

MANUAL 2100-014E

INSTALLATION INSTRUCTIONS



WALL MOUNTED AIR CONDITIONERS

MODELS

18WA1

20WA

24WA1

30WA1

36WA3

48WA3

507819

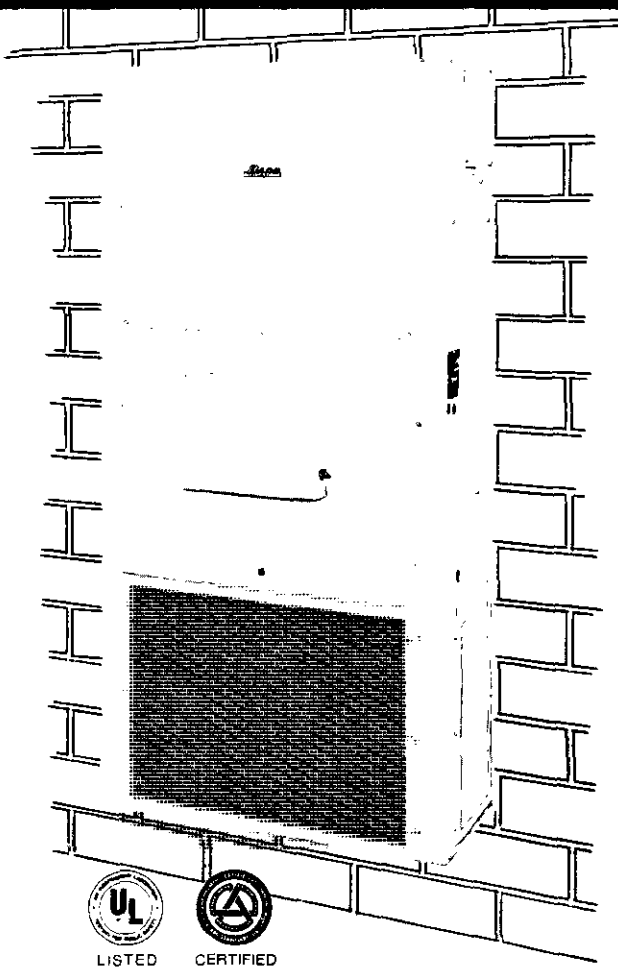
BARD MANUFACTURING CO. • BRYAN, OHIO 43506

Dependable quality home equipment... since 1914



HI-BOY AIR CONDITIONERS

EIGHT MODELS • Cooling Capacities: 16,500 to 45,000



Practical outside wallmount installation provides versatile applications for:

- HOME IMPROVEMENT PROJECTS
- NEW CONSTRUCTION ● APARTMENTS
- MODULAR FACILITIES ● OFFICES
- SCHOOLS



Electric Heat Strips with automatic limit and thermo cut-off are available as a built-in option. Accessible from top or side outlet without removing unit from wall.

Aluminum Finned Copper Coil surfaces provide maximum transfer.

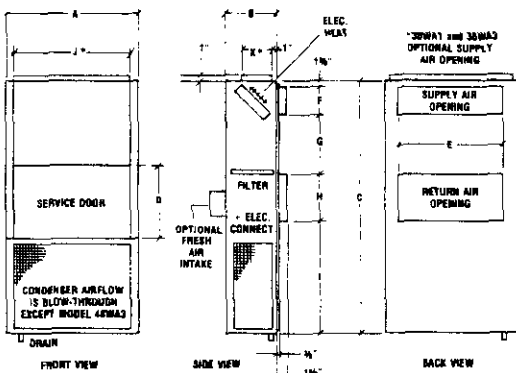
Twin Blowers move air quietly. Extra built-in capacity provides maximum air delivery. Motor overload protection is standard on all models.

Totally Enclosed Compressor operates quieter than others. Equipped with crankcase heater and is protected with internal overload, pressure relief valve and anti-slug device.

Galvanized Steel Cabinet is hand-somely finished with baked-on polyester enamel.

Electrical Components are easily accessible for routine inspection and maintenance through service panel opening.

Air Filters are standard equipment. Replacement filters are easy to install.



*Must be installed at factory. Openings J and K cannot be properly made in the field.

Dimensions for architectural and installation requirements (Nominal)

MODEL	A	B	C	D	E	F	G
18WA1-20WA-24WA1	32 1/4	13 1/2	67 1/2	20	20	8	20 1/2
30WA1-36WA3	38 1/4	15 1/4	74	22 1/2	28	8	18
48WA3	38 1/4	18	84	32 1/2	30	10	30

MODEL	H	I	J	K	Fresh Air Intake	Filter Sizes*
18WA1-20WA-24WA1	12	25 1/2	N/A	N/A	0 to 25%	14x25x1
30WA1-36WA3	14	32 1/2	32	8	0 to 25%	15x30 3/8x1
48WA3	16	26 1/4	N/A	N/A	0 to 50%	(2) 16x16x1

*Dimensions and filter sizes are in inches.

