



INSTALLATION INSTRUCTIONS

**MODELS:
WERV-A2B
WERV-A3B
WERV-C3B**

**WALL MOUNT
ENERGY RECOVERY VENTILATOR
WITH EXHAUST**

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

**BAR D MANUFACTURING COMPANY
Bryan, Ohio 43506**

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

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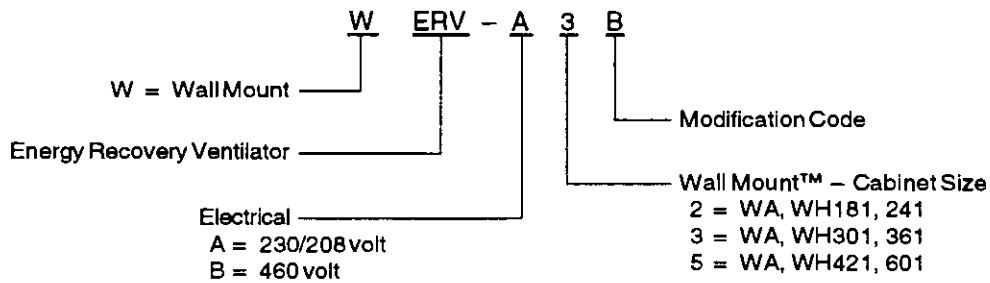
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MODEL NOMENCLATURE LEGEND



ELECTRICAL SPECIFICATIONS

Model	Voltage	Amps	Control Voltage
WERV-A2B	230/208	2.2	24V
WERV-A3B	230/208	2.2	24V
WERV-C3A	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 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-A2B 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.

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-A2B

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

Ambient O.D.	VENTILATION RATE 400 CFM						VENTILATION RATE 325 CFM						VENTILATION RATE 250 CFM						
	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					
	400 CFM 75% Eff		325 CFM 76% Eff		250 CFM 77% 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

PERFORMANCE AND APPLICATION DATA – WERV-*3B

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

Ambient O.D.	VENTILATION RATE 400 CFM						VENTILATION RATE 325 CFM						VENTILATION RATE 250 CFM						
	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	5285		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	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 Recover–Sensible
- HRL = Heat Recover–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-A2B	WA181-A	WH181-A,-B	230/208-1 or 3 phase
	WA241-A,-B	WH241-A,-B	
WERV-A3B	WA301-A,-B	WH301-A,-B	230/208-1 or 3 phase
	WA361-A,-B	WH361-A,-B	
WERV-C3B	WA301-C	WH301-C	460-3 phase
	WA361-C	WH361-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 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.)

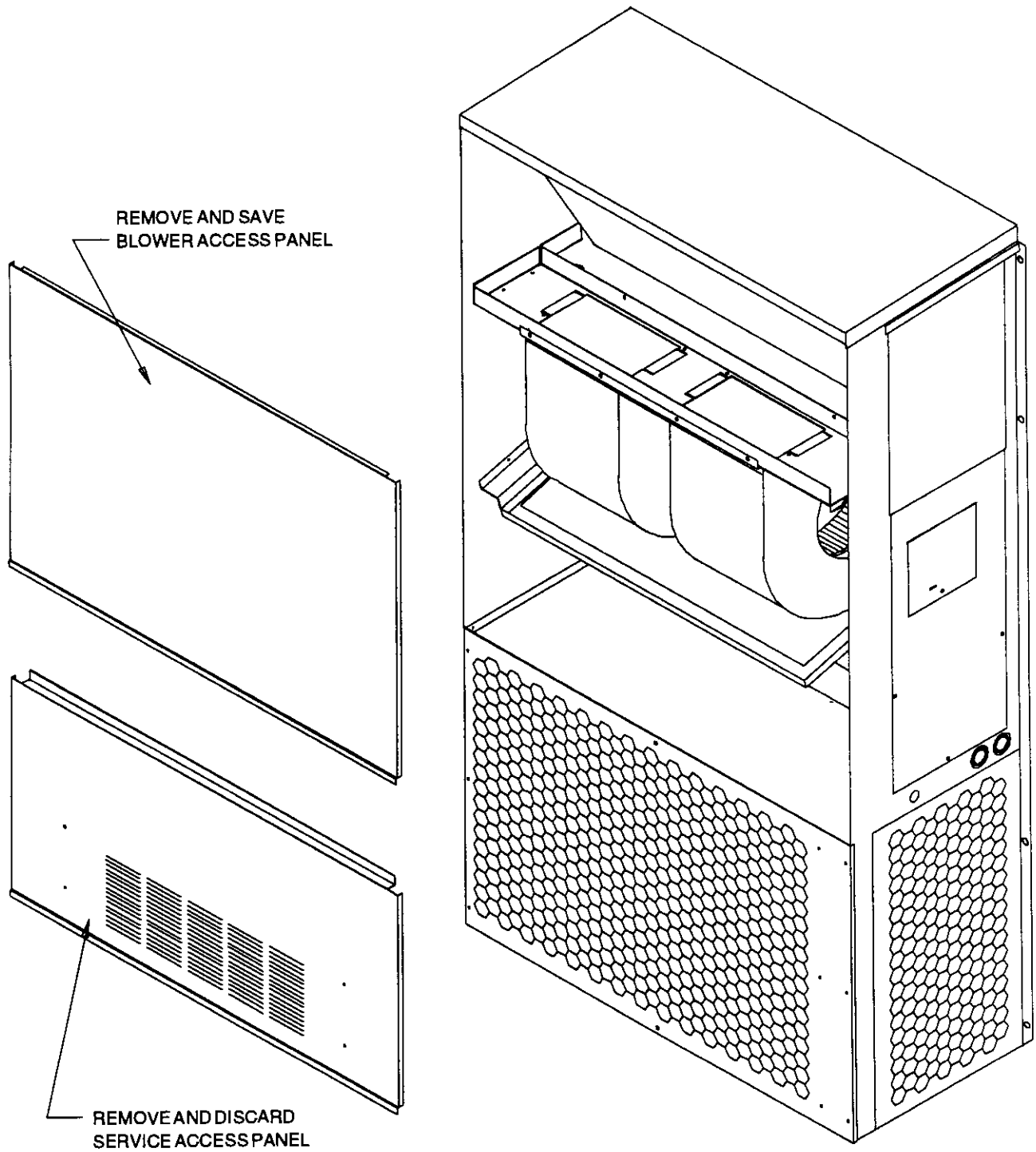
NOTE: These 24 volt control wires control the starting and stopping of the Energy Recovery Ventilator and can be independently controlled by an energy management control or timer. See separate section on Control Wiring.

