

INSTALLATION INSTRUCTIONS

WALL MOUNT ENERGY RECOVERY VENTILATOR WITH EXHAUST

MODELS:
WERV-A5B
WERV-C5B

For Use With Bard
3-1/2 Thru 5 Ton
Wall Mount™ Air Conditioners
and Heat Pumps



BARD MANUFACTURING COMPANY
Bryan, Ohio 43506

Since 1914...Moving ahead, just as planned.

Manual: 2100-308A
Supersedes: 2100-308
File: Volume III, Tab 19
Date: 02-15-2000

Contents

Model Nomenclature Legend 1

Electrical Specifications 1

General Description 1

General Information 1

Unpacking 1

Performance and Application Data 2

Basic Installation (Field Installation) 3

Basic Installation (Factory Installed Versions) 12

Control Wiring 12

Control Requirements 12

Recommended Control Sequences 12

Ventilation Air Flow 12

Maintenance Procedures 16

Figures

Figure 1 4

Figure 2 5

Figure 3 6

Figure 4 7

Figure 5 8

Figure 6 9

Figure 7 10

Figure 8 11

Figure 9 13

Figure 10 14

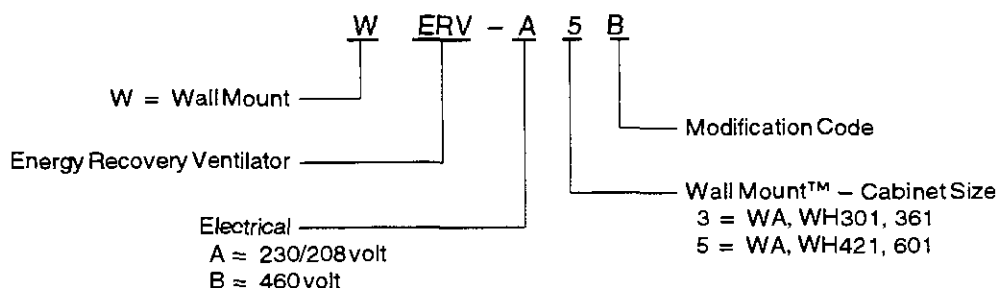
Figure 11 15

Figure 12 17

Tables

Table 1 12

MODEL NOMENCLATURE LEGEND



ELECTRICAL SPECIFICATIONS

Model	Voltage	Amps	Control Voltage
WERV-A5B	230/208	2.2	24V
WERV-C5B	460	1.2	24V

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.

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 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 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-*5B has two 15 inch diameter heat transfer wheels 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.

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 – WERV-5B

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

Ambient O.D.		VENTILATION RATE 450 CFM						VENTILATION RATE 375 CFM						VENTILATION RATE 300 CFM					
DB/ WB	F	VLT	VLS	VLL	HRT	TRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL
105	75	21465	14580	6884	13952	9477	4475	17887	12150	5737	11805	8018	3786	14310	9720	4590	9587	6512	3075
	70	14580	14580	0	9477	9477	0	12150	12150	0	8018	8018	0	9720	9720	0	6512	6512	0
	65	14580	14580	0	9477	9477	0	12150	12150	0	8018	8018	0	9720	9720	0	6512	6512	0
100	80	31590	12150	19440	20533	7897	12635	26325	10125	16200	17374	6682	10692	21060	8100	12960	14110	5427	8683
	75	21465	12150	9314	13952	7897	6054	17887	10125	7762	11805	6682	5123	14310	8100	6210	9587	5427	4160
	70	12352	12150	202	8029	7897	131	10293	10125	168	6793	6682	111	8235	8100	135	5517	5427	90
	65	12150	12150	0	7897	7897	0	10125	10125	0	6682	6682	0	8100	8100	0	5427	5427	0
	60	12150	12150	0	7897	7897	0	10125	10125	0	6682	6682	0	8100	8100	0	5427	5427	0
95	80	31590	9720	21870	20533	6318	14215	26325	8100	18225	17374	5345	12028	21060	6480	14580	14110	4341	9768
	75	21465	9720	11744	13952	6318	7634	17887	8100	9787	11805	5345	6459	14310	6480	7830	9587	4341	5246
	70	12352	9720	2632	8029	6318	1711	10293	8100	2193	6793	5345	1447	8235	6480	1755	5517	4341	1175
	65	9720	9720	0	6318	6318	0	8100	8100	0	5345	5345	0	6480	6480	0	4341	4341	0
	60	9720	9720	0	6318	6318	0	8100	8100	0	5345	5345	0	6480	6480	0	4341	4341	0
90	80	31590	7290	24300	20533	4738	15794	26325	6075	20250	17374	4009	13365	21060	4860	16200	14110	3256	10854
	75	21465	7290	14175	13952	4738	9213	17887	6075	11812	11805	4009	7796	14310	4860	9450	9587	3256	6331
	70	12352	7290	5062	8029	4738	3290	10293	6075	4218	6793	4009	2784	8235	4860	3375	5517	3256	2261
	65	7290	7290	0	4738	4738	0	6075	6075	0	4009	4009	0	4860	4860	0	3256	3256	0
	60	7290	7290	0	4738	4738	0	6075	6075	0	4009	4009	0	4860	4860	0	3256	3256	0
85	80	31590	4860	26730	20533	3159	17374	26325	4050	22275	17374	2672	14701	21060	3240	17820	14110	2170	11939
	75	21465	4860	16605	13952	3159	10793	17887	4050	13837	11805	2672	9132	14310	3240	11070	9587	2170	7416
	70	12352	4860	7492	8029	3159	4870	10293	4050	6243	6793	2672	4120	8235	3240	4995	5517	2170	3346
	65	4860	4860	0	3159	3159	0	4050	4050	0	2672	2672	0	3240	3240	0	2170	2170	0
	60	4860	4860	0	3159	3159	0	4050	4050	0	2672	2672	0	3240	3240	0	2170	2170	0
80	75	21465	2430	19035	13952	1579	12372	17887	2025	15862	11805	1336	10469	14310	1620	12690	9587	1085	8502
	70	12352	2430	9922	8029	1579	6449	10293	2025	8268	6793	1336	5457	8235	1620	6615	5517	1085	443
	65	4252	2430	1822	2764	1579	1184	3543	2025	1518	2338	1336	1002	2835	1620	1215	1899	1085	81
	60	2430	2430	0	1579	1579	0	2025	2025	0	1336	1336	0	1620	1620	0	1085	1085	0
75	70	12352	0	12352	8029	0	8029	10293	0	10293	6793	0	6793	8235	0	8235	5517	0	5517
	65	4252	0	4252	2764	0	2764	3543	0	3543	2338	0	2338	2835	0	2835	1899	0	1899
	60	0	0	0	0	0	0	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					
	450 CFM		375 CFM		300 CFM	
DB F	WVL	WHR	WVL	WHR	WVL	WHR
65	2430	1944	2025	1640	1620	1328
60	4860	3888	4050	3280	3240	2656
55	7290	5832	6075	4920	4860	6985
50	9720	7776	8100	6561	6480	9313
45	12150	9720	10125	8201	8100	11642
40	14580	11664	12150	9841	9720	13970
35	17010	13608	14175	11481	11340	16298
30	19440	15552	16200	13122	12960	18627
25	21870	17496	18225	14762	14580	20955
20	24300	19440	20250	16402	16200	23284
15	26730	21384	22275	18042	17820	25612

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 Following Units		Electrical
WERV-A5B	WA421-A,-B	WH421-A,-B	230/208-1 or 3 phase
	WA482-A,-B	WH482-A,-B	
	WA602-A,-B	WH602-A,-B	
WERV-C5B	WA421-C	WH421-C	460-3 phase
	WA482-C	WH482-C	
	WA602-C	WH602-C	



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 exhaust blower assembly from back of ventilator and discard shipping plate. (See Figure 1.)
3. 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 2.)
4. Remove and save existing unit air filter. Remove and discard the exhaust cover plate and remove center screw from condenser grille. (See Figure 3.)
5. Install exhaust blower assembly in exhaust opening and secure with four (4) screws. Position 4 pin connector so it is accessible. (See Figure 4.)
6. 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.)

