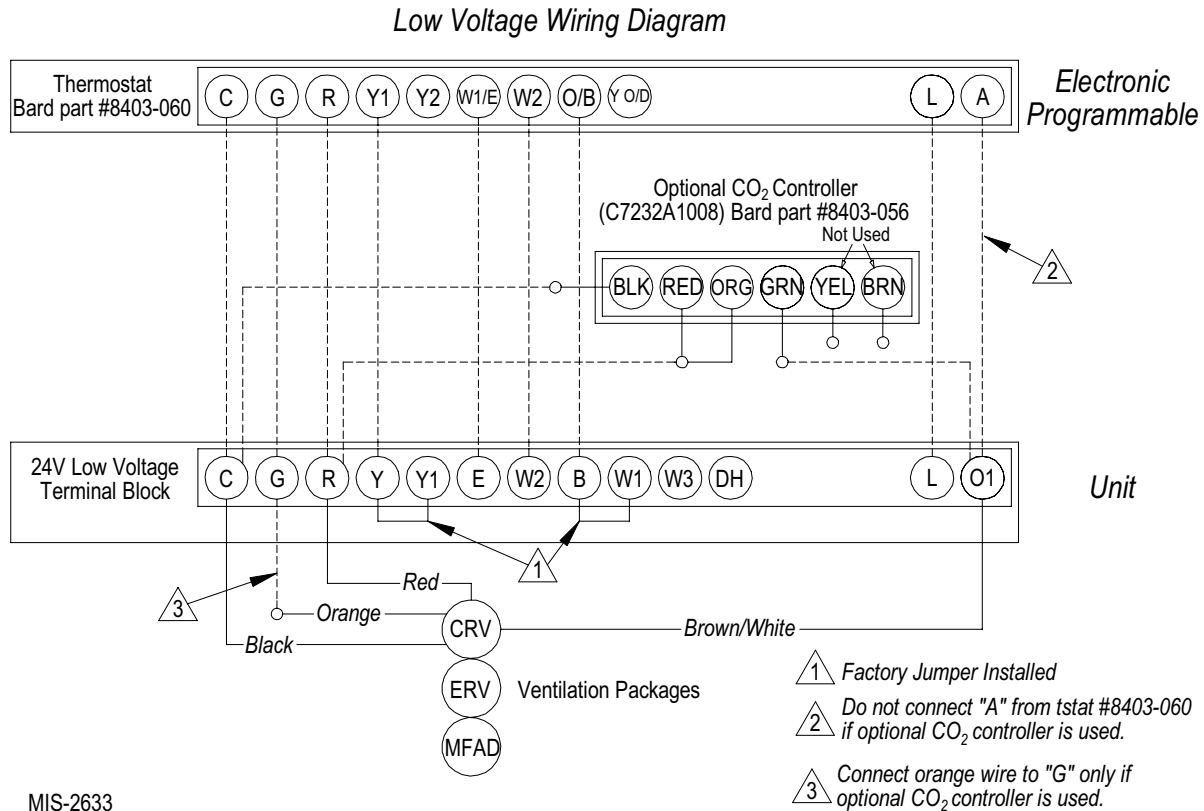
2 DO NOT CONNECT "A" FROM 8403-060 IF OPTIONAL CO₂ CONTROLLER IS USED

3 CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO₂ CONTROLLER IS USED

4 CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL

MIS-2479 A

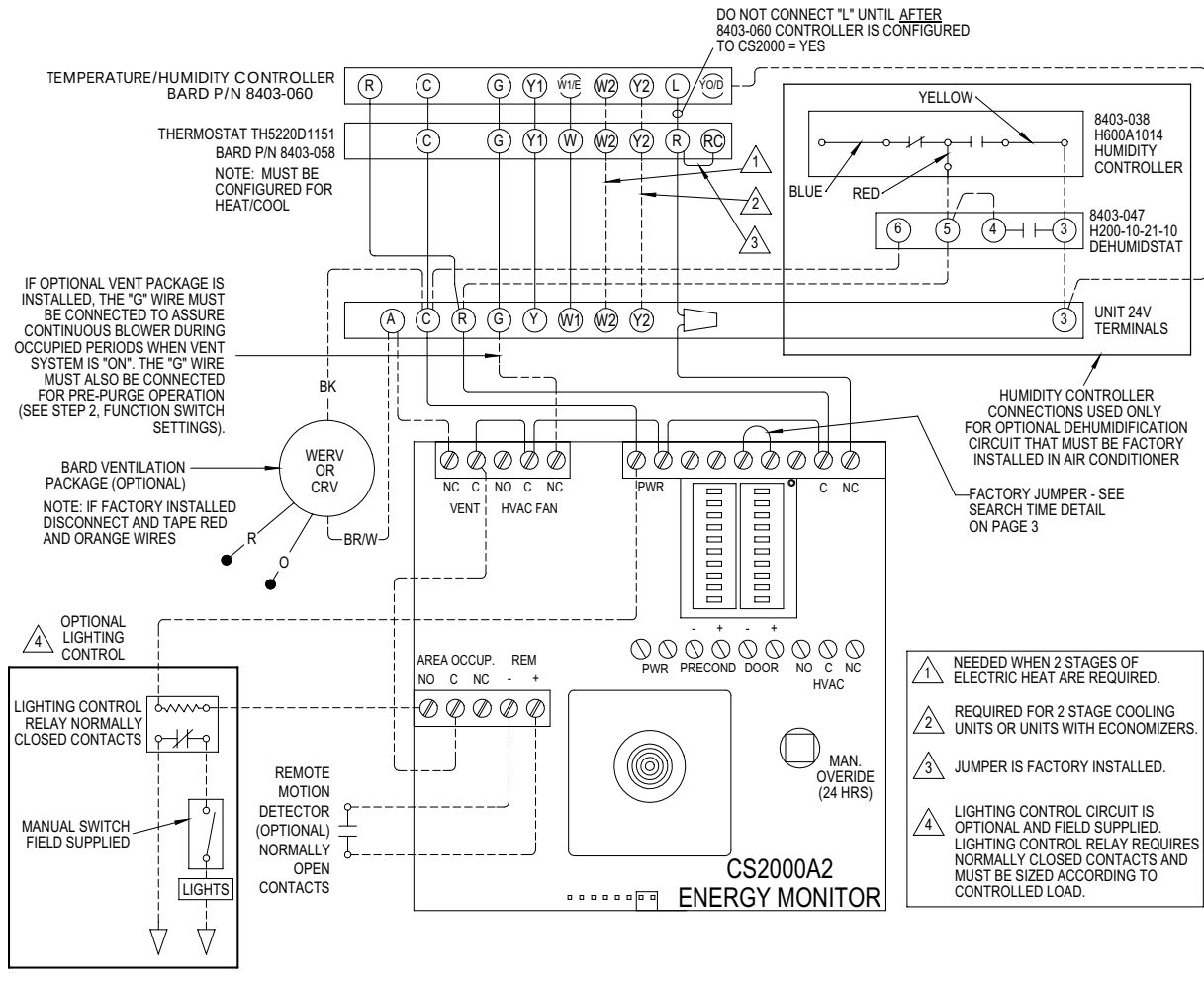
