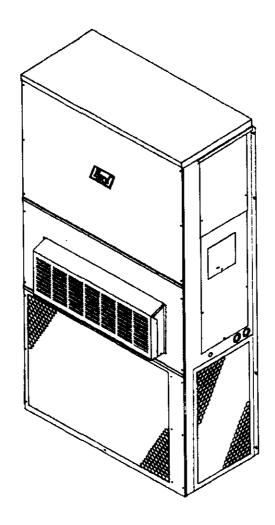


INSTALLATION INSTRUCTIONS WALL MOUNTED PACKAGE AIR CONDITIONERS

MODELS: WA702, WA721



BARD MANUFACTURING COMPANY Bryan, Ohio 43506

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

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GETTING OTHER INFORMATION AND PUBLICATIONS

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 of

ANSI/NFPA 90A

Air Conditioning and Ventilating Systems

Standard for Warm Air Heating

ANSI/NFPA 90B

and Air Conditioning Systems

ACCA Manual J

Load Calculation for Residential
Winter and Summer Air Conditioning

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

FOR MORE INFORMATION, CONTACT THESE PUBLISHERS:

ACCA:

AIR CONDITIONING CONTRACTORS OF AMERICA

1513 16th Street NW Washington, DC 20036

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, INCORPORATED

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

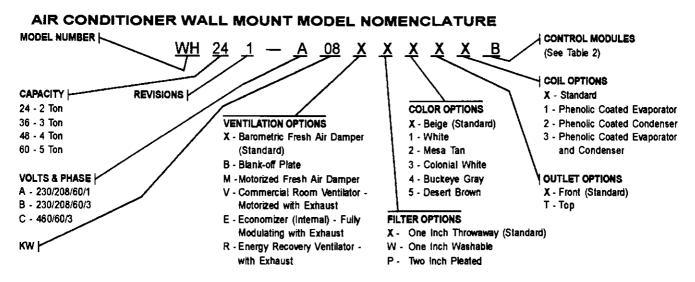
Telephone: (800) 344-3555

Fax: (617) 984-7057

Manufactured under the following U.S. patent numbers: 5,301,744; 5,002,116; 4,924,934; 4,875,520; 4,825,936; 4,432,409. Other patents pending.

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Bard Manufacturing Company
Bryan, Ohio

WALL MOUNT GENERAL INFORMATION



NOTE: For 0KW and circuit breakers (230/208 Volt) or pull disconnects (460 Volt) applications, insert OZ in the KW of the model number.

<i>f</i> lodel	Rated Volts and Phase	No. Field Power Ckts.	③ Minimum Circuit Ampacity	① Maximum External Fuse or Circuit Breaker	② Field Power Wire Size	② Ground Wire Size
-B00,BOZ		1	33	45	8	10
VA702 -B09	220,000 2	1	34	45	8	10
VA721 -B15	230/208-3	1	52	60	6	10
-B18		1	60	60	6	10
-C00,COZ		1	16	20	12	12
VA702 -C09	460-3	1	17	20	12	12
-C15		1	26	30	10	10

① Maximum size of the time delay fuse or HACR type circuit breaker for protection of field wiring conductors.

② Based on 75°C copper wire. All wiring must conform to NEC and all local codes.

³ These "Minimum Circuit Ampecity" values are to be used for sizing the field power conductors. Refer to the National Electric Code (latest revision), article 310 for power conductor sizing. CAUTION: When more than one field power conductor circuit is run through one conduit, the conductors must be derated. Pay special attention to note 8 of Table 310 regarding Ampacity Adjustment Factors when more than 3 conductors are in a raceway.

