

## **MODELS**

**P25A, P31A1, P36A5  
P48A5, P60A6**

**PACKAGED AIR CONDITIONER**

**INSTALLATION INSTRUCTIONS**

**FOR RESIDENTIAL AND COMMERCIAL  
HEATING / COOLING APPLICATIONS**

**ELECTRICAL DATA**

Model	Rated Volts & PH	Operating Voltage Range	Max. Unit Amps	Req'd Maximum External Fuses or Ckt. Breaker*	Minimum Circuit Amperity	Field Power Wiring**	Ground Wire Size**
				Ckt. A	Ckt. A	Ckt. A	Ckt. A
P25A	230/208-1	197-253	14.6	30	20	12	10
P25A-B	230/208-3	197-253	10.3	20	15	14	12
P31A1	230/208-1	197-253	28.0	40	25	10	10
P36A5	230/208-1	197-253	22.4	40	27	10	10
P36A5-B	230/208-3	197-253	16.4	30	19.4	12	10
P36A5-C+	460-3	414-506	8.7	15	15.0	14	14
P48A5	230/208-1	197-253	38.8	60	37	8	10
P48A5-B	230/208-3	197-253	22.5	40	27	10	10
P48A5-C+	460-3	414-506	11.5	20	19	14	14
P60A6	230/208-1	197-253	34.2	60	44	6	10
P60A6-B	230/208-3	197-253	27.5	50	34.0	8	18
P60A6-C+	460-3	414-506	13.8	25	17.0	14	12

\*Maximum time delay fuse or HACR type circuit breaker. HACR type not applicable to 460 volt.  
 \*\*90°C copper wire size, basic unit only.  
 +460 volt not U.L. listed.

**OPTIONAL FIELD-INSTALLED ELECTRIC HEATER TABLE**

Heater Package Model No.	Unit Volts Phase	Htr. Kw & Capacity @ 240V (or 480V if applicable)		Heater Kw & Capacity @ 208 Volts		# 240V or 480V as applicable Htr. Amps	Heater Internal Fuses	Circuit B				
		Kw	Bluh	Kw	Bluh			Number Field Ckts.	Minimum Circuit Amperity	Max. Over-Current <sup>①</sup> Protection	Field Power Wiring <sup>②</sup>	Ground Wire Size <sup>③</sup>
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	32.3		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
EHSPA-A05	240/208-1	5	17,100	3.75	12,800	20.8		1	26	30	10	10
EHSPA-A10	240/208-1	10	34,100	7.5	26,000	41.7		1	53	60	6	10
EHSPA-A15	240/208-1	15	51,200	11.25	38,400	62.5	30/60	1	79	80	3	8
EHSPA-A20	240/208-1	20	68,200	15	51,200	83.2	60/60	1	104	110	2	6
EHSPA-B09	240/208-3	9	30,700	6.75	23,000	21.7		1	28	30	10	10
EHSPA-B15	240/208-3	15	51,200	11.25	38,400	36.2		1	46	50	6	10
EHSPA-B18	240/208-3	18	61,400	13.5	46,100	43.4		1	55	60	6	10
EHSPA-C09	460-3	9	30,700	6.75	23,000	10.8		1	15	15	14	14
EHSPA-C15	460-3	15	51,200	11.25	38,400	18.0		1	23	25	10	10
EHSPA-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°C. Other wiring materials must be rated for marked "Minimum Circuit Amperity" 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°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.

**OPTIONAL FIELD-INSTALLED HEATER PACKAGES ARE ONLY TO BE USED WITH THE AIR CONDITIONER MODELS AS INDICATED BELOW**

Heater Model No.	Volts & Ph	P25A	P15A-B	P31A1	P36A5	P36A5-B	P36A5-C 460V	P48A5	P48A5-B	P48A5-C 460V	P60A6	P60A6-B	P60A6-C 460V
		EH3PA-A05	240	1	*	1	1	*	*				
EH3PA-A08	240	1	*	1	1	*	*						
EH3PA-A10	240	1	*	1	1	*	*						
EH3PA-A15	240	1	*	1	1	*	*						
EH3PA-B09	240	3	*	1	*	1	*						
EH3PA-B15	240	3	*	*	*	1	*						
EH3PA-C09	460	3	*	*	*	*	1						
EH3PA-C15	460	3	*	*	*	*	1						
EHSPA-A05	240							1	*	*	*	*	*
EHSPA-A10	240							1	*	*	*	*	*
EHSPA-A15	240							1	*	*	*	*	*
EHSPA-A20	240							1	*	*	*	*	*
EHSPA-B09	240							1	*	*	*	*	*
EHSPA-B15	240							1	*	*	*	*	*
EHSPA-B18	240							1	*	*	*	*	*
EHSPA-C09	460							1	*	*	*	*	*
EHSPA-C15	460							1	*	*	*	*	*
EHSPA-C18	460							1	*	*	*	*	*

- 1 - Standard application - Heater volts and phase same as basic unit.
- \* - Alternate application - Heater volts and phase different from basic unit.