**FIGURE 8
HEAT PUMP CONNECTION**



MIS-2633

FIGURE 9

AIR CONDITIONER WITH CS2000



RECOMMENDED SWITCH SETTINGS SHOWN BELOW

FUNCTION SWITCHES

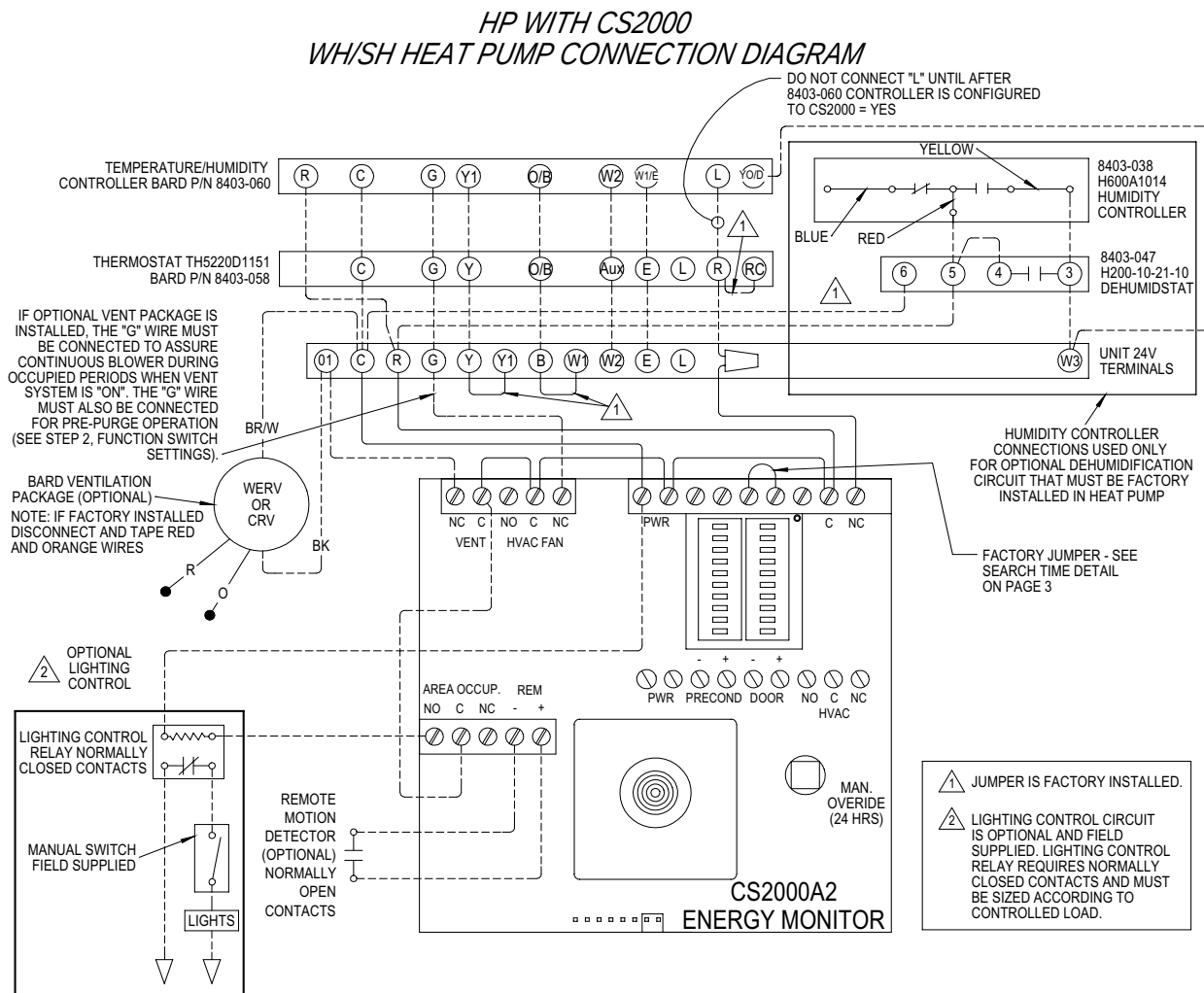
LEARN	
PRE P	
MODE	
RATE	
SEARCH-TIME	
N/C	
STAGE	
AUX	
DEMAND 2	
DEMAND 1	

TEMPERATURE SWITCHES

	90
	84
	81
	78
	68
	65
	62
	58
	54
	48

4093-150 A

FIGURE 10



RECOMMENDED SWITCH SETTINGS SHOWN BELOW

FUNCTION SWITCHES		TEMPERATURE SWITCHES	
LEARN			90
PRE P			84
MODE			81
RATE			78
SEARCH-TIME			68
N/C			65
STAGE			62
AUX			58
DEMAND 2			54
DEMAND 1			48

4093-140 K

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.

