INSTALLATION INSTRUCTIONS

SINGLE PACKAGE HEAT PUMPS

MODELS

PH251
PH314
PH365
PH421
PH484
PH605

FOR RESIDENTIAL AND COMMERCIAL HEATING/COOLING APPLICATIONS

MANUAL 2100-045 REV. Q
SUPERSEDES REV. P
FILE VOL. II, TAB 11

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TABLE 1

ELECTRICAL DATA

Model	Rated Volts & PH	Operating Voltage Range	Max. Unit Amps	Req'd. Maximum External Fuses Or Ckt. Brk * Ckt. A	Minimum Circuit Ampacity Ckt. A	Field Power Wiring** Ckt. A	Ground Wire Size** Ckt. A
PH251	230/208-1	197-253	16.5	30	20	12	10
PH314	230/208-1	197-253	18.4	35	24	10	10
PH365	230/208-1	197-253	21.2	45	27	10	10
PH365-B	230-208-3	187-253	15.2	30	19	12	10
PH365-C+	460-3	414-506	8.2	15	15	14	14
PH421	230/208-1	197-253	28.0	50	35	8	10
PH421-B	230/208-3	187-253	21.0	35	26	10	10
PH421-C+	460-3	414-506	11	20	15	14	14
PH484	230/208-1	197-253	30	60	36	8	10
PH484-B	230/208-3	187-253	22	40	26	10	10
PH484-C+	460-3	414-506	12.5	20	15	14	14
PH605	230/208-1	197-253	37.5	60	45	6	10
PH605-B	230/208-3	187-253	26.5	50	31	8	10
PH605-C+	460-3	414-506	13.5	25	16	12	10

*Maximum time delay fuse or HACR type circuit breaker. HACR type not applicable to 460 volt.

**60 degree C copper wire size, basic unit only.

+460 volt not U.L. listed.

TABLE 2

OPTIONAL FIELD INSTALLED HEATER PACKAGES

ARE ONLY TO BE USED WITH THE HEAT PUMP MODELS AS INDICATED BELOW

Heater Package Model No.	Volts and Phase	PH251	PH314	PH365	PH365-B	PH365-C	PH421	PH421-B	PH421-C	PH484	PH484-B	PH484-C	PH605	PH605-B	PH605-C
EH3PA-A05	240/1	S	S	S	A	A									
EH3PA-A08		S	S	S	A	A									
EH3PA-A10			S	S	A	A									
EH3PA-A15			S	S	A	A									
EH3PA-B09	240/3		A	A	S	A									
EH3PA-B15			A	A	S	A									
EH3PA-C09	480/3		A	A	A	S									
EH3PA-C15			A	A	A	S									
EH5PA-A05							S	A	A	S	A	A	S	A	A
EH5PA-A10	240/1						S	A	A	S	A	A	S	A	A
EH5PA-A15							S	A	A	S	A	A	S	A	A
EH5PA-A20										S	A	A	S	A	A
EH5PA-B09							A	S	A	A	S	A	A	S	A
EH5PA-B15	240/3						A	S	A	A	S	A	A	S	A
EH5PA-B18										A	S	A	A	S	A
EH5PA-C09							A	A	S	A	A	S	A	A	S
EH5PA-C15	480/3						A	A	S	A	A	S	A	A	S
EH5PA-C15										A	A	S	A	A	S

S Standard application--Heater volts and phase same as basic unit.

A Alternate application--Heater volts and phase different from basic unit.

TABLE 3

OPTIONAL FIELD-INSTALLED ELECTRIC HEATER TABLE

Heater Pkg. Model No.	Unit Volts Phase	Htr. KW & Cap. @240V (or 480V if applicable		Heater KW & Capacity @208 Volts		@240V or 480V as Applicable Htr. Amps	Heater Internal Fuses	Circuit B				
		KW	BTUH	KW	BTUH			No. Field Ckts.	Minimum Circuit Ampacity	① Maximum Overcurrent Protection	② Field Power Wiring	③ Ground Wire Size
EH3PA-A05	240/208-1	5	17,100	3.75	12,800	20.8		1	26	30	10	10
EH3PA-A08	240/208-1	8	27,300	6	20,500	33.3		1	42	45	6	10
EH3PA-A10	240/208-1	10	34,100	7.5	26,000	41.7		1	53	60	6	10
EH3PA-A15	240/208-1	15	51,200	11.25	38,400	62.5	30/60	1	79	80	3	8
EH3PA-B09	240/208-3	9	30,700	6.75	23,000	21.7		1	28	30	10	10
EH3PA-B15	240/208-3	15	51,200	11.25	38,400	36.2		1	46	50	6	10
EH3PA-C09	460-3	9	30,700	6.75	23,000	10.8		1	15	15	14	14
EH3PA-C15	460-3	15	51,200	11.25	38,400	18.0		1	23	25	10	10
EH5PA-A05	240/208-1	5	17,100	3.75	12,800	20.8		1	26	30	10	10
EH5PA-A10	240/208-1	10	34,100	7.5	26,000	41.7		1	53	60	6	10
EH5PA-A15	240/208-1	15	51,200	11.25	38,400	62.5		1	79	80	3	8
EH5PA-A20	240/208-1	20	68,200	15	51,200	83.2	30/60	1	104	110	④ 2	6
EH5PA-B09	240/208-3	9	30,700	6.75	23,000	21.7	60/60	1	28	30	10	10
EH5PA-B15	240/208-3	15	51,200	11.25	38,400	36.2		1	46	50	6	10
EH5PA-B18	240/208-3	18	61,400	13.5	46,100	43.4		1	55	60	6	10
EH5PA-C09	460-3	9	30,700	6.75	23,000	10.8		1	15	15	14	14
EH5PA-C15	460-3	15	51,200	11.25	38,400	18.0		1	23	25	10	10
EH5PA-C18	460-3	18	61,400	13.5	46,100	21.7		1	28	30	10	10

① Time delay fuses or "HACR Type" circuit breakers must be used for 60 and smaller sizes. Standard fuses or circuit breakers are suitable for sizes 70 and larger. 480V circuit breakers are not "HACR Type".