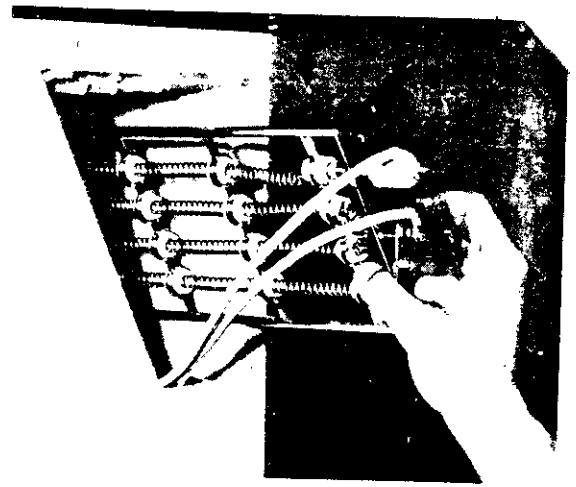
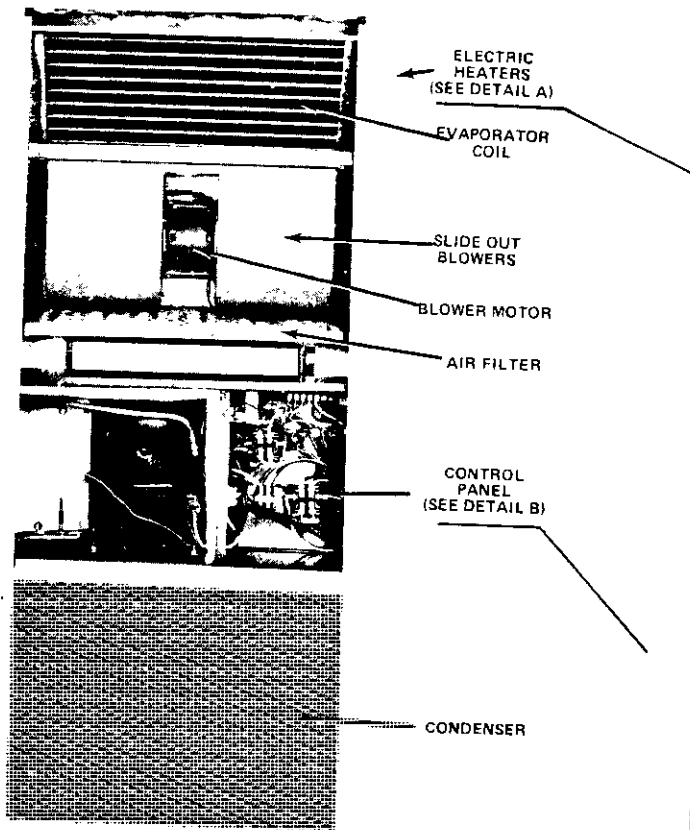
SPECIFICATIONS — Hi-Boy Air Conditioners

MODEL	18WA1	20WA	24WA1	30WA1	36WA3**	36WA3**	48WA3	48WA3
Cooling Capacity (BTU)	16,500	20,000	23,000	30,000	36,500	36,500	45,000	45,000
Hi-Temp. Heating BTU*	SEE ELECTRIC HEAT TABLE NO. 1							
Low-Temp. Heating BTU*	SEE ELECTRIC HEAT TABLE NO. 1							
Electrical — Low KW	1-Ph 60Hz	1-Ph 60Hz	1-Ph 60Hz	1-Ph 60Hz	1-Ph 60Hz	3-Ph 60Hz	1-Ph 60Hz	3-Ph 60Hz
Cooling Watts	2700	2800	3200	4200	5000	4850	6400	6200
Operating Voltage Range	197-253V	197-253V	197-253V	207-253V	197-253V	187-264V	187-253V	187-264V
Min. Circuit Ampacity	20	18	20	30	35	23	41	29
Field Wire Supply**	2 No. 12AWG	2 No. 12AWG	2 No. 12AWG	2 No. 10AWG	2 No. 8AWG	2 No. 10AWG	2 No. 6AWG	2 No. 10AWG
Delay Fuse — Max	30A	25A	30A	50A	50A	35A	80A	45A
Total Unit Amps	16.3	14.8	16.3	25	29	19.5	34	24.5
Compressor — Circuit A								
Volts	230/208	230/208	230/208	230	230/208	230/208	230/208	230/208
Name Plate Amps	13.5	12	13.5	20	24	14.5	26	18.5
Lock Rotor Amps	53	53	60	76	110	74	115	33
Fan Motor & Condenser								
Fan Motor — HP/RPM	1/5-1050	1/5-1050	1/5-1050	1/5-1050	1/5-1050	1/5-1050	1/2-1075	1/2-1075
Fan Motor — AMPS	1.6	1.6	1.6	1.6	1.6	1.6	3.9	3.9
Fan — OAA/CFM	18"/1450	18"/1450	18"/1450	20"/1900	20"/1900	20"/1900	30"/2400	24"/2400
Face Area Sq. Ft./Row/Fins per in.	3.75/2.12	3.75/2.15	3.75/2.15	5.04/2.18	5.04/2.18	5.04/2.18	5.15/3.14	5.15/3.14
Motor & Evaporator								
Blower Motor — HP/RPM	1/6-1050	1/6-1050	1/6-1050	1/3-1050	1/3-1050	1/3-1050	1/2-1050	1/2-1050
Blower Motor — AMPS	1.2	1.2	1.2	3.4	3.4	3.4	4.1	4.1
CFM Cooling								
w/Filter (Rated)	635 @ 32	750 @ 22	810 @ 10	1120 @ 32	1275 @ 15	1275 @ 15	1600 @ 2	1600 @ 2
Face Area Sq. Ft./Row/Fins per in.	2.08/2.14	2.08/2.12	2.08/3.12	3.21/3.13	3.21/3.13	3.21/3.13	4.04/3.12	4.04/3.12
Filter Sizes (inches)	14x25x1	14x25x1	14x25x1	15x30 3/8x1	15x30 3/8x1	15x30 3/8x1	(2) 16x16x1	(2) 16x16x1
Refrigerant — R22	32 oz.	40 oz.	41 oz.	40 oz.	49 oz.	49 oz.	83 oz.	83 oz.
Shipping Weight Lbs.	310	315	318	380	385	385	456	496