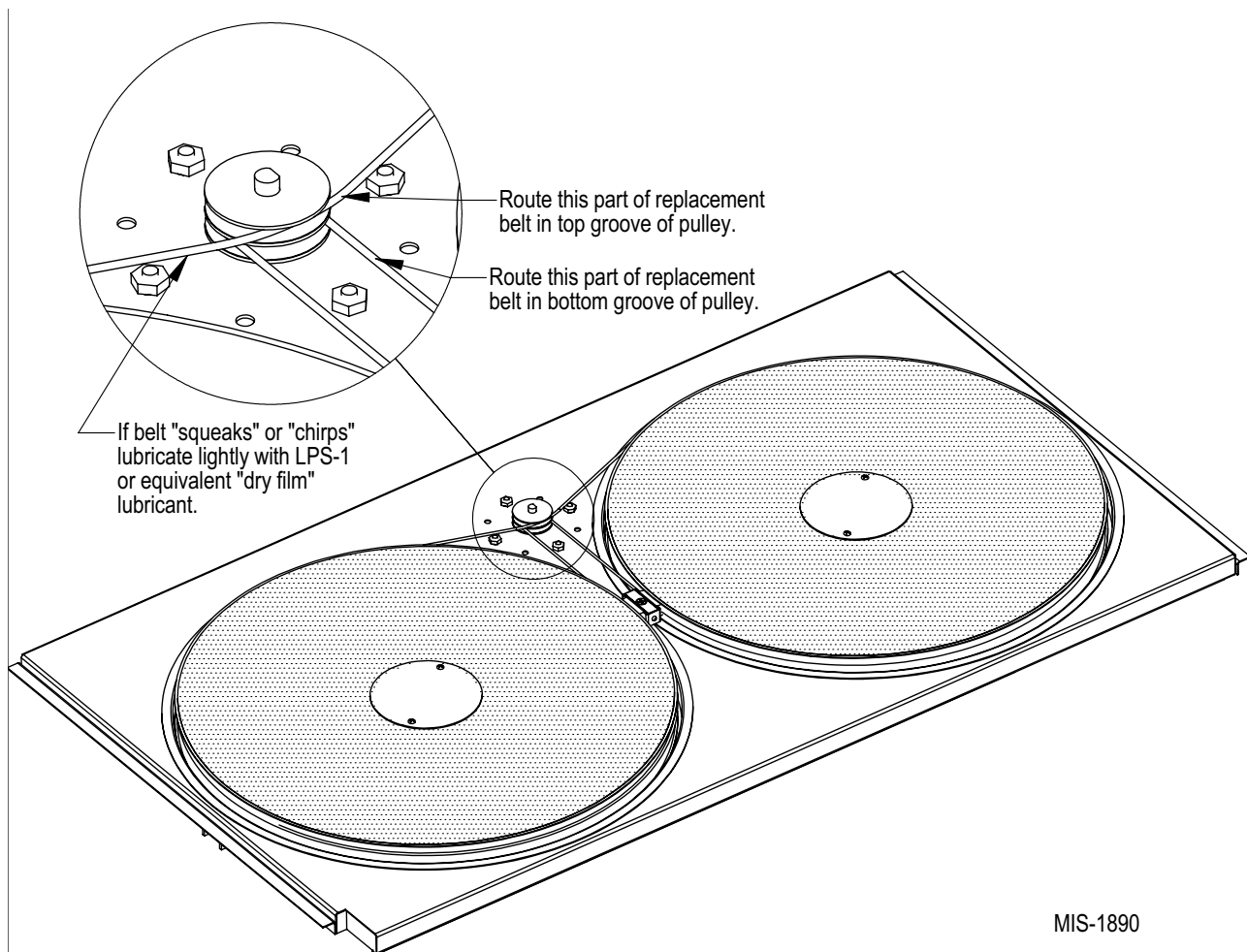
2. To maintain peak latent (moisture) removal capacity, it is recommended that the energy recovery wheels be sprayed with a diluted nonacid based evaporator coil cleaner or alkaline detergent solution such as 409.

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.

