INSTALLATION INSTRUCTIONS

Models:

ERVR-A3D-X
ERVR-C3D-X

RETROFIT ENERGY RECOVERY VENTILATOR

For Use with Bard 2 Thru 5 Ton "P" Series Air Conditioners and Heat Pumps

Bard™ SINCE 1914
Climate Control Solutions

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

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

Manual :	2100-445A
Supersedes:	2100-445
File:	Volume III Tab 19
Date:	05-25-04

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BARD MANUFACTURING COMPANY, INC.
BRYAN, OHIO USA 43506

ELECTRICAL SPECIFICATIONS

TABLE 1
SPECIFICATIONS

Model	Voltage	Amps	Control Voltage
ERVR-A3X	230/208 1 PH or 3 PH	2.2	24V
ERVR-C3X	460 3 PH	1.2	24V

NOTE: The power supply and wiring to an existing unit must be reviewed for adequacy to handle the additional amperage of the ERVR in accordance with all local and national electrical codes.

GENERAL DESCRIPTION

The Bard 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_2, 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 field installed for new installations or retrofit. The package consists of a unique rotary Energy Recovery Cassette that can be easily removed for cleaning or maintenance. The ERVR 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 two (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. The ERVR provides required ventilation to meet the requirements of ASHRAE 62-1989 standard.

NOTE: During operation below 4 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. Parts Kit
3. 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.

BASIC INSTALLATION (FIELD INSTALLATION)

Unpack the ventilator assembly which includes the integral ventilator with attached electrical harnesses and miscellaneous hardware.

⚠ WARNING

Open and lock unit disconnect switch before installing this accessory to prevent injury or death due to electrical shock or contact with moving parts. Turn thermostat to OFF.

⚠ CAUTION

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

APPLICATION DATA – ERVR-A3D-X AND ERVR-C3D-X

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

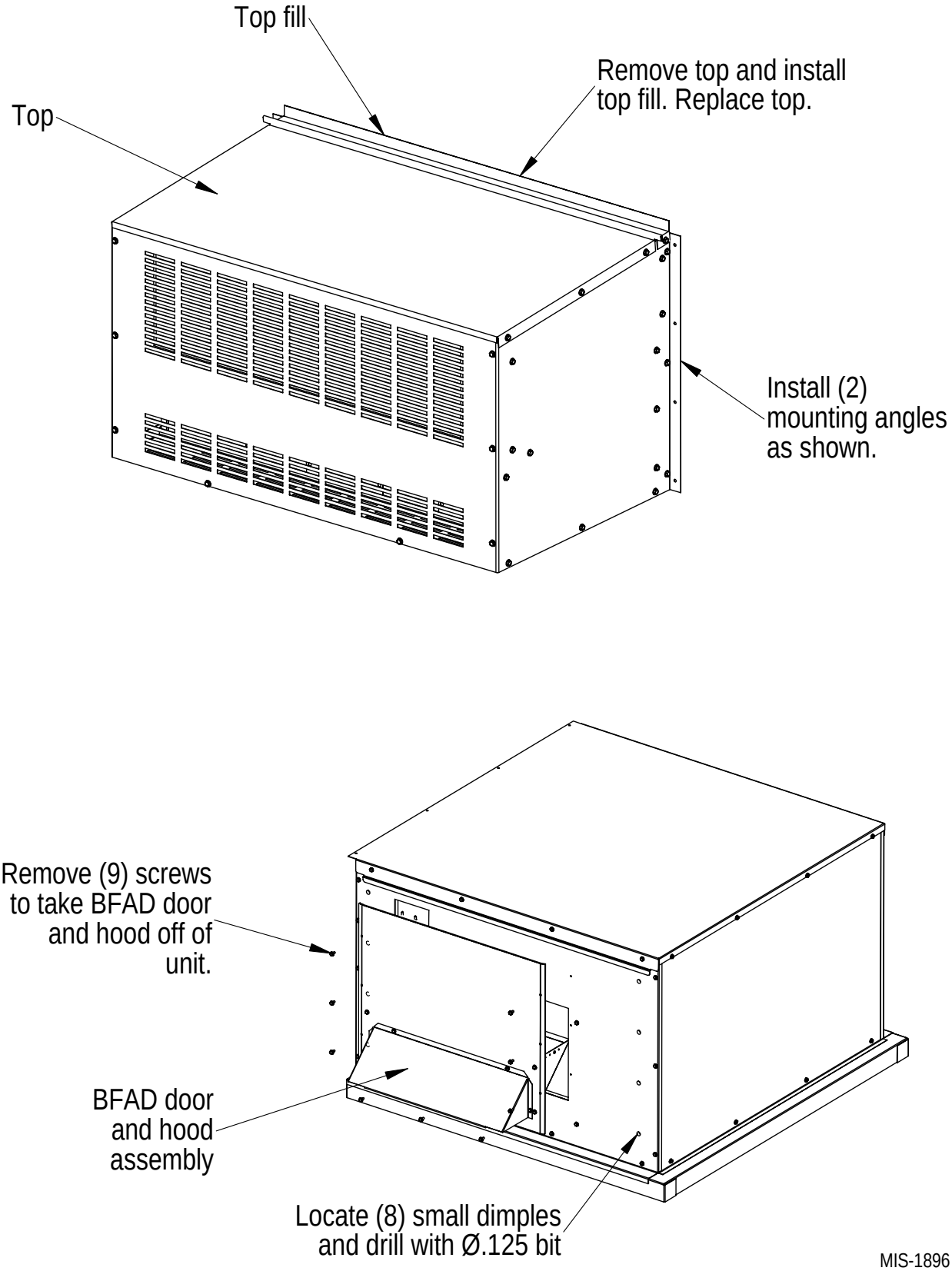
Ambient O.D.	VENTILATION RATE 400 CFM 63% Efficiency						VENTILATION RATE 325 CFM 64% Efficiency						VENTILATION RATE 250 CFM 65% Efficiency					
DB/WB F	VLT	VLS	VLL	HRT	TRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL	VLT	VLS	VLL	HRT	HRS	HRL
75	19080		6120	12020		3855	15502		4972	9921		3182	11925		3825	7751		2486
105 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
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
100 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
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
95 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
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
90 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
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
85 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
75	19080		16920	12020		10659	15502		13747	9921		8798	11925		10575	7751		6873
70	10980	2160	8820	6917	1360	5556	8921	1755	7166	5709	1123	4586	6862	1350	5512	4460	877	3583
80 65	3780		1620	2381		1020	3071		1316	1965		842	2362		1012	1535		658
60	2160		0	1360		0	1755		0	1123		0	1350		0	877		0
70	10980		10980	6917		6917	8921		8921	5709		5709	6862		6862	4460		4460
75 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