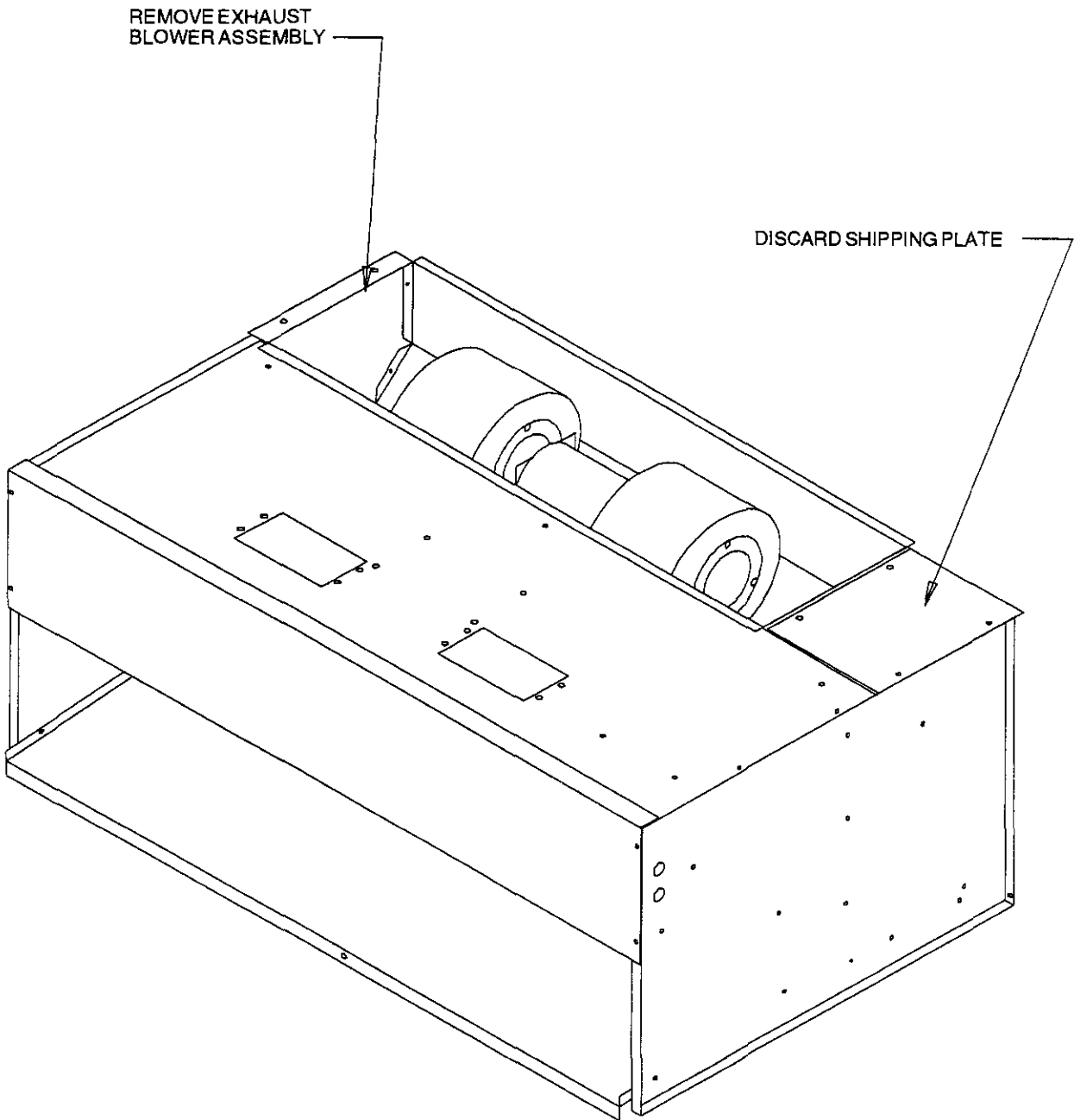
IMPORTANT NOTE: Position front lip of ventilator over front grille and on top of condenser partition. (See Figure 5 inset.) This is important to ensure proper drainage of any water entering damper assembly.

7. Remove access panel and plug in exhaust blower. (See Figure 5.) Replace access panel.
8. Open control panel to gain access to unit low voltage terminal block. (Insure all power is OFF prior to opening the control panel.)
9. Route electrical harness leads through the 7/8" bushing in control panel (Figure 5) into low voltage box.
10. Temporarily connect leads with fork terminal to corresponding points on terminal strip to terminals C and G. (See Figure 6 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 for suggested control schemes..