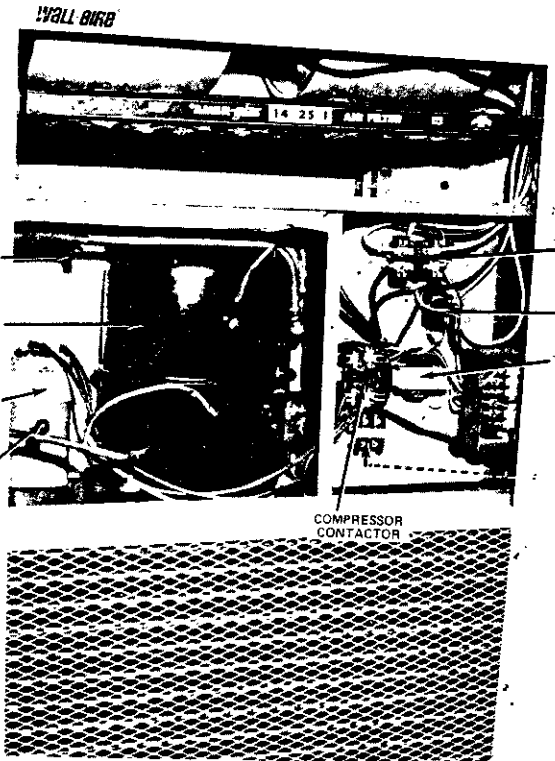
NOTE: **For additional heating capacity add the KW from Table No. 1. See also electrical data table. ***60°C Cooper Wire Size - basic unit only. See electrical data for models with electric heat. ****Deduct 500 Btu for 208V operation.

Specifications subject to change without notice.

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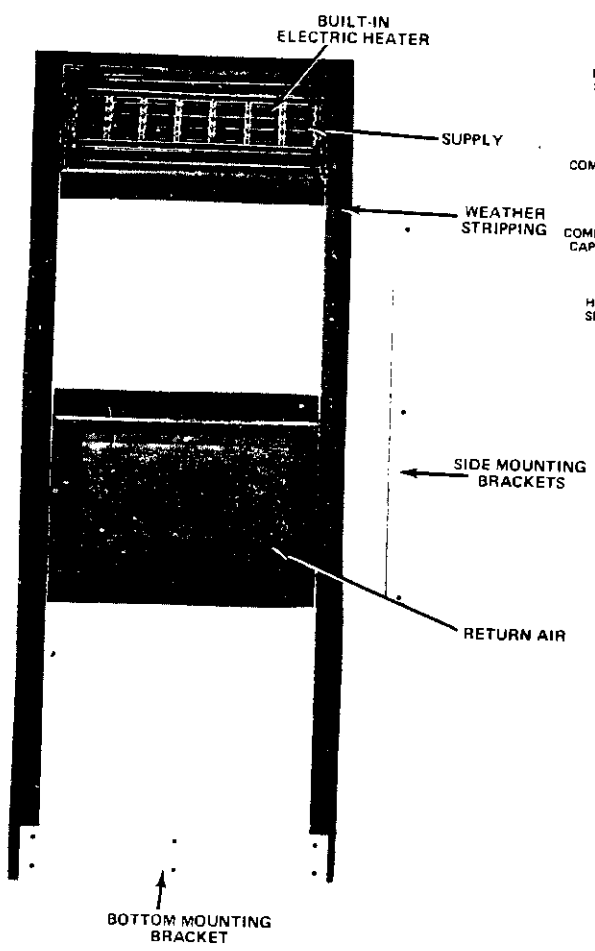