RETROFIT INSTALLATION OF ENERGY RECOVERY VENTILATOR
(PAGES 3 THRU 6)
FIGURE 1



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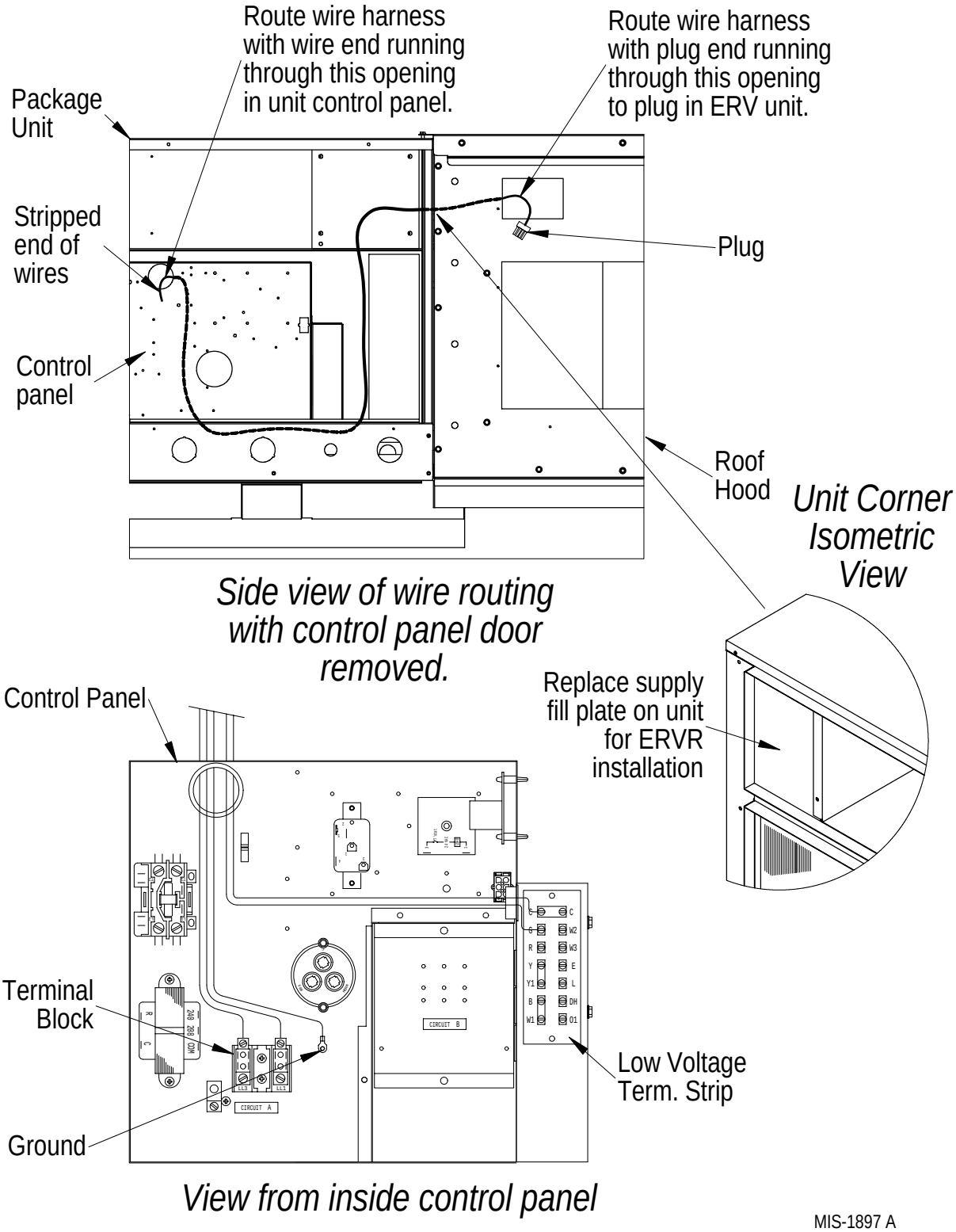
RETROFIT INSTALLATION OF ENERGY RECOVERY VENTILATOR
FIGURE 2