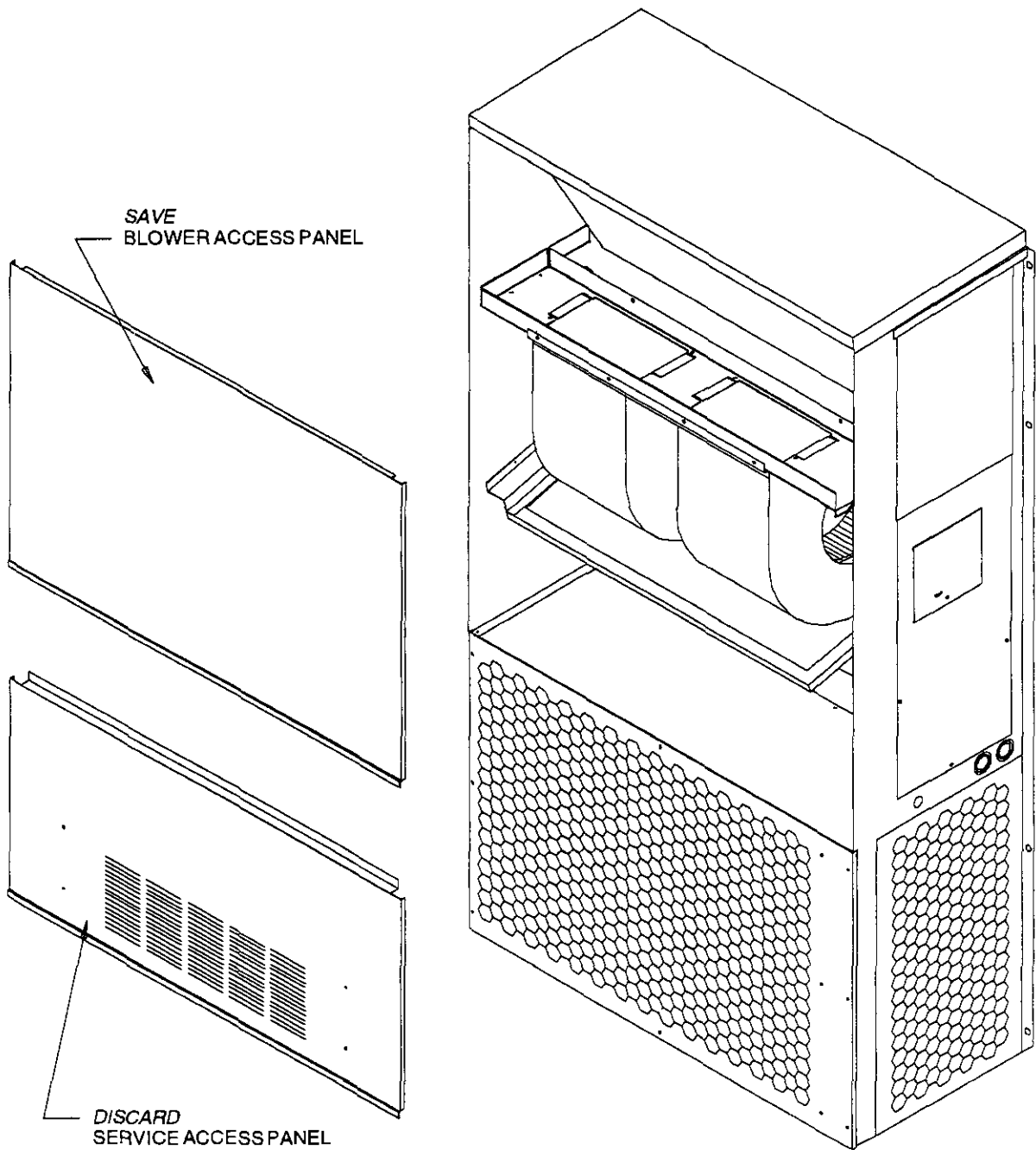
11. Remove female plug of high voltage wiring harness from the heat recover assembly and snap into unit control panel. Wire to terminal block. (See Figure 6 and wiring diagram.)
12. Plug male plug from female at side of control panel. (See Figures 5.)
13. Close control panel cover.
14. Replace filter and one (1) screw in condenser grille. (See Figure 3)
15. 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. (See Figure 8.)
 - D. De-energize the evaporator blower. Energy Recovery wheels, and fresh air and exhaust air blowers should stop.
 - E. This completes ventilator checkout.
16. Disconnect the wires temporarily connected in Step 10.
17. Reinstall the blower access panel at top of unit and secure with sheet metal screws. (See Figure 2.)
18. Replace the lower service 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.
19. Ventilator is now ready for operation.

