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# INSTALLATION INSTRUCTIONS

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## CHDM DEHUMIDIFICATION MODULE for use with

**CH3S1**

**CH4S1**

**CH5S1**



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

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Supersedes: 2100-506B  
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# Getting Other Information and Publications

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These publications can help you install the air conditioner or heat pump. You can usually find these at your local library or purchase them directly from the publisher. Be sure to consult current edition of each standard.

National Electrical Code ..... ANSI/NFPA 70

Standard for the Installation ..... ANSI/NFPA 90A  
of Air Conditioning and Ventilating Systems

Standard for Warm Air ..... ANSI/NFPA 90B  
Heating and Air Conditioning Systems

Load Calculation for ..... ACCA Manual J  
Residential Winter and Summer Air Conditioning

Duct Design for Residential ..... ACCA Manual D  
Winter and Summer Air Conditioning and Equipment  
Selection

## FOR MORE INFORMATION, CONTACT THESE PUBLISHERS:

**ACCA**     **Air Conditioning Contractors of America**  
1712 New Hampshire Ave. N.W.  
Washington, DC 20009  
Telephone: (202) 483-9370  
Fax: (202) 234-4721

**ANSI**     **American National Standards Institute**  
11 West Street, 13th Floor  
New York, NY 10036  
Telephone: (212) 642-4900  
Fax: (212) 302-1286

**ASHRAE**   **American Society of Heating, Refrigerating,  
and Air Conditioning Engineers, Inc.**  
1791 Tullie Circle, N.E.  
Atlanta, GA 30329-2305  
Telephone: (404) 636-8400  
Fax: (404) 321-5478

**NFPA**     **National Fire Protection Association**  
Batterymarch Park  
P.O. Box 9101  
Quincy, MA 02269-9901  
Telephone: (800) 344-3555  
Fax: (617) 984-7057

## DESCRIPTION

The CHDM dehumidifier is designed to be used with Bard 3 through 5 ton CH heat pump models. It will be installed in the outdoor section of the CH unit. The dehumidifier incorporates a complete refrigeration system. It will share the high & low voltage control from the CH control panel. The CHDM is for use in CH\*S Series units with or without CHERV or CHCRV. The CHDM cannot be used in units equipped with economizers CHEIFM.

## SHIPPING DAMAGE

If a shipment is damaged or the piece count does not agree with the quantity shown on the freight bill, the buyer/receiver should make note on all copies of the freight company's delivery receipt of any damages and/or shortages at the time of delivery. The receiving agent and the freight company's agent should both sign the delivery receipt and the bill of lading. It is preferred, that both signatures are obtained at the time of delivery. If at all possible at the time of delivery, photograph the noted damages as evidence to support a freight claim.

The damage and/or shortage notation on the delivery receipt does not constitute a claim. It is the recipient's responsibility to initiate the claim process by requesting an inspection and requesting a claim number from the freight carrier. Save all noted freight bills, bills of lading, delivery receipts, packing sheets and invoices for documentation that will be required to support an itemized claim.

For concealed damage you must immediately notify the delivering freight carrier by phone and request an inspection. Many freight carriers will not honor concealed damage claim beyond 48 hours from the time of delivery or if the product has been moved to another location other than the ship to address. Most freight carriers will challenge claims written after a two-week period.

## GENERAL

The CH Dehumidifier equipment covered in this manual should be installed by trained, experienced service and installation technicians.

While these instructions are intended as a general recommended guide, they do not supersede any national and/or local codes in any way and are not intended as a step-by-step procedure with which the mechanically inclined owner can install the package. See Page 3 for information on codes and standards.

The dehumidifier is shipped in one carton and contains the electrical harness, miscellaneous hardware and installation instructions. Where local regulations are at a variance with instructions, installer should adhere to local codes.

## INSTALLATION

**DEHUMIDIFIER:** Unpack the dehumidifier. Set aside the sheet metal duct for now. Facing the outdoor section of the CH model, on the right-hand side, there is a long, narrow access panel. Remove this panel and set aside. (See Page 11, Figure 4.)

Remove the fill plate located in the bottom of this compartment by unscrewing the four screws. Remove the 1/2" knockout and clear the insulation hole. Place fill plate back in the unit. With a marker, trace the 1/2" hole onto the screen below. Remove the fill plate again and cut out marked hole. Place fill plate back into unit and reattach with four screws.

Place the dehumidifier in this opening by placing the wedge end of the cabinet in first and slide all the way back (see Figure 4).

<b>IMPORTANT</b>
<b>Make sure cabinet insulation does not tear!</b>

**WIRING:** Remove the knockout in the back of the CH control panel and insert bushing (see Figure 2). Route high and low voltage wires into the CH control panel through the bushing. Connect per Figures 1 & 2. Connect a humidistat (field-supplied) per the low voltage connection diagram in the CH Literature.