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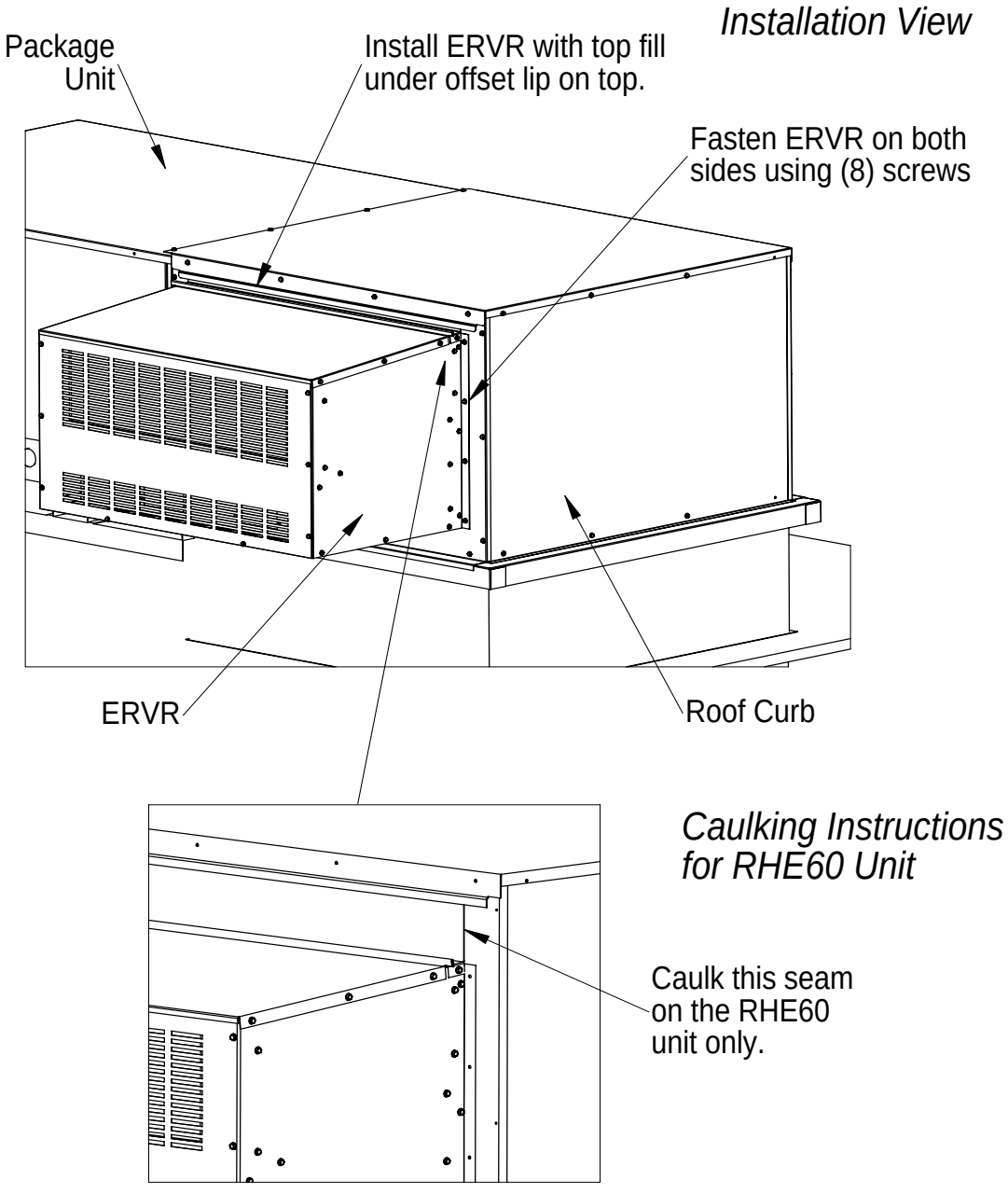
RETROFIT INSTALLATION OF ENERGY RECOVERY VENTILATOR
FIGURE 3