DETAIL A



DETAIL B

NOTE:
BEFORE FASTENING
SIDE MOUNTING
BRACKETS
CHECK INSIDE
FOR CLEARANCE



BACK SIDE OF UNIT

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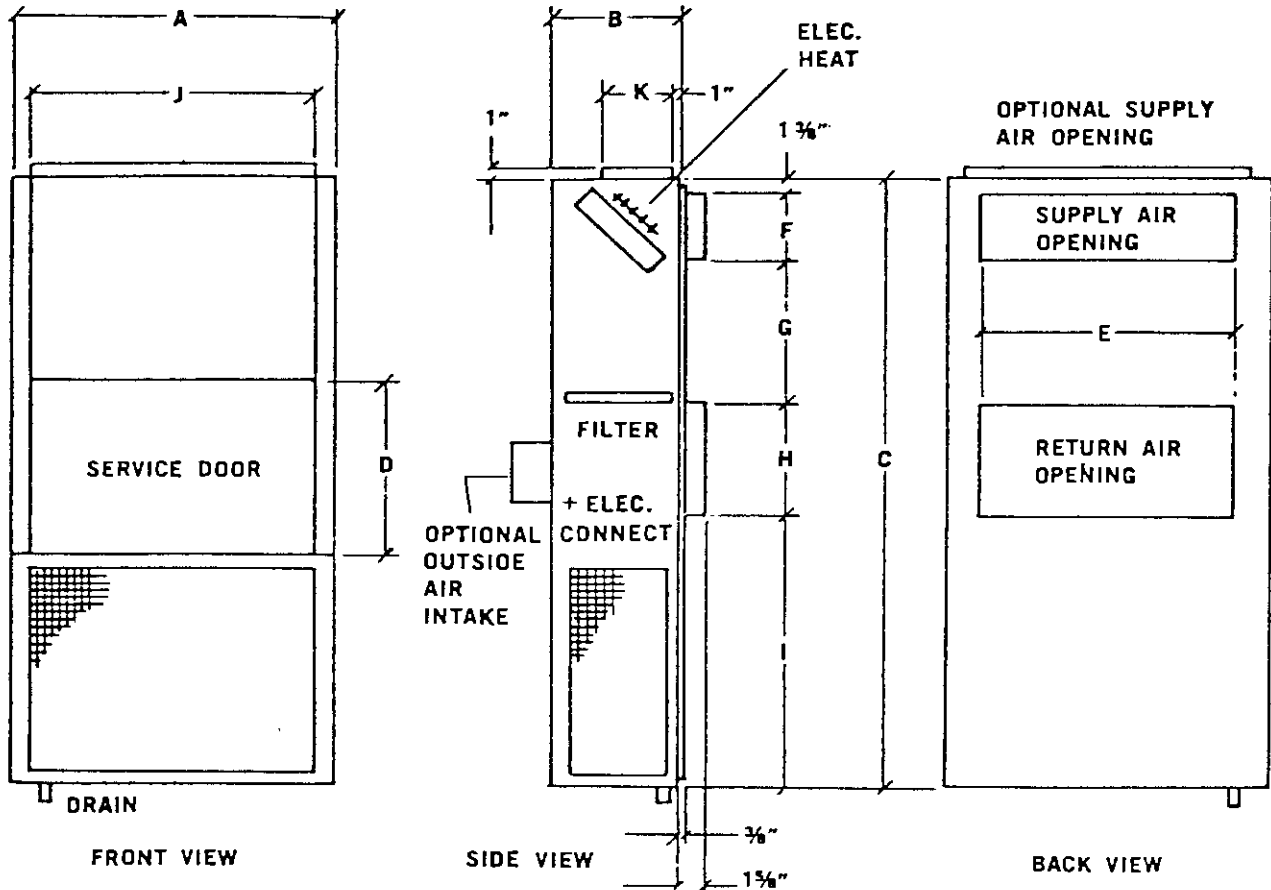
DIMENSIONS *

... for architect and installation requirements

MODEL	A	B	C	D	E	F	G	H	I	J	K
18WA1-20WA-24WA1	32¼	13½	67½	20	20	8	20½	12	25¾		
30WA1-36WA3	38¼	15¼	74	22½	28	8	18	14	32¾	32	8
48WA3	38¼	18	84	32½	30	10	30	16	26¾		

FILTER SIZES*
14 x 25
15 x 30-5/8
(2) 16 x 16

* Dimensions and filter sizes are in inches.



INSTALLER NOTE: Optimum unit performance will occur with a refrigerant charge resulting in a suction line temperature (near the compressor) of 53°F to 58°F with 95°F outdoor temperature and 80°F dry bulb/67°F wet bulb (50% R.H.) indoor temperatures and rated airflow across the indoor coil.

50883

ELECTRICAL INFORMATION										WIRING INFORMATION		
Model	Volts/Ph	Heater Kw @ 240V	Max. Unit Amps	No. Field Power Circuits	Internal Fuses		Req'd. Maximum External Fuses Ckt.A/B	Min. Ckt. Ampacity Ckt.A/B	Field Power Wiring Ckt.A/B	Ground Wire Size Ckt.A/B	Wiring Diagram No.	
					Ckt. A	Ckt. B						
18WA1	230/1	0	16.3	1			30	20	12	12	4007-110	
18WA1	230/1	4	17.9	1			30	22	10	10	-120	
18WA1	230/1	5	22	1			30	28	10	10	-120	
18WA1	230/1	8	34.5	1			45	43	6	10	-130	
18WA1	230/1	10	42.8	1			60	54	6	10	-130	
20WA	230/1	0	14.8	1			25	18	12	12	4007-110	
20WA	230/1	4	17.9	1			25	22	10	10	-120	
20WA	230/1	5	22	1			30	28	10	10	-120	
20WA	230/1	8	34.5	1			45	43	6	10	-130	
20WA	230/1	10	42.8	1			60	54	6	10	-130	
24WA1	230/1	0	16.3	1			30	20	12	12	4007-110	
24WA1	230/1	4	17.9	1			30	22	10	10	-120	
24WA1	230/1	5	22	1			30	28	10	10	-120	
24WA1	230/1	8	34.5	1			45	43	6	10	-130	
24WA1	230/1	10	42.8	1			60	54	6	10	-130	
30WA1	230/1	0	25	1			50	30	10	10	4008-110	
30WA1	230/1	5	25	1			50	30	10	10	-120	
30WA1	230/1	10	45	1			60	56	4	10	-130	
30WA1	230/1	15	65.9	1	60	30	90	82	2	8	-140	
36WA3	208-230/1	0	29	1			50	35	8	10	4009-110 Rev.A	
36WA3	208-230/1	5	29	1			50	35	8	10	-120 A	
36WA3	208-230/1	10	45	1			60	56	4	10	-130 A	
36WA3	208-230/1	15	65.9	1	60	30	90	82	2	8	-140 A	
36WA3	208-230/3	0	19.5	3			35	23	10	10	-210 A	
36WA3	208-230/3	6	19.5	3			35	23	10	10	-220 A	
36WA3	208-230/3	9	25.1	3			35	31	8	10	-220 A	
36WA3	208-230/3	12	32.3	3			40	40	8	10	-230 A	
36WA3	208-230/3	15	39.6	3			50	50	6	10	-230 A	
48WA3	208-230/1	0	34	1			60	41	6	10	4010-110 Rev.A	
48WA3	208-230/1	5	34	1			60	41	6	10	-120 A	
48WA3	208-230/1	10	45.7	1			60	57	4	10	-130 A	
48WA3	208-230/1	15	66.6	1	60	30	90	83	2	8	-140 A	
48WA3	208-230/1	20	87.3	1	60	60	60/60	57/52	3/4	10/10	-150 A	
48WA3	208-230/3	0	24.5	3			45	29	10	10	-210 A	
48WA3	208-230/3	9	25.8	3			45	32	8	10	-220 A	
48WA3	208-230/3	12	33	3			45	41	6	10	-230 A	
48WA3	208-230/3	15	40.3	3			50	50	6	10	-230 A	
48WA3	208-230/3	18	47.5	3			60	59	4	10	-240 A	