FIGURE 1



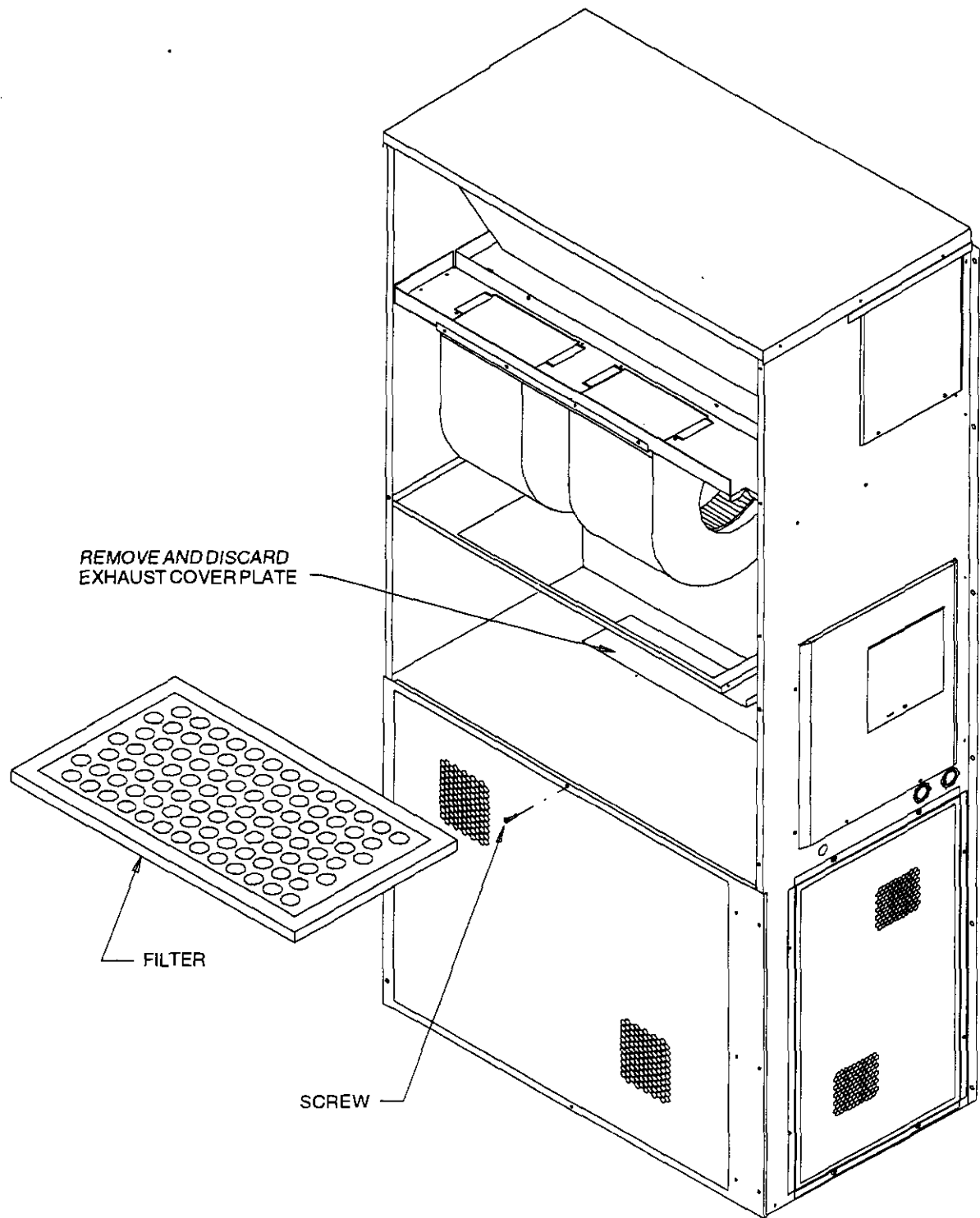
MIS-528

FIGURE 2



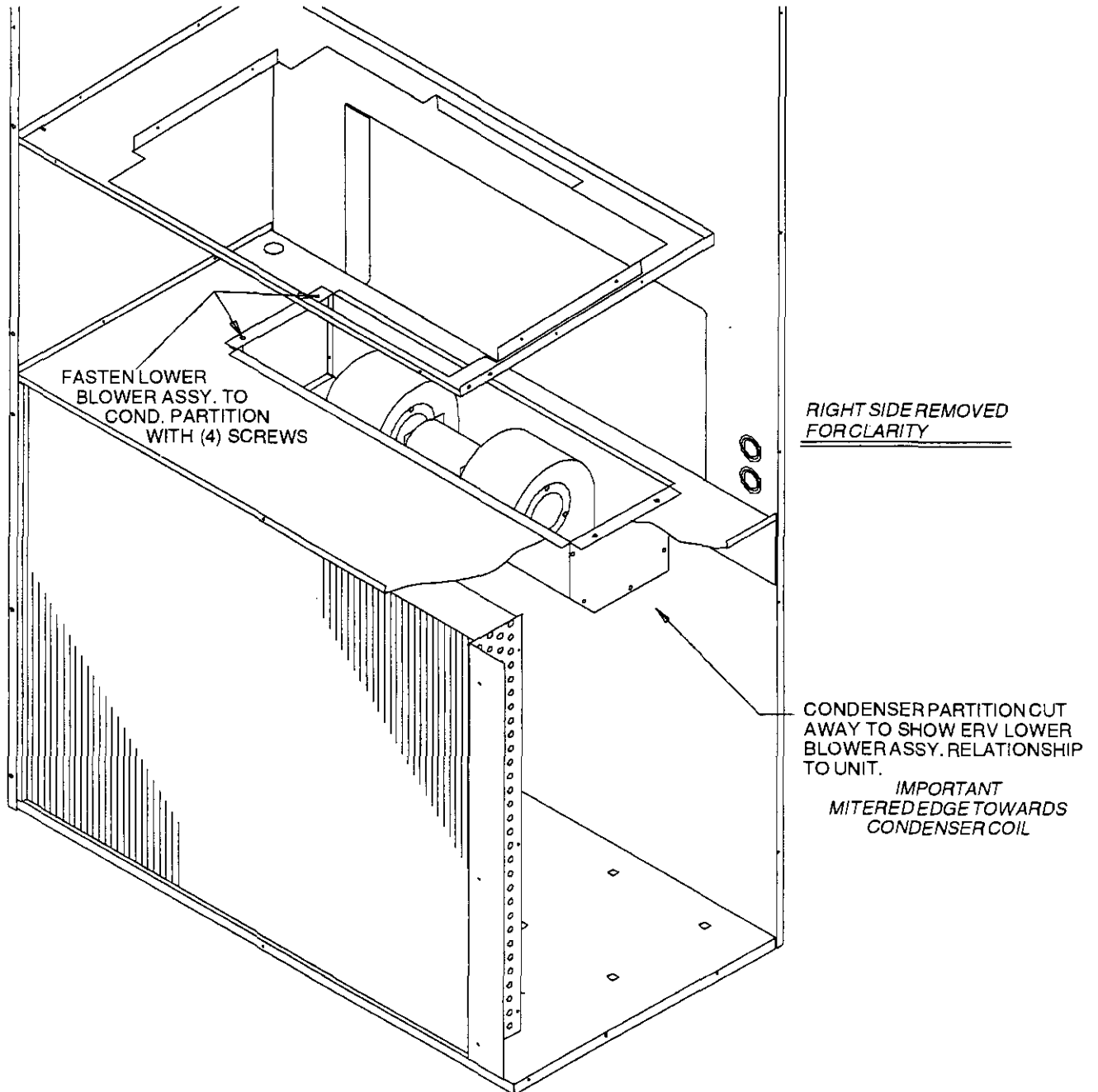
MIS-344

FIGURE 3



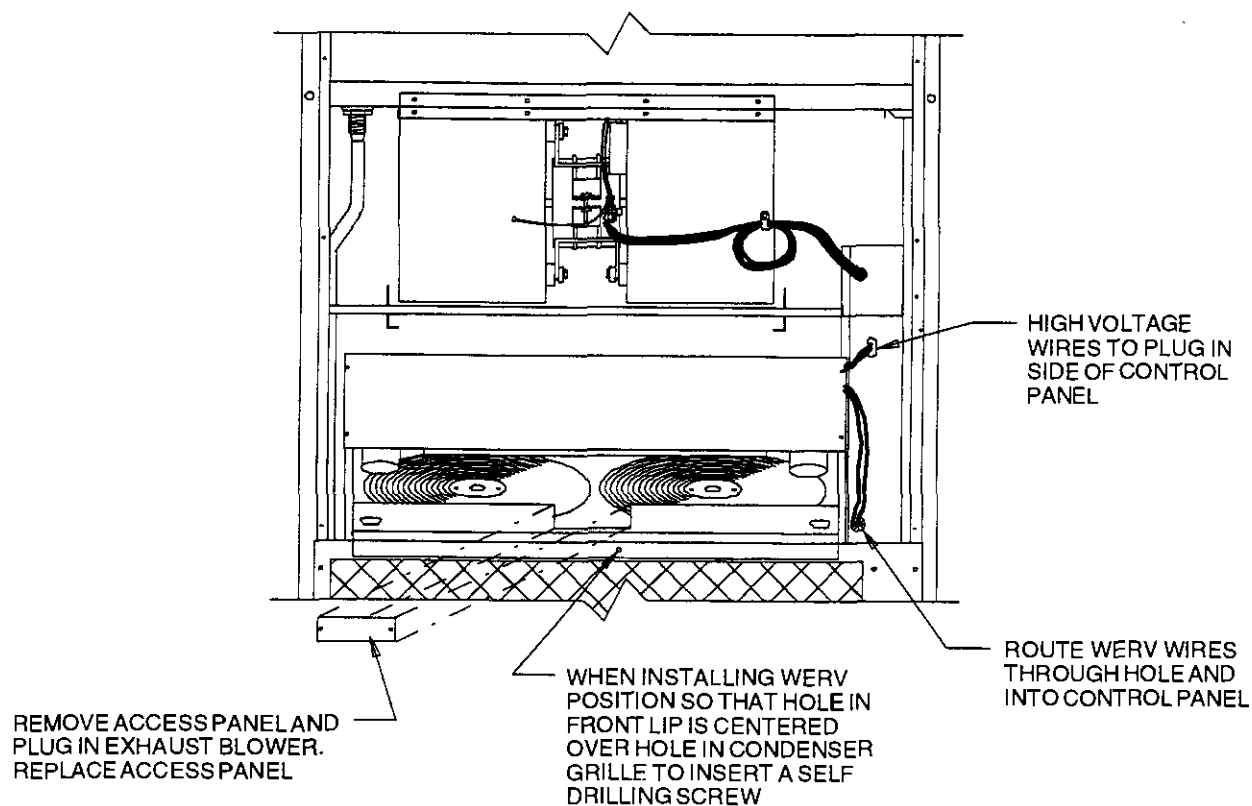
MIS-427

FIGURE 4



