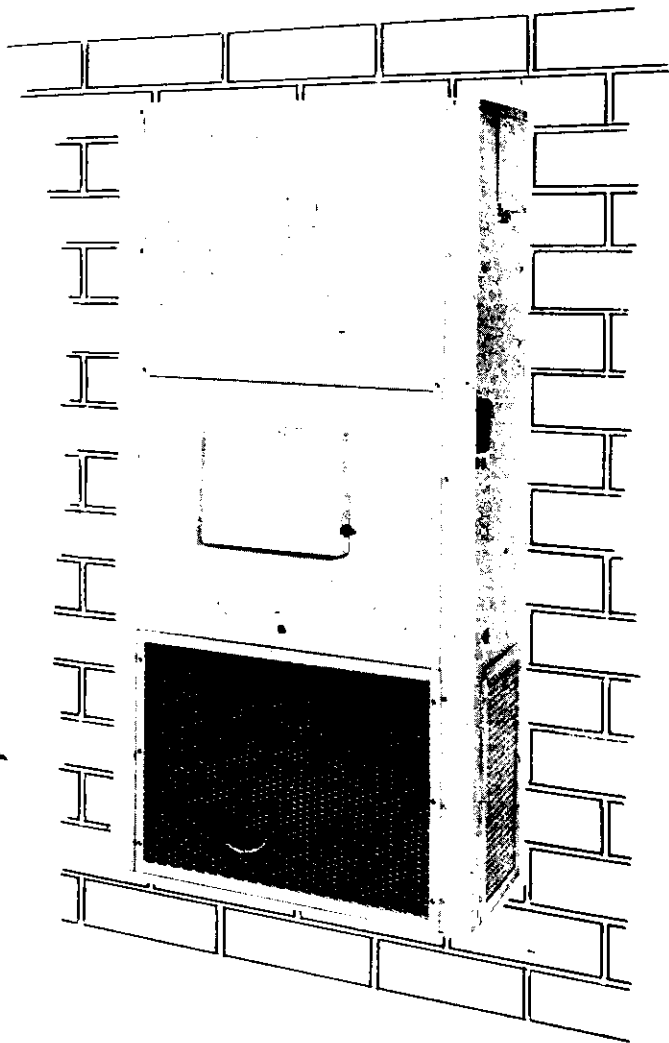


INSTALLATION INSTRUCTIONS

SELF CONTAINED WALL MOUNTED
HEAT PUMPS



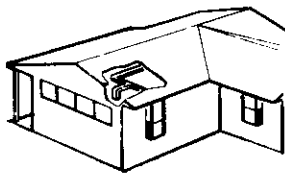
18WH

24WH

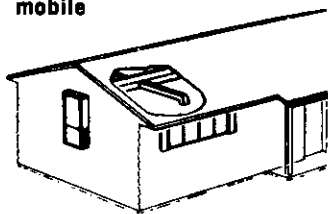
36WH

APPLICATIONS

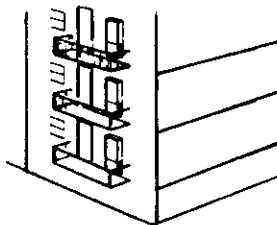
RESIDENTIAL . . . single, multiple, mobile



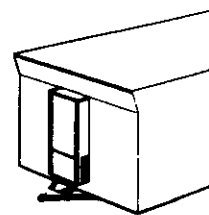
Zoned heating/cooling control in multiple areas



Attic ducted single unit installation

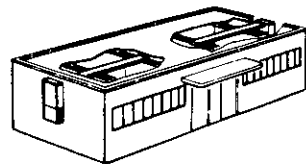


Multiple dwelling installation

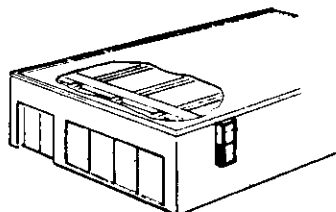


Offices/Homes on wheels

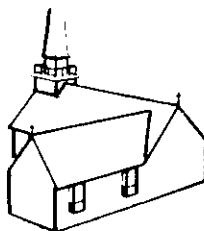
COMMERCIAL and INSTITUTIONAL



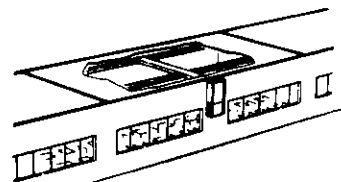
Separate offices (zoned)



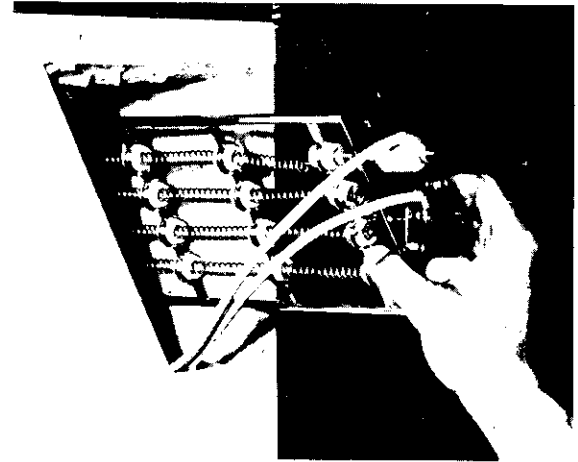
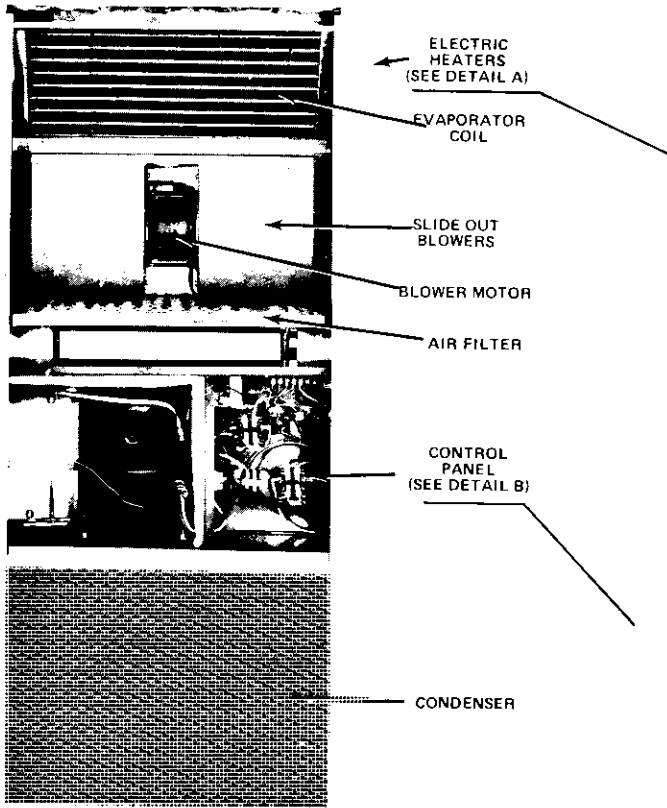
Production areas (for complete conditioning from single unit)



Churches (zoned)