② Based on wire suitable for 60 degrees C. Other wiring materials must be rated for marked "Minimum Circuit Ampacity" or greater.

③ Based upon Table 250-95 of N.E.C. 1984. See electrical data for basic heat pump for Ckt. A wiring specification requirements.

④ For ampacities over 100 amperes use wire suitable for at least 75 degrees C.

IMPORTANT: While this electrical data is presented as a guide, it is important to electrically connect, properly size fuses and conductor wires in accordance with the National Electrical Code and all existing local codes.

IMPORTANT

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

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 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 ducts.

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.

LOCATION

GENERAL--The unit must be located outside, or in a well ventilated area. It must not be in the space being heated or cooled. A sound absorbing material should be considered if the unit is to be installed in such a position or location that might cause transmission of sound or vibration to the living area or adjacent buildings.

SLAB MOUNTING--In areas where winter temperatures DO NOT go below 32 degrees F for periods over twelve hours, the unit may be slab mounted at grade level. When installing unit at grade level, install on a concrete slab at least four inches above finished grade level. Slab should have a slope tolerance away from the building structure of at least 1/4 inch per foot, while being level from side to side. This will prevent ice buildup under the unit during defrost cycles. Place slab in a location where run-off water from higher ground will not collect around unit. See Figure 9.

A minimum of 18 inches should be provided between the coil inlet and any building surfaces. Provide at least four feet between coil outlet and any building wall, fences or other vertical structures. Provide a minimum of three feet clearance on the service access side of the unit. See Figure 10.

ROOF MOUNTING--When a unit is installed in areas where low ambient temperatures or strong winter winds exist, it should be placed so prevailing winter winds are not in direct line with the heat pump coil. If this is not possible, a wind barrier should be constructed. Place barrier 24 inches from the coil inlet side of the unit and in the direction of prevailing winds. Size barrier at least the same height and width as the unit. This may be necessary on ground level installations. See Figure 11.

WINTER INSTALLATION BELOW 32 DEGREES F--In areas where winter conditions go below 32 degrees F for extended periods, the unit must be elevated above the mounting surface to prevent snowfall or defrost ice accumulation from interfering with the operation of the unit. A minimum of twelve inch elevation is recommended, while greater elevation may be required for areas of high snow accumulation. Poured concrete, steel framework, brick, cement block, etc., can be utilized to construct a suitable raised mounting platform. See Figure 7.

TYPICAL INSTALLATION

1. ROOF MOUNTED--The unit is mounted on a sturdy base on the roof of the building. Return air to the unit is brought through a single return grille (grilles with built-in filters are best, since they enable easy access for filter changing). Return air ducts are attached to the lower section of the front panel. Supply air is brought from the unit to attic duct work or to a furred down hall. Supply air duct is attached to the top of the front panel. CAUTION: All outdoor duct work must be thoroughly insulated and weatherproofed. All attic duct work must be thoroughly insulated. Two inch thick insulation with suitable vapor barrier is recommended for both outdoor and attic runs. In rooftop installations, as in all installations, the heat pump must be level from side to side. However, the unit should have a pitch along the length to assure complete external drainage of precipitation and of defrost condensate.

2. CRAWL SPACE--Duct work installed in crawl space must be well insulated and provided with a vapor barrier. In addition, the crawl space must be thoroughly ventilated and provided with a good vapor barrier as a ground cover. It is most desirable to install the unit outdoors, rather than inside the crawl space, so that it will be readily accessible for service. In addition, it is necessary to dispose of the condensate from the outdoor coil on the heating cycle, and this is virtually impossible with the unit installed inside the crawl space.

3. SLAB MOUNTED AT GROUND LEVEL--This type installation is ideal for homes with a slab floor construction, where a roof mounted unit is not desired. The supply and return duct work can be run through a furred closet space.

4. THRU-THE-WALL--This type installation requires a suitable framework to be fabricated capable of withstanding the unit weight. Normally the unit will be insulated so as to minimize supply and return duct work.

5. OTHER INSTALLATIONS--Many other installations are possible with the packaged heat pump. No matter what the installation, always consider the following facts:
   A. Insure that the discharge air is not obstructed in any way so as to cause operation difficulties.
   B. The indoor coil drain pan is equipped with a coupling that must be piped through a condensate drain trap to a suitable drain.
   C. Always mount the unit in such a position that it may be easily reached for servicing and maintenance.
   D. Insure that the unit is clear so that proper air flow over the outdoor coil will be maintained.

TABLE 4

RATED CFM AND EXTERNAL STATIC PRESSURE (ESP)
WET COIL (COOLING)

Model	Rated CFM	Rated ESP	Recommended Air Flow Range
PH251	800	.20	720 - 880 CFM
PH314	1125	.50	1000 - 1340 CFM
PH365	1275	.23	1150 - 1400 CFM
PH421	1500	.30	1520 - 1765 CFM
PH484 PH605	1700	.20	1520 - 1765 CFM

If this unit is operated in cooling below a 65 degree outdoor ambient temperature, the installation of low ambient controls (LAC-1 and 8201-008 relay) to unit is required.