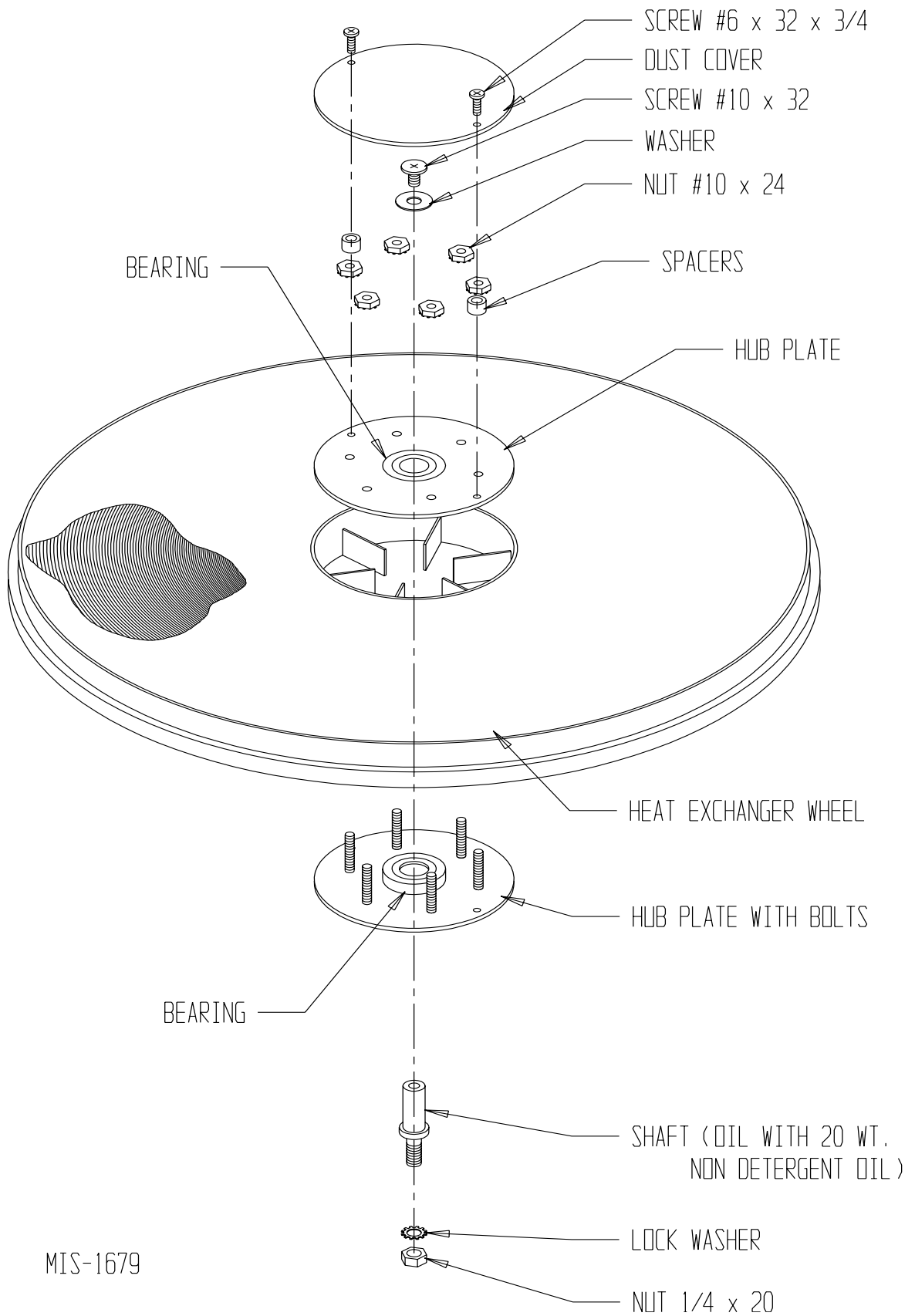
3. Rinse wheel thoroughly after application of the cleaning solution, and allow to drain before reinstalling.
4. No re-lubrication is required to heat wheel bearings of the drive motor, or to the intake and exhaust blower motors.
5. If any belt chirping or squealing noise is present, apply a small amount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

**FIGURE 11
BELT REPLACEMENT INSTRUCTIONS
(2 WHEEL CASSETTE ONLY)**



MIS-1890

FIGURE 12
HUB ASSEMBLY WITH BALL BEARINGS



MIS-1679