## IMPORTANT

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

## 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.

## LOCATION

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.

## TYPICAL INSTALLATIONS

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. One inch thick insulation with suitable vapor barrier is recommended for both outdoor and attic runs. In roof-top installation, as in all installations, the unit 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 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 installed so as to minimize supply and return duct work.
5. Other Installations - Many other installations are possible with the packaged air conditioner. 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.

RATED CFM AND E.S.P. (WET COIL - COOLING)			
Model	Rated CFM	Rated E.S.P.	Recommended Airflow Range
P29A	880	.35	720 - 880
P31A1	1150	.35	1025 - 1275
P36A5	1275	.15	1150 - 1400
P48A5	1700	.20	1520 - 1850
P60A6	1775	.20	1580 - 1850

## WIRING - MAIN POWER

Refer to the unit rating plate for wire sizing information and maximum fuse or "HACR Type" circuit breaker size. Each outdoor unit is marked with a "Minimum Circuit Ampacity." This means that the field wiring used must be sized to carry that amount of current. 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 page 1). 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 data 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 "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 motor.

## 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.

## AIR FILTERS

Air filters for the return air side of the system are not provided as part of the basic piece of equipment because of the various types of application 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 area 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.

Model	Minimum Filter Area	Recommended Size
P25A, P31A1, P36A3	463 sq.in. (3.21 sq.ft.)	15x20-3/8 x 1
P46A3, P66A6	608 sq.in. (4.62 sq.ft.)	(2) 18x20 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.

## 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 (5° from compressor) as shown in the following table:

Model	Rated Airflow	55°F O.D. Temp.	67°F O.D. Temp.
P25A	800	58 - 58	61 - 63
P31A1	1150	53 - 54	62 - 64
P36A3	1278	51 - 53	59 - 61
P46A3	1700	52 - 54	61 - 63
P66A6	1775	53 - 55	63 - 65

The above suction line temperatures are based upon 80°F dry bulb/67° wet bulb (90% R.H.) temperature and rated airflow across the evaporator during cooling cycle.

## 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 wall-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.

## 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. ENSURE AS REQUIRED FOR SAFETY WHILE SERVICING - DO NOT OPEN SYSTEM DISCONNECT SWITCH.

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## IMPORTANT INSTALLER NOTES