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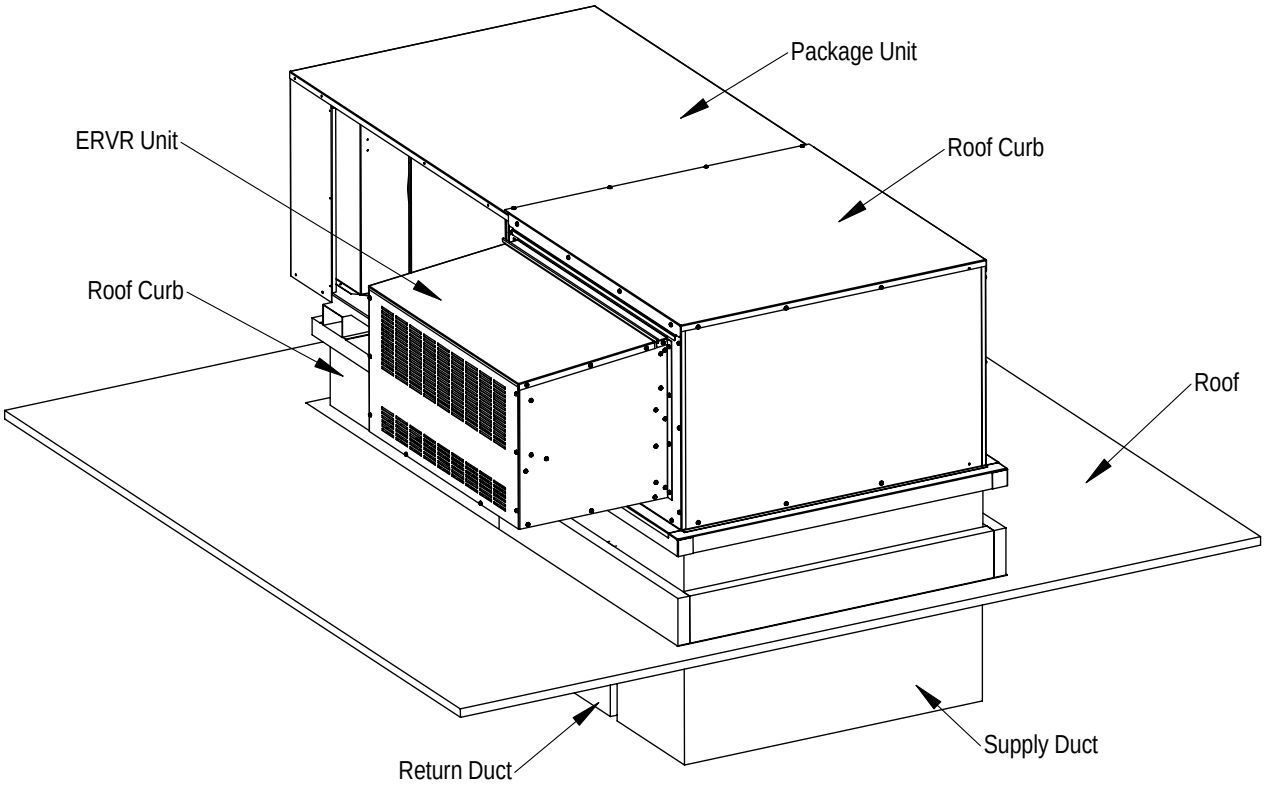
RETROFIT INSTALLATION OF ENERGY RECOVERY VENTILATOR
FIGURE 4



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VENTILATOR CHECKOUT

1. Resupply power to unit.
2. Energize the evaporator blower by switching thermostat to the manual fan position with Heat/ Cool in OFF position.
3. Ventilator heat transfer wheels should rotate slowly. (49 RPM). Intake and exhaust blowers should run.
4. De-energized evaporator blower. Energy recovery heat transfer wheels and fresh air exhaust air blowers should stop.
5. Reinstall top on ERVR.
6. This completes ventilator checkout.

CONTROL OPTIONS

The unit comes from the factory wired to provide ventilation whenever the indoor blower of the air conditioner or heat pump is operating. Continuous ventilation can be obtained by setting the wall thermostat on continuous fan.

VENTILATION AIR FLOW

The ERVR is 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 2
VENTILATION AIR TABLE

VENTILATION AIR (CFM)			
Model	**High Speed (Black)**	**Medium Speed (Blue)**	**Low Speed (Red)**
ERVR	400	325	250

⚠ WARNING

Open disconnect to shut all power off before changing wiring to change motor speed. 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 blow clear as the flow direction is reversed. For this reason the primary need for cleaning is to remove films of oil based aerosols that have condensed on energy transfer surfaces. Buildup of material over time may eventually reduce airflow. Most importantly, in the case of desiccant coated (enthalpy) wheels, such films can close off micron sized pores at the surface of the desiccant material, reducing the efficiency with which the desiccant can adsorb and desorb moisture.

FREQUENCY

In a reasonably clean indoor environment such as a school, office building, or home, experience shows that reductions of airflow or loss of sensible (temperature) effectiveness may not occur for ten or more years. However, experience also shows that measurable changes in latent energy (water vapor) transfer can occur in shorter periods of time in commercial, institutional and residential applications experiencing moderate occupant smoking or with cooking facilities. In applications experiencing unusually high levels of occupant smoking, such as smoking lounges, nightclubs, bars and restaurants, washing of energy transfer surfaces, as frequently as every six months, may be necessary to maintain latent transfer efficiency. Similar washing cycles may also be appropriate for industrial applications involving the ventilation of high levels of smoke or oil based aerosols such as those found in welding or machining operations, for example. In these applications, latent efficiency losses of as much as 40% or more may develop over a period of one to three years.

CLEANABILITY AND PERFORMANCE

In order to maintain energy recovery ventilation systems, energy transfer surfaces must be accessible for washing to remove oils, grease, tars and dirt that can impede performance or generate odors. Washing of the desiccant surfaces is required to remove contaminate buildups that can reduce adsorption of water molecules. The continued ability of an enthalpy wheel to transfer latent energy depends upon the permanence of the bond between the desiccant and the energy transfer surfaces.

Bard wheels feature silica gel desiccant permanently bonded to the heat exchange surface without adhesives; the desiccant will not be lost in the washing process. Proper cleaning of the Bard energy recovery wheel will restore latent effectiveness to near original performance.

MAINTENANCE PROCEDURES

NOTE: Local conditions can vary and affect the required time between routine maintenance procedures, therefore all sites (or specific units at a site) may not have the same schedule to maintain acceptable performance. The following timetables are recommended and can be altered based on local experience.