AIR FILTERS

Air filters for the return air side of the system are not provided as part of the various types of applications for these models, and must be field supplied and installed as part of the final installation.

Prior thought should be given to return air location and placement of the air filter(s). The air filter(s) must be of adequate size and readily accessible to the operator of the equipment. Filters must be adequate in size and properly maintained for proper operation. If this is not done, excessive energy use, poor performance, and multiple service problems will result. IT IS IMPOSSIBLE TO OVERSIZE AIR FILTERS. Generous sizing will result in cleaner air and coils, as well as lower operating costs and extend the time between required changes. The following table shows minimum filter areas and recommended filter sizes. Actual filter sizes can vary with the installation due to single or multiple returns utilizing a filter/grille arrangement or being placed immediately ahead of the indoor coil face in the return air duct.

TABLE 5

Model	Minimum Filter Areas	Recommended Size
PH251, PH314, PH365	462 sq.in. (3.21 sq.ft.)	15 x 30-5/8 x 1
PH421, PH484, PH605	608 sq.in.(4.62 sq.ft.)	(2) 16 x 20 x 1

NOTE: If roof hood accessory is to be used, information on air filters may be found under that heading in this manual. Air filters are supplied as part of that package.

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. If field installed heaters are added to the basic unit, a second, separate power supply circuit will be required. The heater rating plate located adjacent to the basic unit rating plate will show the appropriate circuit ampacity, fuse size, etc. (Also see "Electrical Data" on pages 1 and 2). 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.

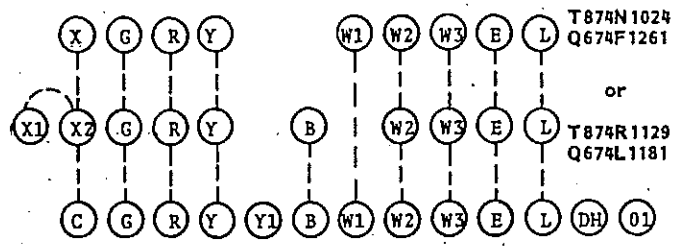
The electrical specifications on pages 1 and 2 lists fuse and wire sizes (60 degrees F copper) for all models, including the most commonly used heater sizes.

The unit rating plate lists a "Maximum Time Delay 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.

WIRING--24V CONTROL CIRCUIT

Ten (10) wires should be run from thermostat subbase to the 24V terminal board in the unit. A nine conductor, 18 gauge copper, color-coded thermostat cable is recommended. The connection points are shown on most of the wiring diagrams and are also shown below.

FIGURE 1



IMPORTANT NOTE: Only the thermostat and subbase combinations as shown above will work with this equipment. The thermostat and subbase MUST be matched, and correct operation can be assured only by proper selection and application of these parts.

COMPRESSOR CUT-OFF THERMOSTAT AND OUTDOOR THERMOSTATS

Heat pump compressor operation at outdoor temperatures below 0 degree F are neither desirable nor advantageous in terms of efficiency. Since most equipment at time of manufacture is not designated 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.

Outdoor thermostats are available to hold off various banks of electric heat until needed as determined by outdoor temperature. The set point of either type of thermostat is variable with geographic region and sizing of the heating equipment to the structure. Utilization of the Heating Application Data and the heat loss calculation of the building are useful in determining the correct set points.

COMPRESSOR CUT-OFF AND OUTDOOR THERMOSTAT WIRING

See specific wiring information for the different models, heater KW's, and voltages on pages 12 and 13.

TABLE 6

WALL THERMOSTAT AND SUBBASE COMBINATIONS

Group	Thermostat	Subbase	Predominant Feature
A	8403-017 (T874R1129)	8404-009 (Q674L1181)	Heat or Cool (1) No Auto
B	8403-018 (T874N1024)	8404-010 (Q674F1261)	Automatic Heat-Cool (2) Changeover Position

(1) No automatic changeover position--must manually place in heat or cool. Reversing valve remains energized at all times system switch is in heat position (except during defrost cycle). No pressure equalization noise when thermostat is satisfied on either heating or cooling.

(2) Allows thermostat to control both heating and cooling operation when set in "AUTO" position. Reversing valve denergizes at end of each "ON" heating cycle.

IMPORTANT NOTE: Both thermostat and subbase combinations shown above incorporate the following features: Man-Auto fan switch, Off-Heat-Cool-Em. Heat Switch, and two (2) indicator lamps--one for emergency heat and one for compressor malfunction.

THERMOSTAT INDICATOR LAMPS

The red lamp marked "EM.HT." comes on and stays on whenever the system switch is placed in EM. Ht. position. The green lamp marked "check" will come on if there is any problem that prevents the compressor from running when it is supposed to be.

EMERGENCY HEAT POSITION

The operator of the equipment must manually place the system switch in this position. This is done when there is a known problem with the outdoor section, or when the green "check" lamp comes on indicating a problem.

COMPRESSOR MALFUNCTION RELAY (Single Phase Models Only)

Actuation of the green "check" lamp is accomplished by a voltage type relay which is factory installed. Any condition such as loss of charge, defective capacitor, defective contactor, etc., that will prevent compressor from operating will cause green lamp to activate. This is a signal to the operator of the equipment to place system in emergency heat position.