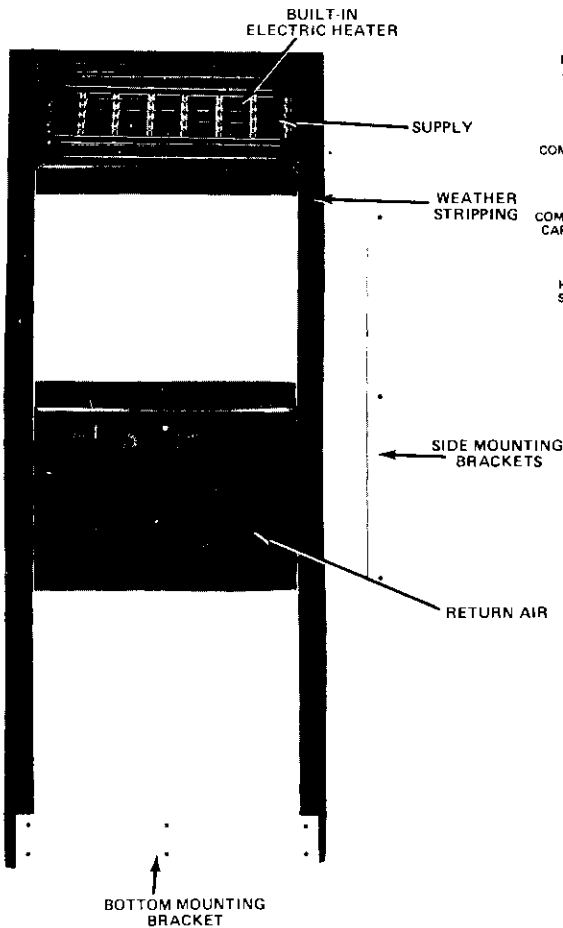


Temporary classrooms

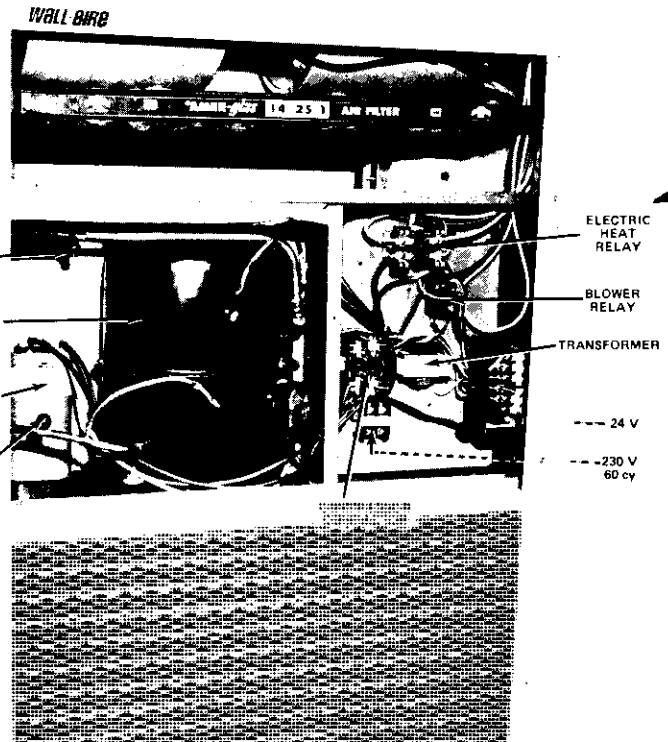


DETAIL A

NOTE:
BEFORE FASTENING
SIDE MOUNTING
BRACKETS
CHECK INSIDE
FOR CLEARANCE



BACK SIDE OF UNIT



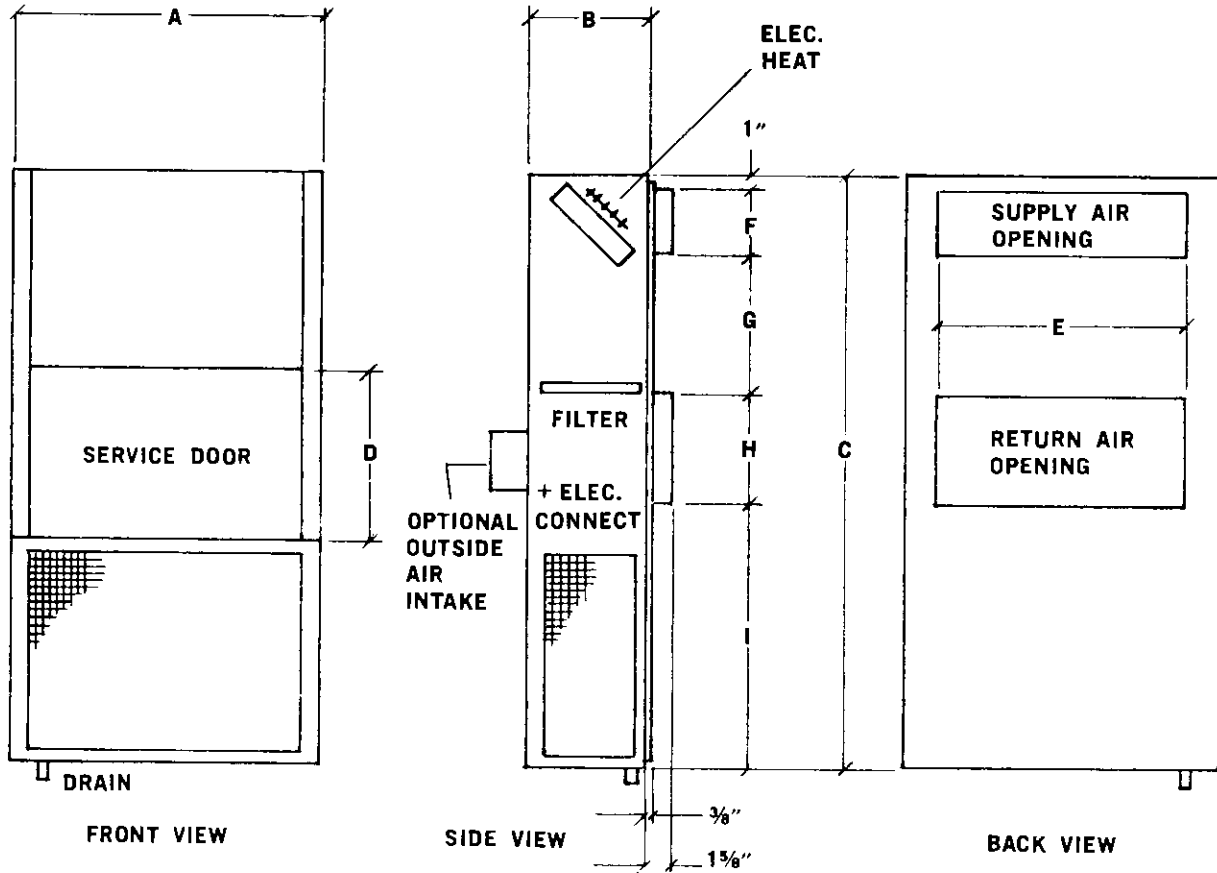
DETAIL B

DIMENSIONS *

... for architect and installation requirements

MODEL	A	B	C	D	E	F	G	H	I	FILTER SIZES*
18WH -24WH	32 $\frac{1}{4}$	13 $\frac{1}{2}$	67 $\frac{1}{2}$	20	20	8	20 $\frac{1}{2}$	12	25 $\frac{3}{4}$	14 x 25
36WH	38 $\frac{1}{4}$	15 $\frac{1}{4}$	74	22 $\frac{1}{2}$	28	8	18 $\frac{1}{8}$	14	32 $\frac{1}{8}$	15 x 30-5/8

*Dimensions (nominal) and filter sizes are in inches.



Model*	ELECTRICAL INFORMATION										WIRING INFORMATION**					
	Volts & Ph	Heater Kw	Kw	Max. Unit Amps	No. Field Power Circuits	Amps Per Circuit	Internal Fuses		Req'd. Ext. Fuses	Min. Ampacity	Power Ckt. Wiring	Ground Wire Size	Wiring Diagram Number			
							Ckt.A	Ckt.B						Ckt.A	Ckt.B	Ckt.A
18WH	230/1			15.9	1	15.9			25	19	12	10	D341			
18WH/4Kw	230/1	4	16.7	32.6	1	32.6			40	40	8	10	D342			
18WH/8Kw	230/1	8	33.3	49.2	2	32.6	16.7		40	40	8	10	D348A			
24WH	230/1			18.1	1	18.1			30	21	12	10	D341			
24WH/4Kw	230/1	4	16.7	34.8	1	34.8			40	42	8	10	D342			
24WH/8Kw	230/1	8	33.3	51.4	2	34.8	16.7		45	42	6	10	D348A			
36WH	230/1			29.8	1	29.8			50	35	8	10	D344			
36WH/5Kw	230/1	5	20.8	50.6	1	50.6			60	61	4	10	D345			
36WH/10Kw	230/1	10	41.6	71.4	2	50.6	20.8		60	26	4	10	D348A			
36WH/15Kw	230/1	15	62.5	92.3	2	50.6	41.6	60	60	61	4	10	D400			
36WH	240/3			20.8	1	20.8			35	24	10	10	D165			
36WH/9Kw	240/3	9	21.7	42.5	2	20.8	21.7		35	24	10	10	D364A			
36WH/12Kw	240/3	12	28.9	49.7	2	20.8	28.9		35	24	10	10	D169			
36WH/15Kw	240/3	15	36.2	57	2	20.8	36.2		35	24	10	10	D169			

*Electric heaters are nominal Kw @ 240V. **Based on using 60°C copper wire. Other wiring materials must be rated for marked minimum circuit ampacity or greater. Not all models approved for aluminum wire.

1 All RPM units dual rated 208/230V.

22177

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.

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.

FILTER

A 1" throw away 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.

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.

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
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.

WIRING - MAIN POWER

Refer to the unit rating plate for wire sizing information and maximum fuse 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. Some models are suitable only for connection with copper wire, while others can be wired with either copper or aluminum wire. Each unit and/or wiring diagram will be marked "Use Copper Conductors Only" or "Use Copper or Aluminum Conductors." These instructions MUST BE adhered to. Refer to the National Electrical Code for complete current carrying capacity data on the various insulation grades of wiring material.

The electrical specifications on page 2 lists fuse and wire sizes (60°F 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 Fuse" that is to be used with the equipment. The correct size fuse 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.

WIRING - CONTROL CIRCUIT

All units are provided with a 24 volt terminal board which is marked C, G, R, Y, W1, W2. DO NOT wire to terminal C. This will cause transformer burnout. Refer to specific unit wiring diagram for details.

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 on both cooling and heating cycles. It is imperative to match the correct pressure curve to the unit by model number.

CRANKCASE HEATERS

All units are provided with some form of compressor crankcase heat. Single phase units utilize the compressor motor start winding in series with a portion of the run capacitor to generate heat within the compressor shell to prevent liquid refrigerant migration.

Three phase units utilize a wraparound type of crankcase heater that warms the compressor oil from the outside.

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.

IMPORTANT NOTICE - Be sure to follow start-up instructions as shown below and also on unit.

<p style="text-align: center;"><u>IMPORTANT</u></p> <p>THESE PROCEDURES MUST BE FOLLOWED AT INITIAL START-UP AND AT ANY TIME POWER HAS BEEN REMOVED FOR 12 HOURS OR LONGER.</p> <p>TO PREVENT COMPRESSOR DAMAGE WHICH MAY RESULT FROM THE PRESENCE OF LIQUID REFRIGERANT IN THE COMPRESSOR CRANKCASE:</p> <ol style="list-style-type: none">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 COMPRESSOR.5. EXCEPT AS REQUIRED FOR SAFETY WHILE SERVICING - DO NOT OPEN SYSTEM DISCONNECT SWITCH. <p style="text-align: right;">7961-061</p>
--

COMPRESSOR CUT-OFF THERMOSTAT

Heat pump compressor operation at outdoor temperatures below 0°F are neither desirable nor advantageous in terms of efficiency. Since most equipment at time of manufacture is not designed for any specific destination of the country, and most of the equipment is installed in areas not approaching the lower outdoor temperature range, the compressor cut-offs are not factory installed.

Typical wiring diagrams showing the application of a compressor cut-off can be found later in the manual on page 19.

SEQUENCE OF OPERATION

Cooling - R-Y at thermostat pulls in the compressor contactor starting the compressor and outdoor fan. The same R-Y also feeds G, which pulls in the fan relay for blower operation. The reversing valve is not energized, so the system is in the cooling cycle.

Heating - R-W (or W1) make at thermostat on a call for heat. This pulls in the changeover relay. Terminals 6-4 of changeover relay make R-Y circuit which pulls in compressor contactor starting the compressor and outdoor fan, also R-Y at thermostat completes G circuit, pulling in fan relay starting indoor blower. Terminals 1-3 on changeover relay make, energizing the reversing valve to put the system into the heating cycle. SEE REFRIGERANT FLOW DIAGRAM. The system will not be producing warm air indoors.

DEFROST CYCLE

The defrost cycle is controlled by time and temperature. When the outdoor temperature is in the lower 40°F temperature range or colder, the outdoor coil temperature is 32°F or below. This temperature is sensed by a defrost thermostat mounted low and at the return bend end of the outdoor coil. The defrost thermostat makes at approximately 32°F refrigerant temperature. The MAKE of the contacts starts the defrost timer motor. The defrost timer motor can run only when the heat pump is in operation. After approximately 30 minutes of heat pump running time, with the outdoor coil below 32°F, the defrost timer contacts make. This causes the defrost relay to pull in.

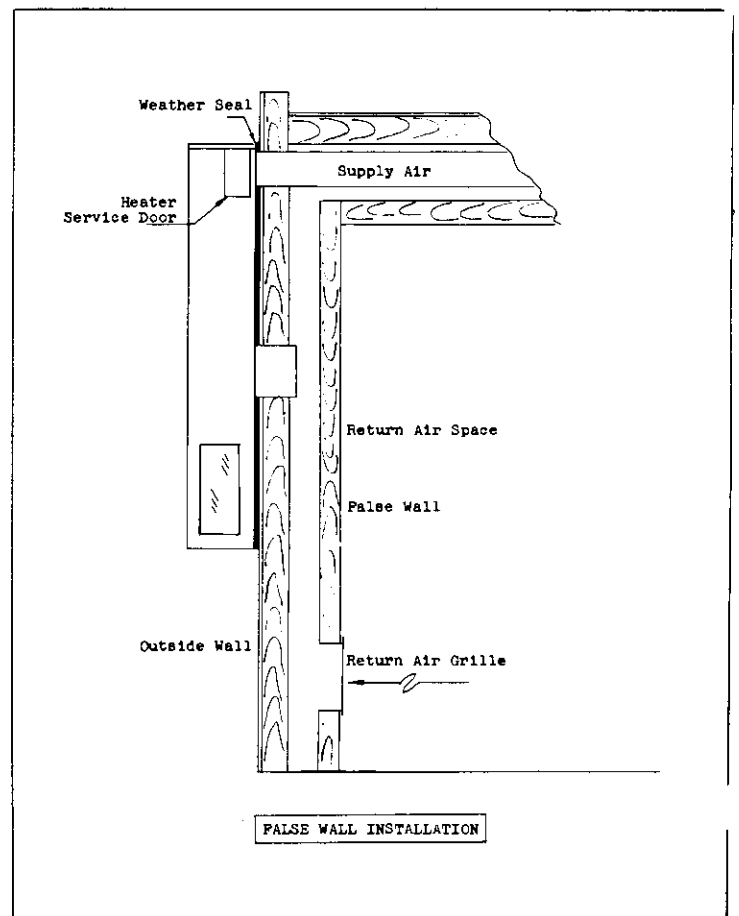
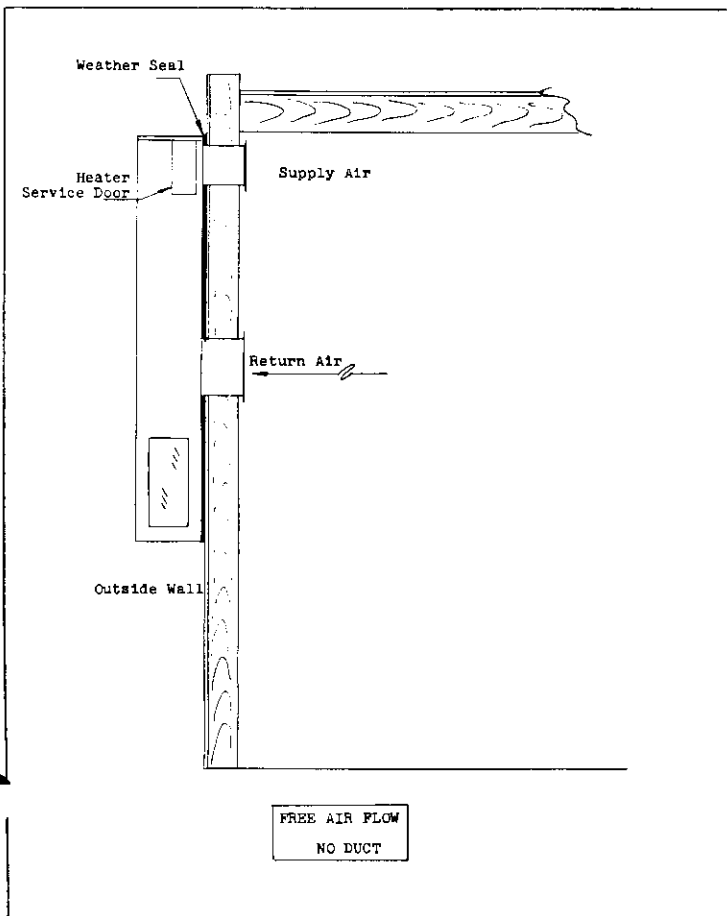
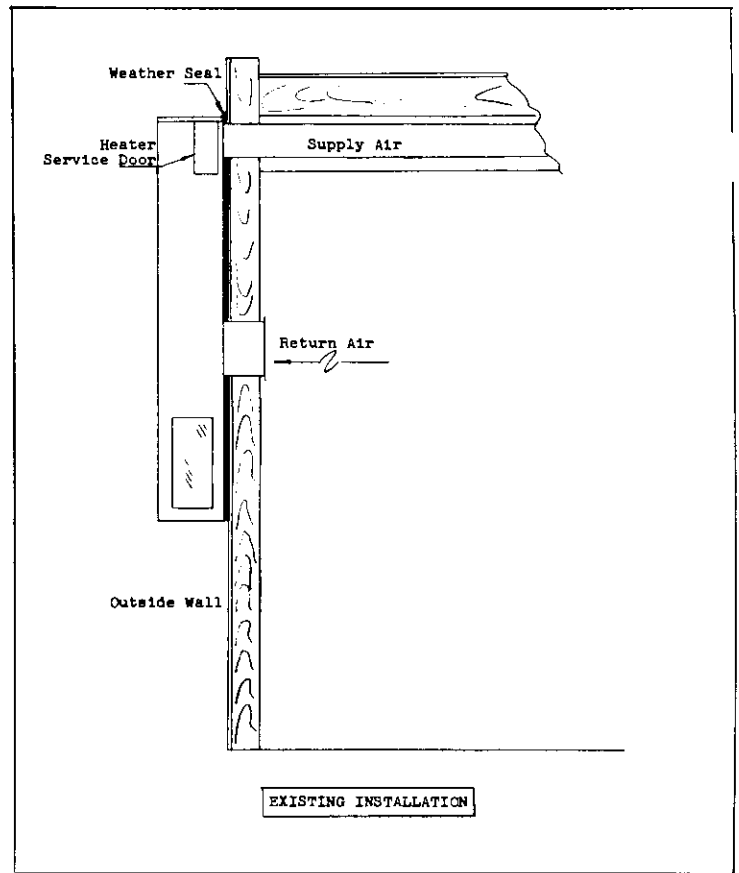
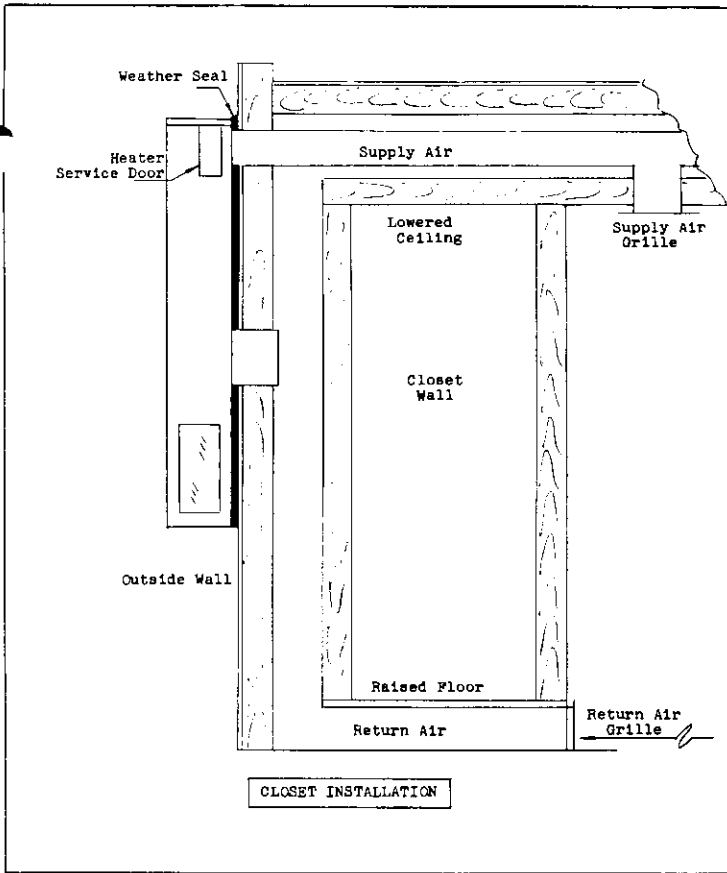
Terminals 4-5 of the defrost relay open, breaking power to the outdoor fan and the reversing valve. The outdoor fan motor stops and the reversing valve shifts to the cooling cycle. Terminals 7-9 of the defrost relay make, which pulls in W2, second stage strip heaters, with the indoor blower continuing to operate.