Based upon the use of 600 copper wiring material.

Based upon Table 250-95 of N.E.C., 1975.

APPLICATION AND INSTALLATION INSTRUCTIONS

GENERAL

Units are shipped completely assembled and internally wired, requiring only duct connections, thermostat wiring and external 220-240 volt AC power supply. The refrigerant system is completely assembled and charged.

These instructions and any instructions packaged with any separate equipment should be carefully read before beginning the installation. Note particularly 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.

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.

INSTALLATION

Size of unit for a proposed installation should be based on heat loss calculation made according to methods of National Warm Air Heating and Air Conditioning Association. 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.

DUCTWORK

Design the ductwork according to methods given by the National Warm Air Heating and Air Conditioning Association. When duct runs through unheated spaces, it should be insulated with a minimum of two inches of insulation. Use insulation with a vapor barrier on the outside of the insulation. Flexible joints should be used to connect the ductwork to the equipment in order to keep the noise transmission to a minimum.

NOTE: All models are U.L. approved with 1" clearance to combustible materials for the first 3 feet of duct attached to the outlet duct flange. The cabinet is approved for 0" clearance.

Refer to Figure 1-8 for additional information.

WALL MOUNTING

1. Two holes, the size of the supply and return air openings must be cut through the wall as shown in Fig. 1, 2, 3, 4, 5 and 6.
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.
3. Concrete block walls must be thoroughly inspected to insure that they are capable of carrying the weight of the installing unit.
4. Ducts through the walls must be insulated and all joints taped or sealed to prevent air or moisture entering the wall cavity.
5. Some installations may not require any return air duct. It is recommended that on this type of installation that a filter grille be located in the wall. Filters must be of sufficient size to allow a maximum velocity of 400 FPM.

FILTER

A 1" throw away filter is supplied with each unit. The filter slides into position making it easy to service. The filter can be serviced from the outside by removing the service door.

FRESH AIR INTAKE

All units are made with a fresh air inlet hole punched in the service panel. If not ordered originally, a fresh air cover with shut-off damper may be ordered from the factory. The fresh air cover is so positioned that all fresh air intake is filtered by the internal unit filter.

WIRING - 24V

A low voltage terminal block is provided for connection of 24V wires from wall thermostat. Refer to unit wiring diagram for specific wiring information.