FIGURE 1
UNIT DIMENSIONS

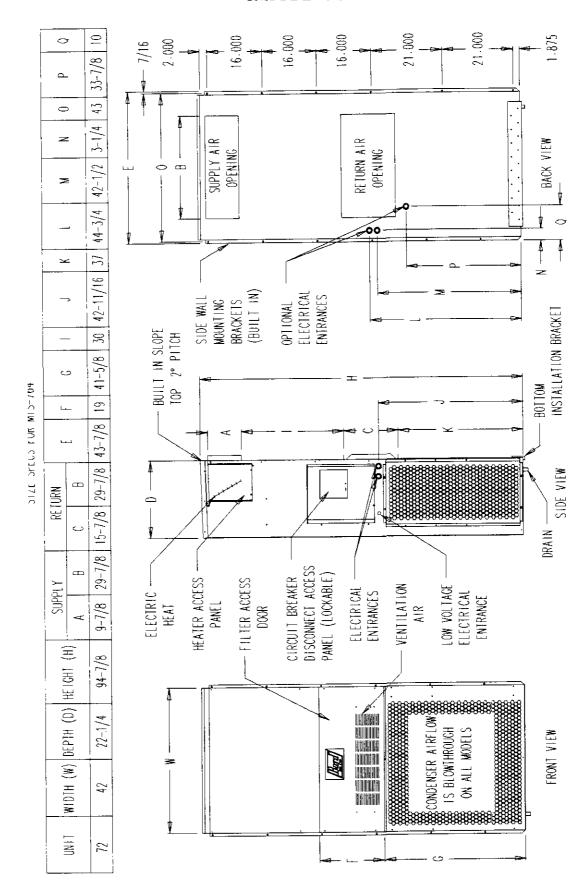


TABLE	TABLE 2—ELECTRICHEAT					
Models	- 1		702-B 721-B		WA7	02-C
	2	40-3	2	08-3	4	60-3
Kw	Α	вти	Α	BTŲ	Α	вт∪
9	21.7	30,600	18.7	23,030	10.8	30,700
15	36.2	51,200	31.2	38,400	17.3	47,000
18	43.3	61,430	37.5	46,100		

SHIPPING DAMAGE

Upon receipt of equipment, the carton should be checked for external signs of shipping damage. If damage is found, the receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent.

GENERAL

The equipment covered in this manual is to be installed by trained, experienced service and installation technicians.

The refrigerant system is completely assembled and charged. All internal wiring is complete.

The unit is designed for use with or without duct work. Flanges are provided for attaching the supply and return

These instructions explain the recommended method to install the air cooled self-contained unit and the electrical wiring connections to the unit.

These instructions and any instructions packaged with any separate equipment required to make up the entire air conditioning system should be carefully read before beginning the installation. Note particularly "Starting Procedure" and any tags and/or labels attached to the equipment.

While these instructions are intended as a general recommended guide, they do not supersede any national and/or local codes in any way. Authorities having jurisdiction should be consulted before the installation is made. See Page 1 for information on codes and standards.

Size of unit for a proposed installation should be based on heat loss calculation made according to methods of Air Conditioning Contractors of America (ACCA). The air duct should be installed in accordance with the Standards of the National Fire Protection Association for the Installation of Air Conditioning and Ventilating Systems of Other Than Residence Type, NFPA No. 90A,

and Residence Type Warm Air Heating and Air Conditioning Systems, NFPA No. 90B. Where local regulations are at a variance with instructions, installer should adhere to local codes.

DUCT WORK

Any heat pump is more critical of proper operating charge and an adequate duct system than a straight air conditioning unit. All duct work, supply and return, must be properly sized for the design air flow requirement of the equipment. Air Conditioning Contractors of America (ACCA) is an excellent guide to proper sizing. All duct work or portions thereof not in the conditioned space should be properly insulated in order to both conserve energy and prevent condensation or moisture

Refer to Table 10 for maximum static pressure available for duct design.

Design the duct work according to methods given by the Air Conditioning Contractors of America (ACCA). When duct runs through unheated spaces, it should be insulated with a minimum of one inch of insulation. Use insulation with a vapor barrier on the outside of the insulation. Flexible joints should be used to connect the duct work to the equipment in order to keep the noise transmission to a minimum.

A 1/4-inch clearance to combustible material for the first three feet of duct attached to the outlet air frame is required. See Wall Mounting Instructions and Figures 2 and 2A for further details.

Ducts through the walls must be insulated and all joints taped or sealed to prevent air or moisture entering the wall cavity.

CAUTION: Some installations may not require any return air duct. A metallic return air grille is required with installations not requiring a return air duct. The spacing between louvers on the grille shall not be larger than 5/8 inches.

Any grille that meets the 5/8 inch louver criteria, may be used. It is recommended that Bard Return Air Grille Kit RG2 thru RG5 or RFG2 thru RFG5 be installed when no return duct is used. Contact distributor or factory for ordering information. If using a return air filter grille, filters must be of sufficient size to allow a maximum velocity of 400 fpm.

NOTE: If no return air duct is used, applicable installation codes may limit this cabinet to installation only in a single story structure.