QUARTERLY MAINTENANCE

1. Inspect mist eliminator/prefilter and clean if necessary. This filter is located in the fresh air intake hood on the front of the unit. This is an aluminum mesh filter and can be cleaned with water and any detergent not harmful to aluminum.
2. Inspect wall mount unit filter and clean or replace as necessary. This filter is located either in the unit, in a return air filter grille assembly, or both. If in the unit it can be accessed by removing the lower service door on the front of the unit. If in a return air filter grille, by hinging the grille open to gain access.
3. Inspect energy recovery ventilator for proper wheel rotation and dirt buildup. This can be done in conjunction with Item 2 above. Energize the energy recovery ventilator after inspecting the filter and observe for proper rotation and/or dirt buildup.
4. Recommended energy recovery wheel cleaning procedures follow: Disconnect all power to unit. Remove the lower service door of the wall mount unit to gain access to the energy recovery ventilator.

FIGURE 5
HUB ASSEMBLY WITH BALL BEARINGS

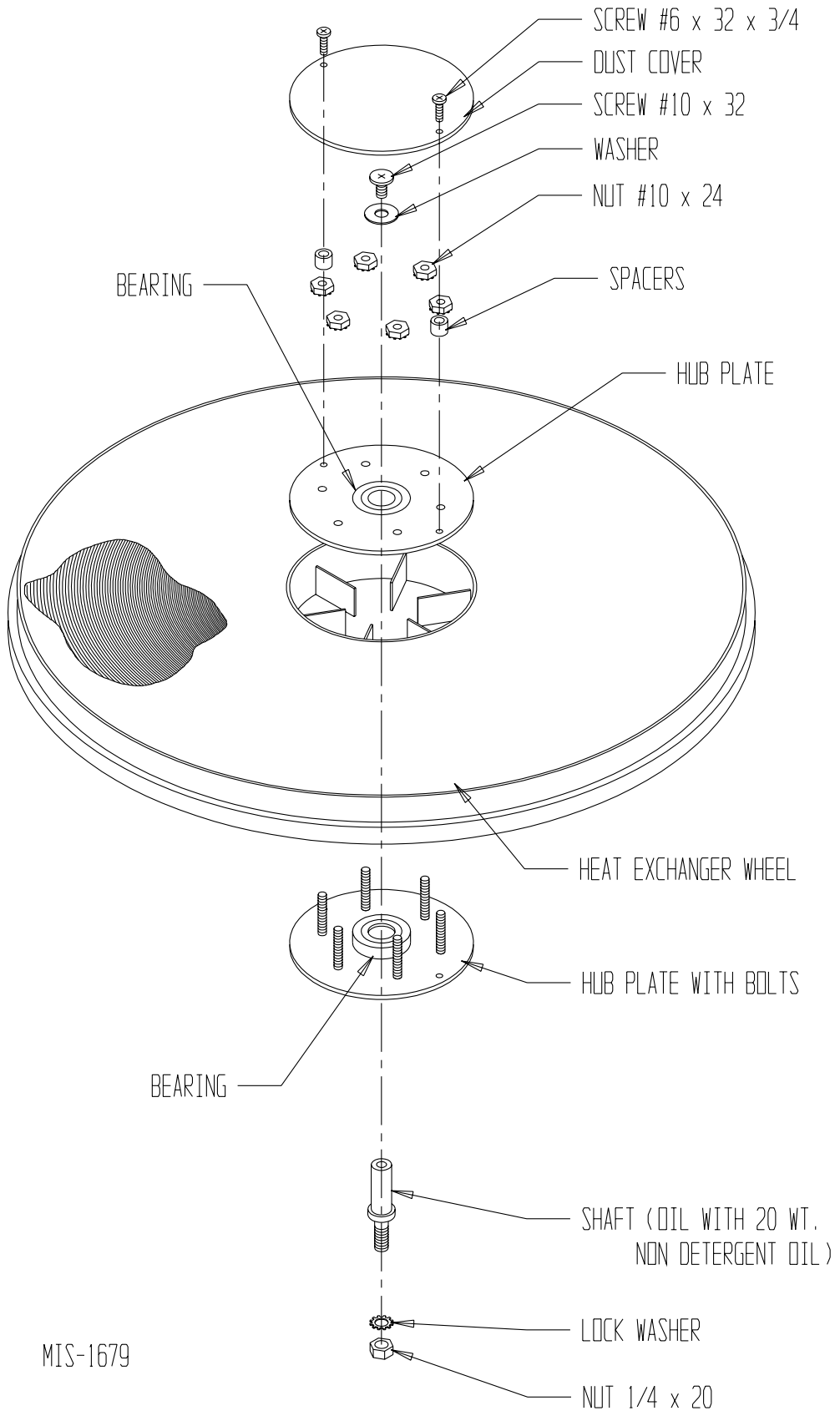
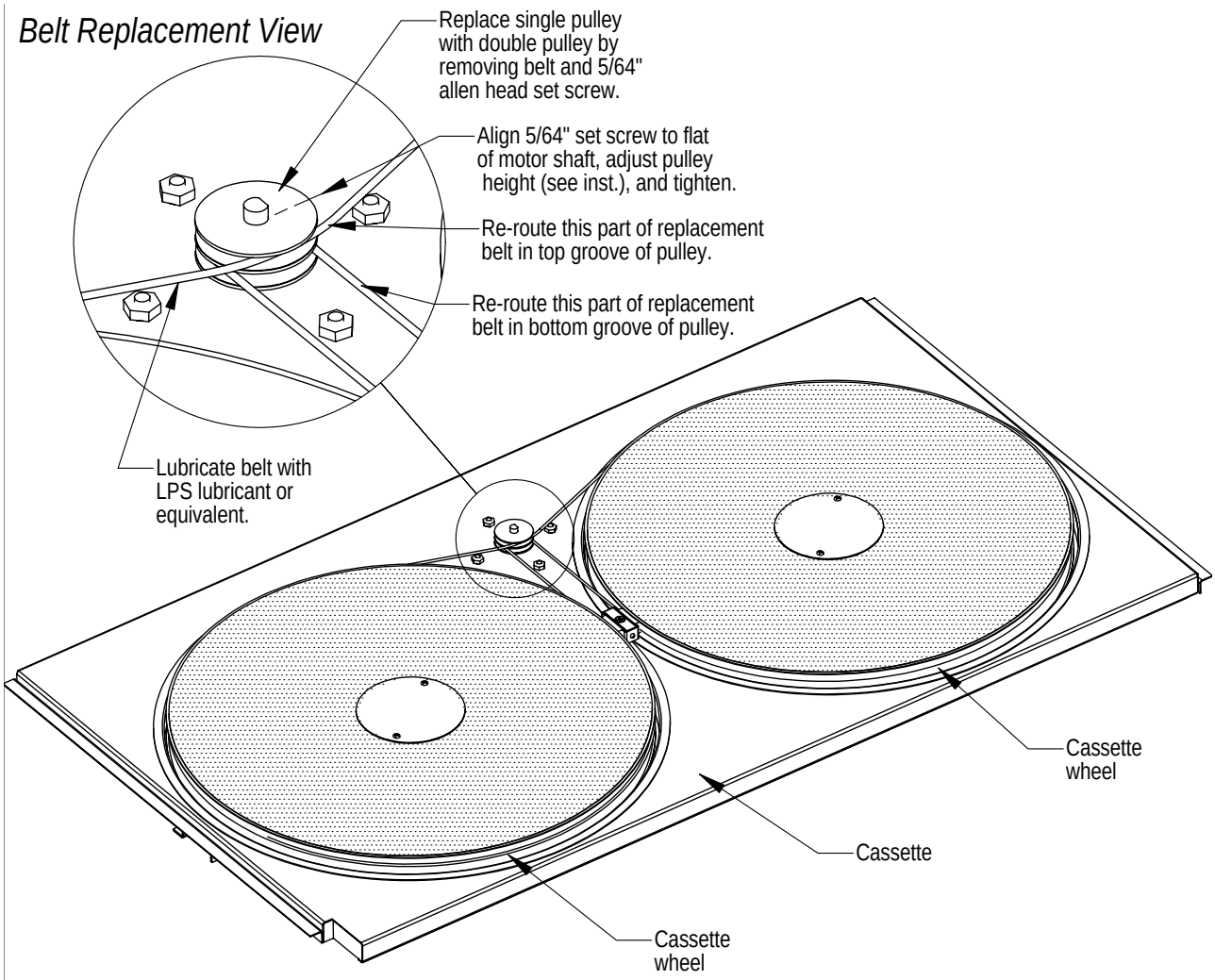