As the heat pump continues to operate in the defrost cycle, the outdoor coil warms up from the hot gas flow. As the temperature rises to approximately 57°F at the defrost thermostat location, the contacts now open. This de-energizes the defrost timer and defrost relay. All the components then return to the normal heating cycle as before.

EMERGENCY HEAT RELAY

It is often desired to utilize an emergency heat relay in conjunction with a special heat pump thermostat subbase to allow the operator of the equipment to easily de-energize the heat pump unit and still have total heating capability from the supplemental heaters.

The emergency heat relay is not standard with the WH series of units and must be field installed. The relay is Bard Part No. 8201-014 (184-20114-406) and is to be installed in the unit control panel and wired according to the diagram on page 19.



MOUNTING ON CONCRETE BLOCK WALL 18WA-18WH-24WA-24WH

These units are secured by wall mounting brackets which secure the unit to the outside wall surface at both sides and at the bottom. (Fig. 1).

In a standard 8 x 16 in. block wall, saw or knock out two 22 inch sections of concrete blocks normally the 7th, 8th and 11th course of blocks above floor level. In both cases this should be one whole block plus 3 in. of the block on each side.

On the wall, lay out approximately the position for the bottom and side brackets. Fasten these brackets to the wall firmly with 3/8 in. lag screws.

The side brackets should be located approximately 15 in. down from the top of the unit and fastened to both sides with metal screws. After mounting the unit on the wall a metal weather stripping should be installed at the top to insure a water tight application.

INSTALLATION SCHEMATIC

CONCRETE BLOCK WALL

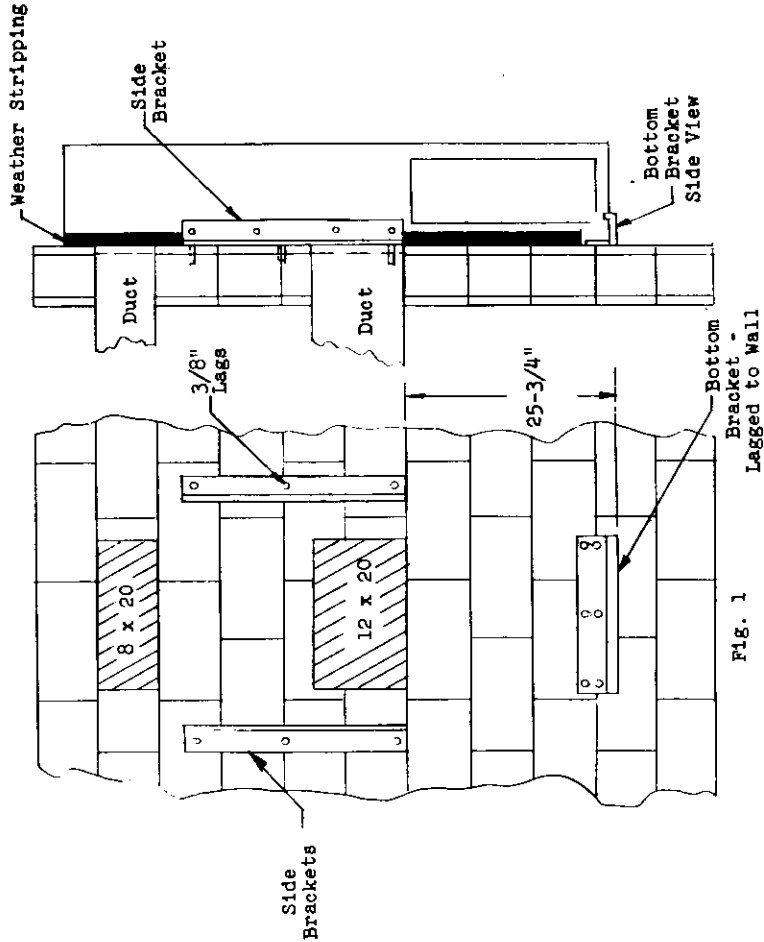


Fig. 1

MOUNTING ON WOOD FRAME WALLS 18WA-18WH-24WA-24WH

Locate and cut out two openings as shown in (Fig. 2). Cut away the outside siding to the depth of the sheathing. Install metal weather stripping at the top and caulk or otherwise seal joints between siding and sheathing. Frame in the openings between the wall studs as necessary for the particular wall involved with the plates at the bottom of each wall opening being sufficiently strong to carry the weight of the unit.

Install the two side brackets to the unit (15 in. down from the top). Mount unit on wall and pull in firmly using three 3/8 in. lag screws through each of the wall mounting brackets.

For additional mounting rigidity, each air opening collar may be screwed to the plate at the bottom of each wall opening. Drill two 1/4 in. holes in the bottom flange of each collar before hanging the unit, then fasten to wall plate with No. 10 by 1-1/2 in. wood screws.

OUTSIDE FRAME WALL SCHEMATIC

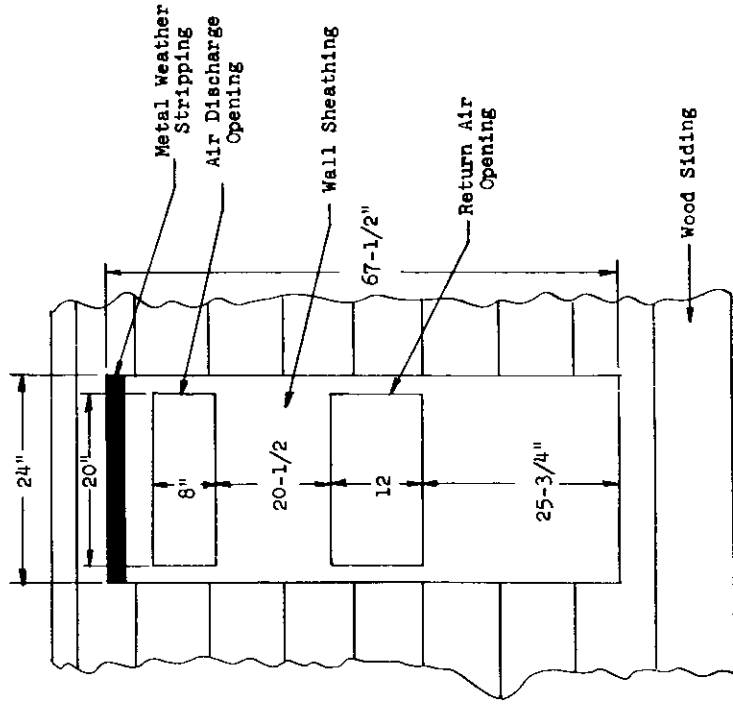


Fig. 2

MOUNTING ON CONCRETE BLOCK WALL 36WA - 36WH

These units are secured by wall mounting brackets which secure the unit to the outside wall surface at both sides and at the bottom (Fig. 3).

In a standard 8 x 16 in. block wall, knock out two 28 in. sections of concrete blocks normally the 7th, 8th, and 11th course of blocks above floor level. In both cases this should be one whole block plus 7 in. of the block on each side.

On the wall, lay out approximately the position for the bottom and side brackets. Fasten these brackets to the wall firmly with 3/8 in. lag screws.

The side brackets should be located approximately 15 in. down from the top of the unit and fastened to both sides with metal screws. Before drilling into side of casing, check inside tubing for clearance. After mounting the unit on the wall a metal weather stripping should be installed at the top to insure a water tight application.

INSTALLATION SCHEMATIC

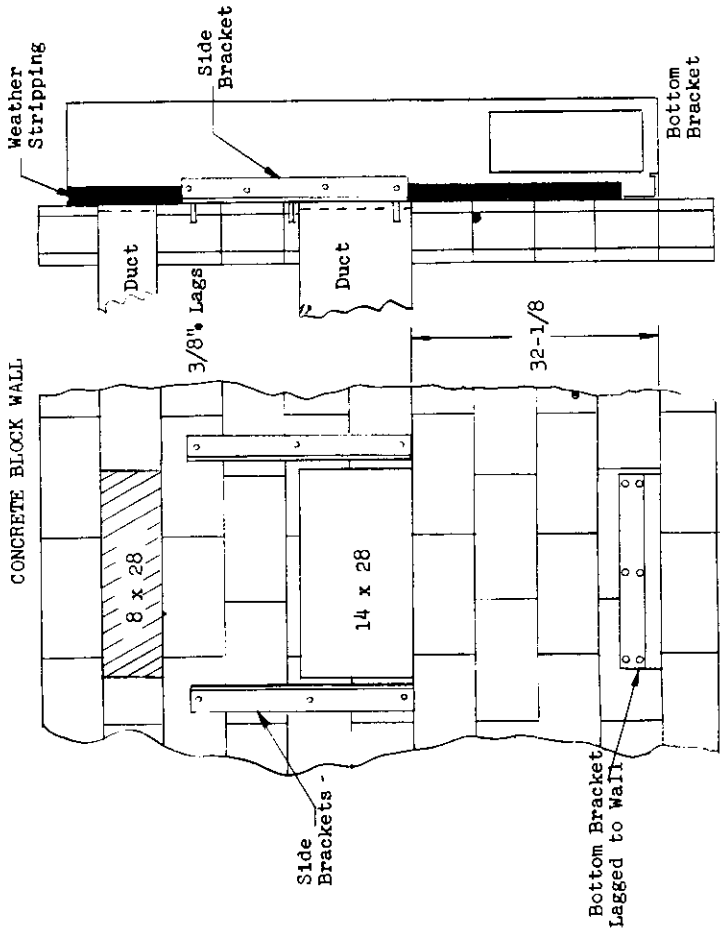


Fig. 3

MOUNTING ON WOOD FRAME WALLS 36WA - 36WH

Locate and cut out two openings as shown in (Fig. 4). Cut away the outside siding to the depth of the sheathing. Install metal stripping at the top and caulk or otherwise seal joints between the siding and sheathing. Frame in the openings between the wall studs as necessary for the particular wall involved with the plates at the bottom of each wall opening being sufficiently strong to carry the weight of the unit.