FILTERS

A 1-inch throwaway filter is supplied with each unit. The filter slides into position making it easy to service. This filter can be serviced from the outside by removing the service door. A 1-inch washable filter and 2-inch pleated filter are also available as optional accessories. The internal filter brackets are adjustable to accommodate the 2-inch filter by loosening 2 screws in each bracket assembly and sliding the brackets apart to the required width and retightening the 4 screws.

FRESH AIR INTAKE

All units are built with fresh air inlet slots punched in the service panel.

The fresh air damper assembly is standard equipment with the unit because of the variety of state or local codes requiring fresh air capability. It is shipped already attached to each unit.

All capacity, efficiency and cost of operation information as required for Department of Energy "Energyguide" Fact Sheets is based upon the fresh air blank-off plate in place and is recommended for maximum energy efficiency.

The blank-off plate is available upon request from the factory and is installed in place of the fresh air damper shipped with each unit.

CONDENSATE DRAIN

A plastic drain hose extends from the drain pan at the top of the unit down to the unit base. There are openings in the unit base for the drain hose to pass through. In the event the drain hose is connected to a drain system of some type, it must be an open or vented type system to assure proper drainage.

INSTALLATION INSTRUCTIONS

WALL MOUNTING INFORMATION

- 1. Two holes, for the supply and return air openings, must be cut through the wall as shown in Figure 2.
- On wood-frame walls, the wall construction must be strong and rigid enough to carry the weight of the unit without transmitting any unit vibration.

WARNING: Fire hazard can result if 1/4-inch clearance to combustible materials for supply air duct is not maintained. See Figure 2.

 Concrete block walls must be thoroughly inspected to insure that they are capable of carrying the weight of the installing unit.

MOUNTING THE UNIT

- These units are secured by wall mounting brackets which secure the unit to the outside wall surface at both sides. A bottom mounting bracket is provided for ease of installation.
- 2. The unit itself is suitable for "0" inch clearance, but the supply air duct flange and the first 3 feet of supply air duct require a minimum of 1/4-inch clearance to combustible material. If a combustible wall, use a minimum of 30-1/2" x 10-1/2" dimensions for sizing. However, it is generally recommended that a 1-inch clearance is used for ease of installation and maintaining the required clearance to combustible material. The supply air opening would then be 32" x 12". See Figures 2 and 2A for details.

WARNING: Failure to provide the 1/4-inch clearance between the supply duct and a combustible surface for the first 3 feet of duct can result in fire.

- 3. Locate and mark lag bolt locations and bottom mounting bracket location. See Figure 2.
- 4. Mount bottom mounting bracket.
- Hook top rain flashing under back bend of top. Top rain flashing is shipped secured to the right side of the back.
- Position unit in opening and secure with 5/16 lag bolts; use 7/8-inch diameter flat washers on the lag bolts.
- 7. Secure rain flashing to wall and caulk across entire length of top. See Figure 2.
- 8. For additional mounting rigidity, the return air and supply air frames or collars can be drilled and

- screwed or welded to the structural wall itself (depending upon wall construction). Be sure to observe required clearance if combustible wall.
- 9. On side by side installations, maintain a minimum of 20-inches clearance on right side to allow access to heat strips and control panel and to allow proper airflow to the outdoor coil. Additional clearance may be required to meet local or national codes.

WIRING-MAIN POWER

Refer to the unit rating plate for wire sizing information and maximum fuse or "HACR Type" circuit breaker size. Each outdoor unit is marked with a "Minimum Circuit Ampacity". This means that the field wiring used must be sized to carry that amount of current. Depending on the installed KW of electric heat, there may be two field power circuits required. If this is the case, the unit serial plate will so indicate. All models are suitable only for connection with copper wire. Each unit and/or wiring diagram will be marked "Use Copper Conductors Only". These instructions MUST BE adhered to. Refer to the National Electrical Code (NEC) for complete current carrying capacity data on the various insulation grades of wiring material. All wiring must conform to NEC and all local codes.

The electrical data lists fuse and wire sizes (75°C copper) for all models, including the most commonly used heater sizes. Also shown are the number of field power circuits required for the various models with heaters.

The unit rating plate lists a "Maximum Time Delay Relay Fuse" or "HACR Type" circuit breaker that is to be used with the equipment. The correct size must be used for proper circuit protection and also to assure that there will be no nuisance tripping due to the momentary high starting current of the compressor motor.