## **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.*

**DRAIN:** Connect a drain trap to the drain fitting under the bottom of the dehumidifier section of the unit. The drain connection is a 3/4" female pipe fitting. The use of a trap is required to ensure proper drainage.

**AIR CHANNEL ASSEMBLY:** (See Figure 3.) Remove cover plate in unit and cut out the insulation. On CH3S1 models, the duct extension is to be removed and a new piece of foam (supplied) added to the bottom of the air channel assembly. Slide the air channel assembly into the unit and position the assembly to the left until the angle hits the side of the inner back. Secure the angle with three self-drilling screws. Secure the top with one screw.

## SEQUENCE OF OPERATION

Dehumidification – Circuit DH makes at the humidistat pulling in the compressor contactor, starting the compressor and the dehumidifier blower motor. The “G” (indoor motor) is automatically completed on call for dehumidification (Relay #2).

The dehumidifier may operate alone or run simultaneously with the first stage of the CH unit. When the CH unit switches to second stage, the operation of the dehumidifier will be locked out (Relay #1).

The Compressor Control Module is an anti-short cycle/lockout timer with high and low pressure switch monitoring.

On initial power up or any time power is interrupted to the unit, the delay on make period begins, which will be two minutes. When the delay on make is complete and the high pressure and low pressure are closed, the compressor contactor is energized. Upon shutdown, the delay or break timer starts and prevents restart until the delay on break and delay on make have expired.

During routine operation of the unit with no power interruption, the compressor will operate on demand with no delay.

## HIGH PRESSURE SWITCH AND LOCKOUT SEQUENCE

If the high pressure switch opens, the compressor contactor will de-energize immediately. The lockout timer will go into a soft lockout and stay in soft lockout until the high pressure switch closes and the delay on break time has expired. If the high pressure switch opens again in the same operating cycle, the unit will go into manual lockout. Recycling the wall humidistat resets the manual lockout.

## LOW PRESSURE SWITCH BYPASS & LOCKOUT SEQUENCE

If the low pressure switch opens for more than 120 seconds, the compressor contactor will de-energize and go into a soft lockout. Regardless the state of the low pressure switch, the contactor will re-energize after the delay on make time delay has expired. If the low pressure switch remains open longer than 120 seconds, the unit will go into manual lockout. Recycling the wall humidistat resets the manual lockout.

**NOTE:** *Both high and low pressure switch controls are inherently automatic reset devices. The high pressure and the low pressure switch cut out and cut in settings are fixed. The lockout features, both soft and manual, are a function of the compressor control module.*

**FREEZE STAT OPERATION:** The freeze stat operation will open at 32° and de-energize the compressor and fan. The compressor and fan will restart after the coil defrosts and the freeze stat warms to 57°.

## PRESSURE SERVICE PORTS

High and low pressure service ports are installed on the unit, so the system operating pressures can be observed. To gain access to these pressure ports, remove the long narrow panel on the right-hand side of the outdoor section of the CH unit. See Figure 4.

Reference the pressure table located on the front lower panel and Table 2 within this manual.

**TABLE 1  
CH DEHUMIDIFIER PERFORMANCE**

Dry Bulb Temp F	Water Removal lb./hr (PPD) Relative Humidity % Rh						
	50	55	60	65	70	75	80
65	1.0 (24.0)	1.3 (31.2)	1.5 (36.0)	1.7 (40.8)	2.0 (48.0)	2.2 (52.8)	2.4 (57.6)
70	1.2 (28.8)	1.5 (36.0)	1.8 (43.2)	2.0 (48.0)	2.3 (55.2)	2.6 (62.4)	2.8 (67.2)
75	1.4 (33.6)	1.7 (40.8)	2.0 (48.0)	2.4 (57.6)	2.7 (64.8)	3.0 (72.0)	3.3 (79.2)
80	1.7 (40.8)	2.0 (46.0)	2.4 (57.6)	2.7 (64.8)	2.8 (67.2)	3.4 (81.6)	3.7 (88.8)
85	2.0 (48.0)	2.3 (55.2)	2.8 (67.2)	3.1 (74.4)	3.5 (84.0)	3.9 (93.6)	4.3 (103.2)
90	2.2 (52.8)	2.7 (64.8)	3.1 (74.4)	3.6 (86.4)	4.0 (96.0)	4.4 (105.6)	4.8 (115.2)

Notes: Dry Bulb Temperature F and % RH are the return air conditions to the CH unit  
One pint of water = 1.04 lb.