PRESSURE SERVICE PORTS

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

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.

HEATING--A 24V solenoid coil on reversing valve controls heating cycle operation. Two thermostat options, one allowing "AUTO" changeover from cycle to cycle and the other constantly energizing solenoid coil during heating season and thus eliminating pressure equalization noise except during defrost, are to be used. On "AUTO" option, a circuit is completed from R-W1 and R-Y on each heating "on" cycle, energizing reversing valve solenoid and pulling in compressor contactor starting compressor and outdoor motor. R-G also make starting indoor blower motor. Heat pump heating cycle now in operation. The second energizes the reversing valve solenoid constantly whenever the system switch on subbase is placed in "Heat" position, the "B" terminal being constantly energized from R. A thermostat demand for heat completes R-Y circuit, pulling in compressor contactor starting compressor and outdoor motor. R-G also make starting indoor blower motor.

DEFROST CYCLE

The defrost cycle is controlled by time and temperature. The 24 volt timer motor runs all the time the compressor is in operation. When the outdoor temperature is in the lower 40 degree F temperature range or colder, the outdoor coil temperature is 32 degrees F or below. This temperature is sensed by the defrost thermostat mounted near the bottom of the outdoor coil on a return bend. The defrost thermostat closes at approximately 32 degrees F. Every 60 (or 30) minutes that the compressor is running, contacts 3 - 5 close for 7 minutes with contacts 3 - 4 closed for the first 40 seconds of that 7 minutes. If the defrost thermostat is closed, the defrost relay energizes and places the system in defrost mode. An interlocking circuit is created with timer contacts 3 - 5 and defrost relay contacts 7 - 9 in series.

During the defrost mode, the refrigerant cycle switches back to the cooling cycle, the outdoor motor stops, electric heaters are energized, and hot gas passing through the outdoor coil melts any accumulated frost. When the temperature rises to approximately 57 degrees F, the defrost thermostat opens, denergizing the defrost relay and returning the system to heating operation.

If some abnormal or temporary condition such as a high wind causes the heat pump to have a prolonged defrost cycle, contacts 3 - 5 of the defrost timer will open after 7 minutes and restore the system to heating operations automatically.

There are two time settings on the defrost timer--30 minutes and 60 minutes. Most models are shipped wired on the 60 minute setting for greatest operating economy. If special circumstances require a change to the shorter time, remove wire connected to terminal 5/60 and reconnect to terminal 5/30.

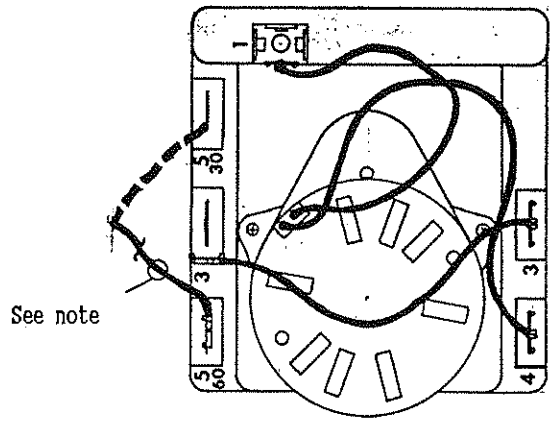
There is a manual advance knob located on the timer. This can be used to advance timer to contact closure point if it is desired to check out defrost cycle operation without waiting for time elapse.

IMPORTANT INSTALLER NOTES

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

FIGURE 2

DEFROST TIMER WIRING



NOTE: All models are connected to 5/60 terminal (60 minute). Any model can be changed from 60 minutes to 30 minutes by unplugging from 5/60 terminal and reconnecting to 5/30 terminal.

SERVICE HINTS

1. 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.

2. Switching to heating cycle at 75 degrees F or higher outside temperature may cause a nuisance trip of the manual reset high pressure switch.

3. The heat pump wall thermostats perform multiple functions. Be sure that all function switches are correctly set for the desired operating mode before trying to diagnose any reported service problems.

4. Check all power fuses or circuit breakers to be sure that they are the correct rating.

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

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 7

Model	Rated Airflow	95 Degree F OD Temperature	82 Degree F OD Temperature
PH251	800	58 - 60	67 - 69
PH314	1075	58 - 60	66 - 68
PH365	1275	58 - 60	66 - 68
PH421	1500	60 - 62	67 - 69
PH484	1700	51 - 53	60 - 62
PH605	1700	59 - 61	64 - 66

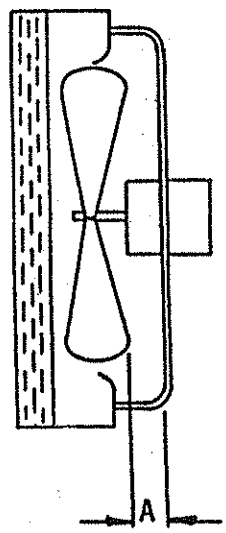
The above suction line temperatures are based upon 80 degree F dry bulb/67 degree F wet bulb (50 percent RH) temperature and rated airflow across the evaporator during cooling cycle.

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 3



Model	Dimension A
PH251	1.00"
PH341	.75"
PH365	.75"
PH421	1.00"
PH484	1.00"
PH605	1.00"

CRANKCASE HEATERS

All units are provided with some form of compressor crankcase heat. Some 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.