The disconnect access door on this unit may be locked to prevent unauthorized access to the disconnect. To convert for the locking capability, bend the tab located in the bottom left hand corner of the disconnect opening under the disconnect access panel straight out. This tab will now line up with the slot in the door. When shut, a padlock may be placed through the hole in the tab preventing entry.

See startup section for information on three phase scroll compressor startups.

WIRING: LOW VOLTAGE WIRING

230/208V, 1 phase and 3 phase equipment dual primary voltage transformers. All equipment leaves the factory wired on 240V tap. For 208V operation, reconnect from 240V to 208V tap. The acceptable operating voltage range for the 240 and 208V taps are:

Тар	Range
240	253 - 216
208	220 - 187

NOTE: The voltage should be measured at the field power connection point in the unit and while the unit is operating at full load (maximum amperage operating condition).

Five (5) wires should be run from thermostat subbase to the 24V terminal board in the unit. A five conductor, 18 gauge copper, color-coded thermostat cable is recommended. The connection points are shown in Figure 3.

			Maximum Distance
Transformer VA	FLA	Wire Gauge	in Feet
55	2.3	20 gauge	45
		18 gauge	60
		16 gaug e	100
		14 gauge	160
		12 gauge	250

Thermostat Subbase		Predominate Features	
8403-019	8404-012	1 stage cool, 2 stage heat	
T874C1760	Q674A1001	System: heat-auto-cool Fan: on-auto	
8403-002	8404-003	1 stage heat, 1 stage cool	
T87F3111	Q539A1220	System: heat-off-cool Fan: auto	
8403-009		1 stage heat, 1 stage cool	
IF56-318			

FIGURE 2
MOUNTING INSTRUCTIONS

NOTE: It is recommended that a bead of silicone caulking be placed behind the side mounting flanges and under the top flashing at the time of installation.

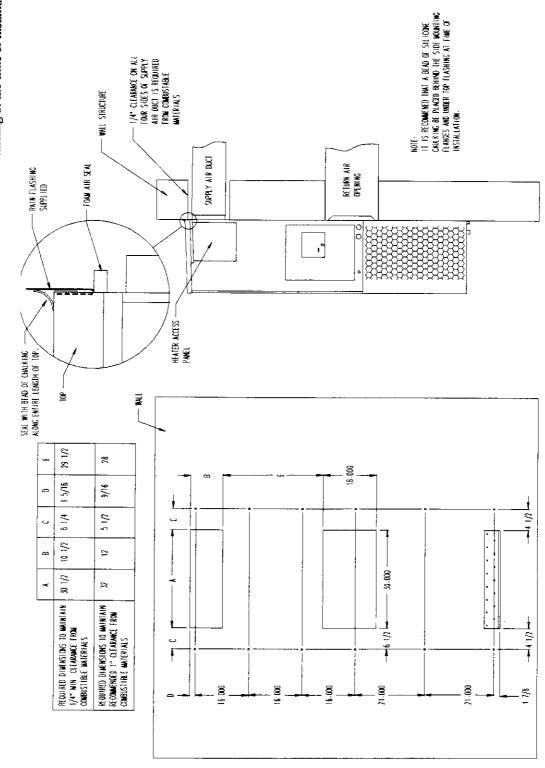
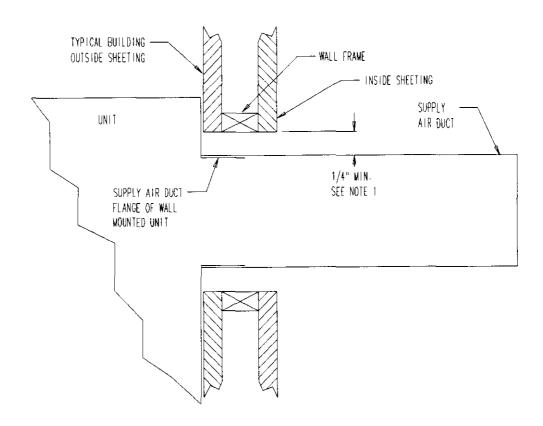


FIGURE 2A ELECTRIC HEAT CLEARANCE



Side section view of supply air duct for wall mounted unit showing 1/4" clearance to combustible surfaces.