MIS-531

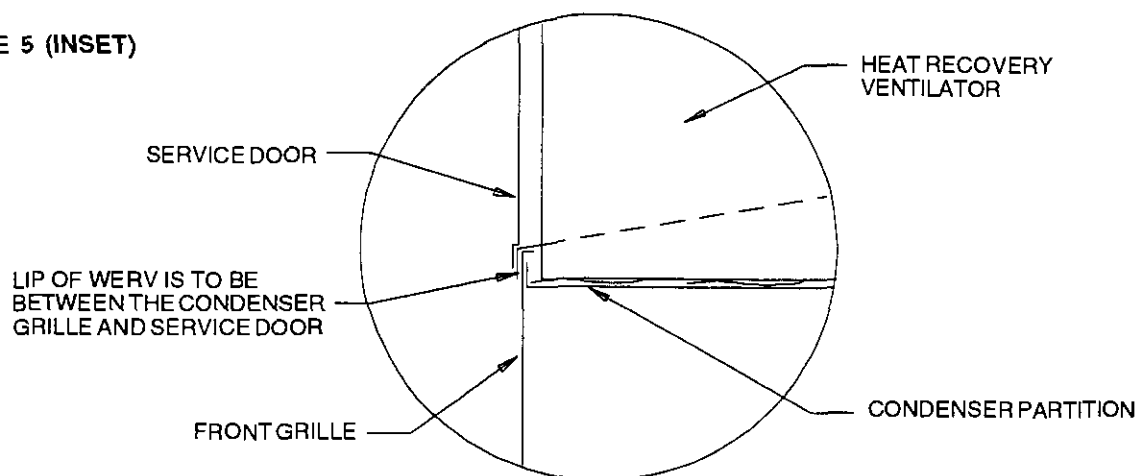
FIGURE 5



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

SIDE SECTION

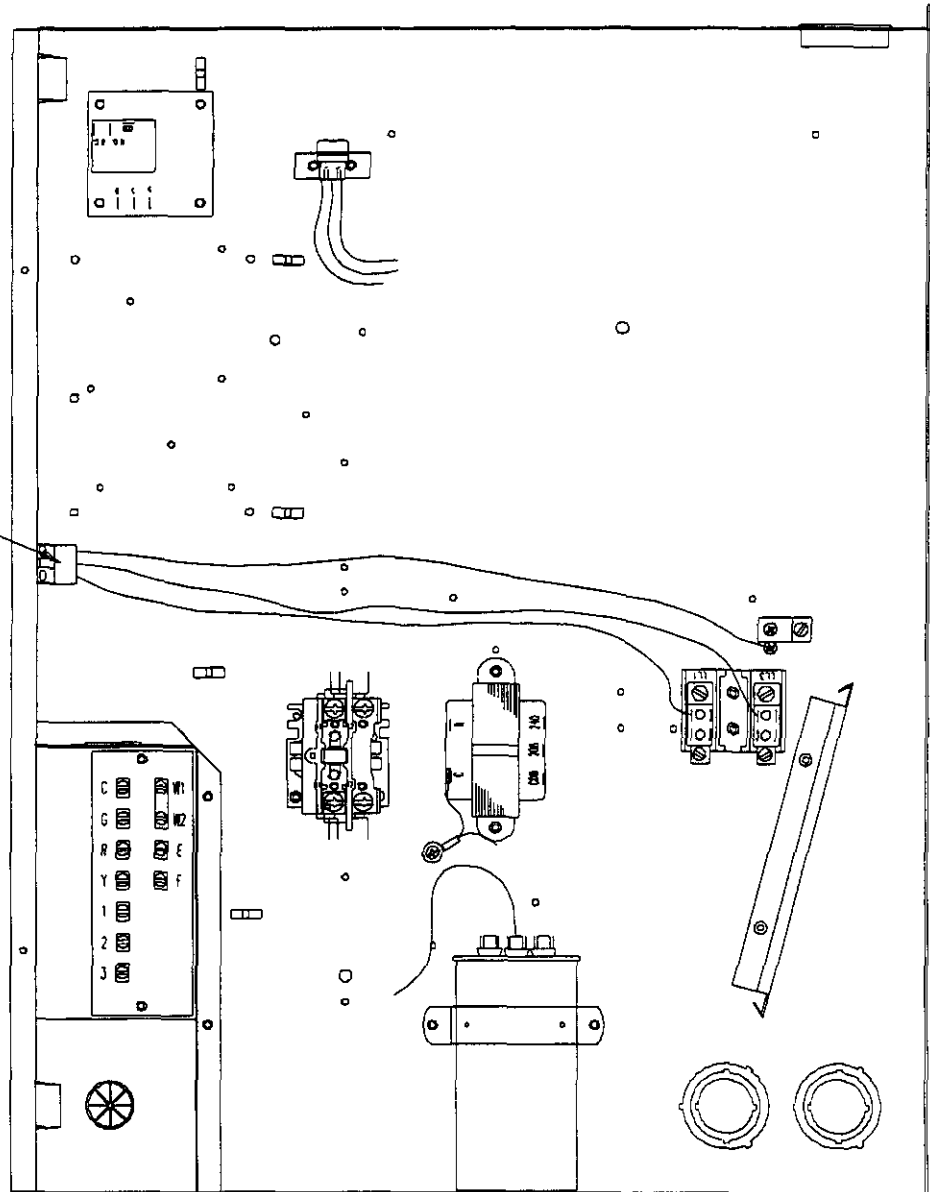
FIGURE 5 (INSET)