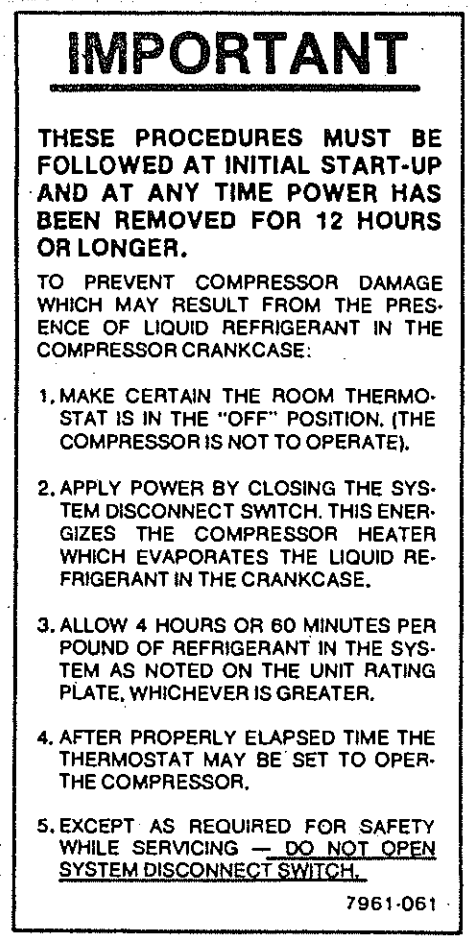
Some single and three phase models have an insertion well-type heater located in the lower section of the compressor housing. This is a self-regulating type heater that draws only enough power to maintain the compressor at a safe temperature.

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.

Refer to unit wiring diagram to find exact type of crankcase heater used.

The following decal is affixed to all outdoor units detailing start-up procedure. This is very important. Please read carefully.

FIGURE 4



OPTIONAL ELECTRIC HEATERS

These packaged heat pumps are manufactured without supplementary electric heaters. Supplementary heaters EH3PA series (to fit PH251, PH314, and PH365) and EH5PA series (to fit PH421, PH484, and PH605) are available for simple, fast, field installation.

A separate field power circuit is required for the supplementary heaters.

Refer to the electrical data shown on pages 1 and 2 for proper application information on all available heater combinations and what units they can be used with. It also shows the applicable circuit ampacities, fuse size, and wire size for each heater combination.

Refer to the installation instructions packed with the heater for details on how to insert it into the basic unit.

COMPRESSOR CUT-OFF WIRING

FIGURE 5

Unit 24V Terminal Board

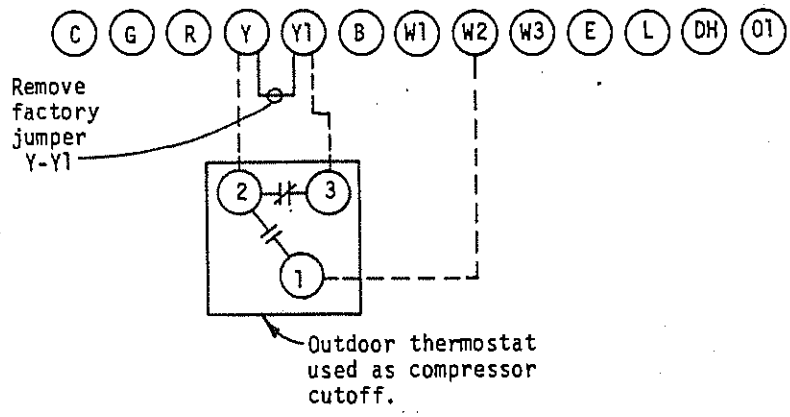


TABLE 8

Model	KW	Volts	Phase
PH251	0, 5, 8	230	1
PH314	0, 5, 8, 10	230	1
PH365	0, 5, 8, 10	230	1
PH365-B,-C	0, 6, 9, 12, 15	230, 460	3
PH421	0, 5, 10	230	1
PH421-B,-C	0, 9, 12, 15	230, 460	3
PH484	0, 5, 10	230	1
PH484-B,-C	0, 9, 12, 15	230, 460	3
PH605	0, 5, 10	230	1
PH605-B,-C	0, 9, 12, 15	230, 460	3

COMPRESSOR CUT-OFF AND OUTDOOR THERMOSTAT WIRING

FIGURE 6

Unit 24V Terminal Board

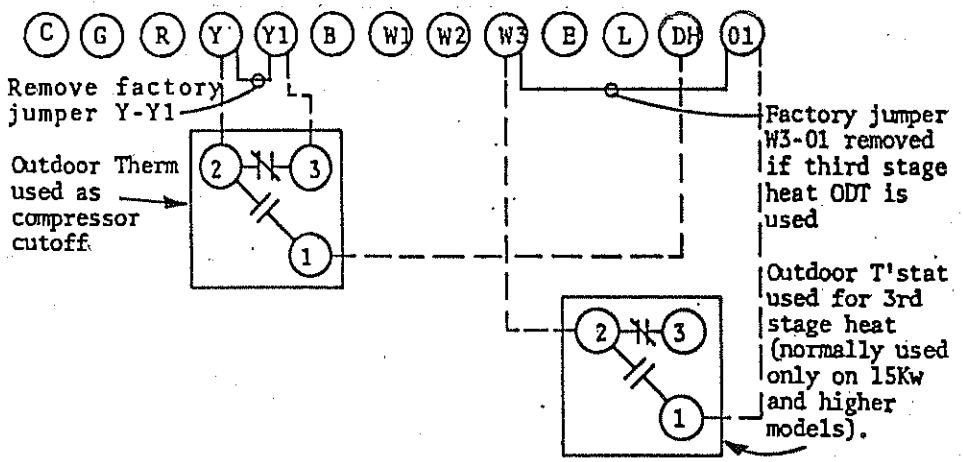


TABLE 9

Model	KW	Volts	Phase
PH314	15	230	1
PH365	15	230	1
PH421	15, 20	230	1
PH484	15, 20	230	1
PH484-B,-C	18	230, 460	3
PH605	15, 20	230	1
PH605-B,-C	18	230, 460	3