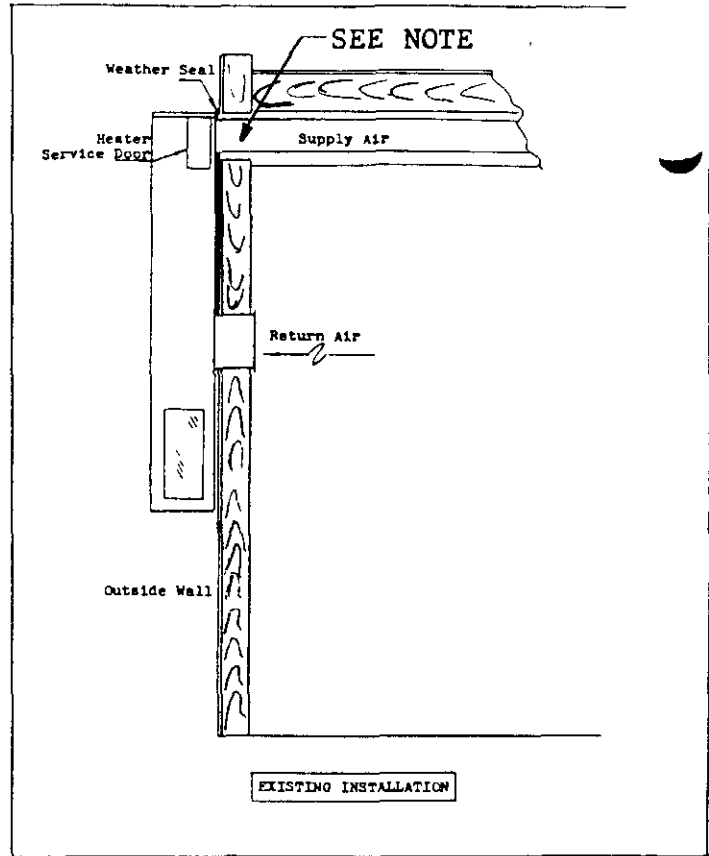
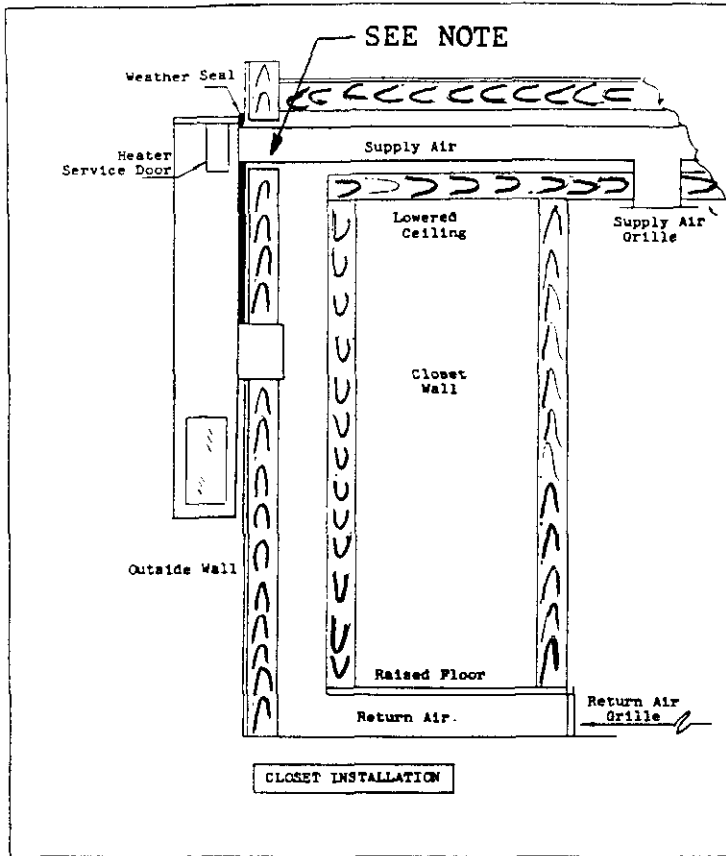
WIRING - 230V

On all models that are not built at the factory with electric heat installed, the field wiring connections are made directly at the compressor contactor. All other models built with electric heat have either a terminal block or a fuse panel for the field wiring connections. Refer to the unit wiring diagram for complete wiring information.

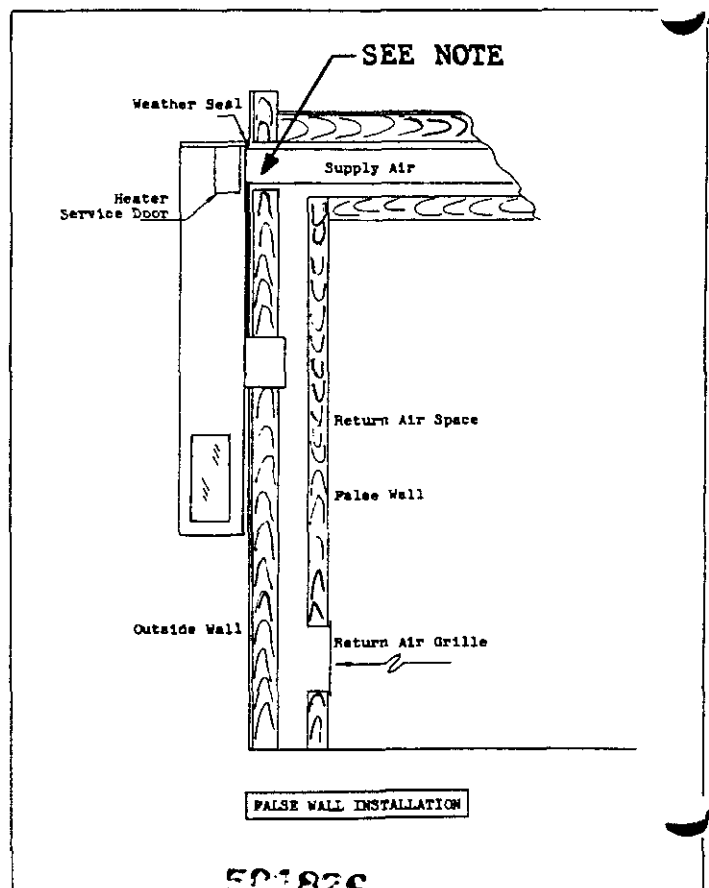
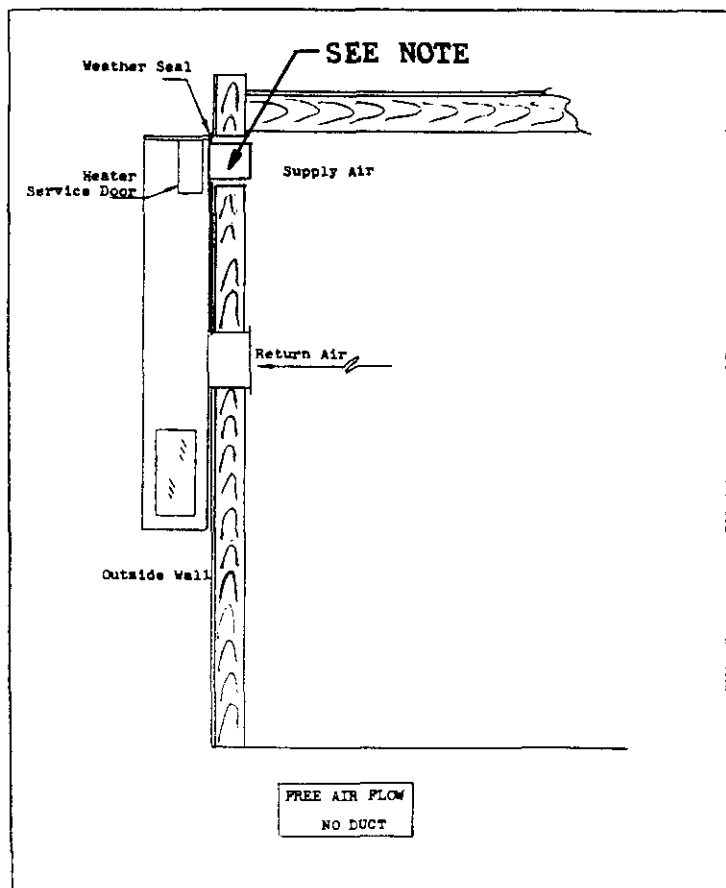
CONDENSATE DRAIN