**TABLE 2  
CHARGING PRESSURE LABEL**

<b>SYSTEM REFRIGERANT PRESSURE CHART</b>								
Return Air Temperature	Pressure	Relative Humidity %						
		50% RH	55% RH	60% RH	65% RH	70% RH	75% RH	80% RH
70° DB	Low Side	96	97	98	100	102	104	106
	High Side	248	253	258	261	265	269	273
75° DB	Low Side	110	112	114	116	117	118	120
	High Side	270	276	282	288	294	298	303
80° DB	Low Side	115	119	123	127	132	136	140
	High Side	297	306	315	324	333	342	351
85° DB	Low Side	120	127	134	141	148	153	158
	High Side	342	349	356	363	370	375	380

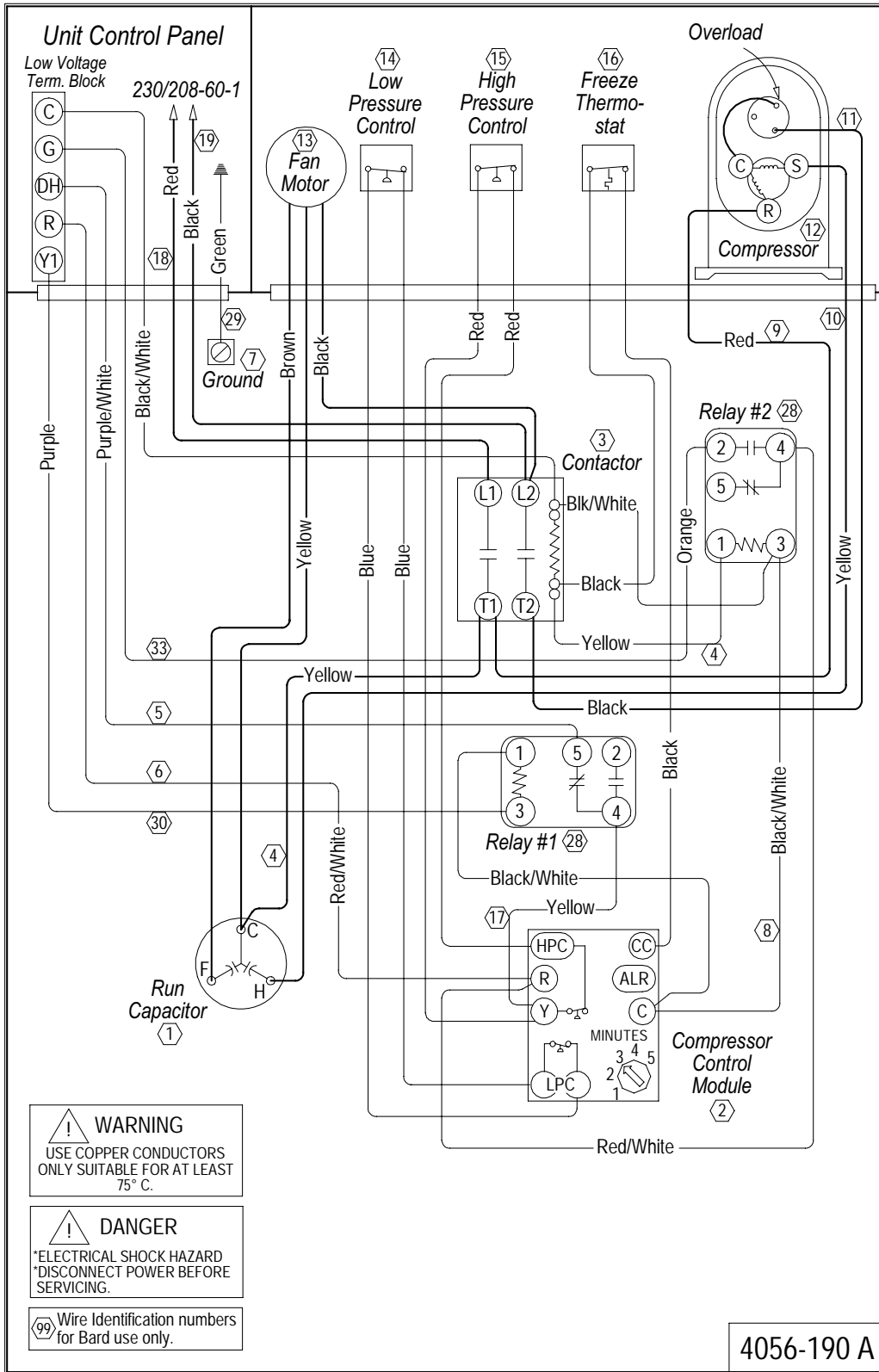
Low Side pressure:  $\pm 2^\circ$   
 High Side Pressure:  $\pm 5^\circ$

Table is based upon rated CFM (airflow) across the Evaporator Coil. If there is any doubt as to the correct operating charge being in the system, the charge should be removed, system evacuated, and recharged to serial plate instructions.