Figure 7

ROOFTOP APPLICATION

(May also be required for ground level installations)

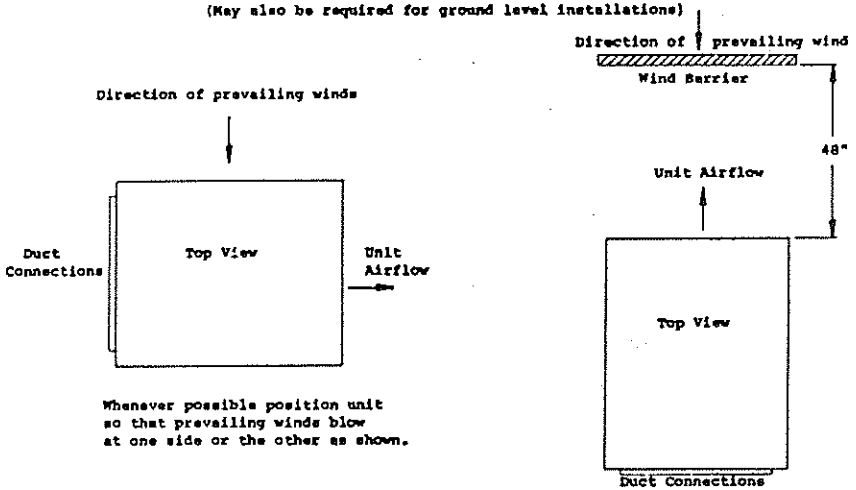


Figure 8

ELEVATED MOUNTING PLATFORMS

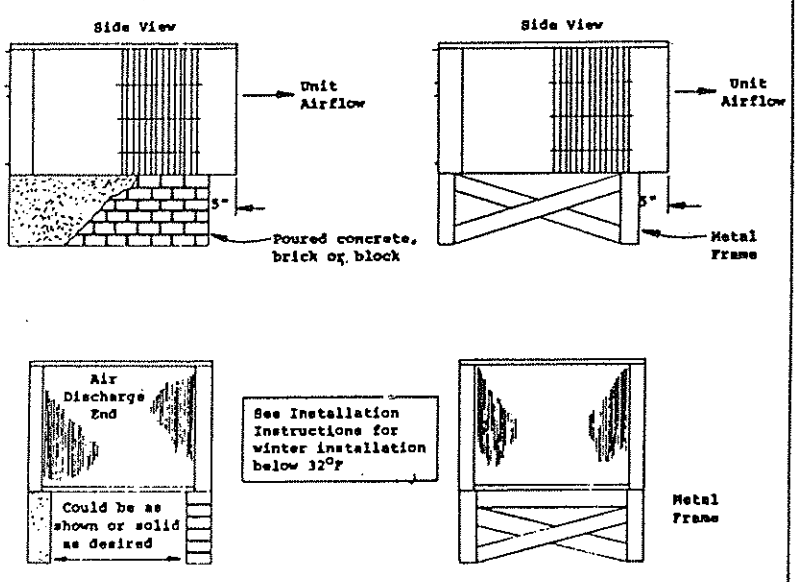


Figure 9

SLAB MOUNTING AT GROUND LEVEL

(Above 32°F Outside Temperature)

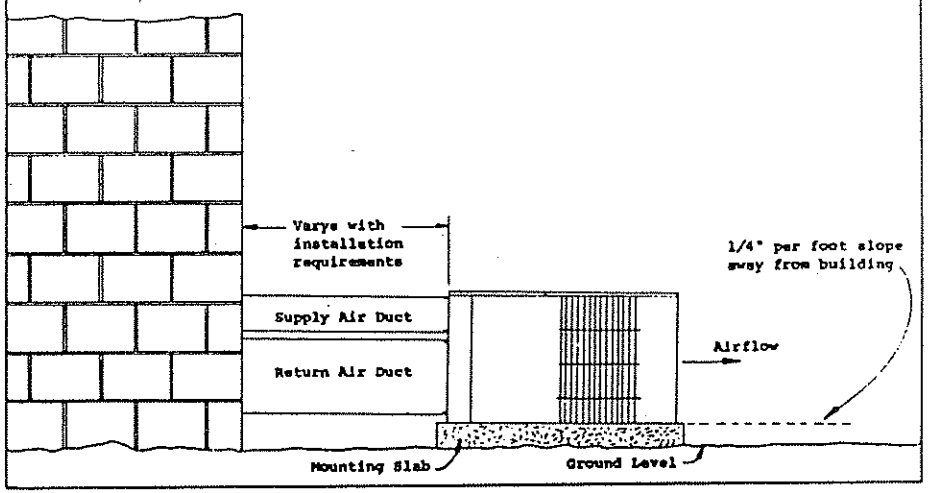
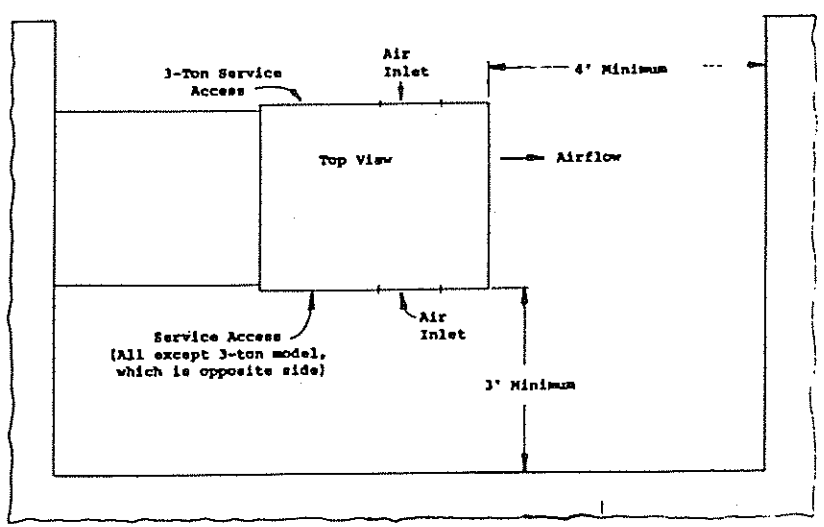