MIS-527

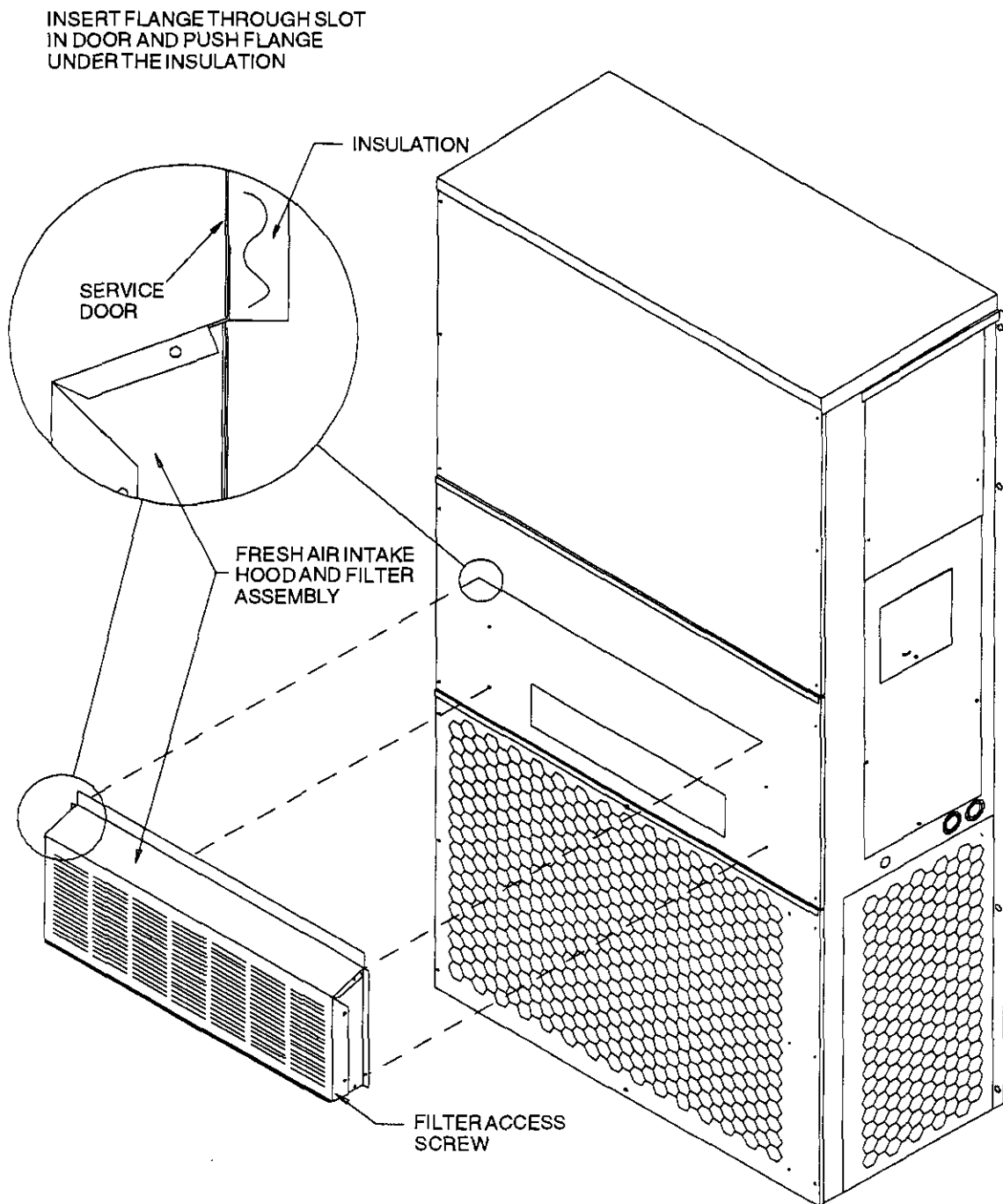
FIGURE 6

INSTALL 1-489701-0 CAP
AS SHOWN AND WIRE
PER WIRING DIAGRAM



MIS-532

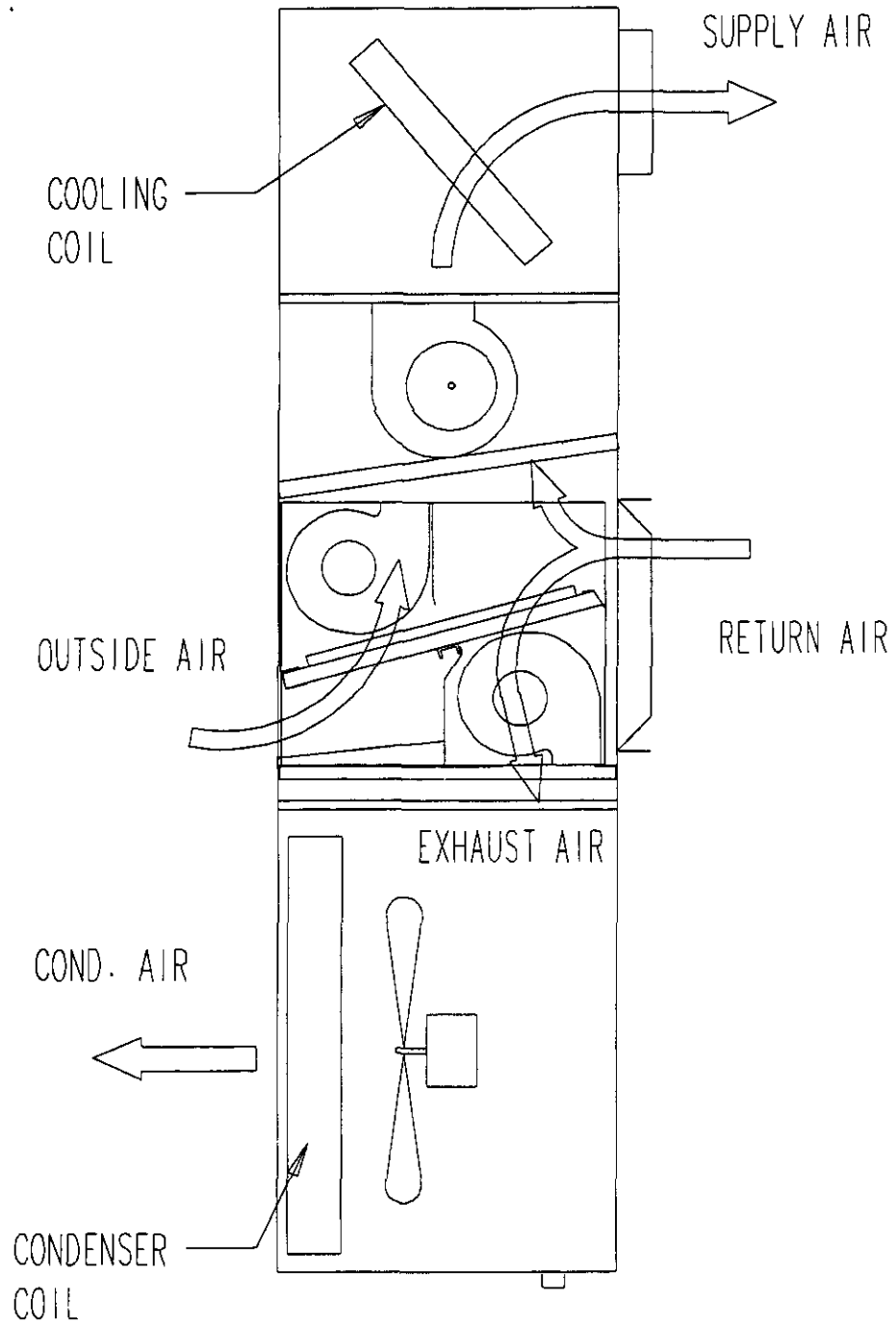
FIGURE 7



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

MIS-488

FIGURE 8



MIS-490

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. Refer to Item 16 of Basic Installation (Field Installation).
3. Refer to Control Wiring section for suggested control schemes for the WERV.
4. After wiring, replace all panels.

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-A5B 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 effect 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. 8403-034) 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 9.)
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 10 and Figure 11.)
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-A5B and WERV-C5B 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)
CFM	450	375	300

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 to the desired speed on the 240 volt models. The speed can be changed by disconnecting the red wire and reconnecting the black or blue wire on the intake or exhaust blower motor on the 460 volt models. 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 9