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.

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NOTE: 1" clearance to combustible materials required for first 3 feet of supply air duct system.



501826

ALPHABETICAL PARTS LIST SINGLE PACKAGE AIR CONDITIONERS

PART NO.	DESCRIPTION	18WA1	20WA	24WA1	30WA1	36WA3	48WA3	48WA3-3	36WA3-3	460V	48WA3-3
5152-030	Blower Housing	X	X	X	X	X	X	X	X	X	X
5152-026	Blower Housing										
5152-028	Blower Wheel	X	X	X	X	X	X	X	X	X	X
5152-029	Blower Wheel	X	X	X	X	X	X	X	X	X	X
5152-011	Blower Wheel cw										
5152-012	Blower Wheel ccw										
8552-015	Capacitor 370V	X	X	X	X	X	X	X	X	X	X
8552-007	Capacitor 370V										
8552-020	Capacitor 440V										
8552-017	Capacitor 440V										
8552-001	Capacitor 370V	X	X	X	X	X	X	X	X	X	X
8552-002	Capacitor 370V	X	X	X	X	X	X	X	X	X	X
8552-003	Capacitor 370V	X	X	X	X	X	X	X	X	X	X
5811-021	Cap Tube - Cool	X	X	X	X	X	X	X	X	X	X
5811-022	Cap Tube - Cool										
5811-008	Cap Tube - Cool										
8000-001	Compressor 1-Ph	X	X	X	X	X	X	X	X	X	X
8000-002	Compressor 1-Ph										
8000-006	Compressor 1-Ph										
8000-045	Compressor 1-Ph										
8000-046	Compressor 3-Ph										
8000-010	Compressor 3-Ph										
8000-026	Compressor 1-Ph										
8000-030	Compressor 3-Ph										
8000-047	Compressor 3-Ph										
83494	Compressor O'Load										
83493	Compressor O'Load										
5051-007	Condenser Coil	X	X	X	X	X	X	X	X	X	X
5051-006	Condenser Coil										
5051-001	Condenser Coil										
5051-016	Condenser Coil										
8401-007	Contact - Comp.	X	X	X	X	X	X	X	X	X	X
8401-003	Contact - Comp.										
8401-002	Contact - Comp.										
8401-001	Contact - Comp.										
8401-006	Contact - Heater	X	X	X	X	X	X	X	X	X	X
8605-001	Crankcase Heater										
8605-002	Crankcase Heater										
5060-007	Evaporator Coil	X	X	X	X	X	X	X	X	X	X
5060-005	Evaporator Coil										
5060-006	Evaporator Coil										
5060-001	Evaporator Coil										
5051-020	Condenser Coil										
8552-022	Capacitor 370V										