FIGURE 6
PULLEY AND BELT REPLACEMENT



Instructions:

1. Gently remove belt from drive pulley.

2. Loosen 5/64" set screw and remove single pulley.

3. Slide double pulley onto motor shaft until pulley bottom surface is .125" from top surface of cassette. (see pulley adjustment view). Tighten set screw until pulley is securely fastened to motor shaft.

4. Replace old drive belt with new belt supplied. Re-route new belt to run around both cassette wheels and in both the top and bottom groove of double pulley as shown (see belt replacement view). Lubricate with LPS lubricant or equivalent.

5. Check assembly for proper operation and functionality. Not following all pulley and belt replacement instructions can result in damage to cassette components.

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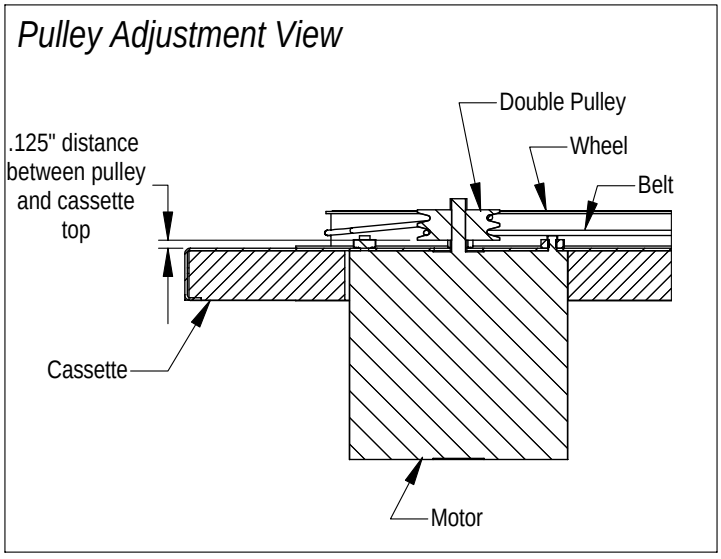