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 between the door and insulation to prevent bowing of the door.
17. Ventilator is now ready for operation.

BASIC INSTALLATION (FACTORY INSTALLED MODELS)

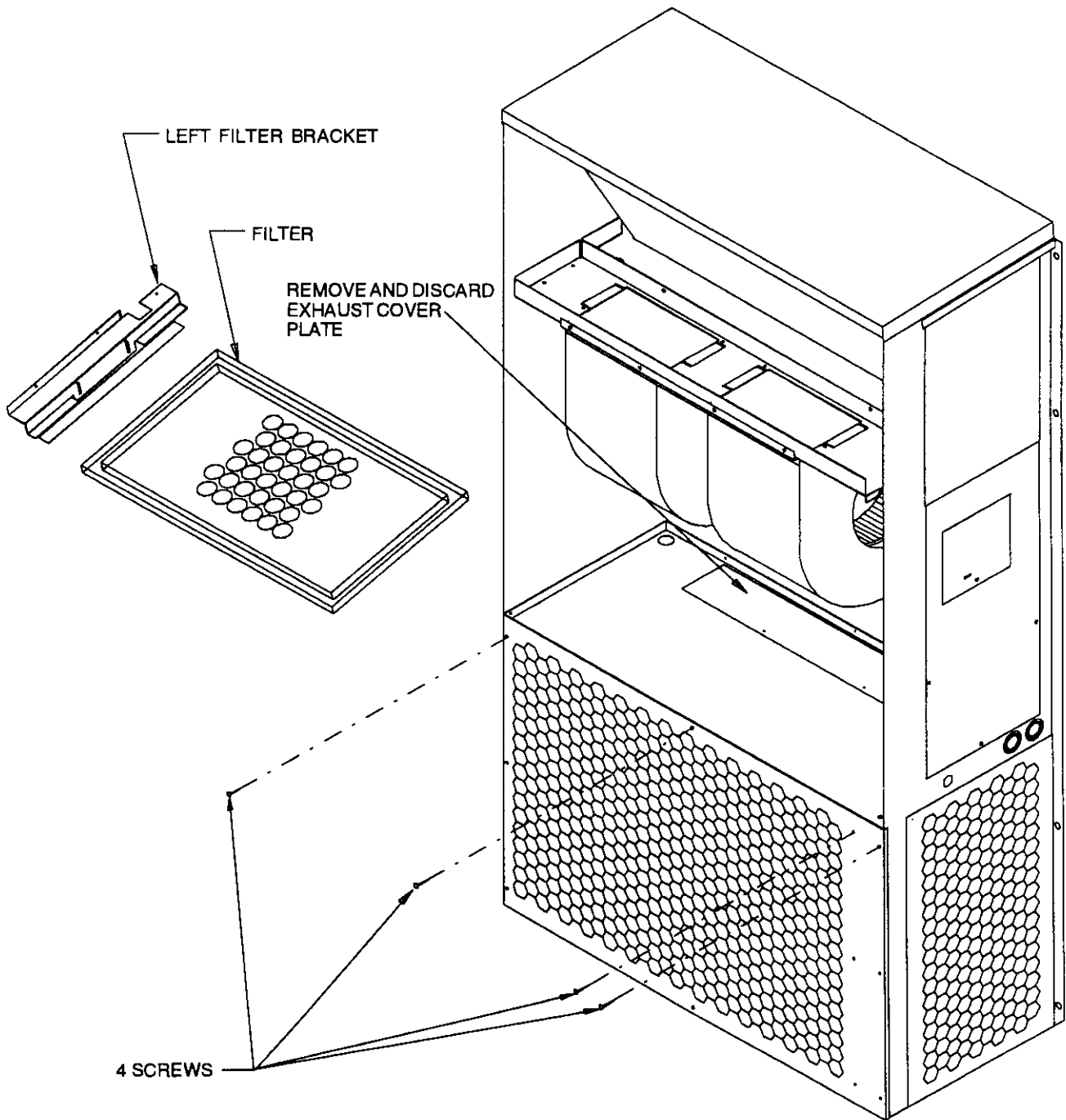
1. Remove blower access door and service door. Room filter located above air circulation blowers. Install filter. Remove filter bracket from shipping location and install on left side.
2. Remove air intake hood from shipping location and install air intake hood on service panel. Refer to the Control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