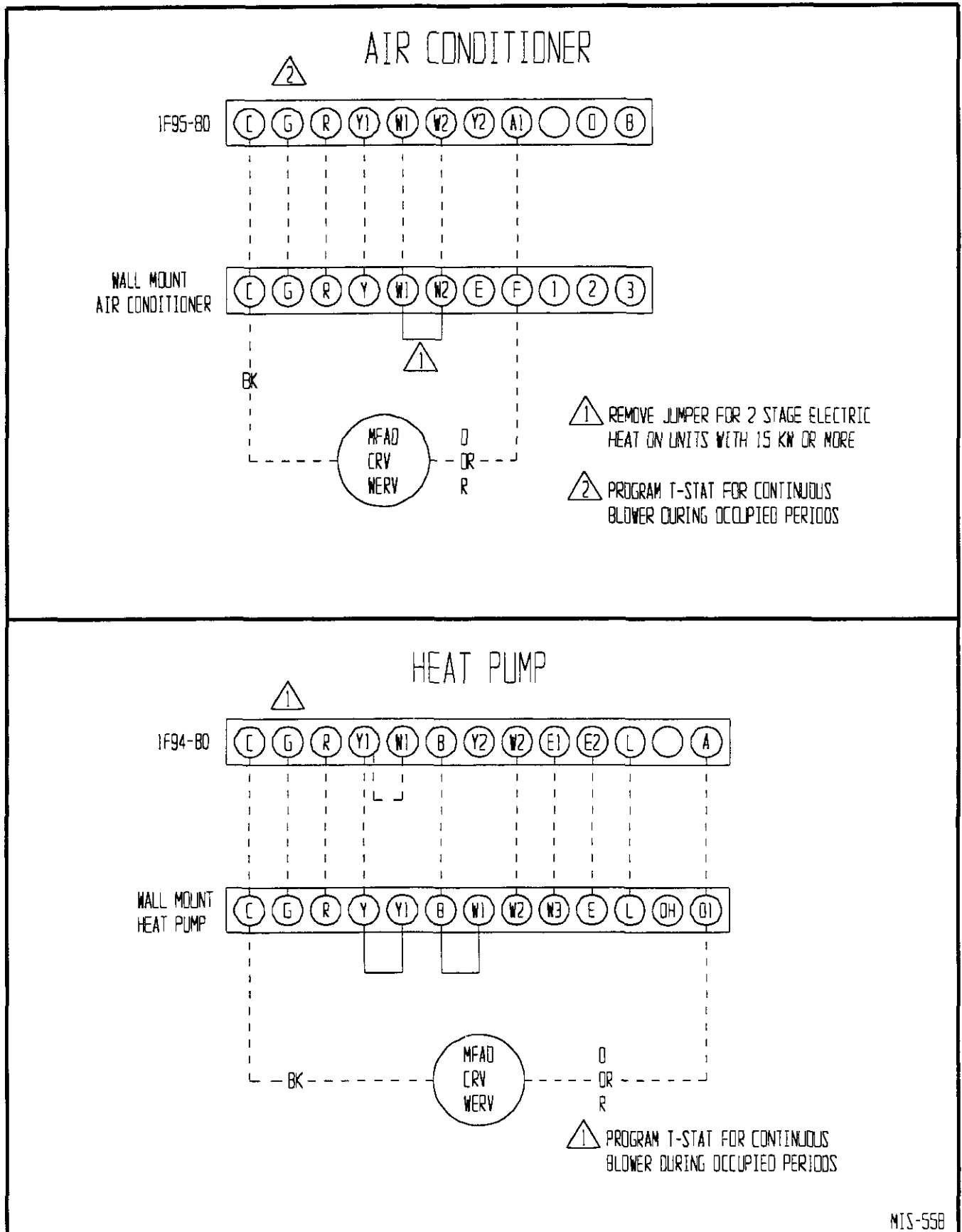


FIGURE 10

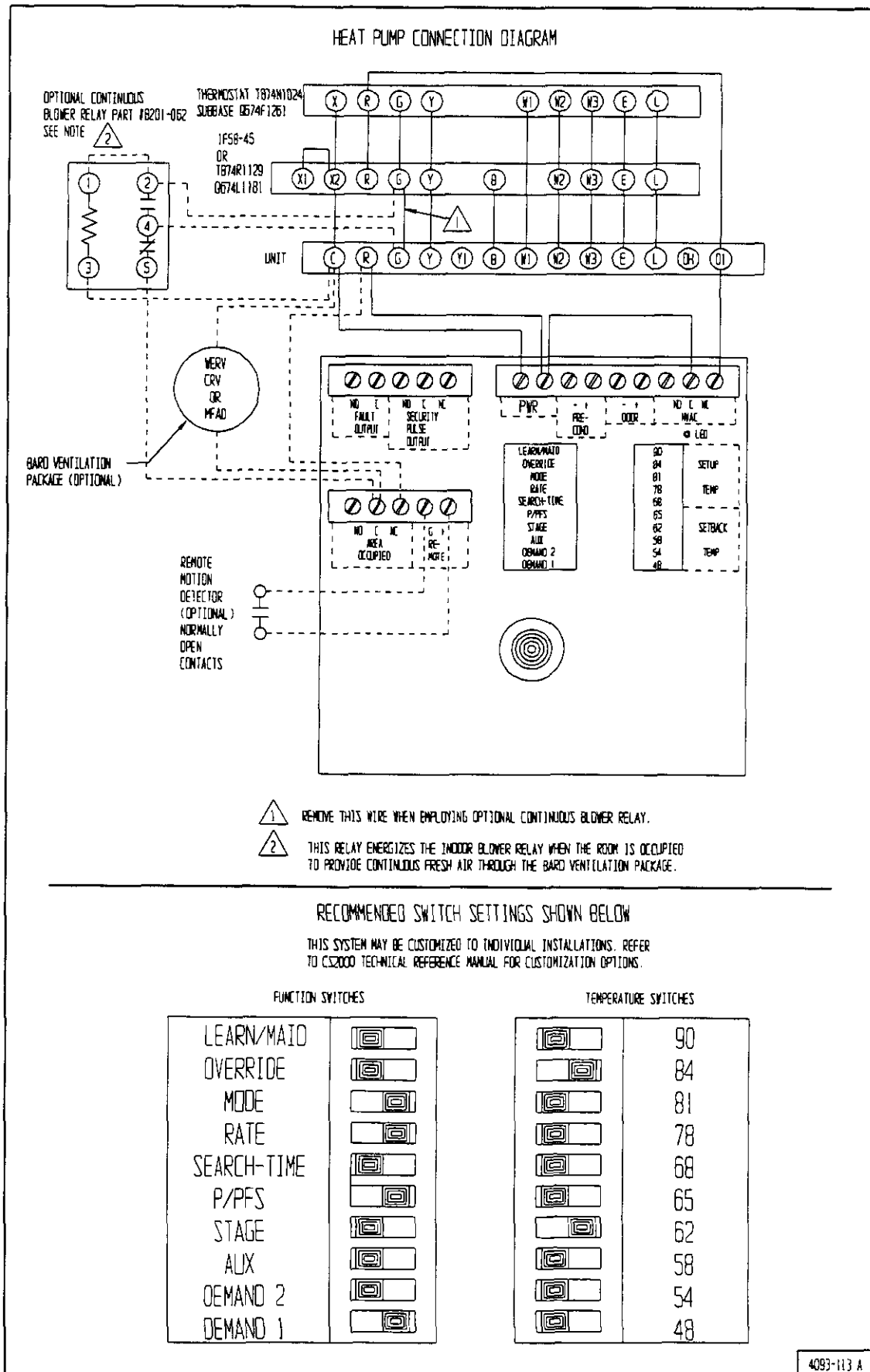
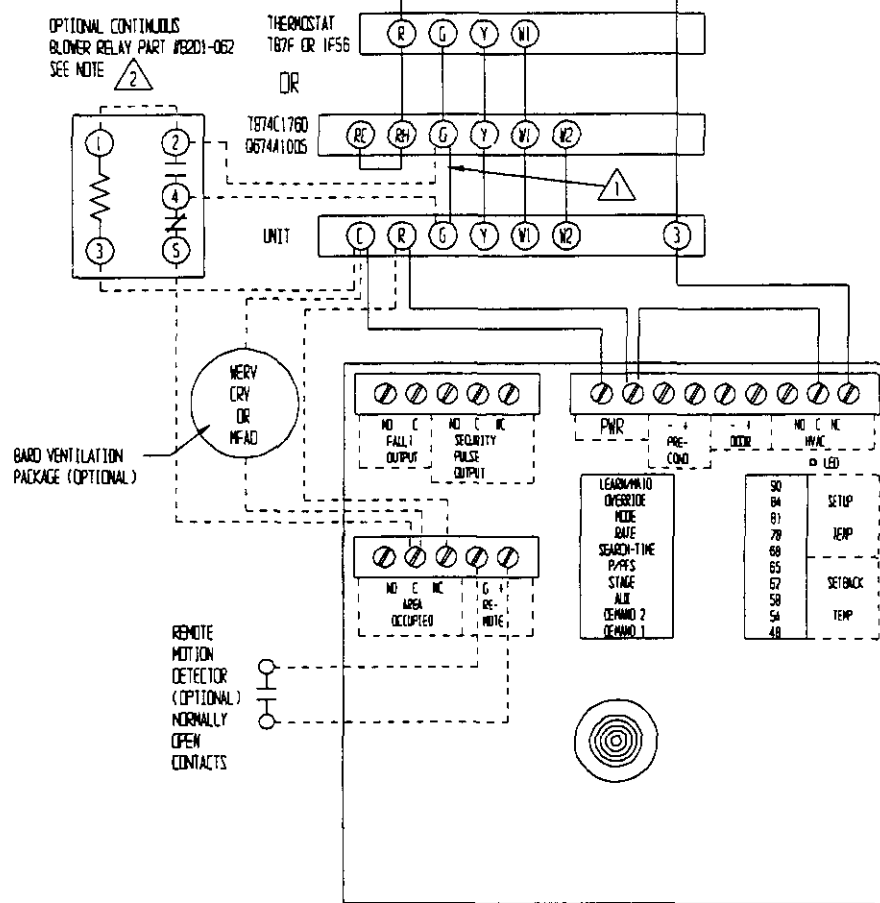


FIGURE 11

AIR CONDITIONER CONNECTION DIAGRAM



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 BARO VENTILATION PACKAGE.

