MANUAL 2100-025

Bard
SINCE 1914

MODELS
42HPQ, 48HPQ2, 60HPQ3

SPLIT HEAT PUMP UNIT
OUTDOOR SECTIONS

INSTALLATION INSTRUCTIONS

FOR USE WITH:
BARD MODELS B48EHQ AND B60EHQ
INDOOR BLOWER COIL UNITS AND
MODEL H5AQ COIL ONLY ADD ON UNIT

BARD MANUFACTURING CO. • BRYAN, OHIO 43506

Dependable quality home equipment . . . since 1914

SPECIFICATIONS • Split Heat Pump Systems

OUTDOOR COMPRESSOR UNIT

MODEL	42HPQ	42HPQ2-3	48HPQ2	48HPQ2-3	60HPQ3	60HPQ3-3
Electrical Rating — 60Hz	**230/208-1 Ph**	**230/208-3 Ph**	**230/208-1 Ph**	**230/208-3 Ph**	**230/208-1 Ph**	**230/208-3 Ph**
Operating Voltage Range	197-253	187-253	197-253	187-253	197-253	187-253
*Minimum Circuit Ampacity	30	18	33	24	39	28
Delay Fuse Max	50	25	50	40	60	45
Total Unit Amps	24.8	14.3	26.8	19.8	31.8	22.8
Compressor	PSC	3-Phase	PSC	3-Phase	PSC	3-Phase
Volts	230/280	230/208	230/208	230/200	230/208	230/200
Name Plate Amps	22	12	24	17	29	20
Lock Rotor Amps	110	74	115	93	132	103
Crankcase Heat	Capacitor Type	Wraparound	Self-Regulating	Self-Regulating	Self-Regulating	Self-Regulating
Fan Motor & Condenser						
Fan Motor-HP/RPM	1/3-825	1/3-825	1/3-825	1/3-825	1/3-825	1/3-825
Fan Motor — Amps	2.8	2.8	2.8	2.8	2.8	2.8
Fan — DIA/CFM	24"/3600	24"/3600	24"/3600	24"/3600	24"/3300	24"/3300
Face Area Sq. Ft/Row/Fins per inch	7.7/2/14	7.7/2/14	7.7/2/14	7.7/2/14	7.7/3/12	7.7/3/12
Refrigerant Control/R22-25 ft.	Cap/86 oz.	Cap/86 oz.	Cap/92 oz.	Cap/92 oz.	Cap/126 oz.	Cap/126 oz.
Shipping Weight Lbs.	261	258	275	272	291	283

*For sizing of CU Wire

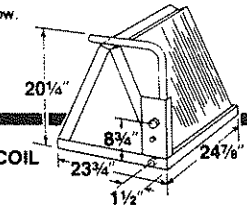
INDOOR BLOWER COIL UNIT

MODEL	B48EHQ	B60EHQ
Electrical Rating — 60 Hz	**240V-1 & 3 Ph**	
Operating Voltage Range	197-253 (1 Ph)	187-253 (3 Ph)
Fusing and Ampacity	SEE ELECTRIC HEAT TABLE	
Motor and Blower	10x10 Direct	12x7 Direct
Motor — RPM/Speed	1075/2 Speed	1075/2 Speed
Motor — HP/Amps	½ hp/ 4.4A	¾ hp/ 6.4A
Evaporator — Face Area Sq.Ft/Row/Fins per inch	5.55/3/14	5.55/3/14
Filter — Permanent or Throwaway	24 x 24 T	24 x 24 T
Refrigerant Control/R22 Chg.	Capillary Tube/23 oz.	
Shipping Weight Lbs.	220	230
Maximum Electric Heat	30Kw Built-in	35Kw Built-in

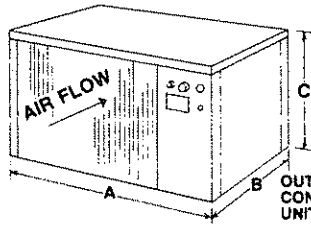
ADD-ON INDOOR HEAT PUMP COIL SPECIFICATIONS

MODEL	H5AQ*	
Evaporator Air Flow	1625**	1900†
CFM/Press. Drop in Water	.16	.30
Face Area Sq.Ft/Row/Fins per in.	5.55/3/14	
Drain Pan Opening W x L	12⅛" x 19¾"	
Refrigerant Control — Capillary	23 oz.	
Shipping Weight Lbs.	71	

* Airflow can also be horizontal, downflow, or upflow.
** Rated CFM for use with 42HPQ or 48HPQ2.
† Rated CFM for use with 60HPQ3.

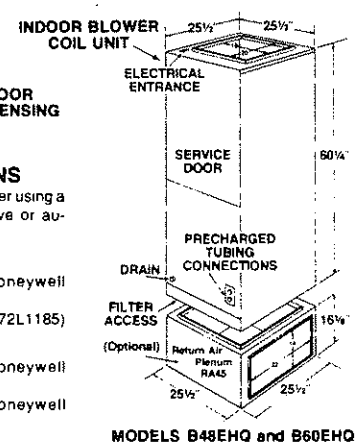


NOMINAL DIMENSIONS FOR ARCHITECTS AND INSTALLATION REQUIREMENTS



CONDENSING UNIT CABINET DIMENSIONS

Models	A	B	C
42HPQ 48HPQ2 60HPQ3	46½"	23¼"	31½"



MODELS B48EHQ and B60EHQ

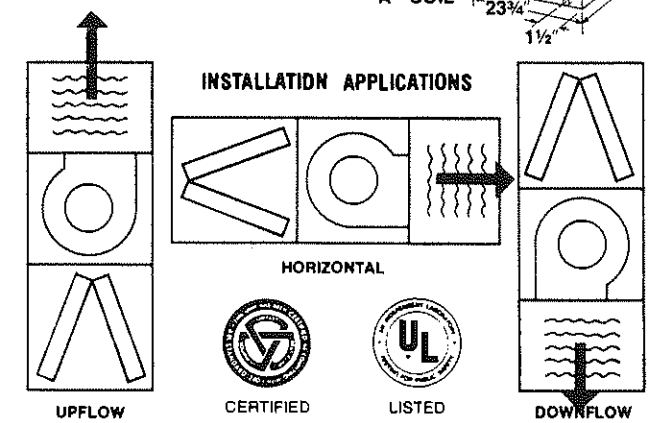
INDOOR THERMOSTAT OPTIONS

These Bard Systems feature the option of either using a thermostat with a non-cycling reversing valve or automatic changeover.

Non-Cycling Reversing Valve
Thermostat — Part No. 8403-012 (Honeywell T872R1164)
Subbase — Part No. 8404-007 (Honeywell Q672L1185)

Automatic Changeover
Thermostat — Part No. 8403-015 (Honeywell T872N1063)
Subbase — Part No. 8404-008 (Honeywell Q672F1299)

INSTALLATION APPLICATIONS



CERTIFIED LISTED

CHARGED TUBING

Model No.	Stub Tube	15'	25'	35'	45'
42HPQ 48HPQ2 60HPQ3	**CTO-12** ⅜" & ⅞"	**CT15-12** ⅜" & ⅞"	**CT25-12** ⅜" & ⅞"	**CT35-12** ⅜" & ⅞"	**CT45-12** ⅜" & ⅞"

ELECTRIC HEAT TABLE

Indoor Unit	Volts & Ph	240V Std *KW	240V Capacity Btuh	No. of Ckts.	Total Amps	Min. Ckt. Ampacity A/B	Max. Fuse A/B
B48EHQ	240 1-Ph	10	34,100	1	46.0	58	60
		20	68,300	1	87.5	110	110
		30	102,400	2	129.4	58/104	60/110
B48EHQ	240 3-Ph	15	51,200	1	40.5	51	60
		18	61,200	1	47.6	60	60
		30	102,400	1	76.6	96	100
B60EHQ	240 1-Ph	15	51,200	1	68.9	86	90
		30	102,400	2	131.4	60/104	60/110
		35	119,500	2	152.2	112/78	125/80
B60EHQ	240 3-Ph	15	51,200	1	42.5	53	60
		30	102,400	1	78.6	98	100

NOTE: When operating on 208V, reduce Kw and Btuh 25%.
*Maximum of 20Kw 1-Ph and 18Kw 3-Ph operates with heat pump on.