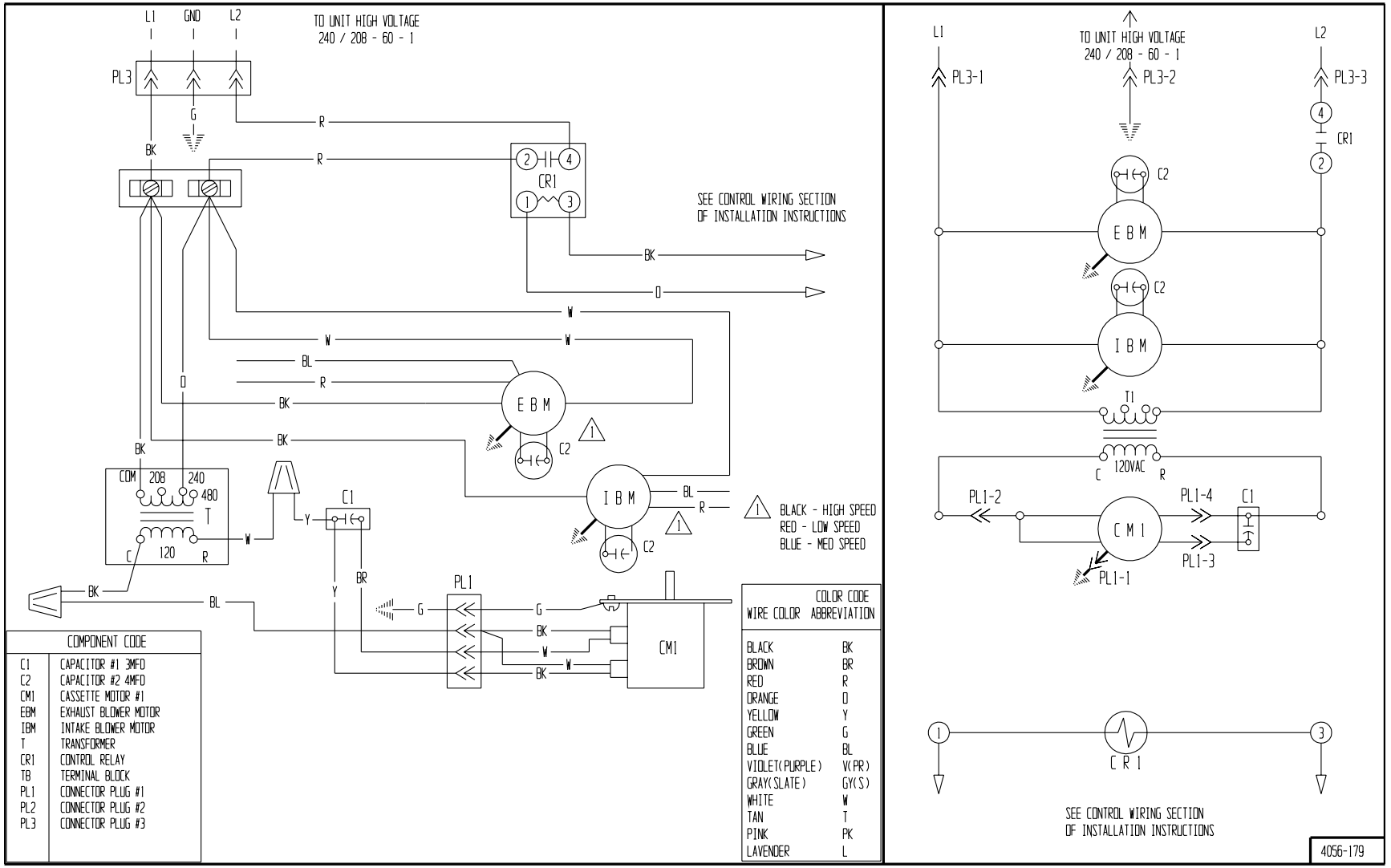
L1
GND
L2
TO UNIT HIGH VOLTAGE
240 / 208 - 60 - 1
PL3
G
BK
R
CR1
SEE CONTROL WIRING SECTION
OF INSTALLATION INSTRUCTIONS
O
W
BL
E B M
C2
I B M
COM
208
240
480
T
C
120
R
C1
Y
BR
PL1
CM1
BLACK - HIGH SPEED
RED - LOW SPEED
BLUE - MED SPEED
COMPONENT CODE
C1 CAPACITOR #1 3MFD
C2 CAPACITOR #2 4MFD
CM1 CASSETTE MOTOR #1
EBM EXHAUST BLOWER MOTOR
IBM INTAKE BLOWER MOTOR
T TRANSFORMER
CR1 CONTROL RELAY
TB TERMINAL BLOCK
PL1 CONNECTOR PLUG #1
PL2 CONNECTOR PLUG #2
PL3 CONNECTOR PLUG #3
COLOR CODE
WIRE COLOR ABBREVIATION
BLACK BK
BROWN BR
RED R
ORANGE O
YELLOW Y
GREEN G
BLUE BL
VIOLET(PURPLE) V(PR)
GRAY(SLATE) GY(S)
WHITE W
TAN T
PINK PK
LAVENDER L
L1
TO UNIT HIGH VOLTAGE
240 / 208 - 60 - 1
L2
PL3-1
PL3-2
PL3-3
4
CR1
2
C2
E B M
C2
I B M
T1
C
120VAC
R
PL1-2
PL1-4
C1
C M 1
PL1-3
PL1-1
1
C R 1
3
SEE CONTROL WIRING SECTION
OF INSTALLATION INSTRUCTIONS
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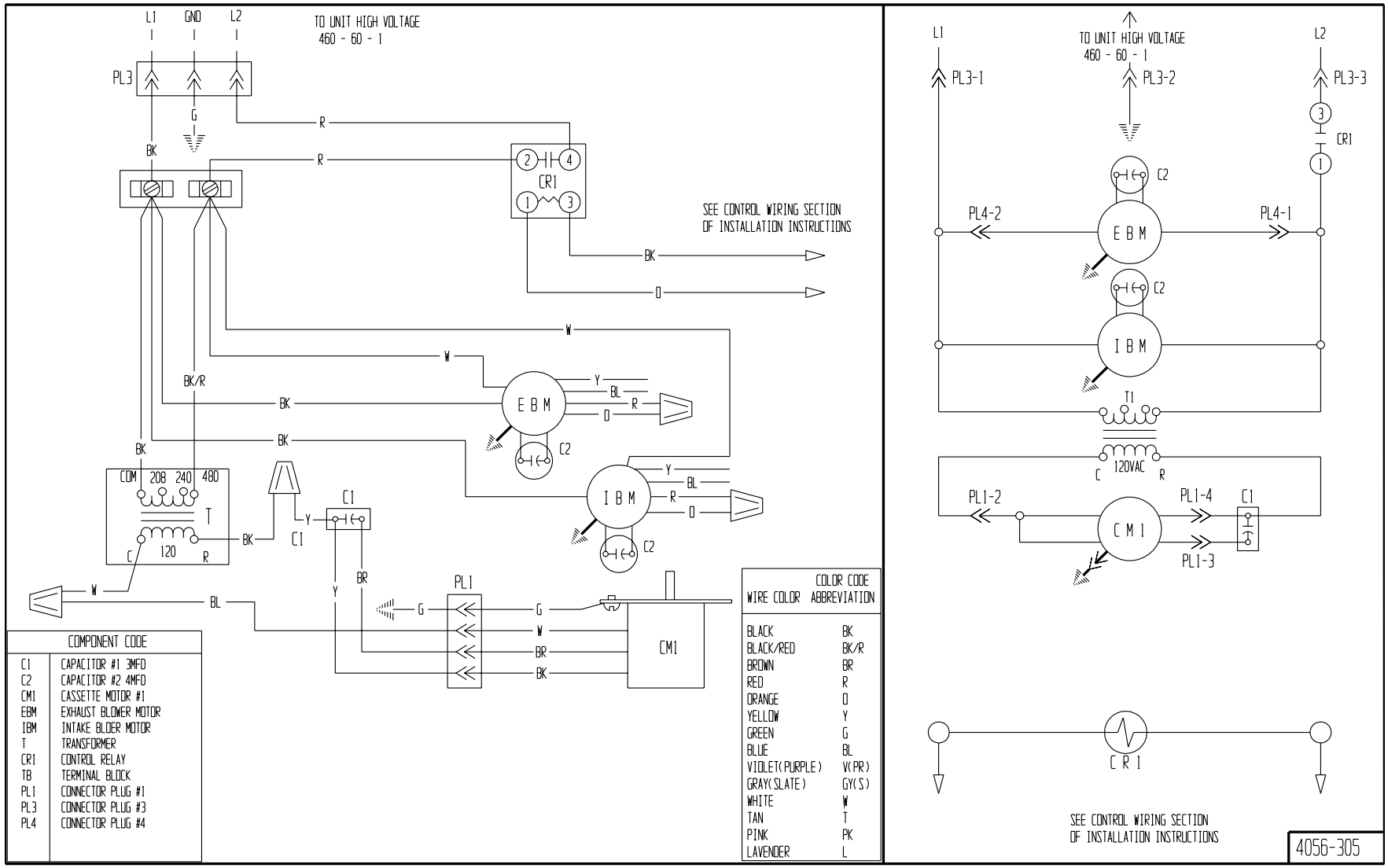