NOTE 1:

WARNING

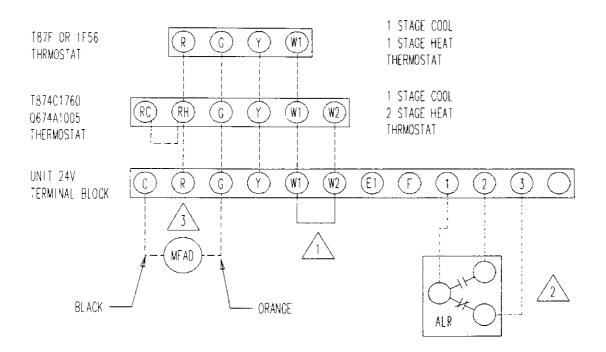
A minimum of 1/4" clearance must be maintained between the supply air duct and combustible materials. This is required for the first 3 feet of ducting.

It is important to insure that the 1/4-inch minimum spacing is maintained at all points.

Failure to do this could result in overheating the combustible material and may result in fire.

FIGURE 3

LOW VOLTAGE WIRING





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

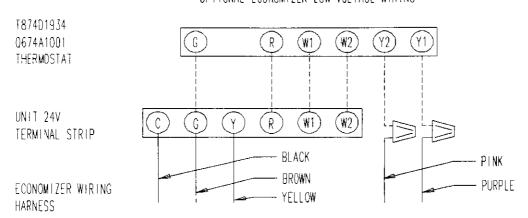


OPTIONAL ALARM RELAY PROVIDED ON UNITS WITH CONTROL MODULE "M" OR "J" INSTALLED. CONTACT RATING 24VAC @ 125VA



OPTIONAL MOTORIZED FRESH AIR DAMPER SUGGESTED HOOK UP

OPTIONAL ECONOMIZER LOW VOLTAGE WIRING



START UP

IMPORTANT INSTALLER NOTE

For improved start-up performance, wash the indoor coil with a dishwasher detergent.

CRANKCASE HEATERS

WA702 and WA721 units are provided with compressor crankcase heat.

Th WA702 and WA721 models have a band type heater located around the bottom of the compressor. This heater is controlled by the crankcase heater relay. The heater is only energized when the compressor is not running.

Some form of crankcase heat is essential to prevent liquid refrigerant from migrating to the compressor, causing oil pump out on compressor start-up and possible valve failure due to compressing a liquid.

The decal in Figure 4 is affixed to all WA702 and WA721 units detailing start-up procedure. This is very important. Please read carefully.

HIGH PRESSURE SWITCH

FIGURE 4

IMPORTANT

THESE PROCEDURES MUST BE FOLLOWED AT INITIAL START-UP AND AT ANY TIME POWER HAS BEEN REMOVED FOR 12 HOURS OR LONGER.

TO PREVENT COMPRESSOR DAMAGE WHICH MAY RESULT FROM THE PRESENCE OF LIQUID REFRIGERANT IN THE COMPRESSOR CRANKCASE.

- 1. MAKE CERTAIN THE ROOM THERMOSTAT IS IN THE "OFF" POSITION (THE COMPRESSOR IS NOT TO OPERATE).
- 2. APPLY POWER BY CLOSING THE SYSTEM DISCONNECT SWITCH. THIS ENERGIZES THE COMPRESSOR HEATER WHICH EVAPORATES THE LIQUID REFRIGERANT IN THE CRANKCASE.
- 3. ALLOW 4 HOURS OR 60 MINUTES PER POUND OF REFRIGERANT IN THE SYSTEM AS NOTED ON THE UNIT RATING PLATE, WHICHEVER IS GREATER.
- 4. AFTER PROPERLY ELAPSED TIME, THE THERMOSTAT MAY BE SET TO OPERATE THE COMPRSSOR.
- 5. EXCEPT AS REQUIRED FOR SAFETY WHILE SERVICING-DO NOT OPEN SYSTEM DISCONNECT SWITCH.

7961-061

The WA702 and WA721 models are supplied with a remote reset high pressure switch. If tripped, this pressure switch may be reset by turning the thermostat off then back on again.

THREE PHASE SCROLL COMPRESSOR START UP INFORMATION

Scroll compressors, like several other types of compressors, will only compress in on rotational direction. Direction of rotation is not an issue with single phase compressors since they will always start and run in the proper direction.