INDOOR BLOWER COIL PERFORMANCE

E.S.P. in H_2O	CFM — Dry Coil With Filter			
	B48EHQ*		B60EHQ**	
	High	Low	High	Low
†.00	1925	1740	2200	1865
.10	1880	1675	2160	1845
.20	1820	1600	2115	1825
.30	1750	1525	2070	1800
.40	1675	1435	2025	1770
.50	1600	‡1335	1875	1740
.60	‡1500	—	1925	‡1700
.70	—	—	‡1875	—

* Rated CFM is 1625.
** Rated CFM is 2000.
† Reduce E.S.P. by .10 with No. RA45 return air plenum with one opening. Reduce E.S.P. by .05 for horizontal & downflow installations.
‡ Max. Allowable E.S.P

APPLICATION AND INSTALLATION INSTRUCTIONS
FOR SPLIT SYSTEM HEAT PUMP UNITS

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. NESCA 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.

GENERAL

These instructions explain the recommended method to install the air cooled split type heat pump, the interconnected refrigerant tubing, and the electrical wiring required for both unit power and control circuit.

These units are to be used in conjunction with the matching indoor coil sections as shown on the specification sheet. Only those combinations as shown are authorized or recommended.

These instructions and any instructions packaged with any separate equipment required to make up the entire heat pump system 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.

SETTING THE UNIT

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°F for periods over twelve hours, the unit may be slab mounted at grade level. When installing unit at grade level, install in 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 1.

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. Refer to Figure 2.

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. See Figure 3.

WINTER INSTALLATION BELOW 32°F

In areas where winter conditions go below 32°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 4.

WIRING - Main Power

Refer to the unit serial plate for wire sizing information and maximum fuze 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. Each unit and/or unit wiring diagram is also marked "Use Copper Conductors Only," meaning that the terminations are not suitable for aluminum wiring. Refer to the National Electrical Code for complete current carrying capacity data on the various insulation grades of wiring material.

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

Since the same outdoor unit can in most cases be matched with more than one indoor unit, the appropriate control circuit wiring diagrams are included with the indoor coil section installation instructions. These control circuit wiring diagrams cover all the available wiring options required in the various geographic areas of the country.

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 option has no "Auto" changeover position, but instead 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 240V timer motor runs all the time the compressor is in operation. 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 near the bottom of the outdoor coil on a return bend. The defrost thermostat closes at approximately 32°F. Every 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 contact 3-5 and defrost relay contact 7-9 in series.

During the defrost mode, the refrigerant cycle switches back to the cooling cycle, and hot gas passing thru the outdoor coil melts any accumulated frost. When the temperature rises to approximately 57°F. the defrost thermostat opens, de-energizing 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, contacts3-5 of the defrost timer will open after 7 minutes and restore the system to heating operations automatically.

There is a manual advance knob located on the top of the timer, with access thru a punched hole in sheet metal barrier just above 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 to elapse.

CRANKCASE HEATERS

All units are provided with some form of compressor crankcase heat. Model 42HPQ 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.

Model 42HPQ three phase units utilize a wraparound type of crankcase heater that warms the compressor oil from the outside.

All models 48HPQ2 and 60HPQ3 single and three phase 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.

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

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 COMPRESSOR.
5. EXCEPT AS REQUIRED FOR SAFETY WHILE SERVICING — DO NOT OPEN SYSTEM DISCONNECT SWITCH.

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COMPRESSOR CUT-OFF THERMOSTAT AND OUTDOOR THERMOSTATS

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 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. Refer to matching indoor section installation manual for more information and required parts.

A separate compartment is located at the top of the control panel section. Holes are prepunched to match with mounting holes of the thermostat brackets.

The sensing capillary can be left coiled at the thermostats and remain in the compartment. Make sure it does not touch any of the electrical terminals. Route the 24V wires thru the hole in partition and make necessary connections at 24V terminal board. Refer to 24V wiring diagrams with indoor unit instructions for wiring details.

SERVICE HINTS

(1) Caution homeowner to maintain clean air filters at all all times. Also, not to needlessly close off supply and return air registers. This reduces airflow through the system, which shortens equipment service life as well as increasing operating costs.

(2) Switching to heating cycle at 75°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 to be sure that they are the correct rating and are the time-delay type.

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

(6) System operating pressures may be checked against the appropriate pressure curves. These are included with the indoor coil section installation instructions.

INSTALLER NOTE: Optimum unit performance will occur with a refrigerant charge resulting in a suction line temperature (near the compressor) of 53° 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.

FIGURE 1

SLAB MOUNTING AT GROUND LEVEL
(ABOVE 32°F OUTSIDE TEMPERATURE)