FIGURE 1



MIS-344

FIGURE 2



MIS-345

FIGURE 3

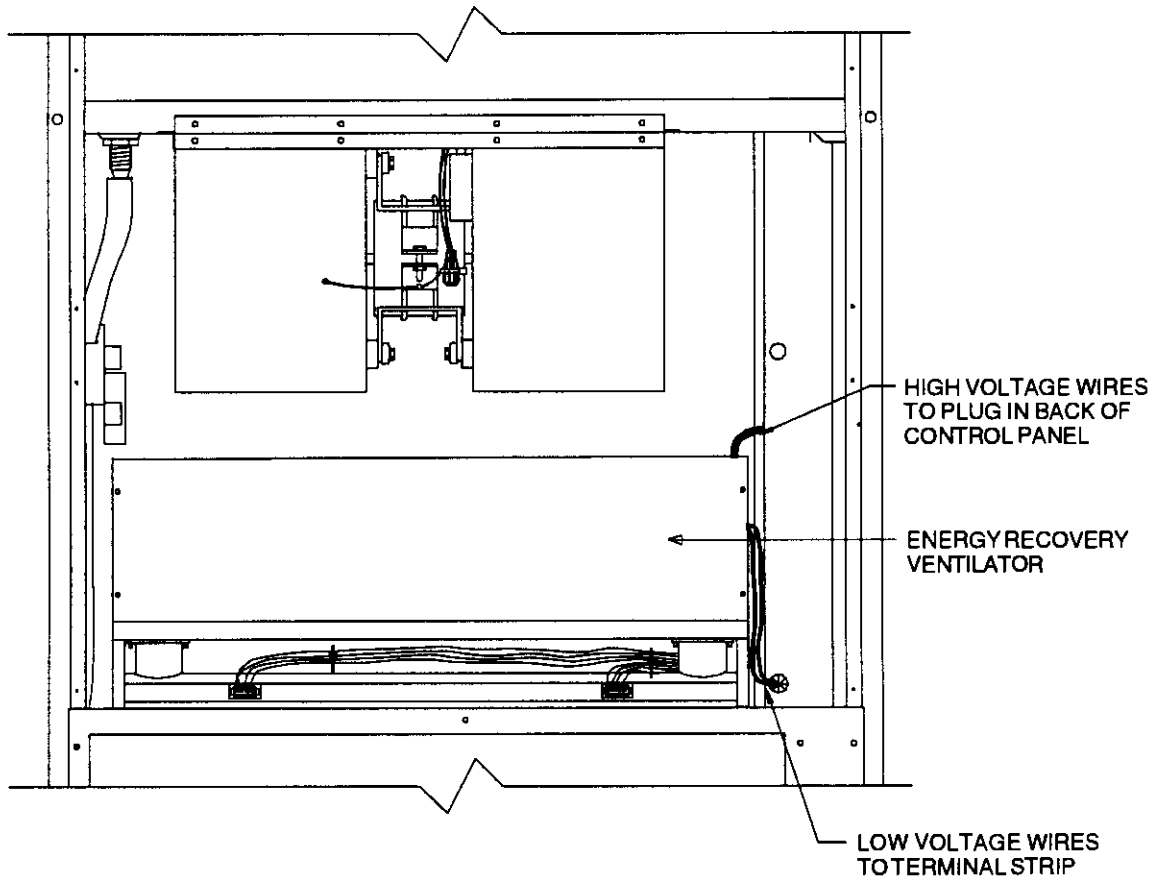