Capacitor for Compressor/Blower Motor: Part #8552-085, 15/5 MFD 370V

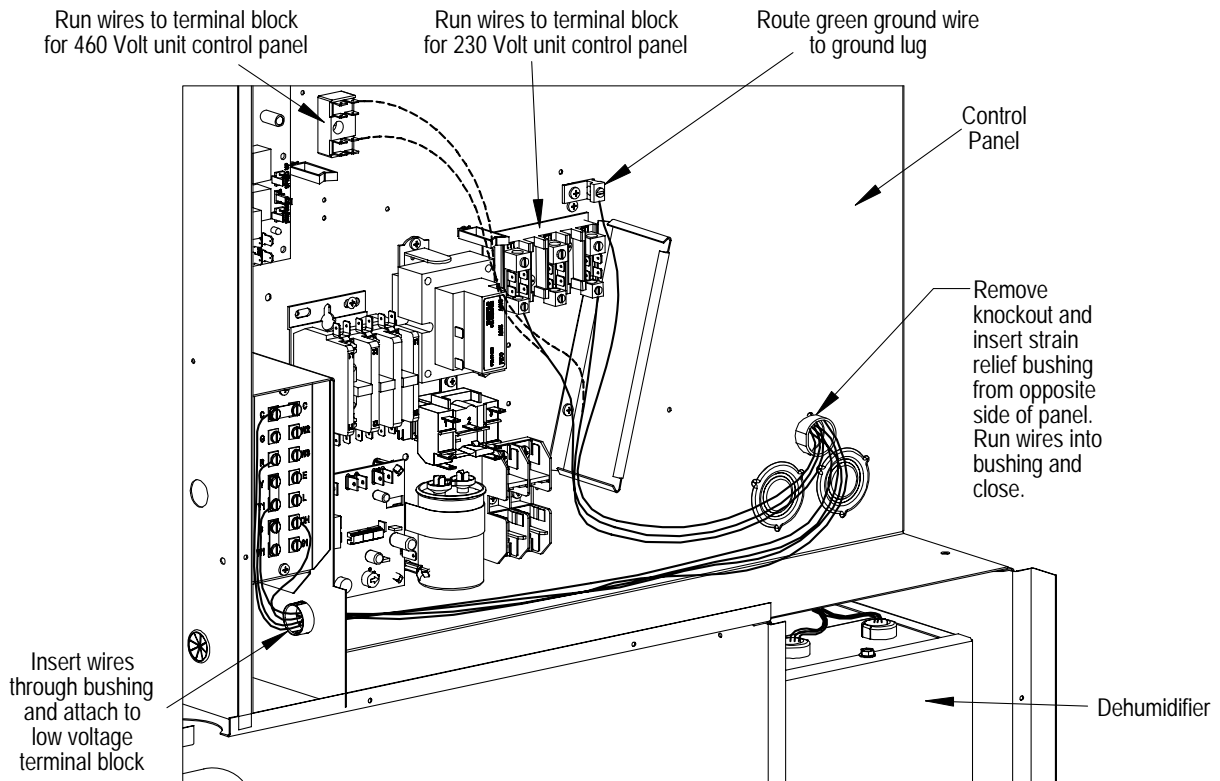
7961-679

FIGURE 1



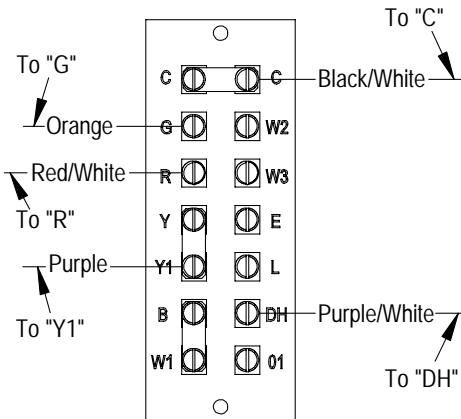