RECOMMENDED SWITCH SETTINGS SHOWN BELOW

THIS SYSTEM MAY BE CUSTOMIZED TO INDIVIDUAL INSTALLATIONS. REFER TO CS2000 TECHNICAL REFERENCE MANUAL FOR CUSTOMIZATION OPTIONS.

FUNCTION SWITCHES

LEARN/MAID	☐
OVERRIDE	☐
MODE	☐
RATE	☐
SEARCH-TIME	☐
P/PFS	☐
STAGE	☐
AUX	☐
DEMAND 2	☐
DEMAND 1	☐

TEMPERATURE SWITCHES

☐	90
☐	84
☐	81
☐	78
☐	68
☐	65
☐	62
☐	58
☐	54
☐	48

4093-114 A

MAINTENANCE PROCEDURES

MONTHLY

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 or in a return air filter grille assembly. 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 grill 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.
Clean as necessary. Clean as follows: Disconnect all power to unit. Remove the lower service door of the wall mount unit to gain access to the energy recovery ventilator. Remove the front access panel on the ventilator. Unplug Amp connectors to cassette motors. Slide energy recovery cassette out of ventilator. Use a shop vacuum with brush attachment to clean both sides of the energy recover wheels.

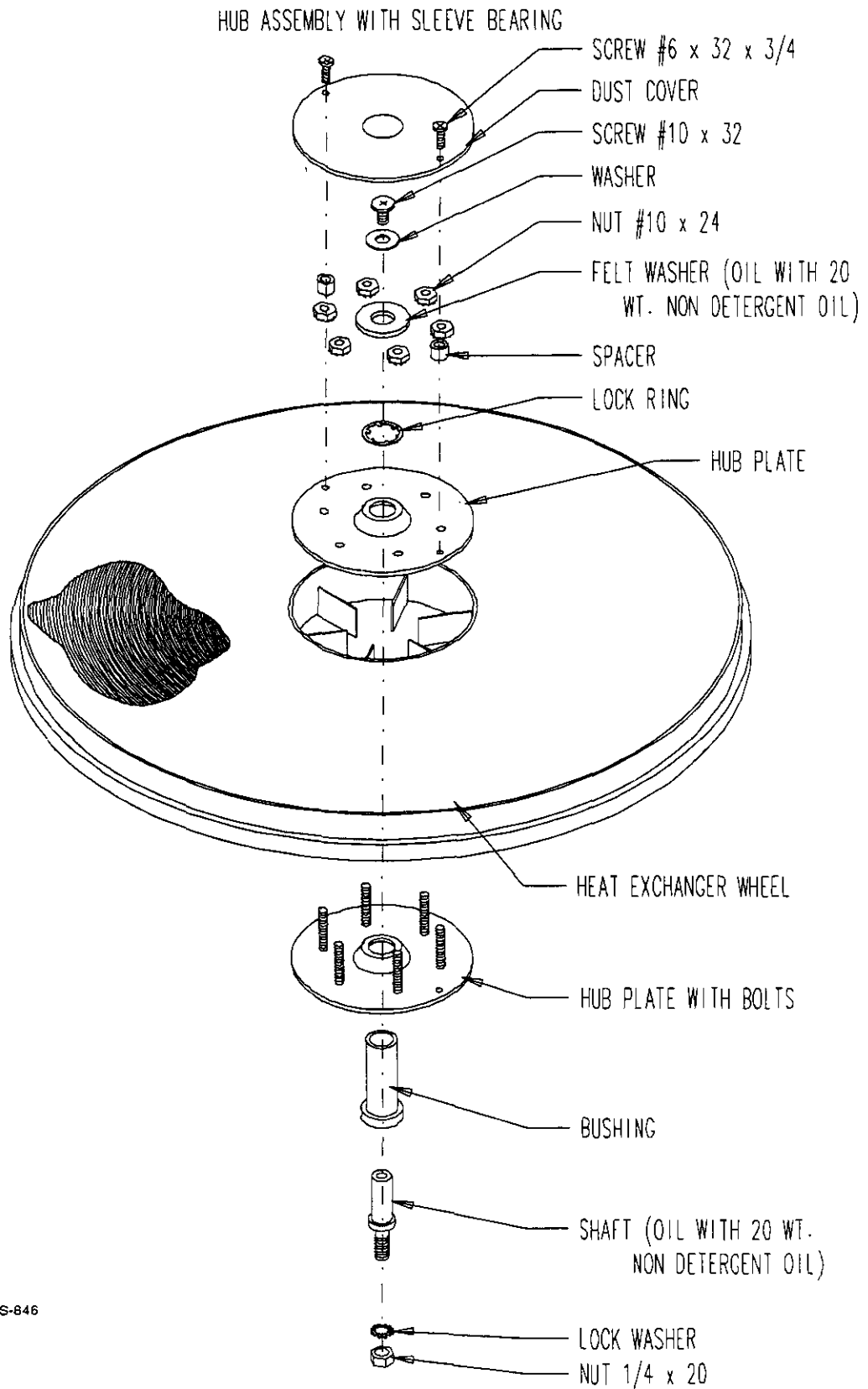
NOTE: Discoloration and staining of the wheel does not affect its performance. Only excessive build up of foreign material needs to be removed.

SEMIANNUALLY

1. Inspect condenser coil for dirt and clean if necessary. Clean all loose dirt, plant matter, cobwebs and/or insects from both sides of the coil with a shop vacuum. Take care not to damage or bend coil fins. For grease or tough dirt a commercial foaming coil cleaner suitable for use on aluminum fins should be used. Follow instructions on the coil cleaner. *Do not* use a high pressure hose or power cleaner.
2. Inspect and re-oil center wheel bearing of energy recovery ventilator wheels (sleeve bearing models only).

Inspect as follows: Disconnect all power to unit. Remove the lower service door of the unit to gain access to the energy recovery ventilator. Remove the front access panel on the ventilator. Unplug Amp connectors to cassette motors. Slide energy recovery cassette out of ventilator. Remove center shaft screw from top of cassette wheel. Remove wheel retaining washer. Push from underneath to slide wheel off shaft. Check for tar-lie deposits. If present clean shaft and bearing with rag soaked with 20 weight oil. Lightly oil shaft and bearing and reassemble. Add oil to re-soak felt washer. Use non-detergent 20 weight oil. Reassemble. (See Figure 12.)

FIGURE 12



MIS-846

1

2

3