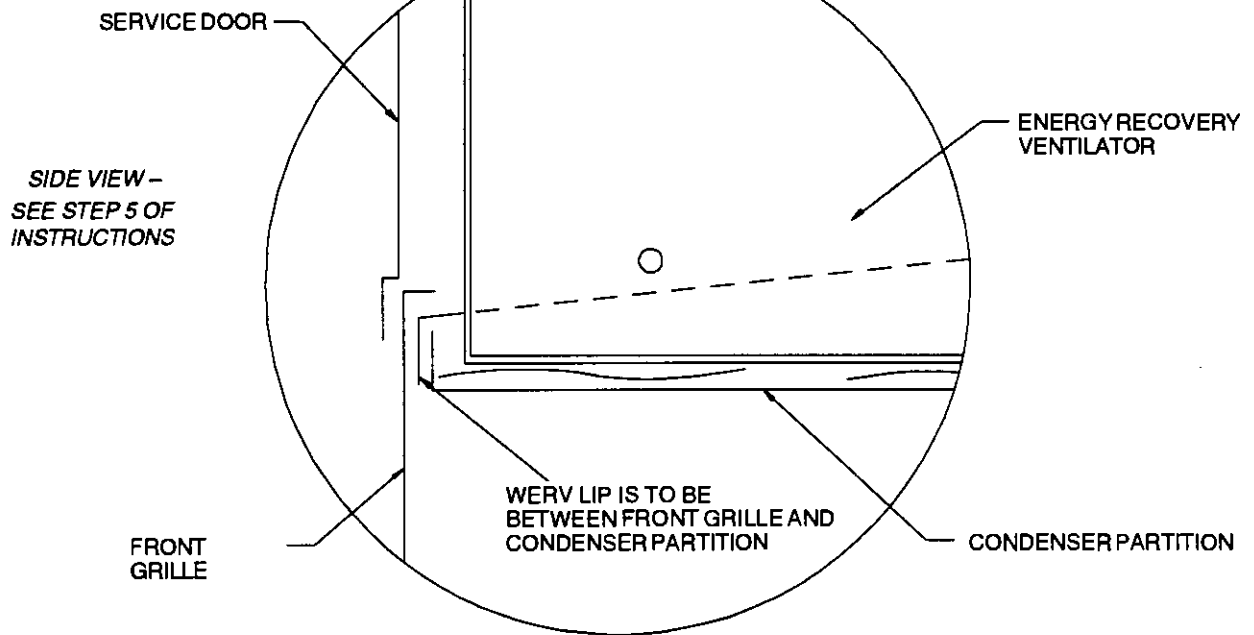
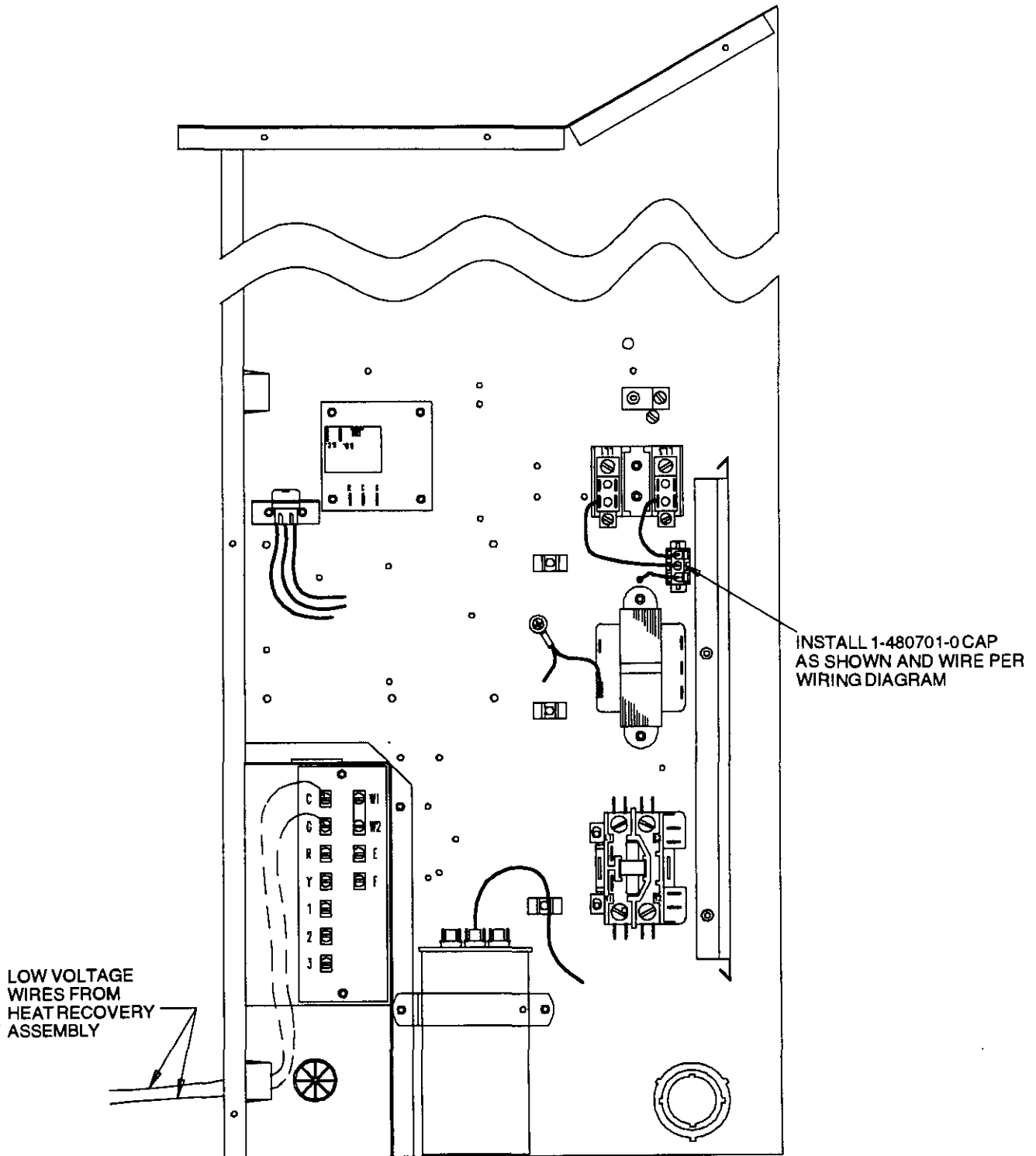