Install the two side brackets to the unit (15 in. down from the top). Before drilling into side of casing, check inside tubing for clearance. Mount unit on wall and pull in firmly using three 3/8 in. lag screws through each of the wall mounting brackets.

For additional mounting rigidity, each air opening collar may be screwed to the plate at the bottom of each wall opening. Drill two 1/4 in. holes in the bottom flange of each collar before hanging the unit, then fasten to wall plate with No. 10 by 1-1/2 in. wood screws.

OUTSIDE FRAME WALL SCHEMATIC

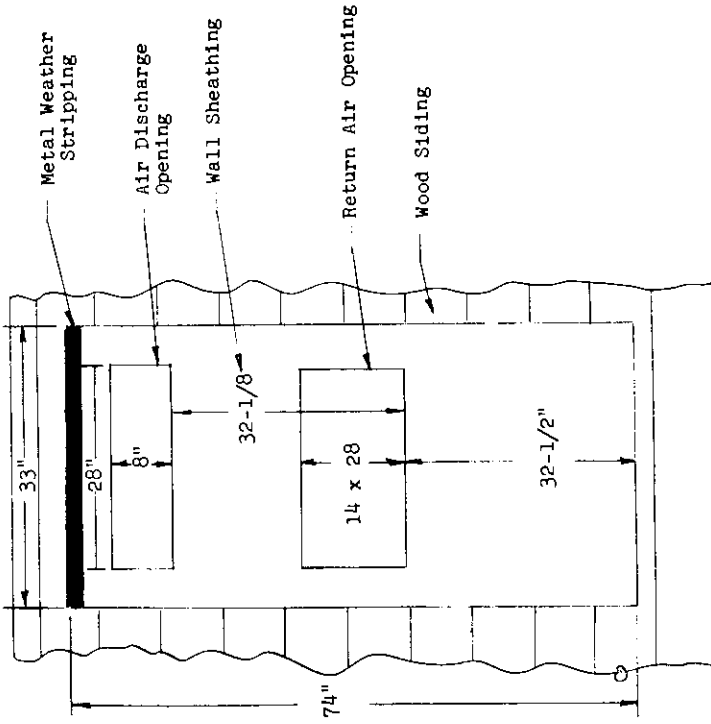
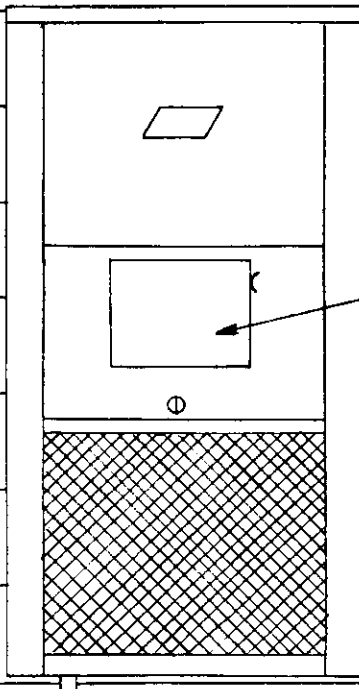
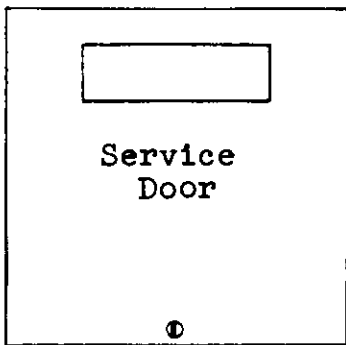


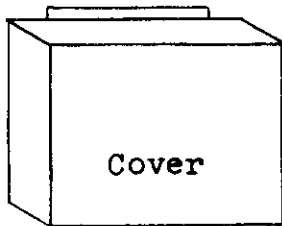
Fig. 4



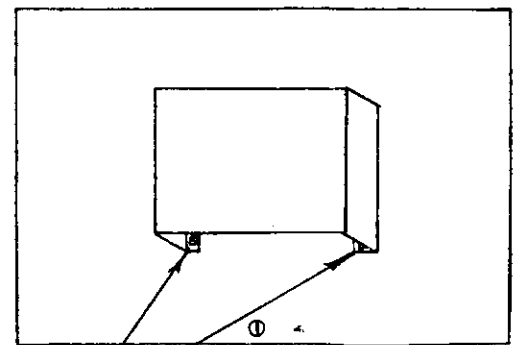
Fresh Air Cover
With Adjustable
Damper



Service
Door



Cover

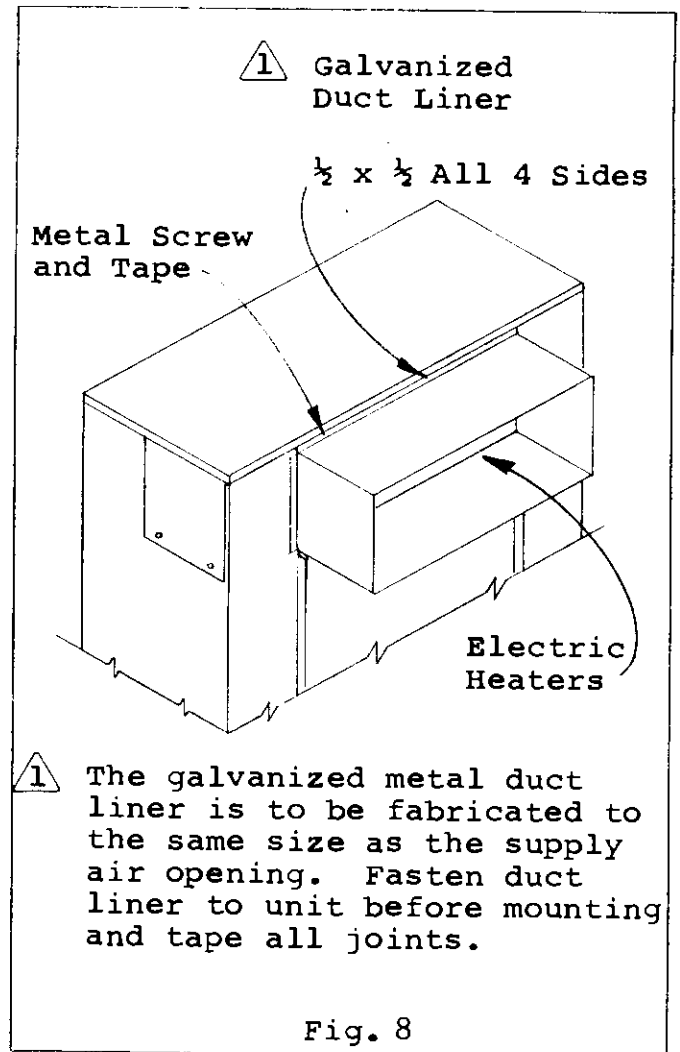
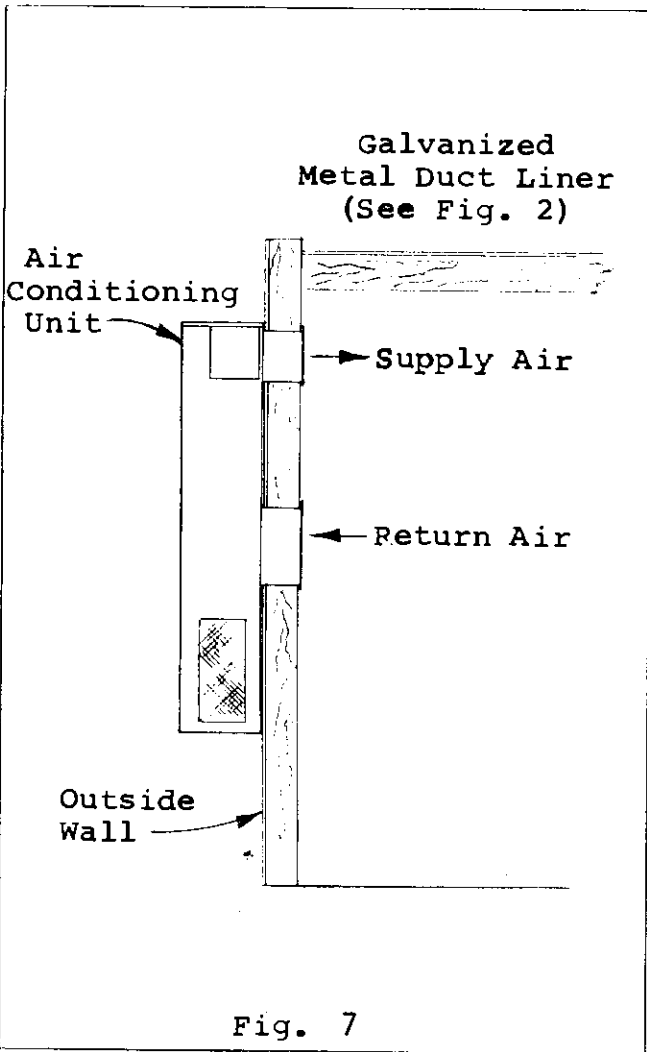