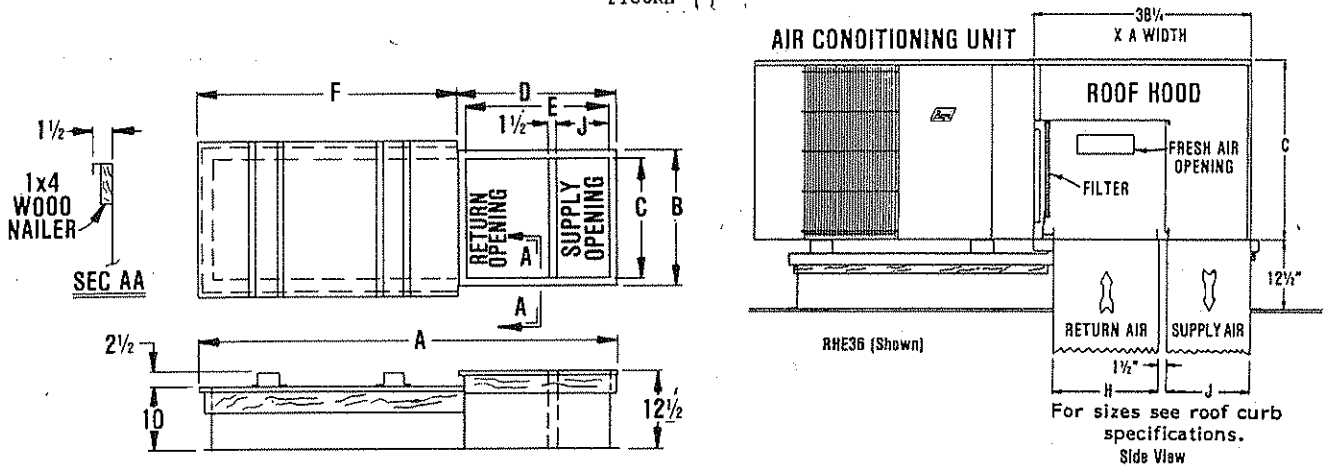
Figure 10

AIRFLOW AND SERVICE ACCESS CLEARANCES



PREFABRICATED ROOF CURB SPECIFICATIONS
HEAVY GAUGE GALVANIZED WITH WOOD NAILING STRIP, WELDED/LEAKPROOF
ONE PIECE CONSTRUCTION--READY TO INSTALL

FIGURE 11



CURB AND ROOF HOOD DETAILS

	A	B	C*	D	E	F	J*	H*	Roof Hood Model	Heat Pump and Air Conditioning Units
P36 Curb	80-3/8	40-1/4	37-1/4	38-3/8	35-3/8	42	14-3/4	19-1/8	RHE36	PH25,P25A,P31A,PH31,P36A,PH36
P60 Curb	82-3/8	44-1/8	41-1/8	38-3/8	35-3/8	44	14-3/4	19-1/8	RHE60	PH421,P48A5,PH484,P60A5,PH605

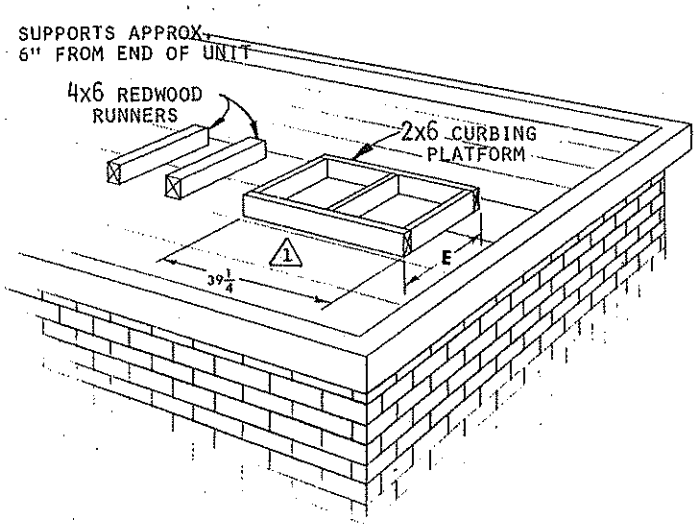
*Duct Sizing Information

Return Air Dimension "C" is length
Return Air Dimension "H" is width

Supply Air Dimension "C" is length
Supply Air Dimension "J" is width

FIELD FABRICATED CURBING

FIGURE 12



Roof Hood Model	Unit Model	E
RHE36	P25A PH25 P31A PH31 P36A PH36	41
RHE60	PH42 P48A PH48 P60A PH60	44-7/8

⚠1 A separate metal flashing should be installed around wood curbing. Caulk and seal all joints and weatherproof.