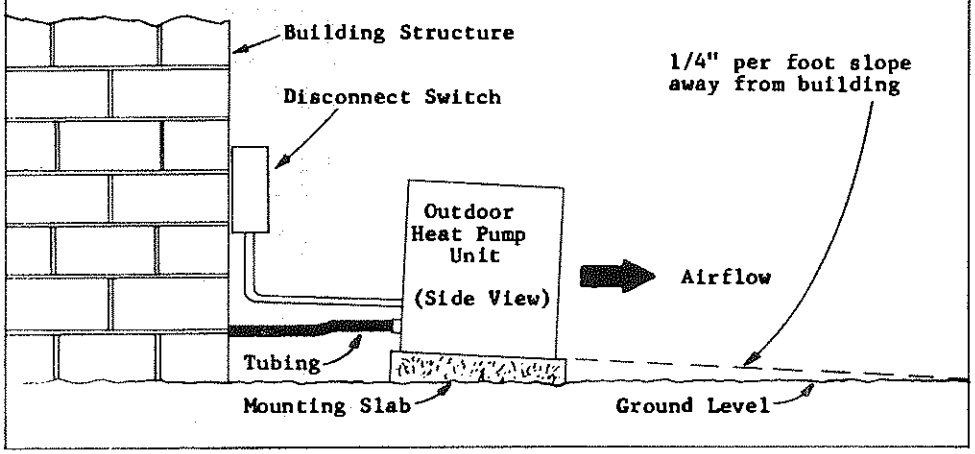


FIGURE 3

ROOFTOP APPLICATION

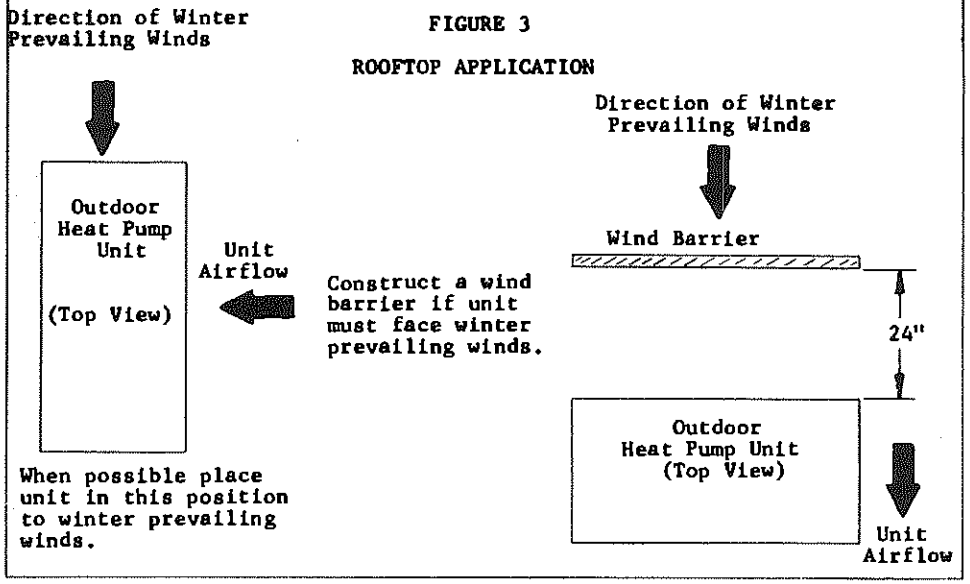


FIGURE 2

AIRFLOW AND SERVICE ACCESS CLEARANCES