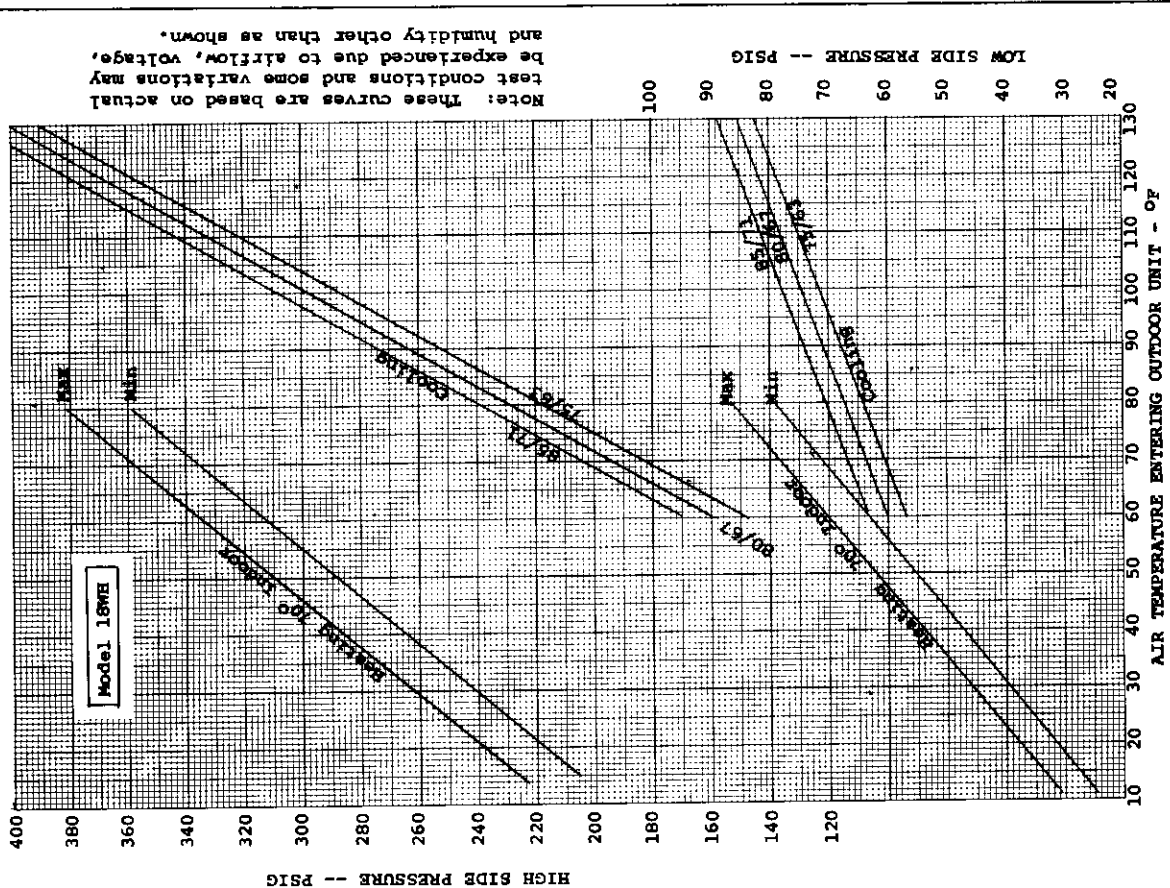
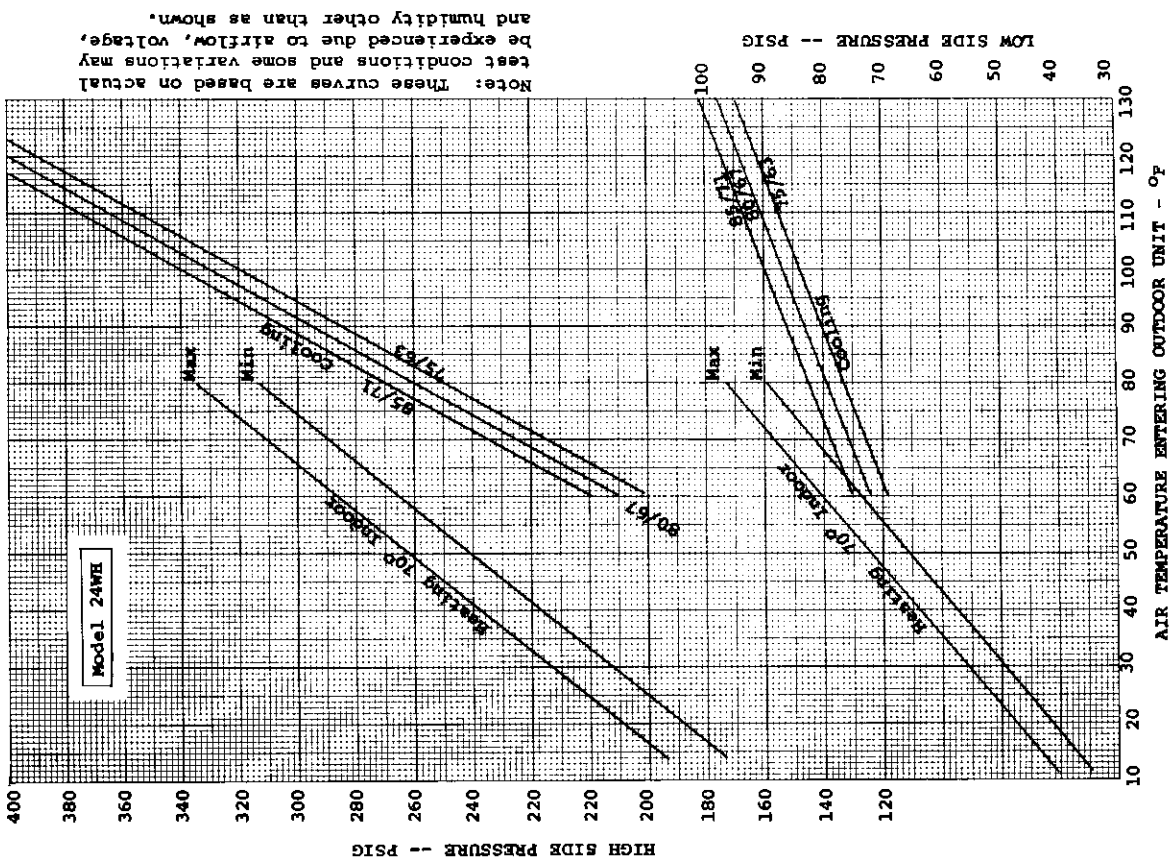
Fasten With Screw

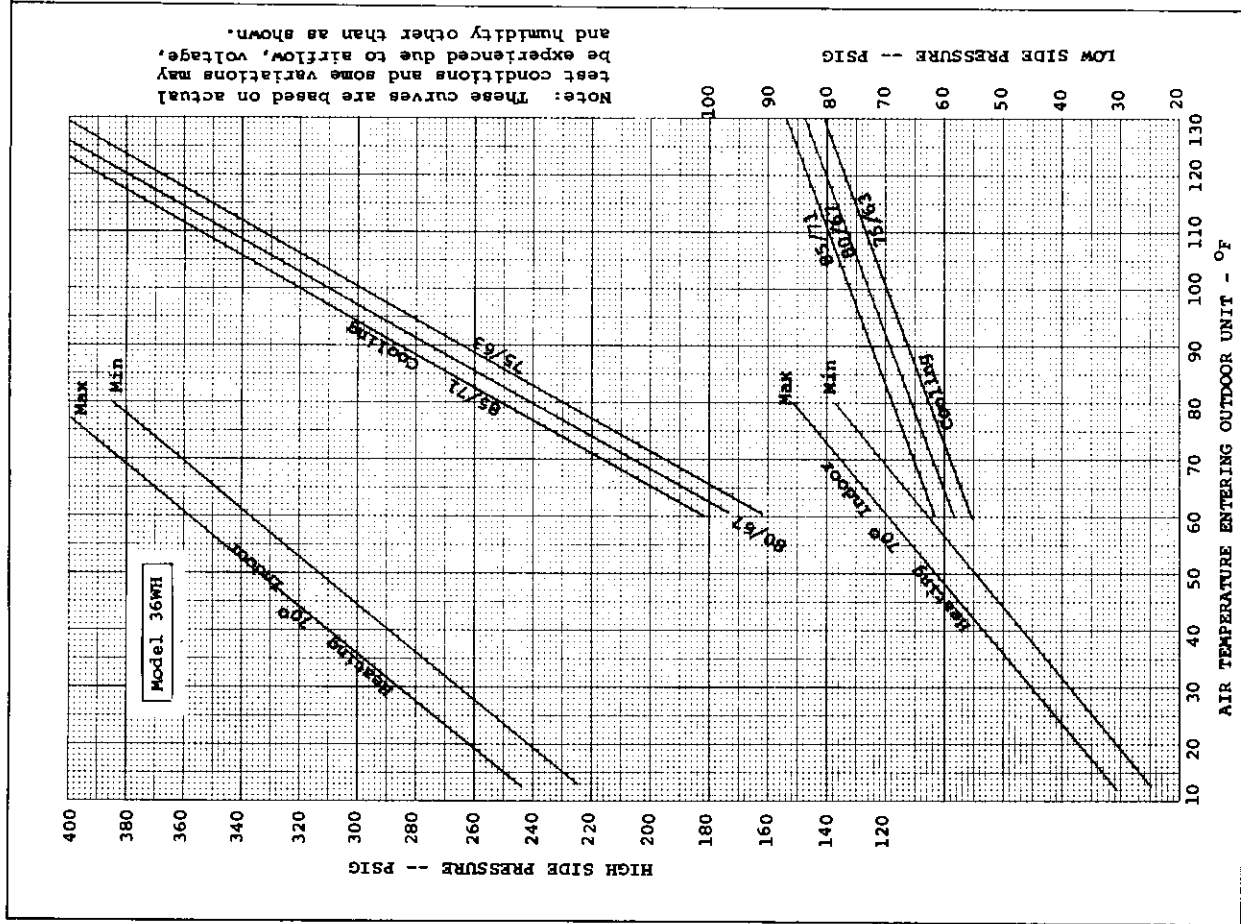
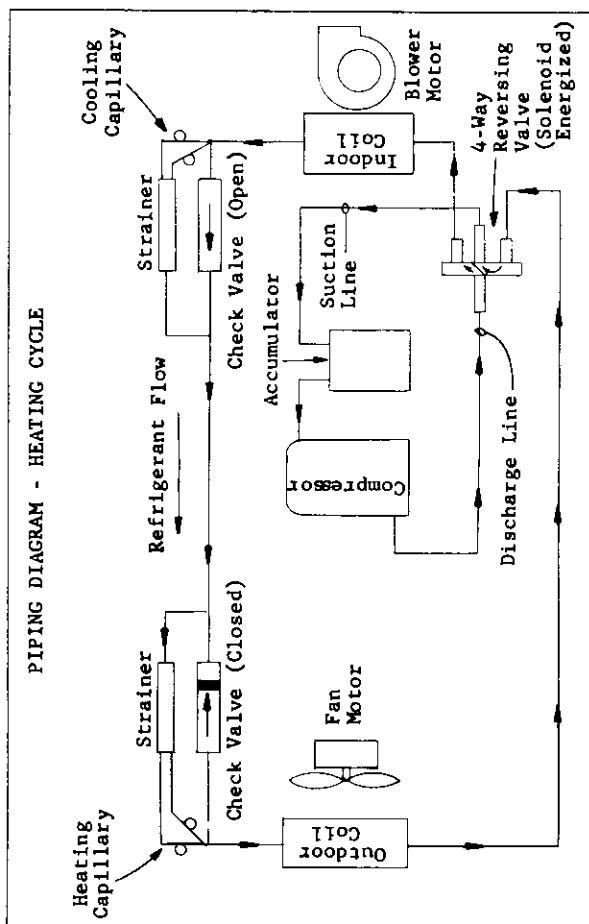
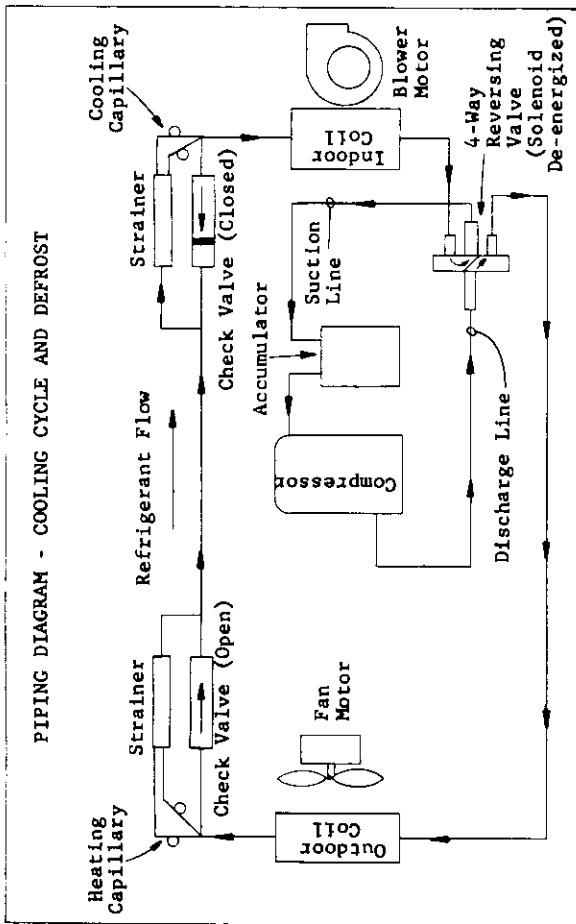
SUPPLY AIR METAL DUCT LINER
MODELS WA AND WH