TABLE 10

COOLING

Model	Return Air Temperature	Pressure	Air Temperature Entering Outdoor Coil Degree F o 75	o 80	o 85	o 90	o 95	o 100	o 105	o 110	o 115
PH251	75 deg. DB	Low Side	58	65	70	75	78	80	82	83	84
	62 deg. WB	High Side	201	216	231	246	262	278	294	310	326
	80 deg. DB	Low Side	64	70	75	79	83	86	87	88	89
	67 deg. WB	High Side	206	222	237	253	269	285	301	318	334
	85 deg. DB	Low Side	68	75	80	85	89	92	94	95	96
	72 deg. WB	High Side	214	230	246	262	278	295	311	329	346
PH314	75 deg. DB	Low Side	65	67	69	71	73	75	77	78	80
	62 deg. WB	High Side	217	233	250	266	281	296	311	325	339
	80 deg. DB	Low Side	70	72	74	76	78	80	82	84	86
	67 deg. WB	High Side	222	239	256	272	288	304	319	334	348
	85 deg. DB	Low Side	75	77	79	82	84	86	88	90	92
	72 deg. WB	High Side	231	248	265	282	298	314	330	345	360
PH365	75 deg. DB	Low Side	63	66	68	71	73	75	77	79	80
	62 deg. WB	High Side	208	224	239	255	271	287	303	320	336
	80 deg. DB	Low Side	69	71	73	76	78	80	82	84	75
	67 deg. WB	High Side	214	230	246	262	278	294	311	328	245
	85 deg. DB	Low Side	73	76	79	81	84	86	88	90	92
	72 deg. WB	High Side	221	237	254	271	288	305	322	340	357
PH421	75 deg. DB	Low Side	64	67	70	72	75	78	80	83	85
	62 deg. WB	High Side	193	227	263	272	283	287	283	272	353
	80 deg. DB	Low Side	69	72	75	77	80	83	85	88	91
	67 deg. WB	High Side	219	237	255	272	290	308	326	344	362
	85 deg. DB	Low Side	74	77	80	83	86	89	92	95	98
	72 deg. WB	High Side	228	246	264	282	300	318	337	356	375
PH484	75 deg. DB	Low Side	69	70	72	74	75	76	78	79	80
	62 deg. WB	High Side	217	233	250	266	282	298	314	329	345
	80 deg. DB	Low Side	74	75	77	78	80	82	83	85	86
	67 deg. WB	High Side	223	239	256	273	289	305	322	338	354
	85 deg. DB	Low Side	80	81	83	84	86	88	89	91	92
	72 deg. WB	High Side	231	248	265	282	299	316	333	349	366
PH605	75 deg. DB	Low Side	55	60	65	69	74	78	83	87	91
	62 deg. WB	High Side	214	233	251	269	287	305	322	339	356
	80 deg. DB	Low Side	59	64	69	74	79	84	88	93	97
	67 deg. WB	High Side	220	238	257	276	294	312	330	348	365
	85 deg. DB	Low Side	63	69	74	80	85	90	95	100	104
	72 deg. WB	High Side	228	247	266	285	304	323	341	360	378

TABLE 11

HEATING

Model	Return Air Temperature	Pressure	Air Temperature Entering Outdoor Coil Degree F 0	5	10	15	17	20	25	30	35	40	45	47	50	55	60
		Low Side	16	21	25	29	31	34	38	42	42	52	56	58	61	65	70
PH251	70 degree	High Side	126	140	153	167	172	180	194	207	221	235	248	254	262	276	290
		Low Side	15	19	24	28	30	33	37	40	44	47	51	52	54	57	59
PH314	70 degree	High Side	146	155	165	174	178	184	193	201	210	218	227	230	235	243	250
		Low Side	10	17	22	28	30	33	38	42	46	50	53	54	56	58	60
PH365	70 degree	High Side	126	140	153	166	171	179	191	203	214	225	236	240	246	256	266
		Low Side	20	24	27	31	32	34	38	41	45	49	52	54	56	60	64
PH421	70 degree	High Side	127	138	148	158	162	168	177	187	196	205	214	217	222	230	238
		Low Side	14	18	22	26	28	30	34	38	42	46	50	51	53	57	60
PH484	70 degree	High Side	140	147	154	161	164	169	176	184	192	200	209	212	217	256	235
		Low Side	22	23	25	27	28	30	32	35	39	43	47	49	52	57	62
PH605	70 degree	High Side	159	163	168	174	177	181	189	198	207	217	228	233	240	253	267

Low side pressure $\pm$ 2 PSIG
High side pressure $\pm$ 5 PSIG

Tables are based upon rated CFM (airflow) across the evaporator coil and should be found under section titled "Refrigerant Charge" elsewhere in manual. If there is any doubt as to correct operating charge being in the system, the charge should be removed, system evacuated, and recharged to serial plate instructions.