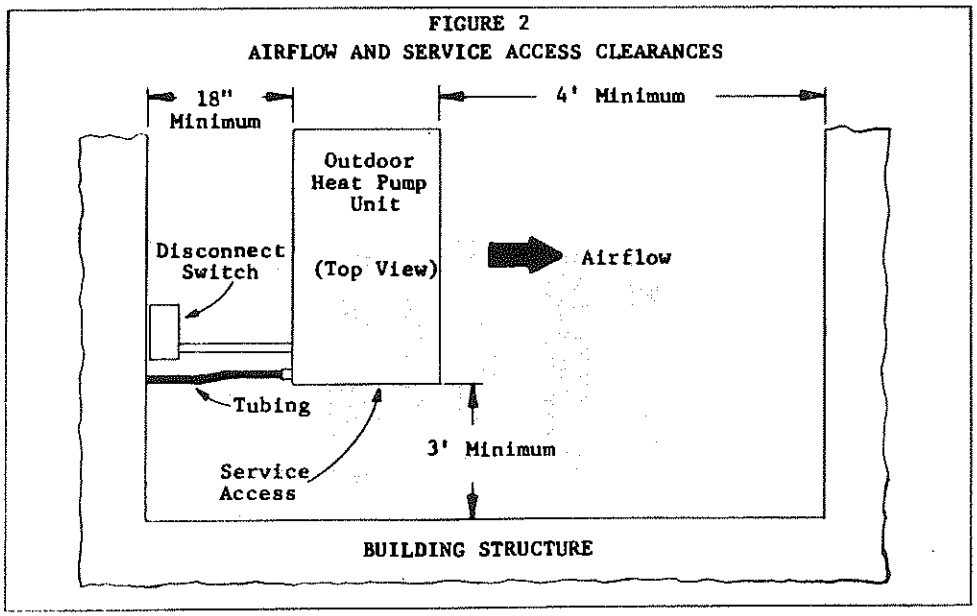
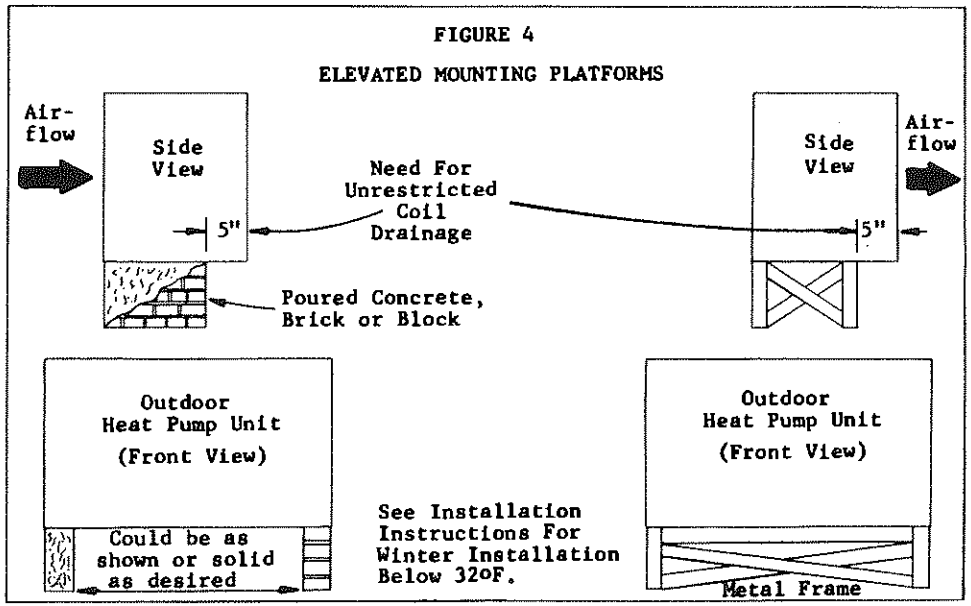
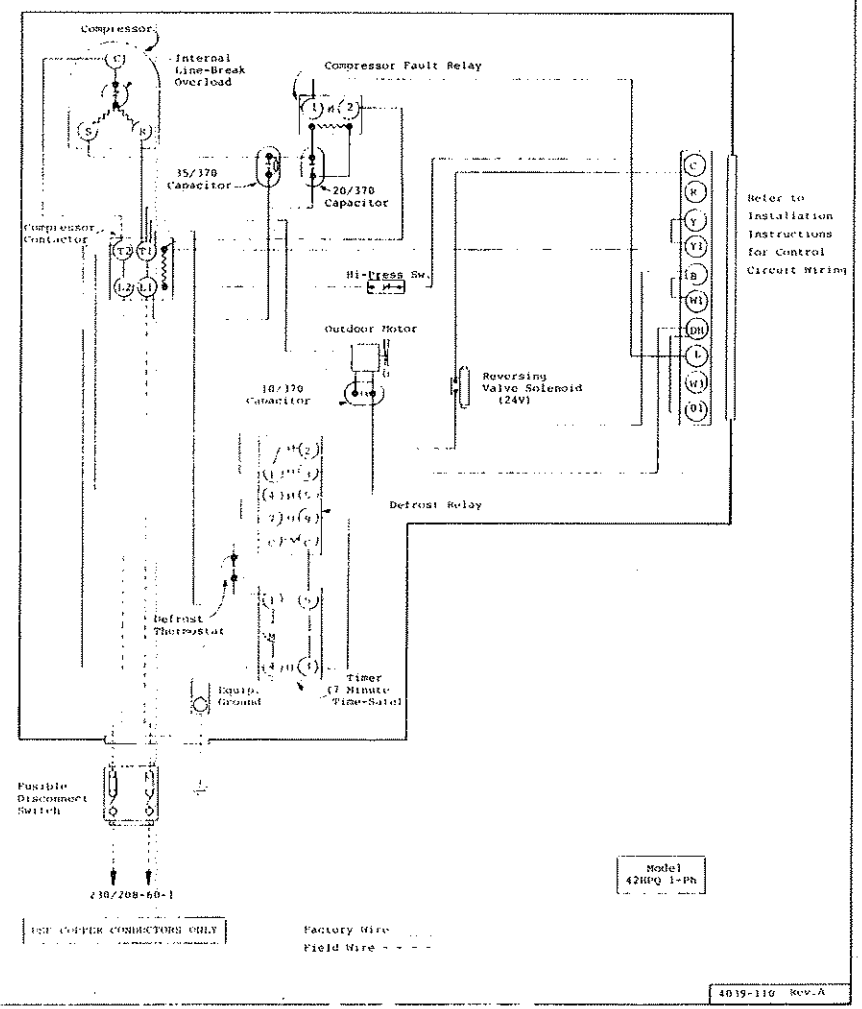
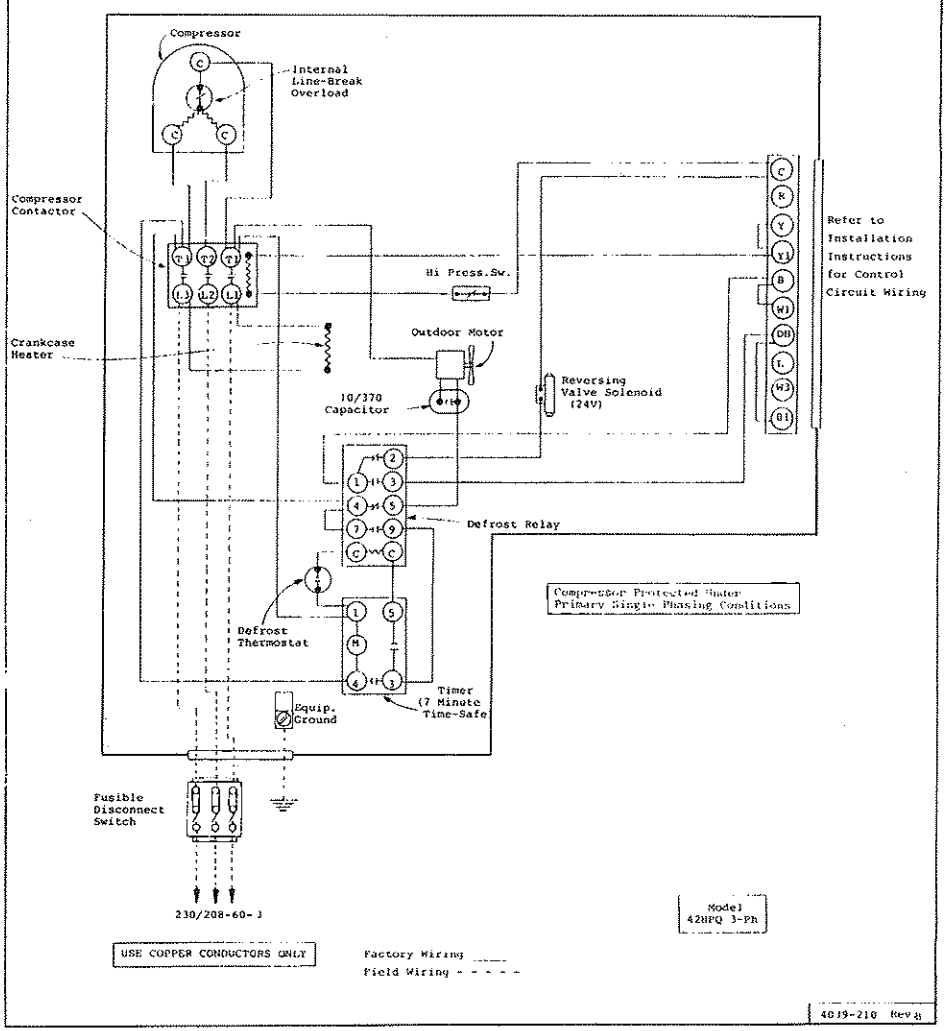