FIGURE 3 - INSET



MIS-489

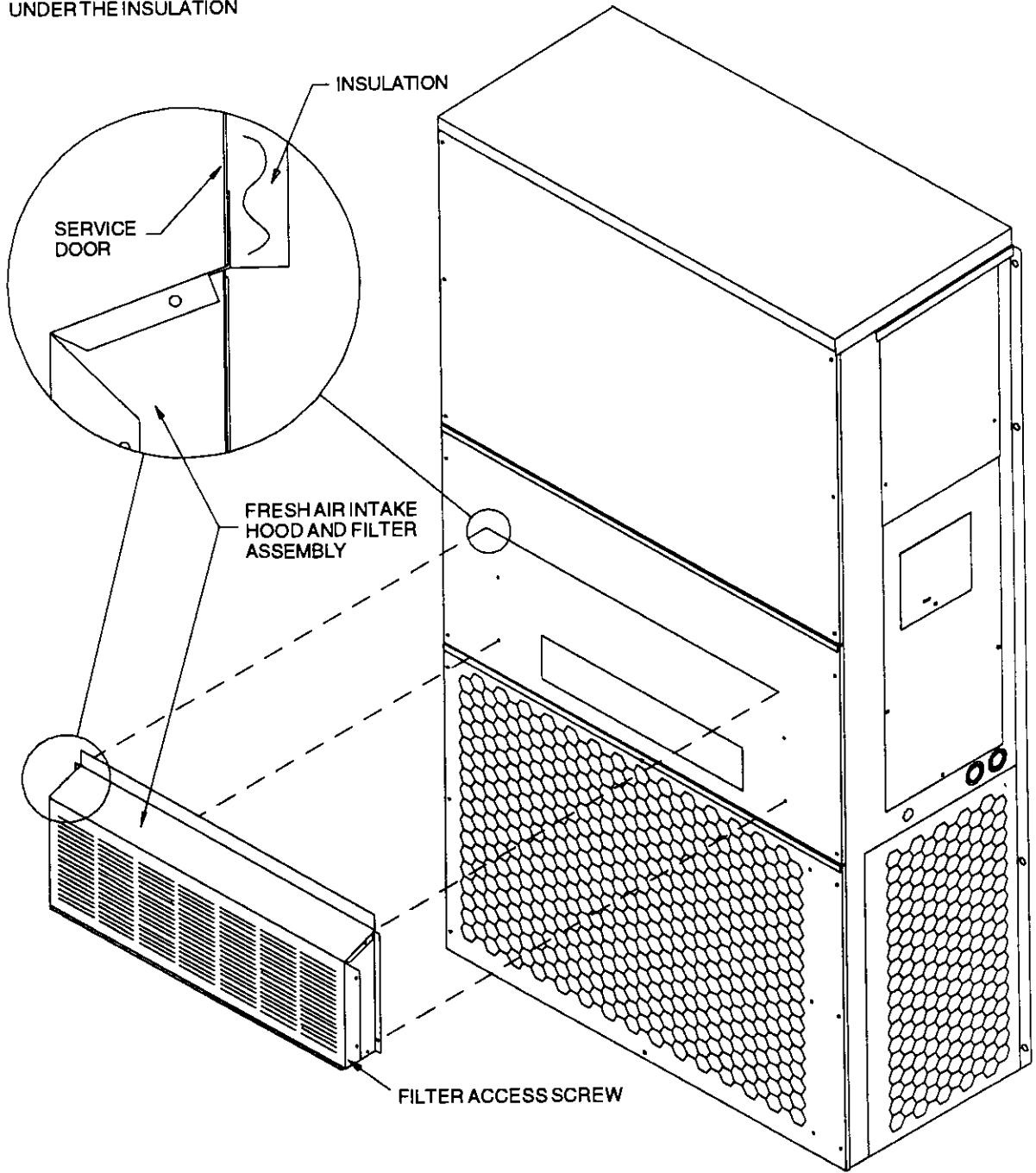
FIGURE 4



MIS-533

FIGURE 5

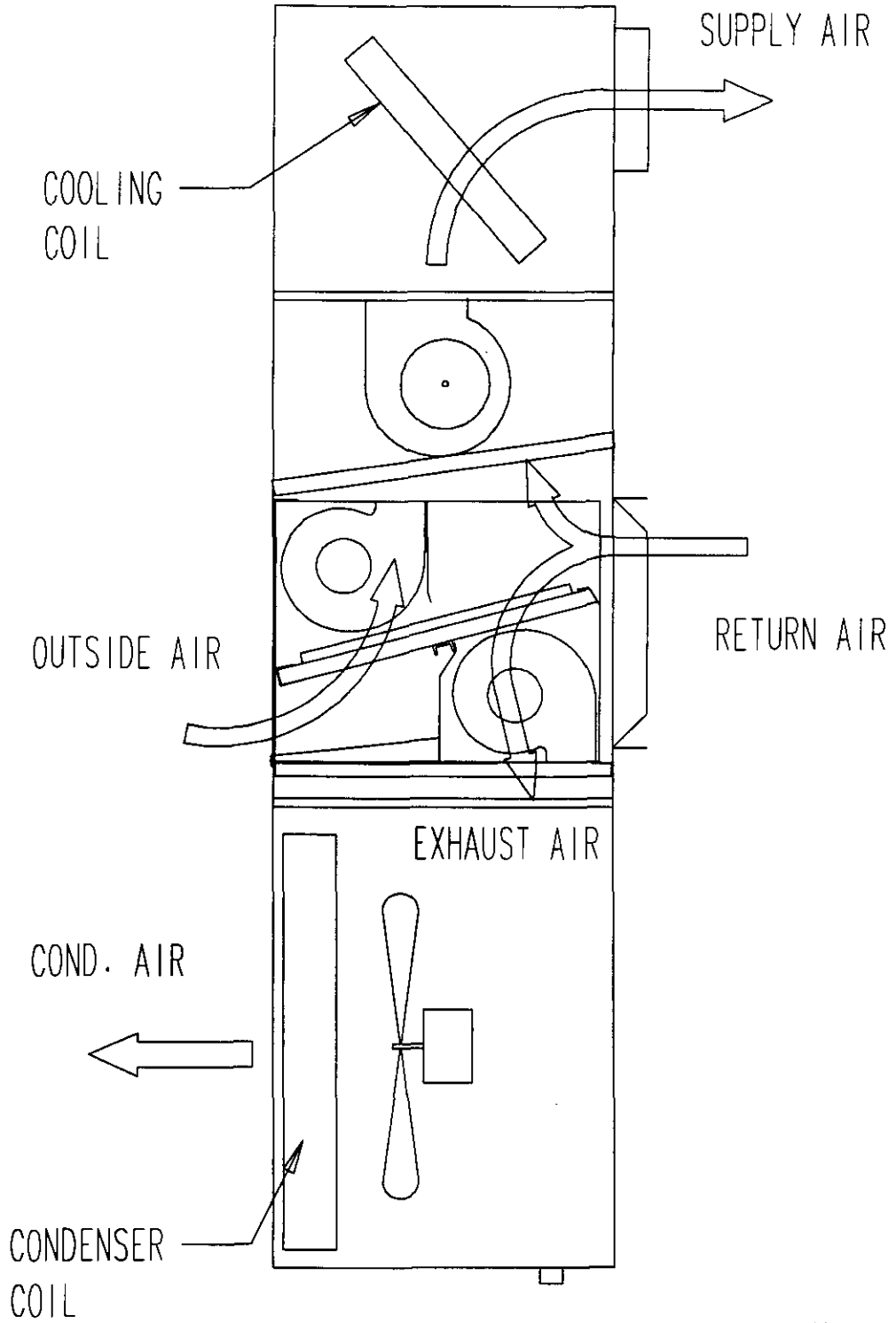
INSERT FLANGE THRU SLOT
IN DOOR AND PUSH FLANGE
UNDER THE INSULATION



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

MIS-488

FIGURE 6



MIS-490

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 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 occupance 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 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