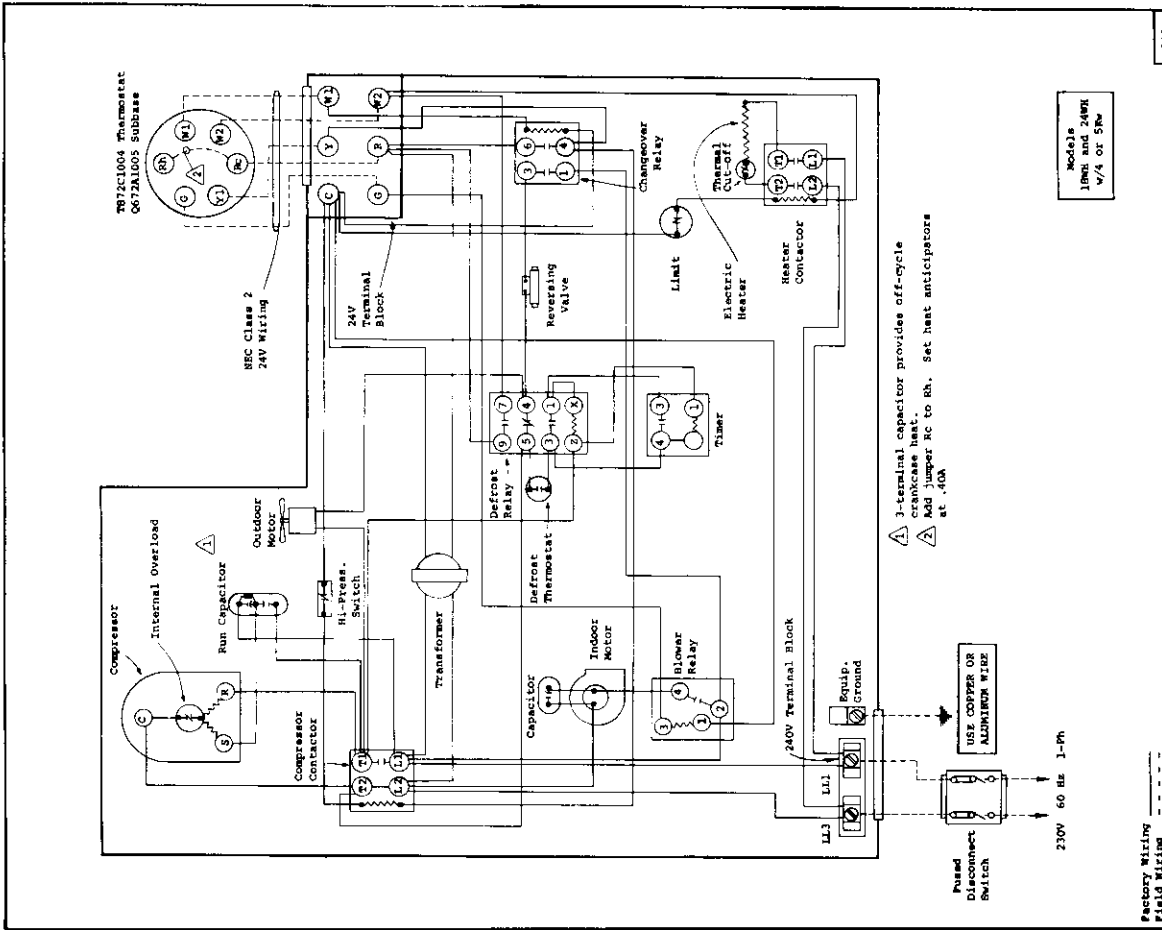
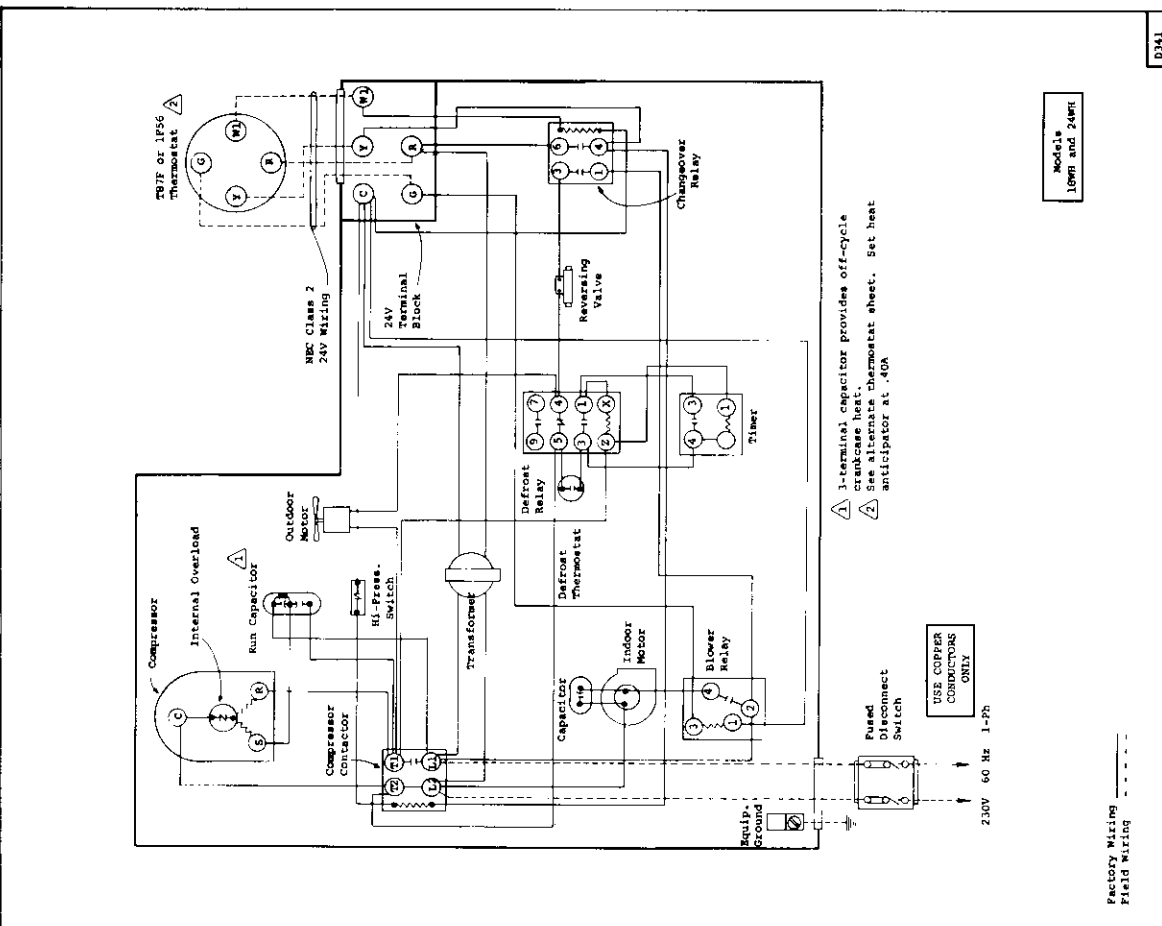
Whenever a model WA or WH is installed, a galvanized metal duct liner must always be attached (Fig. 8). Before installing, determine the wall thickness. If the installation is free air flow, with no external duct, then the liner should be cut flush with the inside wall opening. In order to insure no sweating, the duct liner should be wrapped with a minimum of 1" insulation.

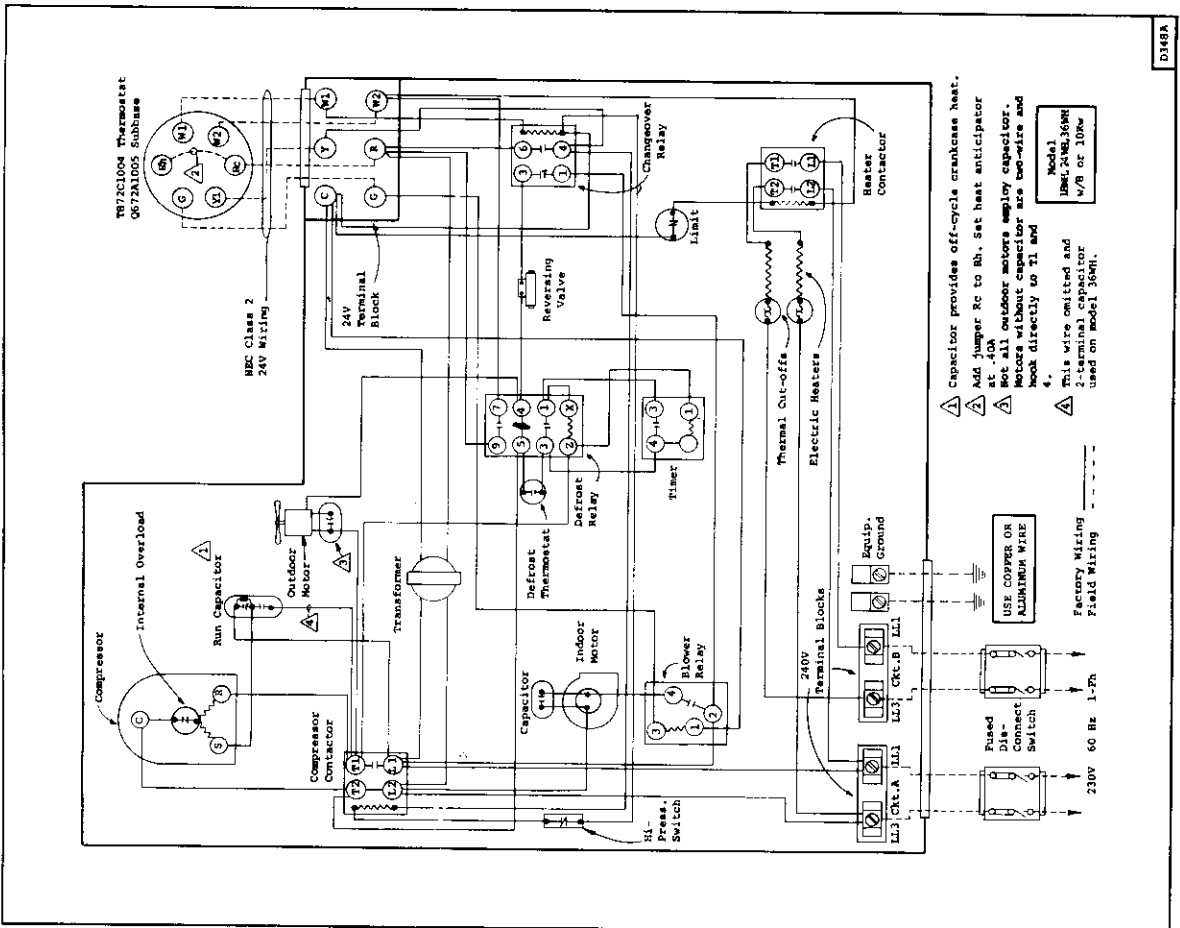
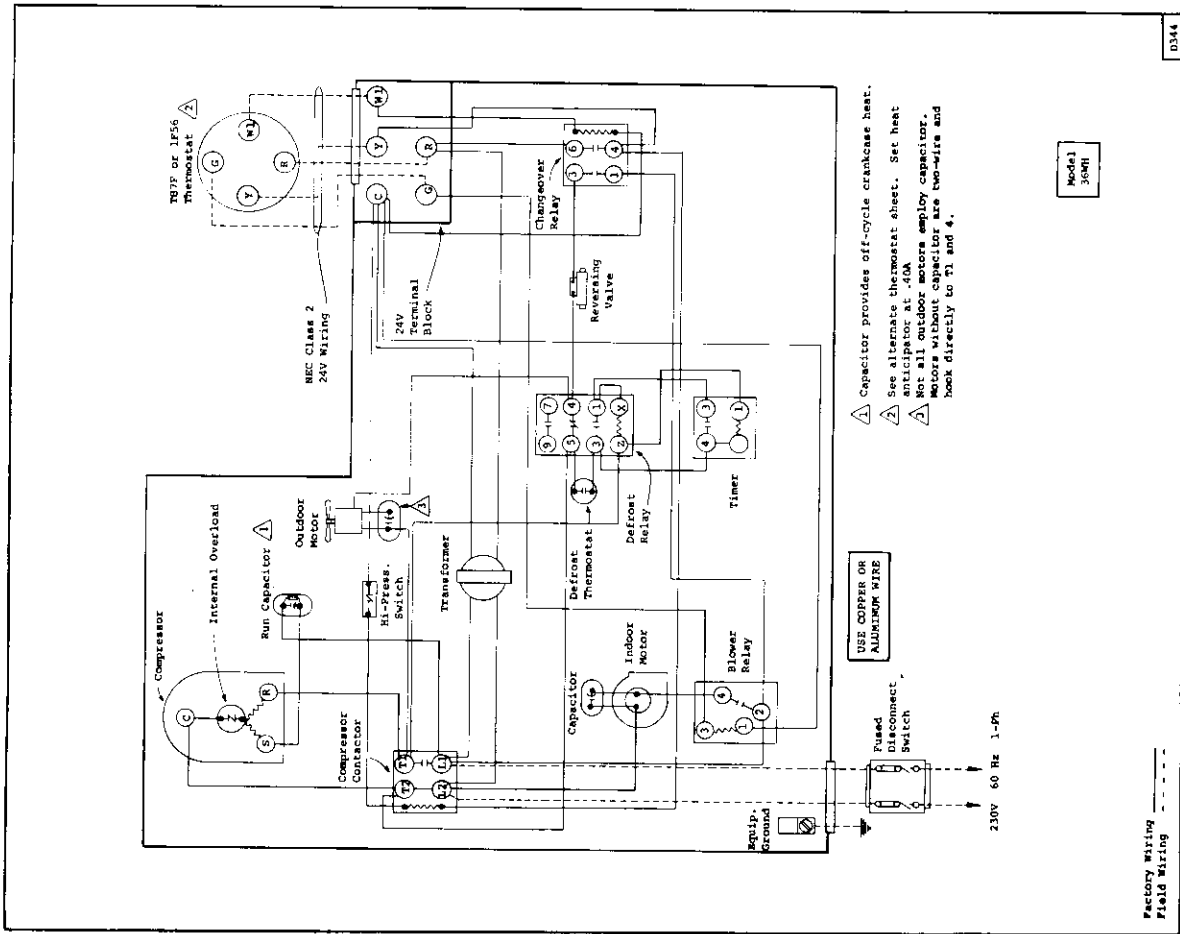
All models, with or without electric heaters, are approved for 0" clearance to combustible material. A metal duct liner, as described and illustrated in Fig. 8, will prevent the possibility of reflected radiant heat on to the internal wall structure.