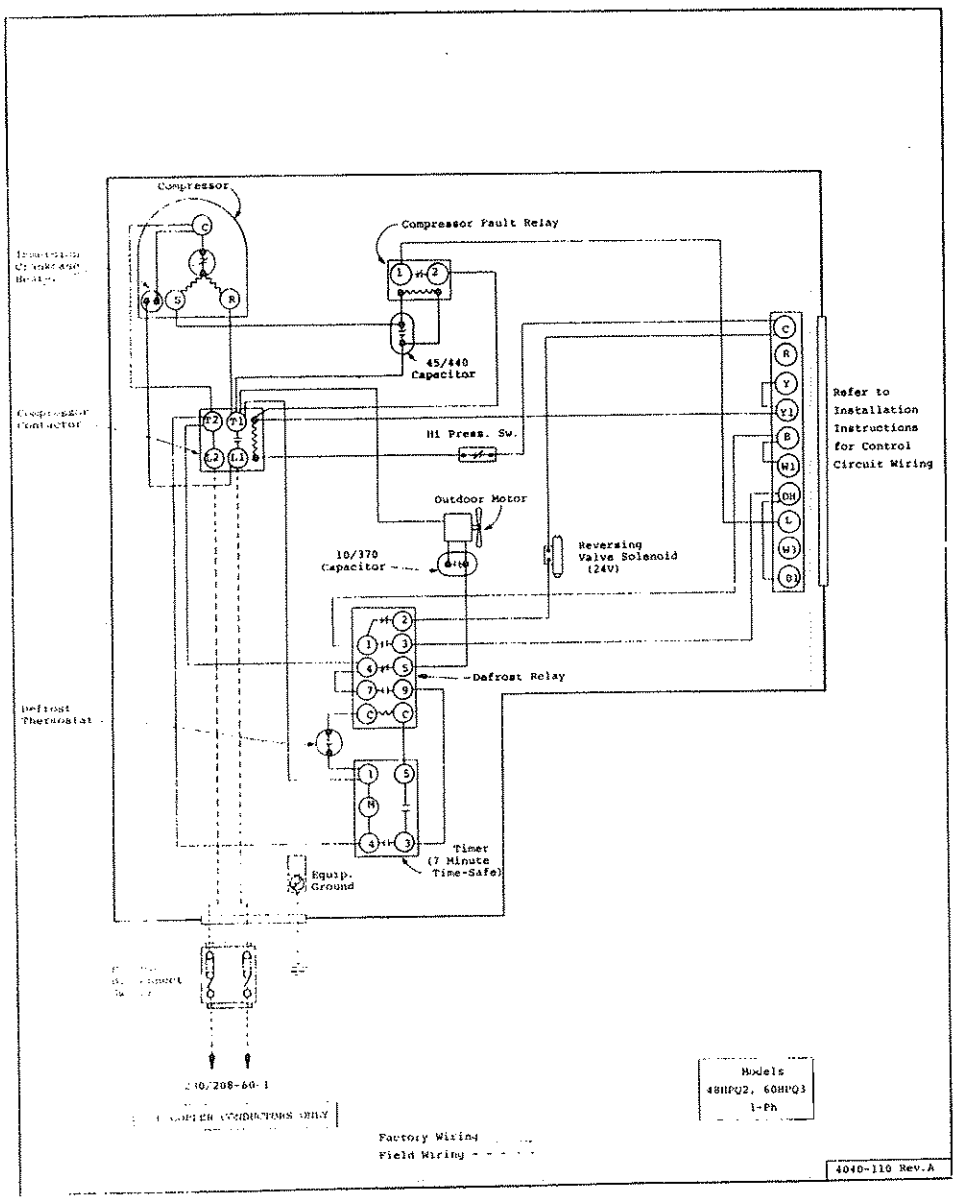
FIGURE 4

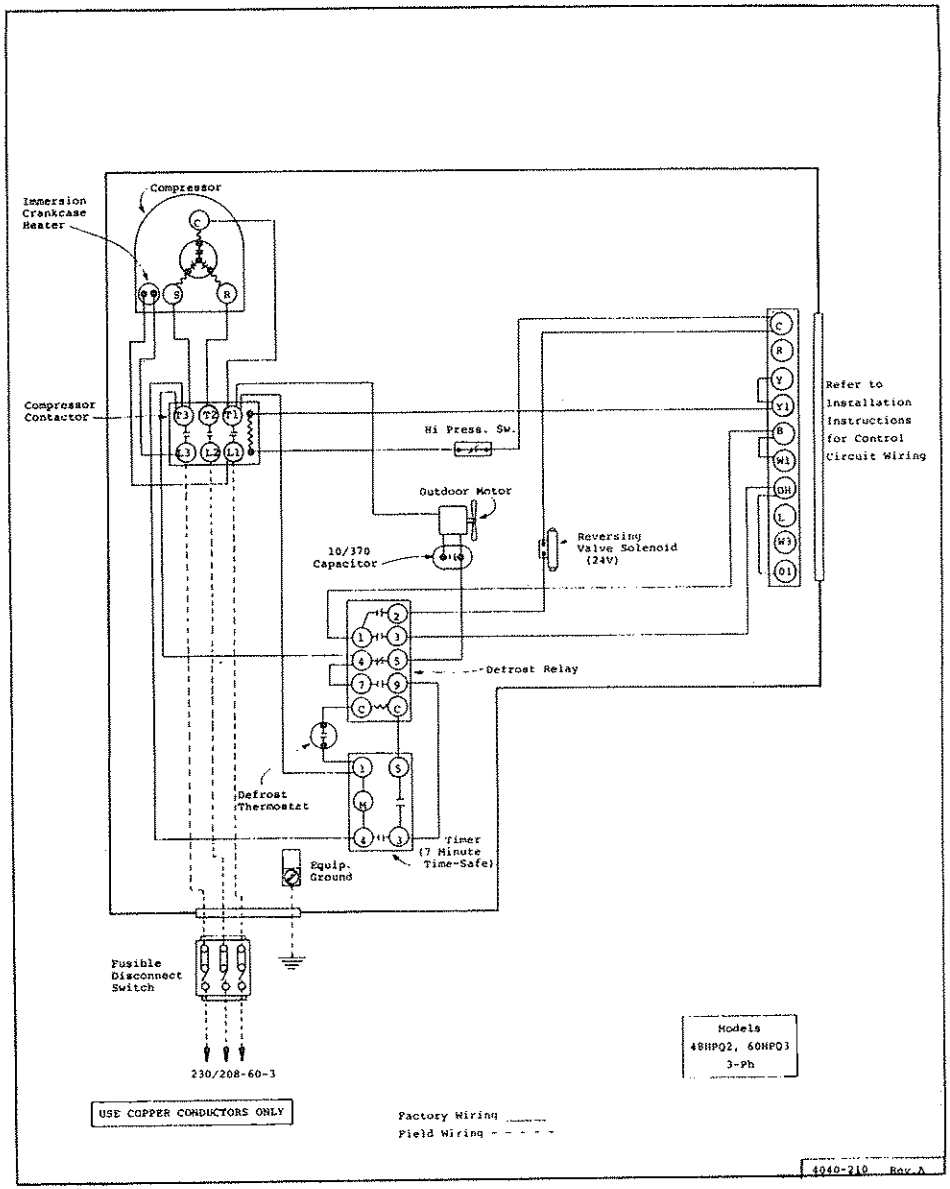
ELEVATED MOUNTING PLATFORMS




Compressor
Internal Line-Break Overload
Compressor Fault Relay
35/370 Capacitor
20/370 Capacitor
Compressor Contactor
Hi-Press Sw.
Outdoor Motor
10/370 Capacitor
Reversing Valve Solenoid (24V)
Defrost Relay
Defrost Thermostat
Timer (7 Minute Time-Safe)
Equip. Ground
Fusible Disconnect Switch
230/208-60-1
Refer to Installation Instructions for Control Circuit Wiring
Model 42HPQ 1-Ph
USE COPPER CONDUCTORS ONLY
Factory Wire
Field Wire - - - -
4819-110 Rev-A


Compressor
Internal Line-Break Overload
Compressor Contactor
Crankcase Heater
Hi Press.Sw.
Outdoor Motor
10/370 Capacitor
Reversing Valve Solenoid (24V)
Defrost Relay
Defrost Thermostat
Timer (7 Minute Time-Safe)
Equip. Ground
Fusible Disconnect Switch
230/208-60-3
Refer to Installation Instructions for Control Circuit Wiring
Compressor Protected Under Primary Single Phasing Conditions
Model 42HPQ 3-Ph
USE COPPER CONDUCTORS ONLY
Factory Wiring
Field Wiring - - - - -
4819-210 Rev-B


Compressor
Compressor Fault Relay
45/440 Capacitor
Compressor Contactor
Hi Press. Sw.
Outdoor Motor
10/370 Capacitor
Reversing Valve Solenoid (24V)
Refer to Installation Instructions for Control Circuit Wiring
Defrost Relay
Defrost Thermostat
Timer (7 Minute Time-Safe)
Equip. Ground
230/208-60-1
Models 48HPQ2, 60HPQ3 1-Ph
Factory Wiring
Field Wiring
4040-110 Rev.A


Immersion Crankcase Heater
Compressor
Compressor Contactor
Hi Press. Sw.
Outdoor Motor
10/370 Capacitor
Reversing Valve Solenoid (24V)
Refer to Installation Instructions for Control Circuit Wiring
Defrost Relay
Defrost Thermostat
Timer (7 Minute Time-Safe)
Equip. Ground
Fusible Disconnect Switch
230/208-60-3
USE COPPER CONDUCTORS ONLY
Models 48HPQ2, 60HPQ3 3-Ph
Factory Wiring
Field Wiring
4040-210 Rev.A

INSTALLING REFRIGERANT TUBING

-CHARGED TUBING - Examine carefully the two lengths pre-charged tubing furnished with the Unit. The ger is the suction line. The smaller is the liquid line. The end of the tubing with the hex nut and gauge port is to be attached to the Condensing Unit.

Unroll the tubing, being careful not to kink, and install it between the Condensing Unit and the Evaporator Coil.

CAUTION: Be careful not to tear the insulation when pushing it through holes in masonry or frame walls.

When sealing tube opening in house wall use a soft material to prevent tube damage and vibration transmission.

Before fastening either end, use a tubing bender to make any necessary bends in the tubing. (AVOID EXCESSIVE BENDING IN ANY ONE PLACE TO AVOID KINKING).

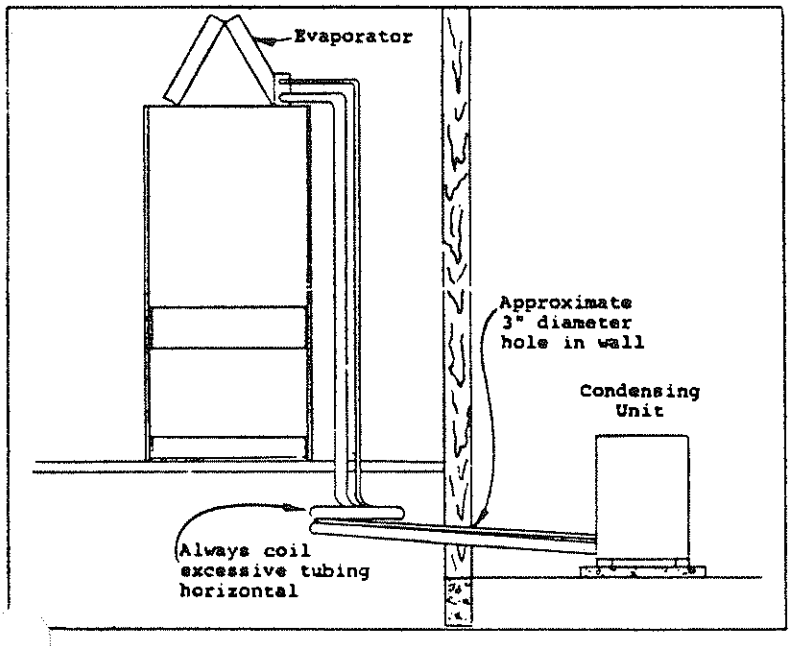
Start connecting the tubing at the Evaporator coil end, first remove the protective caps and plugs from the quick-connect fittings on the Evaporator Coil and the pre-charged tubing. Inspect fittings and clean if necessary, making sure they are clear of foreign materials. If you clean the fittings, lubricate them with refrigeration oil. Connect both tubes to the fittings on the coil and draw up by hand.

When necessary to bend the insulated tube, suction line, cut the insulation around its circumference at a distance far enough beyond the point of the bend so as to clear the tubing bender.

Slip the insulation back together and vapor seal the joint with tape.

E: The maximum distance for pre-charge tubing ween the Condenser and the Evaporator is 45 feet.