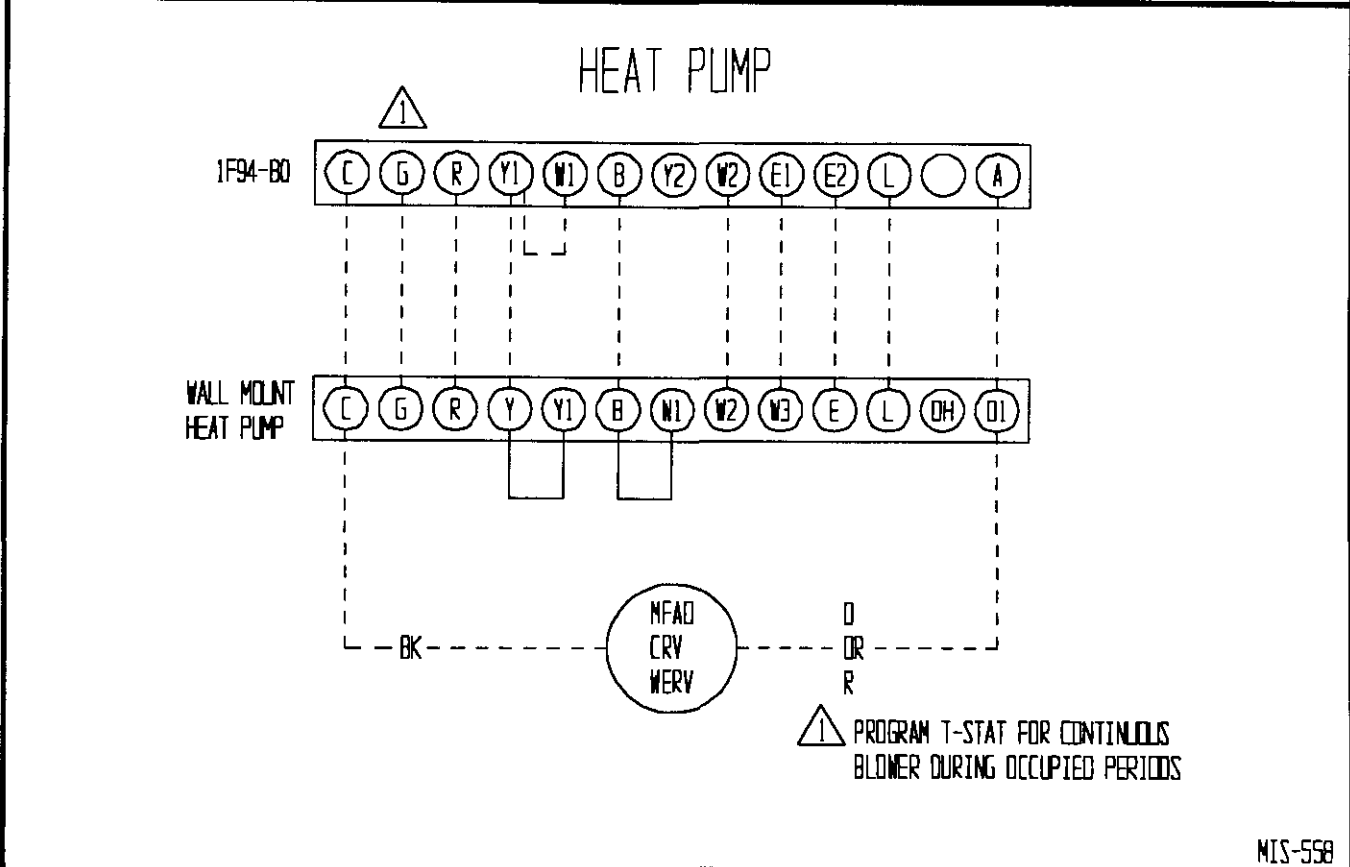
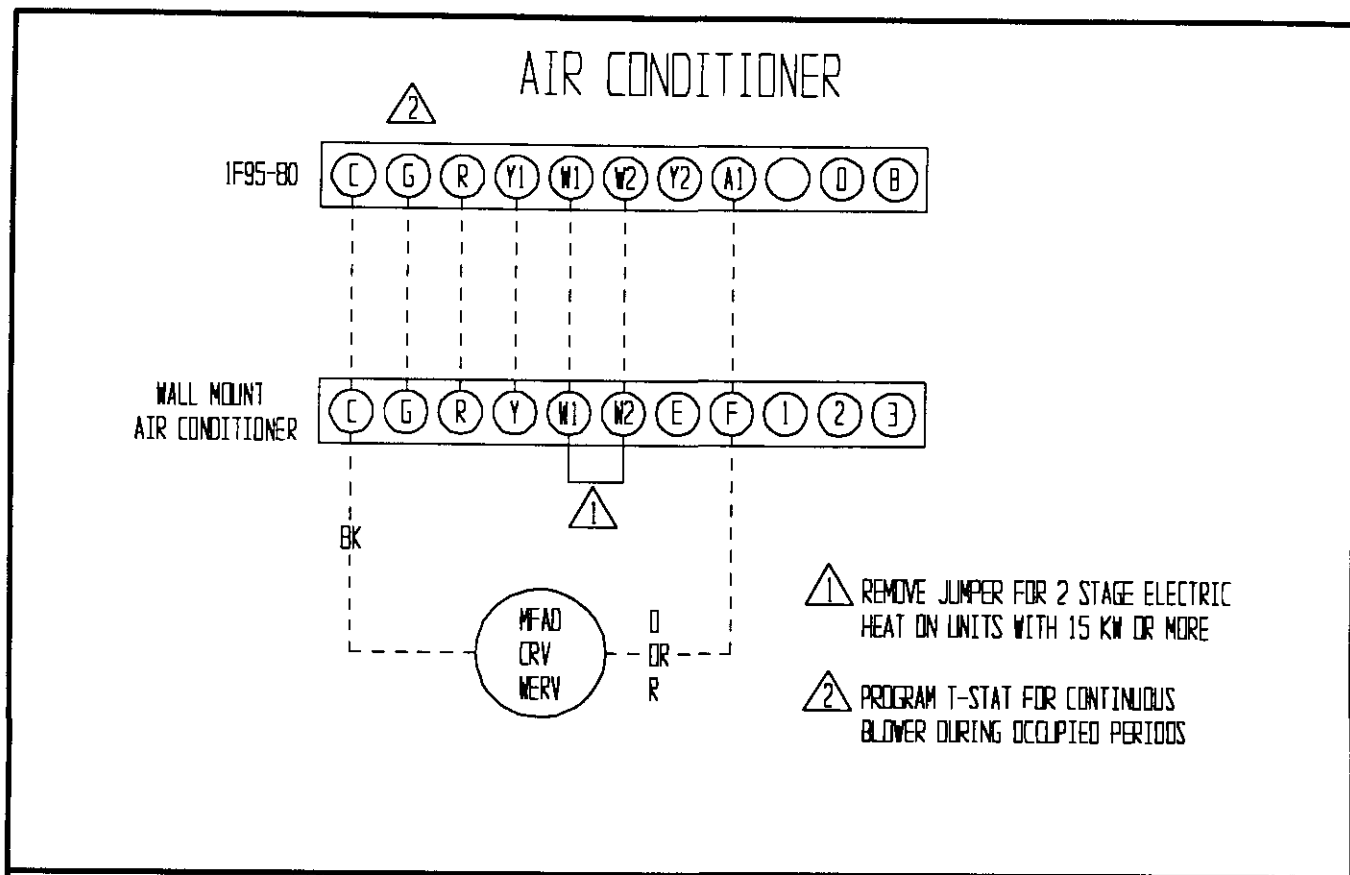
VENTILATION AIR (CFM)			
Model	High Speed (Black)	Medium Speed (Blue)	Low Speed (Red)
WERV-A2B	250	225	200
WERV-A3B WERV-C3B	400	325	250