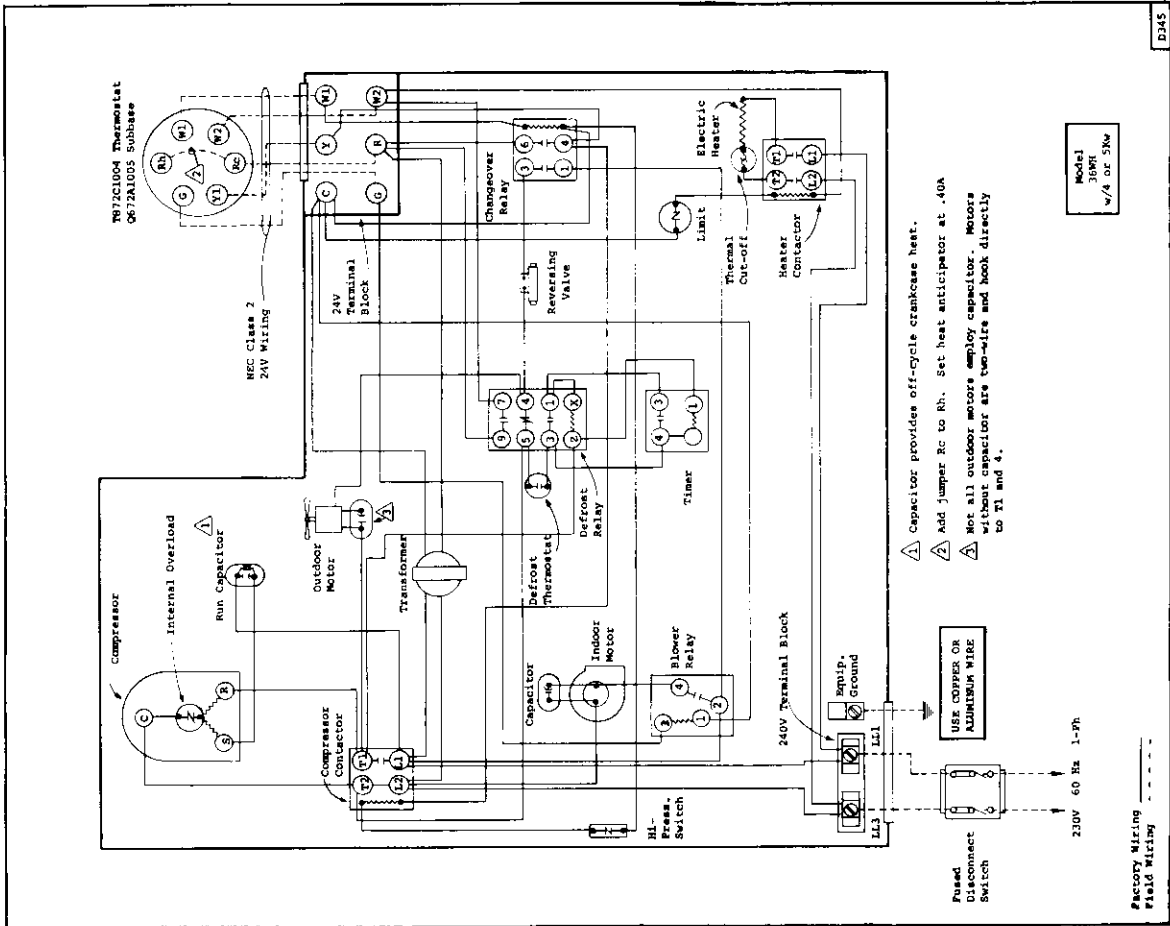




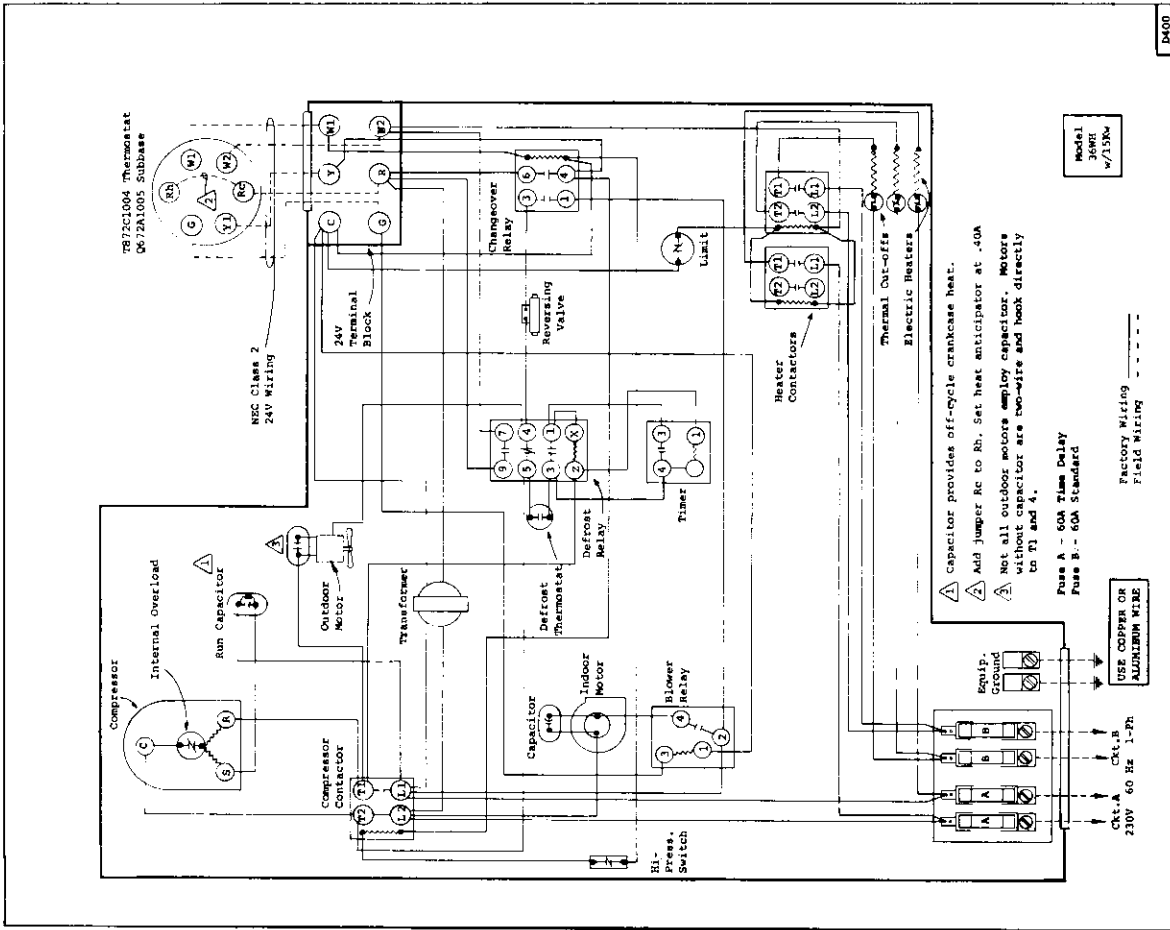




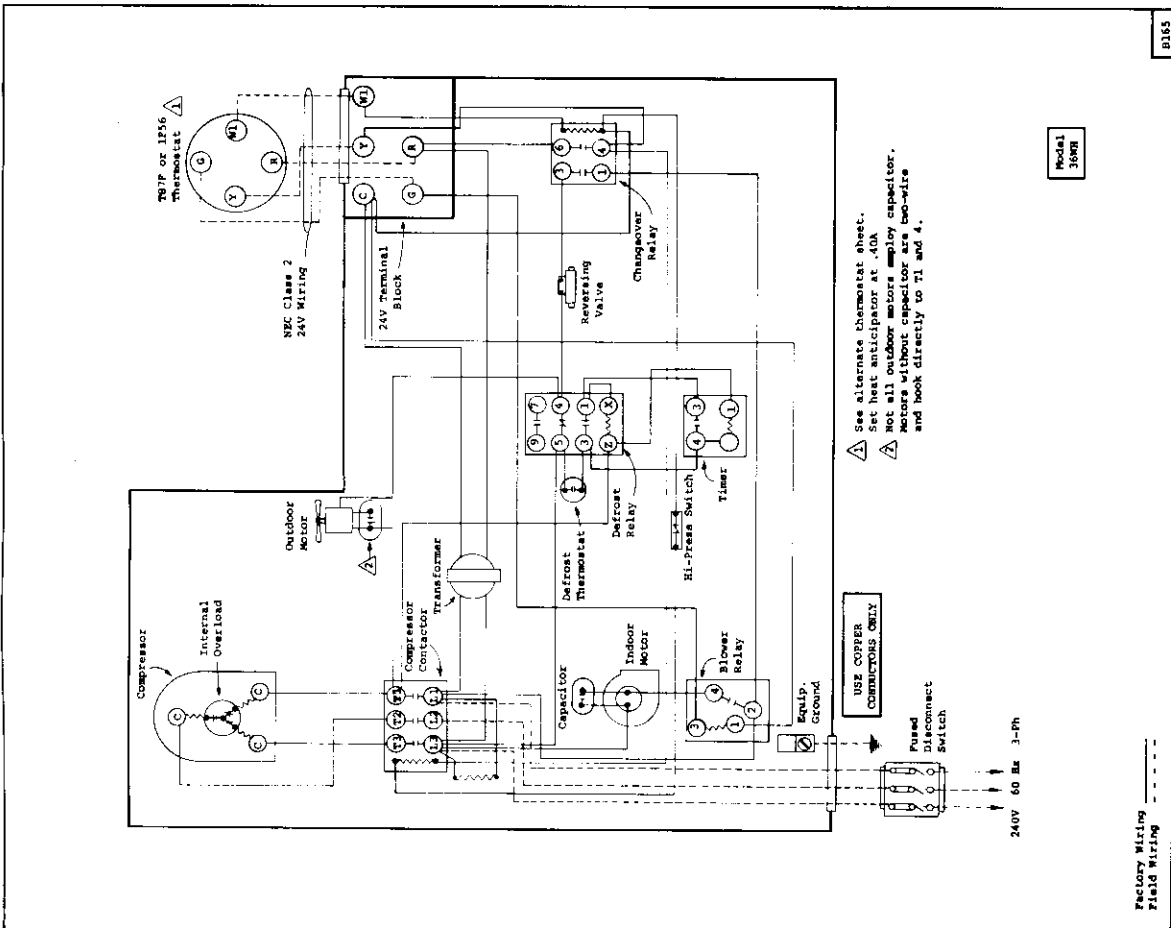
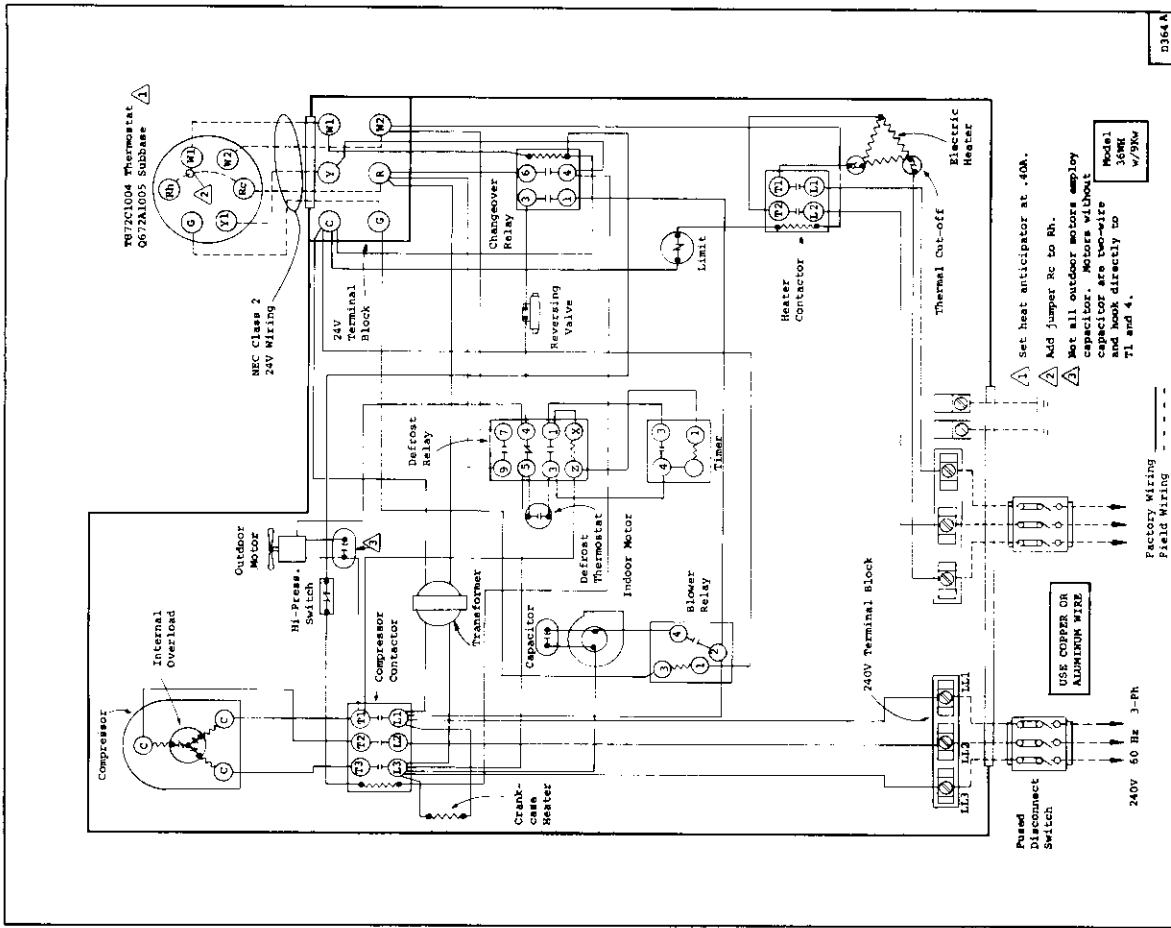