PART NO.	DESCRIPTION	18WA1	20WA	24WA1	30WA1	36WA3	48WA3-3	48WA3	36WA3-3	48WA3-3	460V	48WA3-3
5151-002	Fan Blade	X	X	X	X	X	X	X	X	X	X	X
5151-004	Fan Blade											
5151-014	Fan Blade	X	X	X	X	X	X	X	X	X	X	X
7004-006	Filter											
7004-008	Filter											
7004-009	Filter											
8614-006	Fuse - Heater											
8614-022	Fuse - Compressor	X	X	X	X	X	X	X	X	X	X	X
8614-017	Fuse Block	X	X	X	X	X	X	X	X	X	X	X
8604-041	Heat Strip 4Kw	X	X	X	X	X	X	X	X	X	X	X
8604-042	Heat Strip 5Kw	X	X	X	X	X	X	X	X	X	X	X
8604-049	Heat Strip 6Kw	X	X	X	X	X	X	X	X	X	X	X
8604-043	Heat Strip 8Kw	X	X	X	X	X	X	X	X	X	X	X
8604-044	Heat Strip 10Kw	X	X	X	X	X	X	X	X	X	X	X
8604-048	Heat Strip 9Kw	X	X	X	X	X	X	X	X	X	X	X
8604-046	Heat Strip 12Kw	X	X	X	X	X	X	X	X	X	X	X
8604-047	Heat Strip 15Kw	X	X	X	X	X	X	X	X	X	X	X
8604-050	Heat Strip 9Kw	X	X	X	X	X	X	X	X	X	X	X
8604-051	Heat Strip 12Kw	X	X	X	X	X	X	X	X	X	X	X
8604-052	Heat Strip 15Kw	X	X	X	X	X	X	X	X	X	X	X
8406-010	Hi Pressure Switch											
8402-029	Limit Switch	X	X	X	X	X	X	X	X	X	X	X
8402-031	Limit Switch											
8402-028	Limit Switch											
8102-002	Motor - Blower	X	X	X	X	X	X	X	X	X	X	X
8105-003	Motor - Blower											
8106-005	Motor - Blower											
8103-009	Motor - Fan	X	X	X	X	X	X	X	X	X	X	X
8106-006	Motor - Fan											
8200-001	Motor Mount - Fan	X	X	X	X	X	X	X	X	X	X	X
8201-009	Relay - Blower	X	X	X	X	X	X	X	X	X	X	X
8201-008	Relay - Blower											
8551-001	Start Capacitor											
8201-020	Start Relay											
5210-002	Strainer	X	X	X	X	X	X	X	X	X	X	X
5210-004	Strainer											
5210-003	Strainer											
8607-006	Terminal Board 24V	X	X	X	X	X	X	X	X	X	X	X
8607-001	Terminal Block 230V	X	X	X	X	X	X	X	X	X	X	X
8607-002	Terminal Block	X	X	X	X	X	X	X	X	X	X	X
8607-007	Terminal Board											
8402-030	Thermal Cut off	X	X	X	X	X	X	X	X	X	X	X
8402-032	Thermal Cut off											
8407-007	Transformer	X	X	X	X	X	X	X	X	X	X	X
8407-015	Transformer	X	X	X	X	X	X	X	X	X	X	X
8407-003	Trans. - Stepdown											
8407-004	Trans. - Stepdown											
8607-005	Terminal Board											

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IMPORTANT

PURCHASER'S RESPONSIBILITIES

Below are the responsibilities of the purchaser and these items cannot be considered as defects in workmanship or material.

1. Air filter cleaning or replacement.
2. Failure to operate due to improper air distribution over indoor and outdoor equipment sections.
3. Failure to start due to voltage conditions, blown fuses or other damage due to inadequacy or interruption of electrical service.
4. Damage caused directly or indirectly by improper installation.
5. Damage due to lack of proper and periodic maintenance.
6. Damage resulting from transportation, moving or storage of unit.
7. Unit must be readily accessible for servicing and/or repair at all times.
8. Any adjustment or service to the unit should be made by qualified service personnel.
9. Misapplication of product.

MODEL NO. _____ SERIAL NO. _____ DATE
INSTALLED _____

INSTALLER: Please fill in above blanks and leave
this manual with equipment owner/operator.

501848

COOLING AND HEATING ANTICIPATION
FOR WALL THERMOSTATS

All 24V wall thermostats are built with both cooling and heating anticipators. The purpose of these anticipators is to compensate the thermostat for various system controls and allow the best possible cycle rates.

The cooling anticipator for all thermostats, and the heating anticipator on a limited number, are fixed and require no adjustment. Most heating anticipators are adjustable and DO REQUIRE ADJUSTMENT to match the current rating of the relay, contactor or other control being cycled by that heating stage. In the case of a two stage heating thermostat there will be an anticipator for each stage, either both adjustable, one fixed and one adjustable, or both fixed.

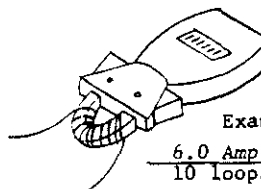
The fixed anticipators are rated for a maximum of 1.5A. The adjustable anticipators generally have a range of .2 - 1.2A, and MUST BE ADJUSTED. Failure to adjust the anticipator lever to correspond to the actual current draw passing through that stage mercury switch and anticipator will cause severe short cycling conditions if set too low and room temperature may never attain the thermostat set point, and if set too high, will cause room temperature over-shoot.

While oil burner primary controls and gas valves are normally marked with the nominal current rating, the contactors and relays installed in air conditioners and heat pumps are not. Listed below are some of the more popularly used controls and their nominal current ratings.

Below is a procedure which allows accurate low amperage current measurements with a standard clamp-on ammeter with a 0-6A range. It is actually recommended that this measurement always be taken, since variations in voltage, thermostat wire length, etc. can all cause some change in current draw.

Contactor or Relay	Nominal Current Rating
Honeywell - R850B Series	.55
- R8210 Series	.40
- R8212 Series	.40
- R8214 Series	.40
- R8222 Series	.38
- R8228 Series	.38
- R8242 Series	.38
- R8243 Series	.38
RBM - Type 84	.12
- Type 91	.34
- Type 112	.34
- Type 143	.34
- Type 154	.26
- Type 184	.12
Elmwood - 30B020	.39
- 30C020	.39
- 30CD020	.39
- 30FO20	.21
- 30DO30	.21
- 30EO30	.21

1. Wrap exactly 10 loops of thermostat wire (W1) around the prongs of an Amprobe.
2. Let the heating system operate for one minute before reading the W1 or W2 current draw.
3. Divide the reading obtained in Step 2 by 10.
4. Use the value calculated in step 3 to set the heat anticipator.
5. Repeat the procedure for (W2) if 2-stage heat.



Example:

$$\frac{6.0 \text{ Amp}}{10 \text{ loops}} = .6A$$

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