However, three phase compressors will rotate in either direction depending upon phasing of the power. Since there is a 50-50 chance of connecting power in such a way as to cause rotation in the reverse direction, verification of proper rotation must be made. Verification of proper rotation direction is made by observing that suction pressure drops and discharge pressure rises when the compressor is energized. Reverse rotation also results in an elevated sound level over that with correct rotation, as well as, substantially reduced current draw compared to tabulated values.

There is no negative impact on durability caused by operating three phase Compliant Scroll compressors in the reversed direction. However, after several minutes of operation, the compressor's internal protector will trip.

All three phase ZR3 compressors are wired identical internally. As a result, once the correct phasing is determined for a specific system or installation, connecting properly phased power leads to the same Fusite terminal should maintain proper rotation direction.

The direction of rotation of the motor may be changed by reversing any two line connections to the unit.

SERVICE HINTS

- Caution homeowner to maintain clean air filters at all times. Also, not to needlessly close off supply and return air registers. This reduces air flow through the system, which shortens equipment service life as well as increasing operating costs.
- Switching to heating cycle at 75°F or higher outside temperature may cause a nuisance trip of the remote reset high pressure switch. Turn thermostat off, then on to reset the high pressure switch.
- Check all power fuses or circuit breakers to be sure they are the correct rating.

4. Periodic cleaning of the outdoor coil to permit full and unrestricted airflow circulation is essential.

SEQUENCE OF OPERATION

COOLING—Circuit R-Y makes at thermostat pulling in compressor contactor, starting the compressor and outdoor motor. The G (indoor motor) circuit is automatically completed on any call for cooling operation or can be energized by manual fan switch on subbase for constant air circulation. On a call for heating, circuit R-W1 make at the thermostat pulling in heat contact for the strip heat and blower operation. On a call for second stage heat, R-W2 makes bringing on second heat contactor, if so equipped.

PRESSURE SERVICE PORTS

High and low pressure service ports are installed on all units so that the system operating pressures can be observed. Pressure curves can be found later in the manual covering all models. It is imperative to match the correct pressure curve to the unit by model number.

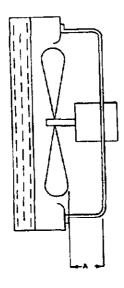
TROUBLESHOOTING

FAN BLADE SETTING DIMENSIONS

Shown in the drawing below are the correct fan blade setting dimensions for proper air delivery across the outdoor coil.

Any service work requiring removal or adjustment in the fan and/or motor area will require that the dimensions below be checked and blade adjusted in or out on the motor shaft accordingly.

FIGURE 5



ABLE 4	
Model	Dimension A
WA721	.75
WA702	1.25

REMOVAL OF THE FAN SHROUD

- 1. Disconnect all power to unit.
- 2. Remove the screws holding both grills—one on each side of unit—and remove grills.
- 3. Remove screws holding fan shroud to condenser and bottom—(9) screws.
- 4. Unwire condenser fan motor.
- 5. Slide complete motor, fan blade, and shroud assembly out the left side of the unit.
- 6. Service motor/fan as needed.
- 7. Reverse steps to reinstall.

REFRIGERANT CHARGE

The correct system R-22 charge is shown on the unit rating plate. Optimum unit performance will occur with a refrigerant charge resulting in a suction line temperature (6" from compressor) as shown in the following table:

TABLE 5				
Model	Rated Airflow	95°F OD Temperature	82°F OD Temperature	
WA721	1,650	59 - 61	57 - 59	
WA702	1,800	58 - 60	56 - 58	

The above suction line temperatures are based upon 80°F dry/bulb/67°F wet bulb (50 percent R.H.) temperature and rated airflow across the evaporator during cooling cycle.

The suction line temperatures are based upon 80°F dry bulb/67°F wet bulb (50 percent relative humidity) temperature and rated airflow across the evaporator during cooling cycle.

	WA702, WA721		
ESP	Low	High	
n H2O	Dry / Wet Coil	Dry / Wet Coil	
<u> </u>			
1			
2			
3			
4			
5			