**FIGURE 2**

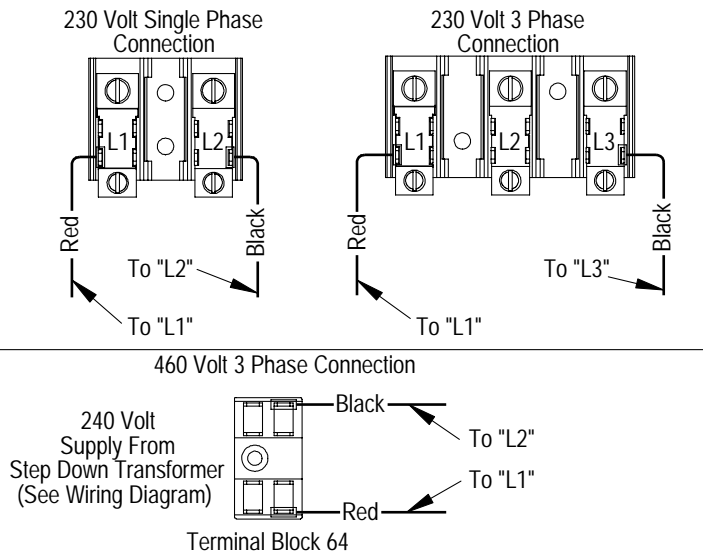


*Wire Routing Instructions*

*Low Voltage Wiring Connections*

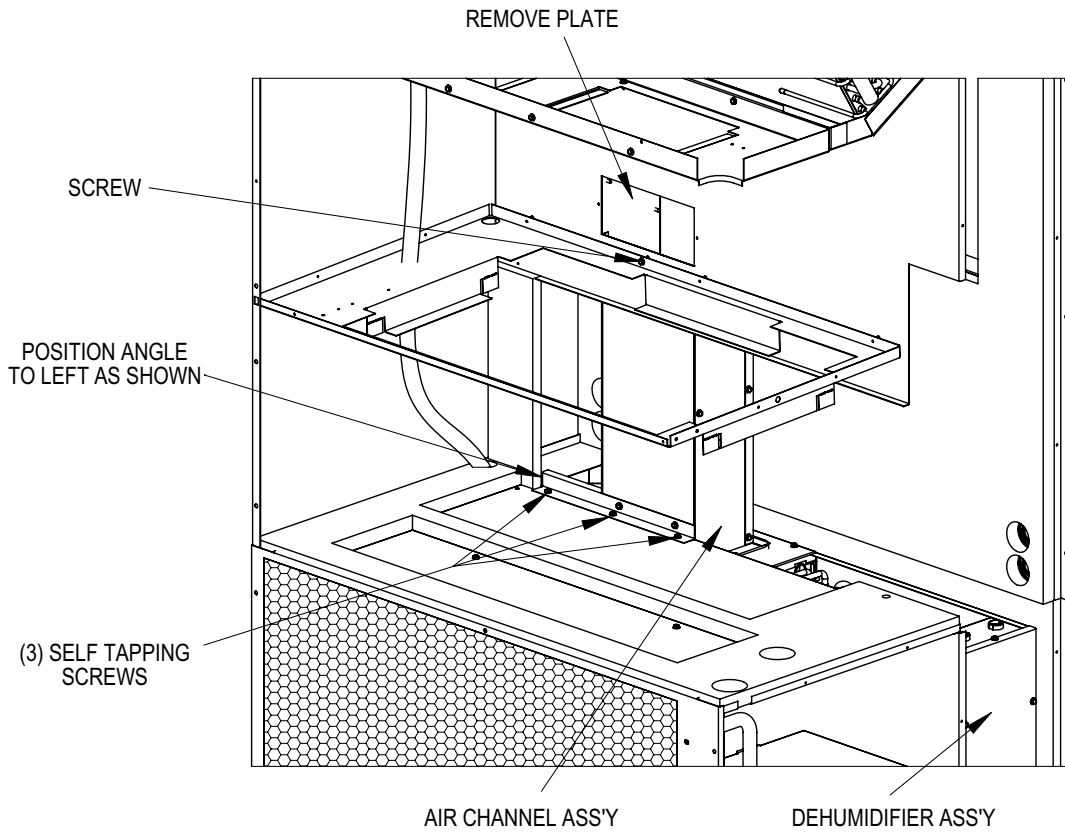


*High Voltage Wiring Connections*

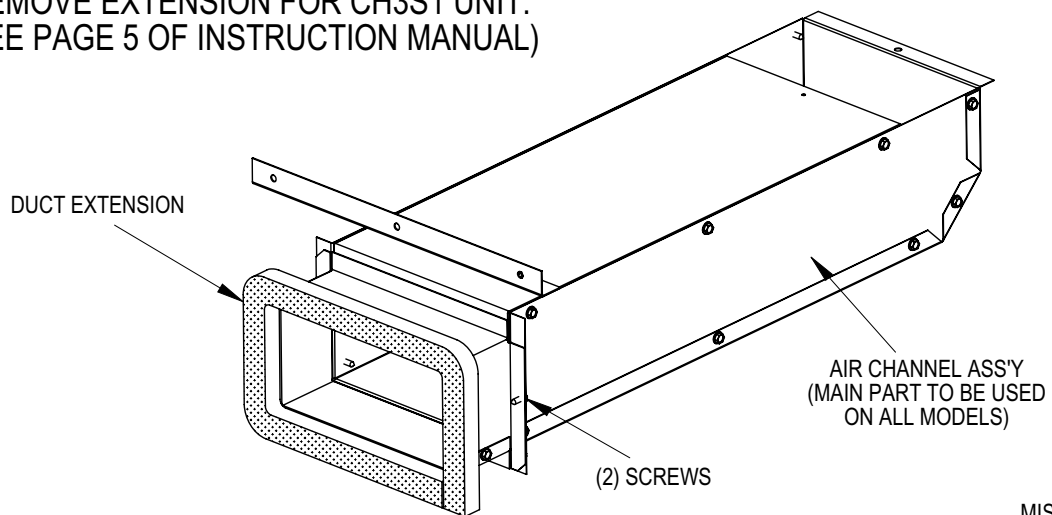