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



MIS-558

FIGURE 8

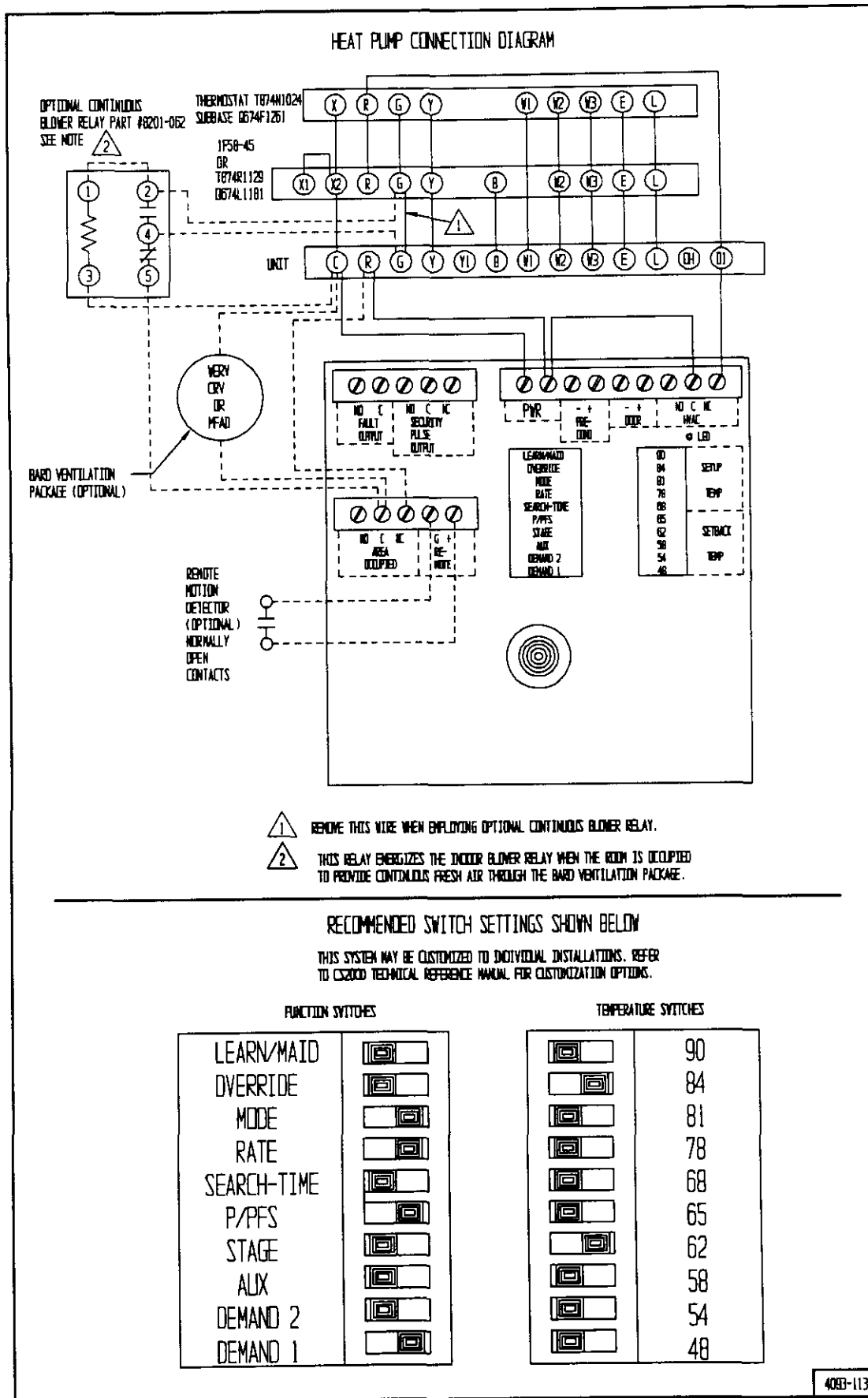
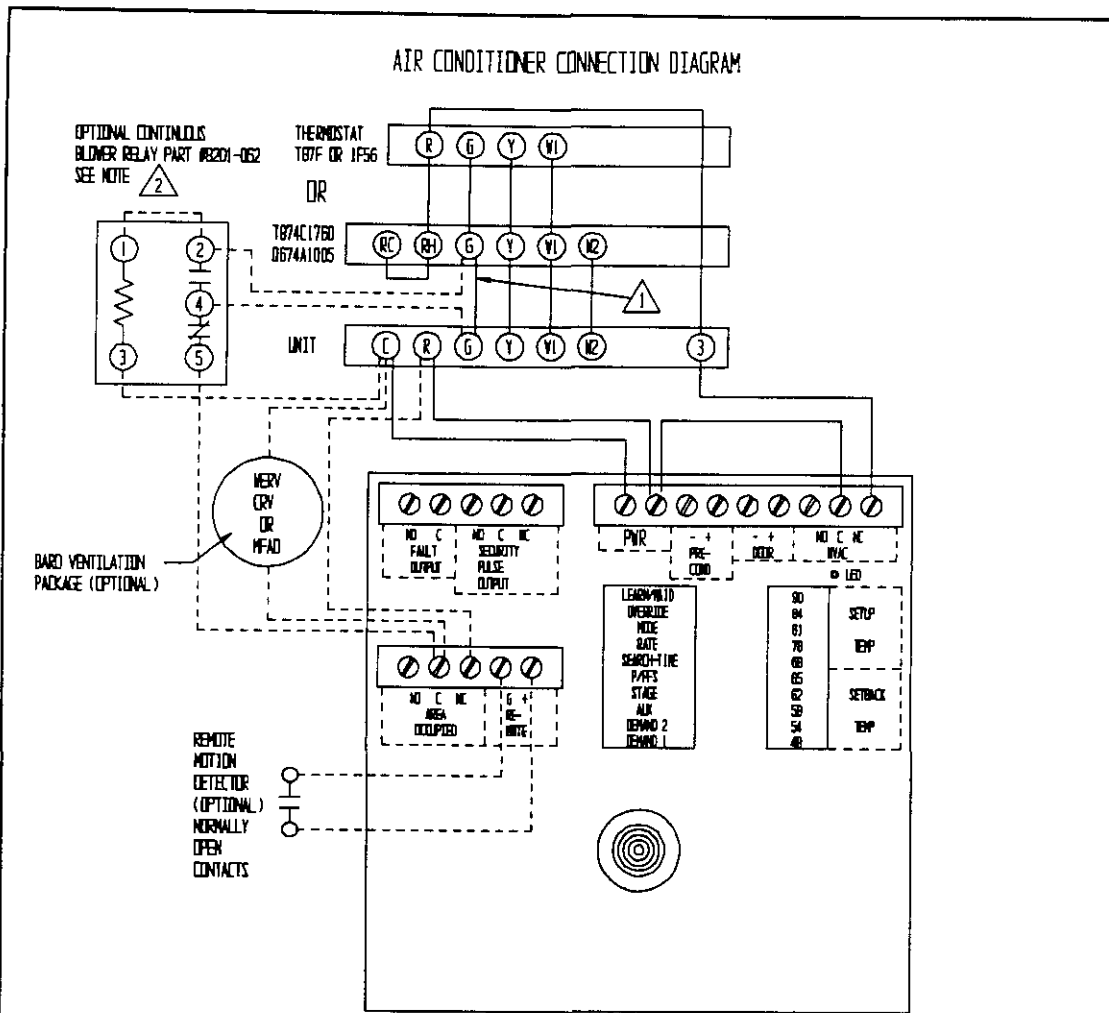