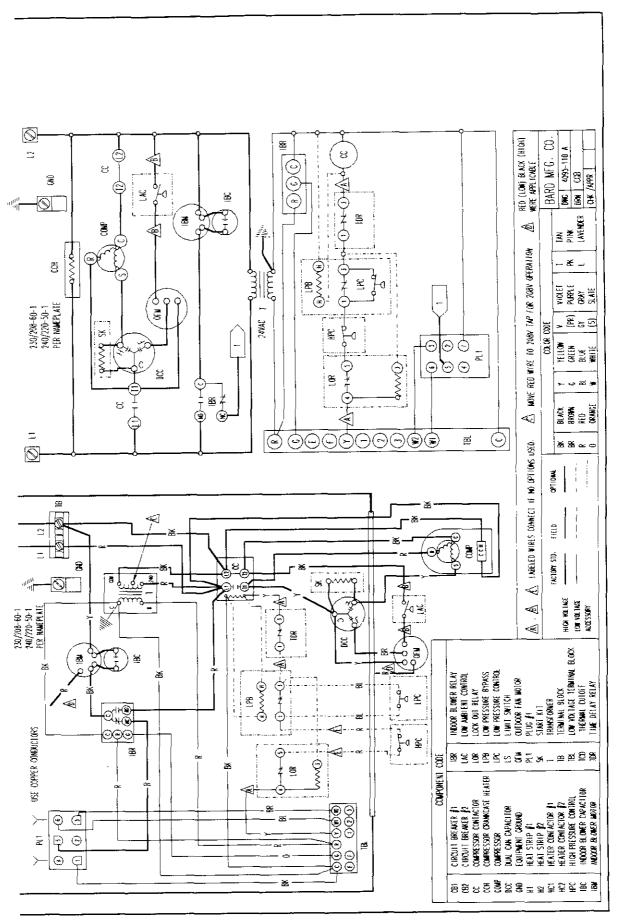
	Rated	Rated	Recommended
Model	CFM*	ESP*	Airflow Range
WA702	1,650	.20	1,750 - 1,285
WA721	1,800	.10	1,950 - 1,375

Model	WA	02	WAT	721
Speed	High	Low	High	Low
kW	Speed	Speed	Speed	Speed
-B00	.50	.50	.50	.50
-B09	.50	.50	.50	.50
-815	.50	.50	.50	.50
-B18	.50	.50	.50	.50
-09	.50	.50	.50	.50
-C15	.50	.50	.50	.50

Values shown are for units equipped with STD 1-inch throwaway filter or 1-inch washable filter. Derate ESP by .15 for 2-inch pleated filters.

	Return Air							•			
Modei	Temperature	Pressure	75°	80°	85°	90°	95°	100°	105°	110°	115°
W A701	75° DB	Low Side	62	63	54	65	66	67	68	69	70
	62° WB	High Side	214	230	247	265	280	299	316	333	351
	80° DB	Low Side	67	68	69	70	71	72	73	74	75
	67° WB	High Side	220	236	254	271	287	306	324	342	360
	85° DB	Low High	72	73	74	75	76	77	78	79	80
	72° WB	High Side	225	243	261	279	297	316	335	353	372
WA721	75° DB	Low Side	63	64	65	66	67	68	69	70	71
	62° WB	High Side	205	222	237	254	268	286	302	318	336
	80° DB	Low Side	68	69	70	71	72	73	74	75	76
	67° WB	High Side	211	227	244	261	275	294	310	327	345
	85° DB	Low High	73	74	75	76	77	78	79	80	81
	72° WB	High Side	216	234	251	266	285	303	321	339	357

TABLE 10 — OPTIONAL ACC	ESSORIES			
Model	Description	WA702-B	WA702-C	WA721-B
HWA05-B09	Heater Packages	x		x
HWA05-B15	Heater Packages	x		x
EHWA05-B18	Heater Packages	x		х
HWC05-C05	Heater Packages		х	
EHWA05-C15	Heater Packages		x	
BOP-5	Blank Off Plate	х	x	x
BFAD-5	Barometric Fresh Air Damper	X	x	x
MFAD-5	Motorized Fresh Air Damper	X	x	х
CRV-5	Clasroom Ventilator with Exhaust	x	x	×
IFM-5	Economzier with Exhaust	X	x	×
VERV-A5A	Energy Recovery Ventilator	X		
VERV-C5A	Energy Recovery Ventilator		x	
CMA-5	Time Delay Relay (TDR)	x	x	X
CMA-6	Low Ambient Control (LAC)	X	-	x
CMA-16	Low Pressure Control	X	×	×
CMA-17	LPC & TDR	X	x	x
CMA-18	LPC & TDR	x		×
MA-19	LAC & TDR	X		×
MC-20	LAC & TDR & LPC	x		×
VMPD-01C	Pull Disconnect Kit		×	



			N.	
				_