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FIGURE 3

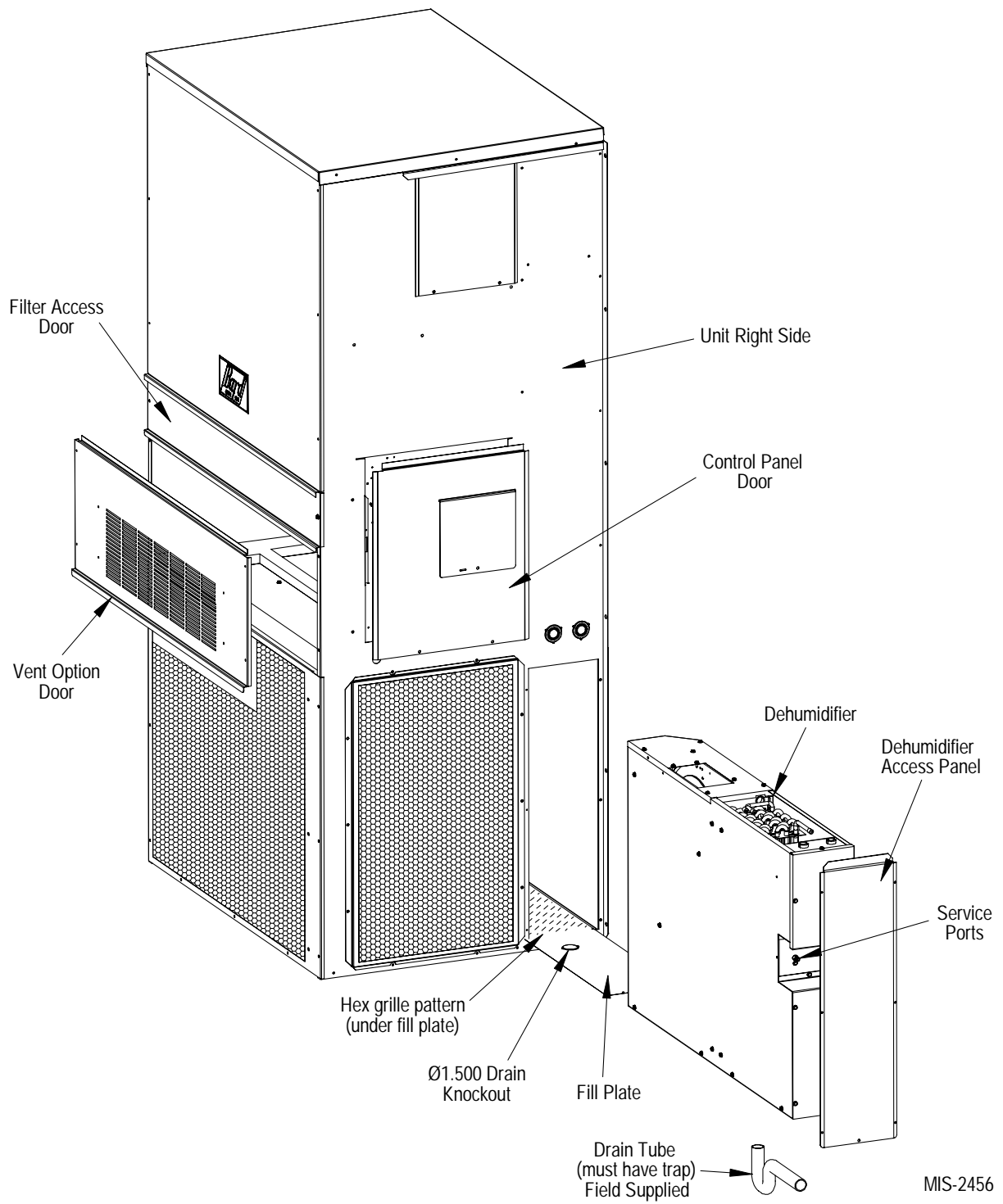


REMOVE EXTENSION FOR CH3S1 UNIT.  
(SEE PAGE 5 OF INSTRUCTION MANUAL)