CAUTION: Prior to connecting the pre-charged tubing to the Evaporator Coil or Condensing Unit, be sure all bends have been made, then coil any excess tubing in a horizontal plane, with the slope of the tubing toward the Condensing Unit.



CAUTION: Be sure to hold the coupling firmly to prevent movement of the coupling and tubing. Failure to do so could tear out the diaphram causing a blockage of the system.

CAUTION: After starting to tighten up the fitting never try to back it off or take it apart.

For connecting the tubing at the condensing unit end, first remove the protective caps and plugs from the quick-connect fittings on the condensing unit and the pre-charged tubing. Inspect fittings and clean if necessary, making sure they are clear of foreign materials. If you clean the fittings, lubricate them with refrigeration oil. Connect both tubes to the fittings on the coil and draw up by hand.

Locate the Gauge Port in a 45° angle from a vertical up position so as to be accessible for gauge connections.

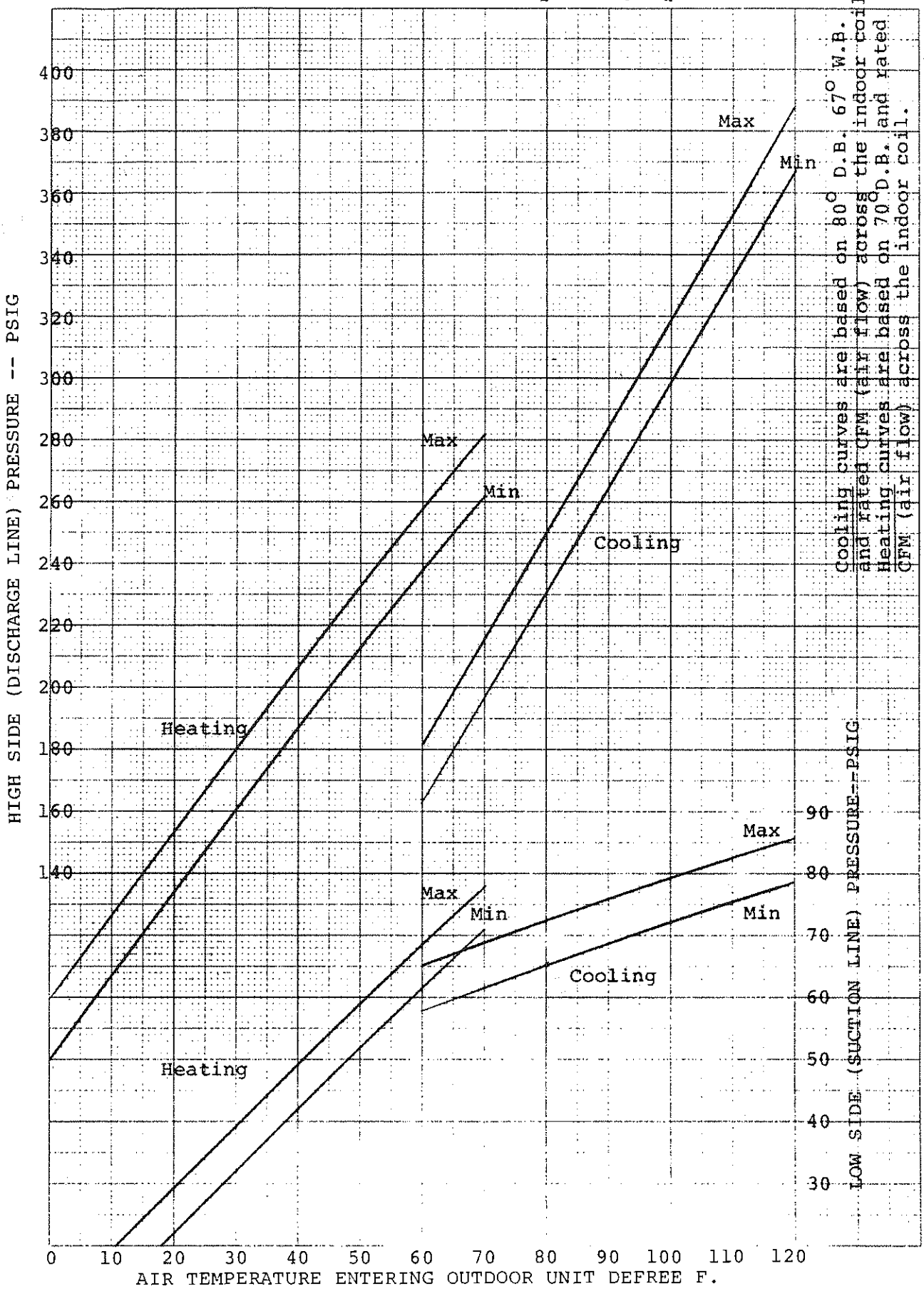
Use a wrench on the hex nut of the female fitting backing up the fitting with another wrench to keep tube from turning. Tighten the fittings together until they bottom out then tighten for an additional 1/4 turn so that coupling will seat properly.

Check the gauge port cap to make sure it is tight. If loose, tighten, being careful not to tighten too much as it will damage the valve in the gauge port.

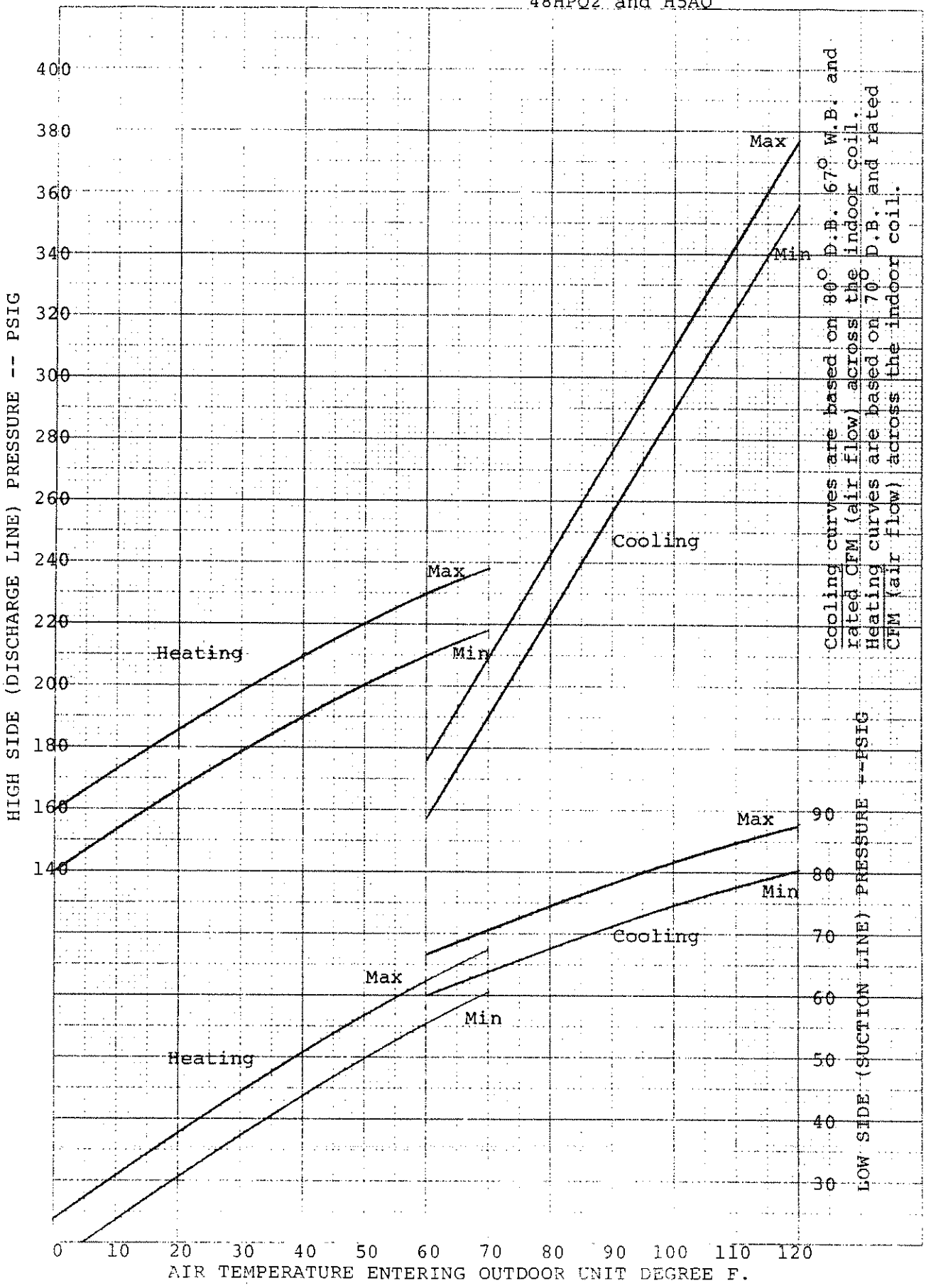
Leak test all connections using an Electronic Leak Detector or a Halide Torch.