L1
GND
L2
TO UNIT HIGH VOLTAGE
460 - 60 - 1
PL3
G
BK
R
R
CR1
SEE CONTROL WIRING SECTION
OF INSTALLATION INSTRUCTIONS
BK
O
W
W
BK/R
BK
E B M
Y
BL
R
O
C2
BK
BK
COM 208 240 480
T
C 120 R
BK
C1
Y
C1
I B M
Y
BL
R
O
C2
W
BL
Y
BR
PL1
G
G
W
BR
BK
CM1
COMPONENT CODE
C1 CAPACITOR #1 3MFD
C2 CAPACITOR #2 4MFD
CM1 CASSETTE MOTOR #1
EBM EXHAUST BLOWER MOTOR
IBM INTAKE BLOER MOTOR
T TRANSFORMER
CR1 CONTROL RELAY
TB TERMINAL BLOCK
PL1 CONNECTOR PLUG #1
PL3 CONNECTOR PLUG #3
PL4 CONNECTOR PLUG #4
COLOR CODE
WIRE COLOR ABBREVIATION
BLACK BK
BLACK/RED BK/R
BROWN BR
RED R
ORANGE O
YELLOW Y
GREEN G
BLUE BL
VIOLET(PURPLE) V(PR)
GRAY(SLATE) GY(S)
WHITE W
TAN T
PINK PK
LAVENDER L
L1
TO UNIT HIGH VOLTAGE
460 - 60 - 1
L2
PL3-1
PL3-2
PL3-3
3
CR1
1
C2
PL4-2
E B M
PL4-1
C2
I B M
T1
120VAC
C
R
PL1-2
PL1-4
C1
C M 1
PL1-3
C R 1
SEE CONTROL WIRING SECTION
OF INSTALLATION INSTRUCTIONS
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