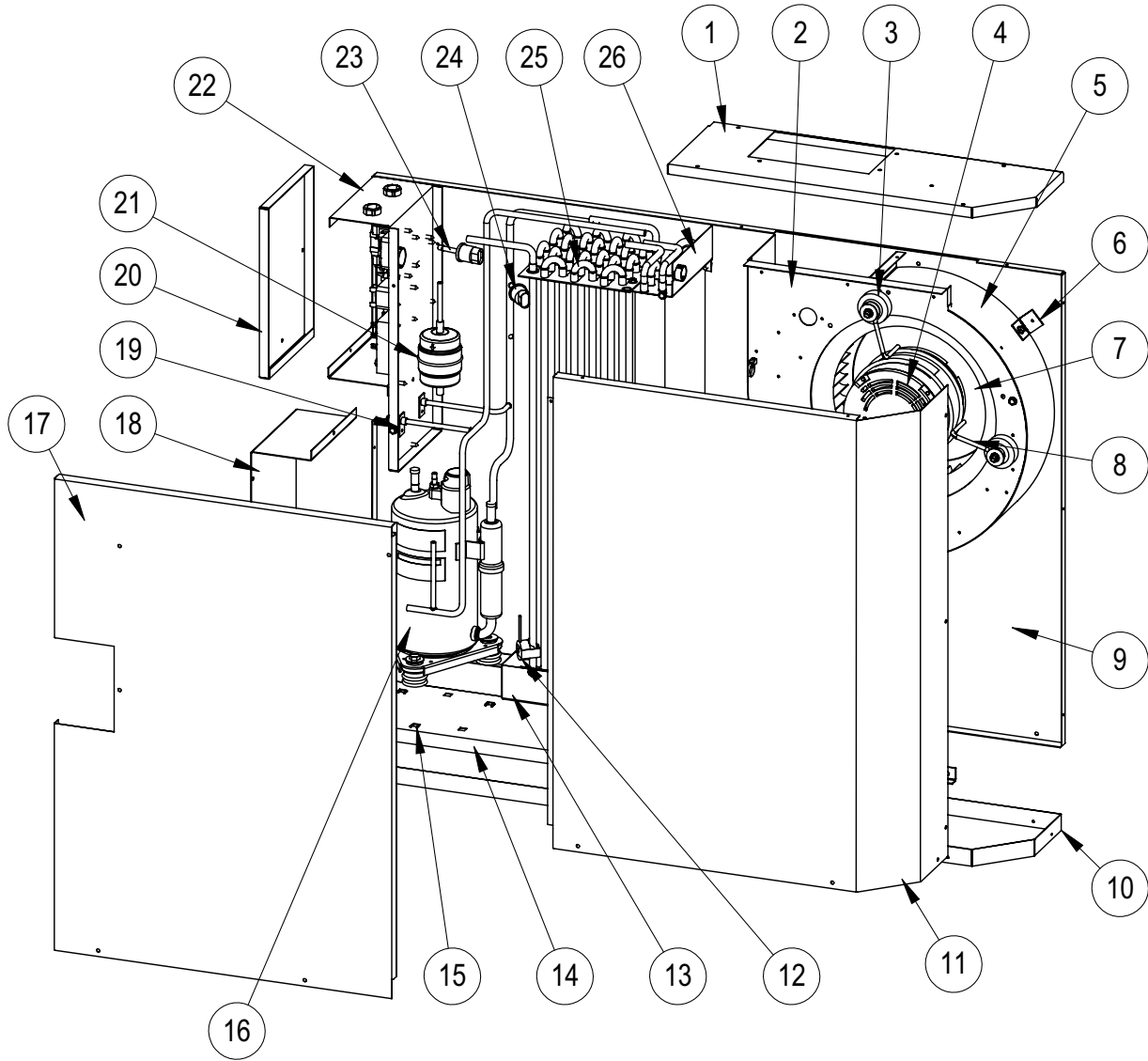


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FIGURE 4



# CABINET and FUNCTIONAL COMPONENTS



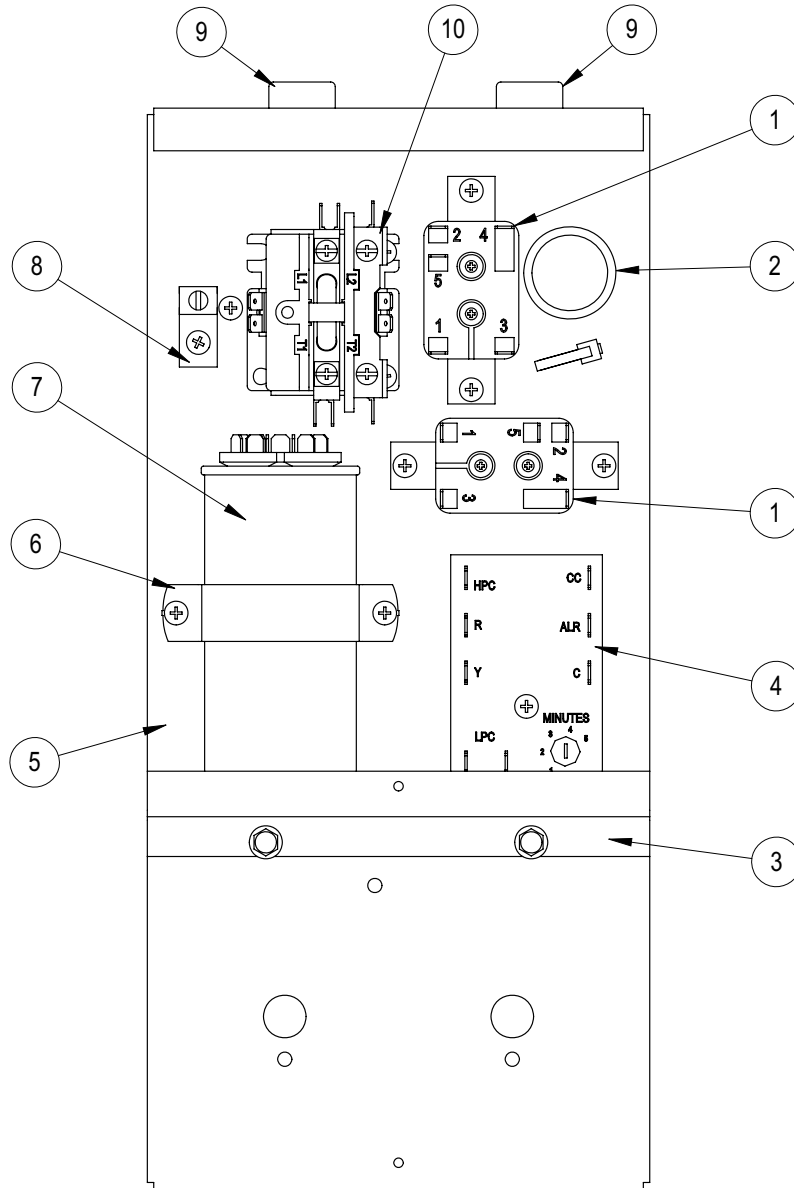
SEXP-494

## CABINET and FUNCTIONAL COMPONENTS

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Drawing No.	Part No.	Description	CHDM
1	107-267	Condenser Top	X
2	S900-289	Complete Blower Assembly	X
3	5451-011	Grommet	3
4	8102-015	1/6 HP Motor	X
5	151-120	Blower Housing	X
6	113-342	Blower Bracket	3
7	5152-099	Blower Wheel	X
8	8200-044	Motor Mount	X
9	109-202	Dehumidifier Back	X
10	127-358	Dehumidifier Base	X
11	152-424	Condenser Door	X
12	8408-038	Freeze Protect T-Stat	X
13	123-117	Drain Pan Assembly	X
14	141-331	Compressor Support	X
15	1012-218	1/4-20 Cage Nut	3
16	8000-304	Compressor	X
17	153-425	Evaporator Door	X
18	S153-427	Compressor Door	X
19	6031-006	Brass Gauge Port	2
20	S153-426	Control Panel Door	X
21	5201-015	Liquid Line Drier	X
22	See Control Panel Parts List	Control Panel Assembly	X
23	8406-111	High Pressure Switch	X
24	8406-065	Low Pressure Switch	X
25	5060-134BX	Evaporator Coil	X
26	5051-149BX	Condenser Coil	X

# CABINET and FUNCTIONAL COMPONENTS



SEXP-495

Drawing No.	Part No.	Description	CHDM
1	8201-062	Relay	2
2	8611-017	Snap Bushing	X
3	135-241	Control Panel Partition	X
4	8201-088	Compressor Control Module	X
5	S117-275	Control Panel	X
6	8550-007	Capacitor Bracket	X
7	8552-085	Capacitor	X
8	8611-006	Ground Terminal	X
9	8611-068	Strain Relief Bushing	2
10	8401-006	Contactor	X