When tubing is installed in attics or drop ceiling, insulate the quick connect fitting on the larger tube thoroughly with 3/8" wall thickness, closed cel' sponge tube insulation or equivalent. Failure to insulate will result in water damage to ceiling since the fitting will "sweat" and drop water on the ceiling.

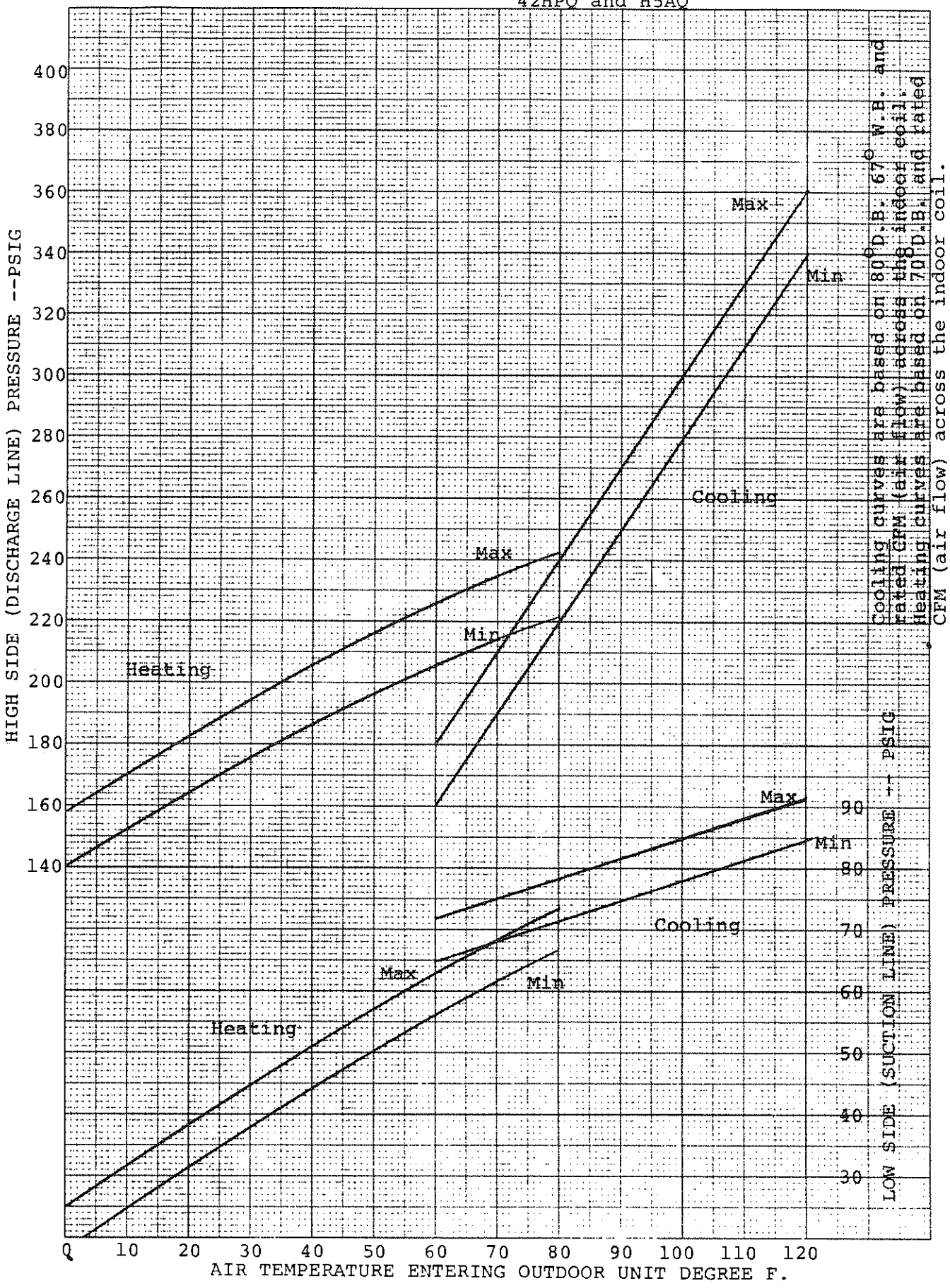
BARD REMOTE HEAT PUMP - 60HPQ3 and B60EHQ
60HPQ3 and H5AQ