FIGURE 9



- 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	TEMPERATURE SWITCHES
LEARN/MAID	<input checked="" type="checkbox"/> 90
OVERRIDE	<input type="checkbox"/> 84
MODE	<input checked="" type="checkbox"/> 81
RATE	<input checked="" type="checkbox"/> 78
SEARCH-TIME	<input checked="" type="checkbox"/> 68
P/PFS	<input checked="" type="checkbox"/> 65
STAGE	<input checked="" type="checkbox"/> 62
ALIX	<input checked="" type="checkbox"/> 58
DEMAND 2	<input checked="" type="checkbox"/> 54
DEMAND 1	<input checked="" type="checkbox"/> 48

4093-114 A

MAINTENANCE PROCEDURES

MONTHLY

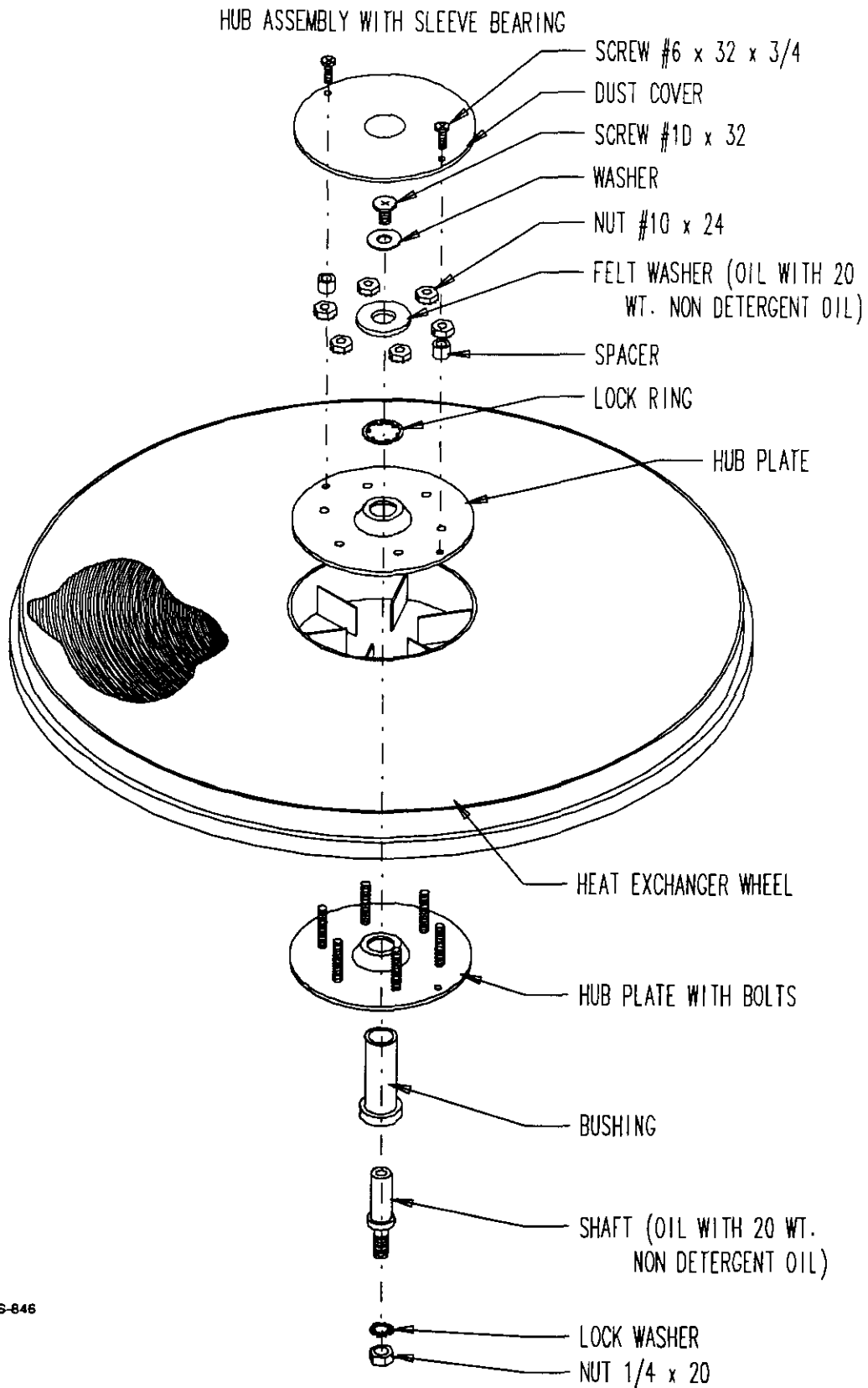
1. Inspect mist eliminator/prefilter and clean if necessary. This filter is located in the fresh air intake hood on the front of the unit. This is an aluminum mesh filter and can be cleaned with water and any detergent not harmful to aluminum.
2. Inspect wall mount unit filter and clean or replace as 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 10.)

FIGURE 10



MIS-846

WIRING DIAGRAM