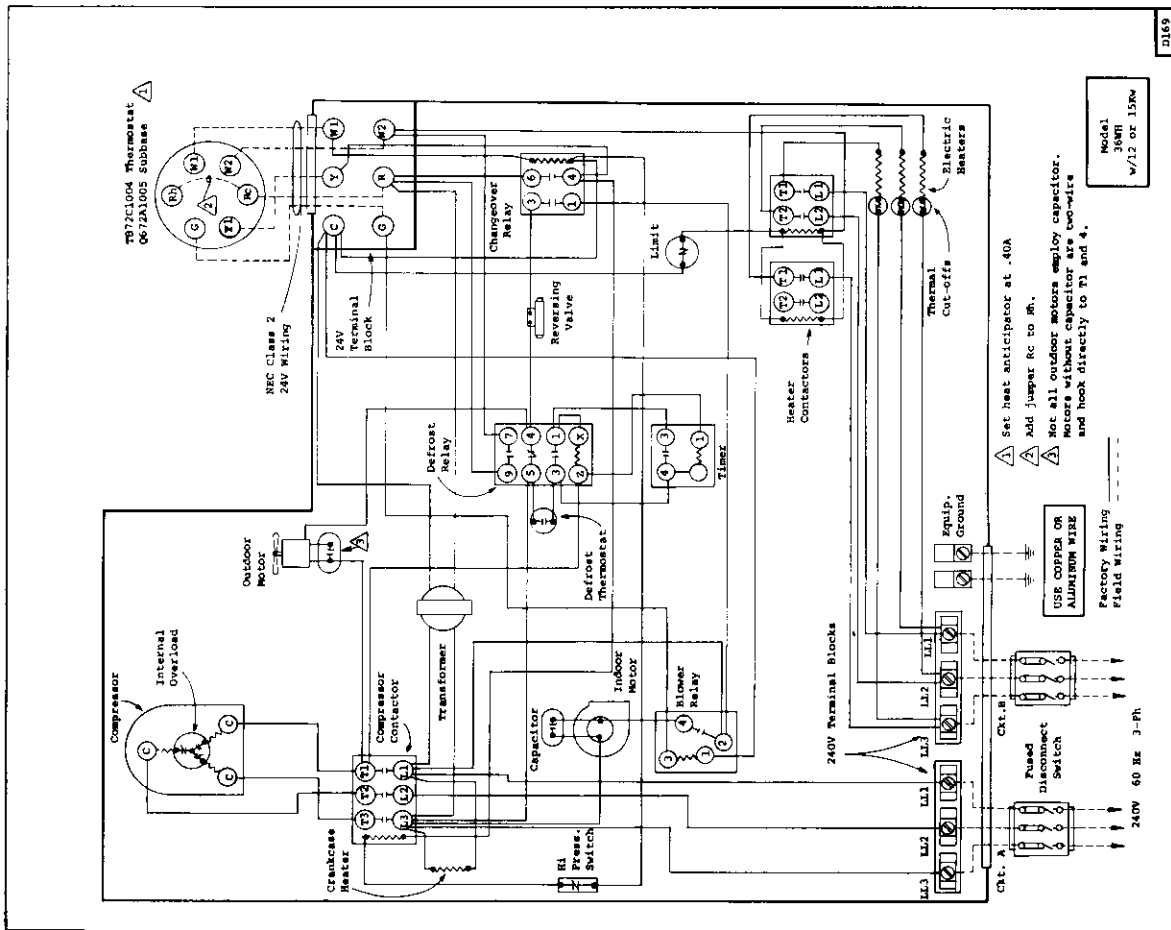


D345



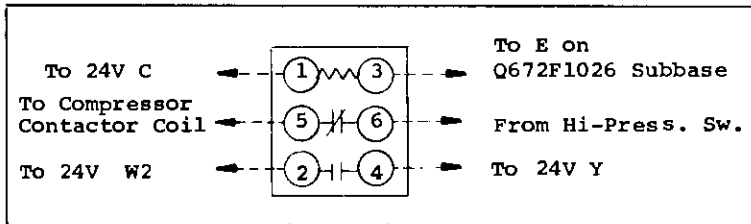
D400





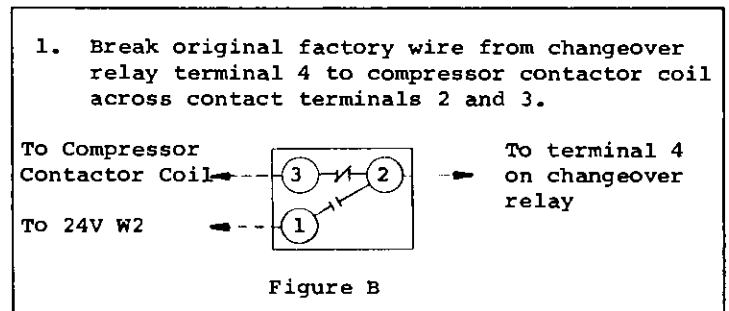
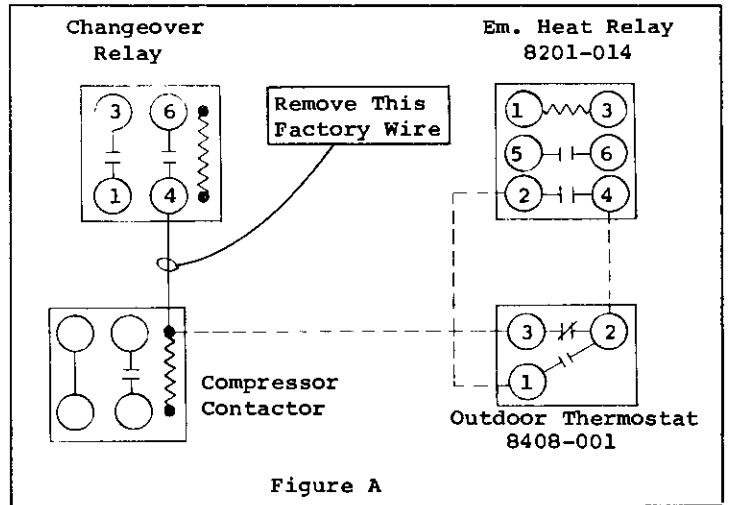
FIELD INSTALLATION OF EMERGENCY HEAT RELAY

1. Mount 8201-014 (184-20114-406) relay in unit control panel.
2. There is a factory wire that goes from the high pressure switch to one side of the compressor contactor 24V coil. This wire should be broken across normally closed contact terminals 5 and 6.
3. Connect a wire from terminal 1 to 24V C on low voltage terminal strip.
4. Connect a wire from terminal 3 to terminal E on Q672F1026 subbase.
5. Connect a wire from terminal 4 to 24V Y on low voltage terminal strip.
6. Connect a wire from terminal 2 to 24V W2. This will shift all electric heat operation to first stage heating when the wall thermostat is set to emergency heat position, and stop the heat pump compressor.



FIELD INSTALLATION OF COMPRESSOR CUT-OFF

1. Mount A-22 thermostat, Bard Part No. 8408-001, so that sensing capillary senses the air temperature in the vicinity of the outdoor fan, and shielded from the sun.
2. If an emergency heat relay is installed as described above, wire by Figure A below. If there is NO emergency heat relay installed, wire by Figure B below.



PART NO.	DESCRIPTION	18WH	24WH	36WH	36WH-3
5152-030	Blower Housing	x	x	x	x
5152-028	Blower Wheel	x	x	x	x
5152-029	Blower Wheel	x	x	x	x
8552-013	Capacitor 370V	x	x	x	
8552-012	Capacitor 440V	x	x	x	x
8552-001	Capacitor 370V	x	x	x	
5811-021	Cap Tube - Cool	x	x	x	
5811-008	Cap Tube - Heat	x	x	x	
5811-017	Cap Tube - Heat	x	x	x	
5811-022	Cap Tube - Cool (2 req'd)	x	x	x	
5811-018	Cap Tube - Heat	x	x	x	
5651-006	Check Valve	x	x	x	
8000-004	Compressor 1-Ph	x	x	x	
8000-005	Compressor 1-Ph	x	x	x	
8000-008	Compressor 1-Ph	x	x	x	
8000-009	Compressor 3-Ph	x	x	x	
5051-004	Condenser Coil	x	x	x	
5051-008	Condenser Coil	x	x	x	
5051-003	Condenser Coil	x	x	x	
8401-007	Contacto - Compressor	x	x	x	
8401-003	Contacto - Compressor	x	x	x	
8401-002	Contacto - Compressor	x	x	x	
8401-006	Contacto - Heater	x	x	x	
8605-001	Crankcase Heater	x	x	x	
8408-004	Defrost Mfg. Plate	x	x	x	
8408-002	Defrost Thermostat	x	x	x	
5060-007	Evaporator Coil	x	x	x	
5060-005	Evaporator Coil	x	x	x	
5060-006	Evaporator Coil	x	x	x	
5151-009	Fan Blade	x	x	x	
5151-004	Fan Blade	x	x	x	
7004-006	Filter	x	x	x	
7004-008	Filter	x	x	x	
8614-007	Fuse - Heater	x	x	x	
8614-022	Fuse - Compressor	x	x	x	
8614-013	Fuse Block	x	x	x	
8604-001	Heat Strip 4Kw	x	x	x	
8604-003	Heat Strip 8Kw	x	x	x	
8604-004	Heat Strip 10Kw	x	x	x	
8604-002	Heat Strip 5Kw	x	x	x	
8604-029	Heat Strip 9Kw	x	x	x	
8604-046	Heat Strip 12Kw	x	x	x	
8604-047	Heat Strip 15Kw	x	x	x	
5202-001	Accumulator	x	x	x	
5202-004	Accumulator	x	x	x	

PART NO.	DESCRIPTION	18WH	24WH	36WH	36WH-3
8406-009	High Pressure Switch	x	x	x	x
8402-010	Limit Switch	x	x	x	x
8101-001	Motor - Blower	x			
8102-002	Motor - Blower	x	x		
8105-003	Motor - Blower	x	x		
8103-002	Motor - Fan	x	x		
8200-006	Motor Mount - Fan	x	x		
8201-008	Relay - Blower	x	x		
8201-013	Relay - Changeover	x	x		
8201-018	Relay - Defrost	x	x		
5650-004	Reversing Valve	x	x		
5650-006	Reversing Valve	x	x		
5650-002	Solenoid Coil	x	x		
5210-004	Strainer	x	x		
8607-005	Terminal Board 24V	x	x		
8607-001	Terminal Block 230V	x	x		
8607-002	Terminal Block 230V	x	x		
8607-003	Terminal Block 230V	x	x		
8402-027	Thermal Cut-off	x	x		
8402-021	Thermal Cut-off	x	x		
8612-008	Timer	x	x		
8407-015	Transformer	x	x		
5210-002	Strainer	x	x		

Minimum Net Billing \$5.00. Supersedes all previous lists.
Subject to change without notice. F.O.B. Bryan, Ohio