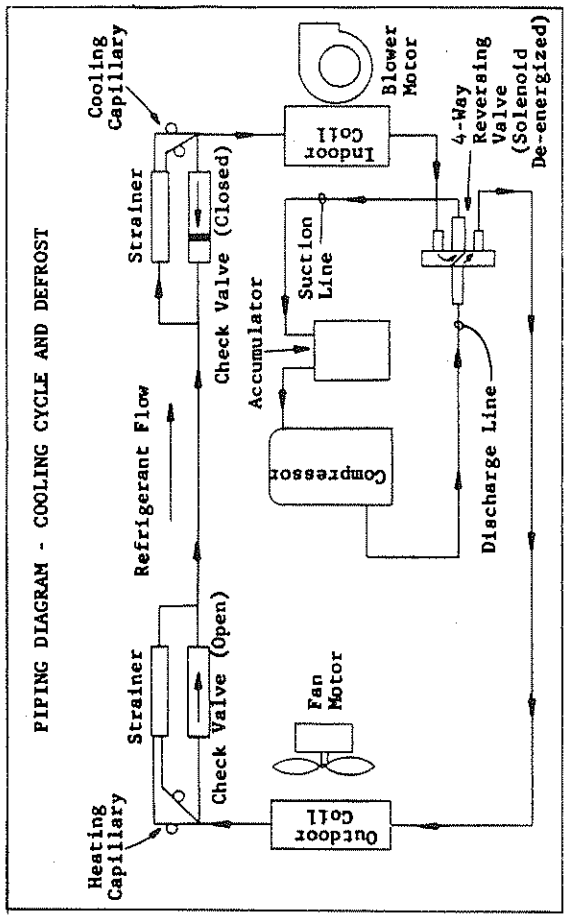


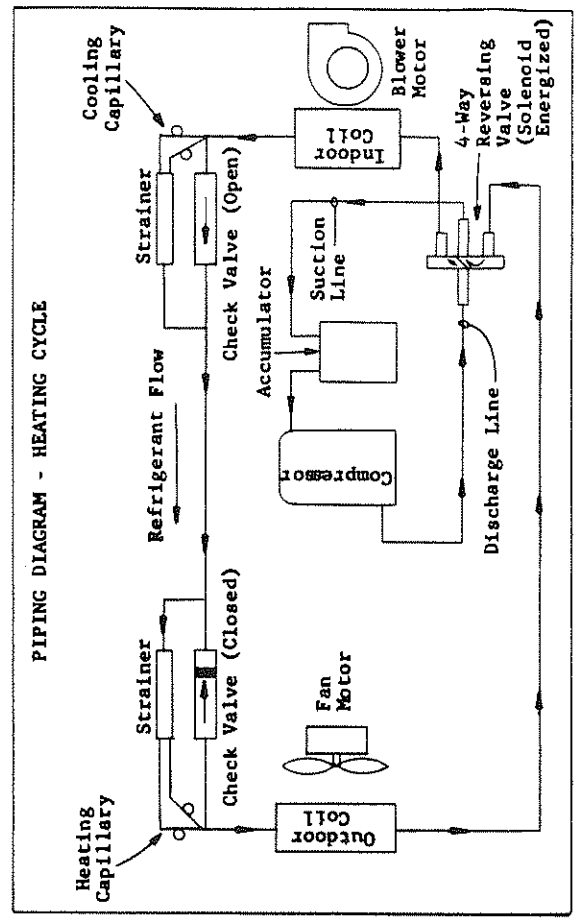
BARD REMOTE HEAT PUMP - 48HPQ2 and B48EHQ
48HPQ2 and H5AQ



BARD REMOTE HEAT PUMP - 42HPQ and B48EHQ
42HPQ and H5AQ




PIPING DIAGRAM - COOLING CYCLE AND DEFROST
Cooling Capillary
Blower Motor
Indoor Coil
4-Way Reversing Valve (Solenoid De-energized)
Strainer
Check Valve (Closed)
Suction Line
Accumulator
Refrigerant Flow
Compressor
Discharge Line
Strainer
Check Valve (Open)
Fan Motor
Heating Capillary
Outdoor Coil


PIPING DIAGRAM - HEATING CYCLE
Cooling Capillary
Blower Motor
Indoor Coil
4-Way Reversing Valve (Solenoid Energized)
Strainer
Check Valve (Open)
Suction Line
Accumulator
Refrigerant Flow
Compressor
Discharge Line
Strainer
Check Valve (Closed)
Fan Motor
Heating Capillary
Outdoor Coil

SCT-2-1
R-22 TOTAL SYSTEM CHARGE FOR
SPLIT HEAT PUMP SYSTEMS

The following table lists the total system operating charge for split heat pump systems when using standard charged tubing lengths of 15 ft, 25 ft, 35 ft, or 45 ft. The values shown are the total amount of refrigerant received in the precharged system components, which include the outdoor unit, indoor unit, and inter-connecting tubing. This is also the amount of refrigerant required for a system recharge following any refrigeration system repairs.

Find the outdoor section and matching indoor section being used, and follow across horizontally to the correct column based on number of feet of inter-connecting tubing. This value is the TOTAL SYSTEM CHARGE.

Outdoor Unit Model	Indoor Unit Model	Outdoor Unit Basic Charge	Total System Charge For Standard Tubing Lengths			
			15 ft	25 ft	35 ft	45 ft
42HPQ	B48EHQ	5# 6 oz	6# 15 oz	7# 5 oz	7# 11 oz	8# 1 oz
	H5AQ	5# 6 oz	6# 15 oz	7# 5 oz	7# 11 oz	8# 1 oz
48HPQ2	B48EHQ	5# 12 oz	7# 5 oz	7# 11 oz	8# 1 oz	8# 7 oz
	H5AQ	5# 12 oz	7# 5 oz	7# 11 oz	8# 1 oz	8# 7 oz
60HPQ3	B60EHQ	7# 14 oz	9# 7 oz	9# 13 oz	10# 3 oz	10# 9 oz
	H5AQ	7# 14 oz	9# 7 oz	9# 13 oz	10# 3 oz	10# 9 oz

In the event that the installer is running his own tubing or is modifying a precharged tubing set by adding or subtracting a few feet of tubing length, the tubing set should be evacuated and charged before being connected to the outdoor and indoor sections.

To determine LINE SET ONLY charges, use the following formula:

Length of 3/8" liquid line in feet x .6 -7 oz.

Example: A 32 ft. line set with 3/8" liquid line is being used.

32 ft. x .6 oz/ft = 19.2 oz -7 oz = 12.2 oz

After evacuating the line set, weigh in 12 oz of R-22 to line set. NOTE: The 12 oz should be introduced into both the liquid line and vapor line so that there is a positive pressure in both lines when connected.

To determine a TOTAL SYSTEM CHARGE for a system that is connected with a non-standard tubing length, the outdoor unit basic charge (from above table) is added to the line set calculation based on liquid line length. An additional adjustment factor may be required depending on the indoor coil section used. Determine this adjustment from the following chart:

Indoor Unit Model	Adjustment Factor
B48EHQ	+16
H5AQ	+16
B60EHQ	+16

Example: Model 48HPQ2 matched with Model B48EHQ and connected by a 38 ft. line set.

Basic charge 5# 12 oz plus .6 x 38 ft plus 16 oz adjustment factor
5# 12 oz plus 22.8 oz* plus 16 oz = 8# 3 oz total

*Round off to nearest whole number

PARTS LIST
SPLIT SYSTEM HEAT PUMPS

PART NO.	DESCRIPTION	42HPQ	42HPQ-3	48HPQ2	48HPQ2-3	60HPQ3	60HPQ3-3	48HPQ2-3 460V	60HPQ3-3 460V
5202-007	Accumulator	x	x	x	x			x	
5202-005	Accumulator					x	x		x
8552-020	Capacitor 35/370V	x							
8552-022	Capacitor 20/370V	x							
8552-017	Capacitor 45/440V			x		x			
8552-005	Capacitor 10/370V	x	x	x	x	x	x	x	x
5811-018	Cap Tube - Heat	(2)	(2)	(2)	(2)			(2)	
5811-019	Cap Tube - Heat					(2)	(2)		(2)
5651-006	Check Valve	x	x	x	x	x	x	x	x
8000-045	Compressor H2EA413AB	x							
8000-046	Compressor H2EA413DB		x						
8000-026	Compressor AG5546E			x					
8000-030	Compressor AG111RT				x				
8000-047	Compressor AG111UT							x	
8000-027	Compressor AG122ET					x			
8000-031	Compressor AG122RT						x		
8000-048	Compressor AG122UT								x
5051-021	Condenser Coil	x	x	x	x			x	
5051-022	Condenser Coil					x	x		x
8401-002	Contactor - Comp. 25A		x		x		x	x	x
8401-016	Contactor - Comp. 35A					x			
8605-001	Crankcase Heater		x						
8408-004	Defrost Mtg. Plate	x	x	x	x	x	x	x	x
8408-002	Defrost Thermostat	x	x	x	x	x	x	x	x
5151-017	Fan Blade FA2430-4B	x	x	x	x	x	x	x	x
8406-011	High Pressure Switch	x	x	x	x	x	x	x	x
8105-005	Motor - Fan 1/3 hp	x	x	x	x	x	x	x	x
8200-004	Motor Mount - Fan	x	x	x	x	x	x	x	x
8201-008	Relay-Motor & Control							x	x
8201-023	Relay - Defrost	x	x	x	x	x	x	x	x
8201-024	Relay - Comp. Fault	x		x		x			
5650-006	Reversing Valve	x	x						
5650-007	Reversing Valve			x	x	x	x	x	x
5210-005	Strainer	x	x	x	x	x	x	x	x
8607-011	Terminal Board	x	x	x	x	x	x	x	x
8612-010	Timer	x	x	x	x	x	x	x	x
8407-003	Stepdown Transformer							x	x
5650-008	Solenoid Coil	x	x	x	x	x	x	x	x
8401-003	Contactor - Comp. 30A	x		x					

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.