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

## OPTIONAL ELECTRIC HEATERS

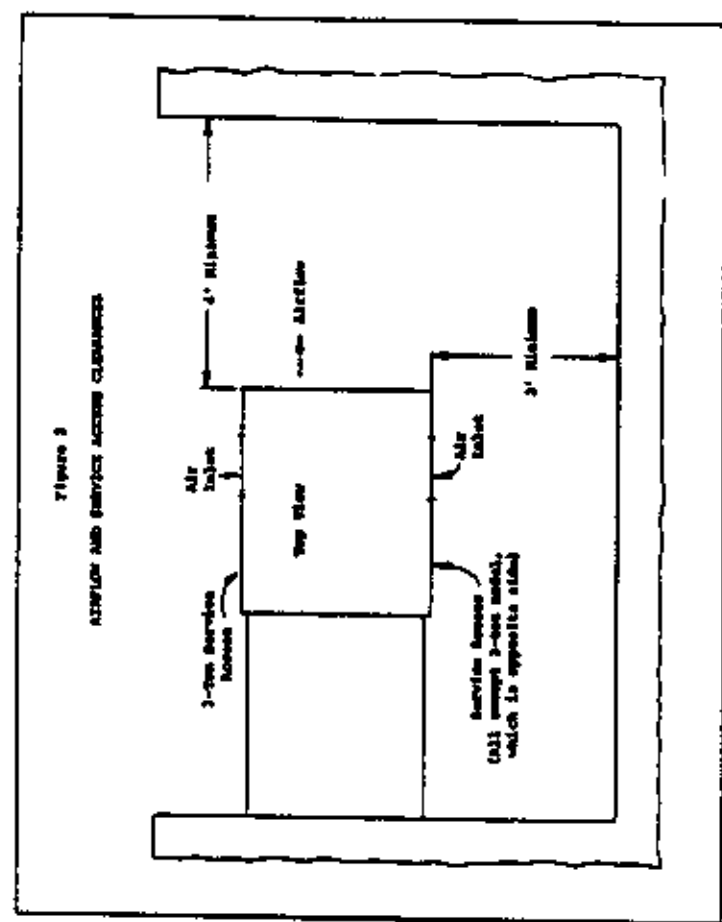
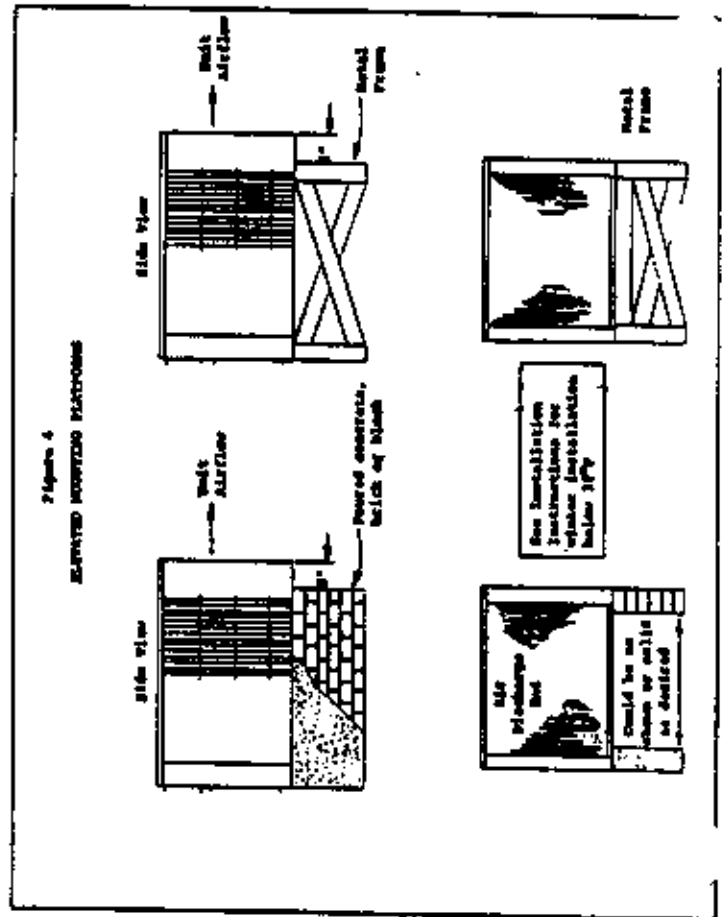
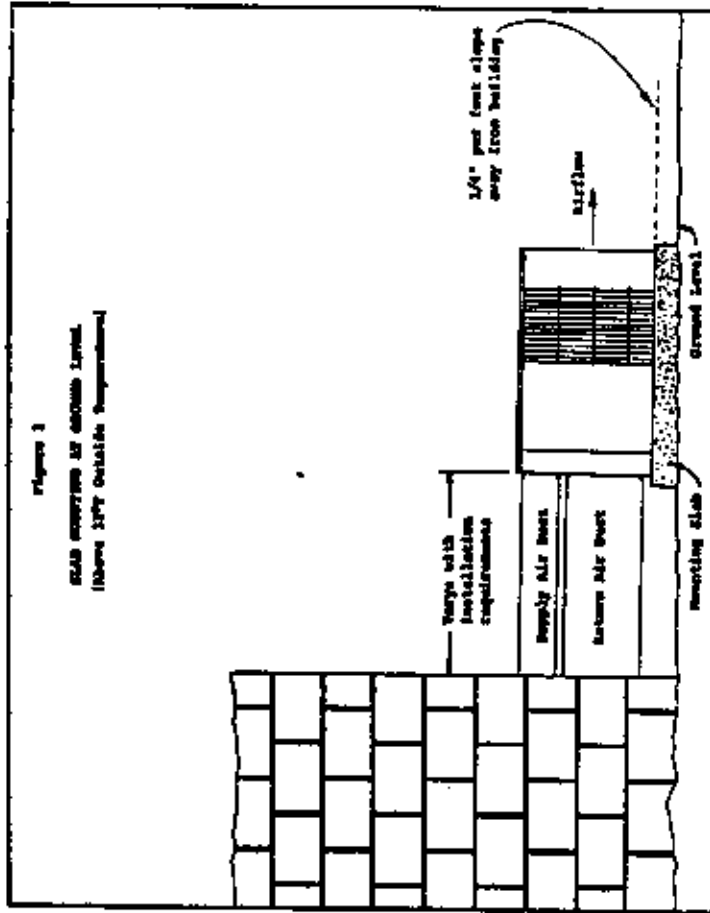
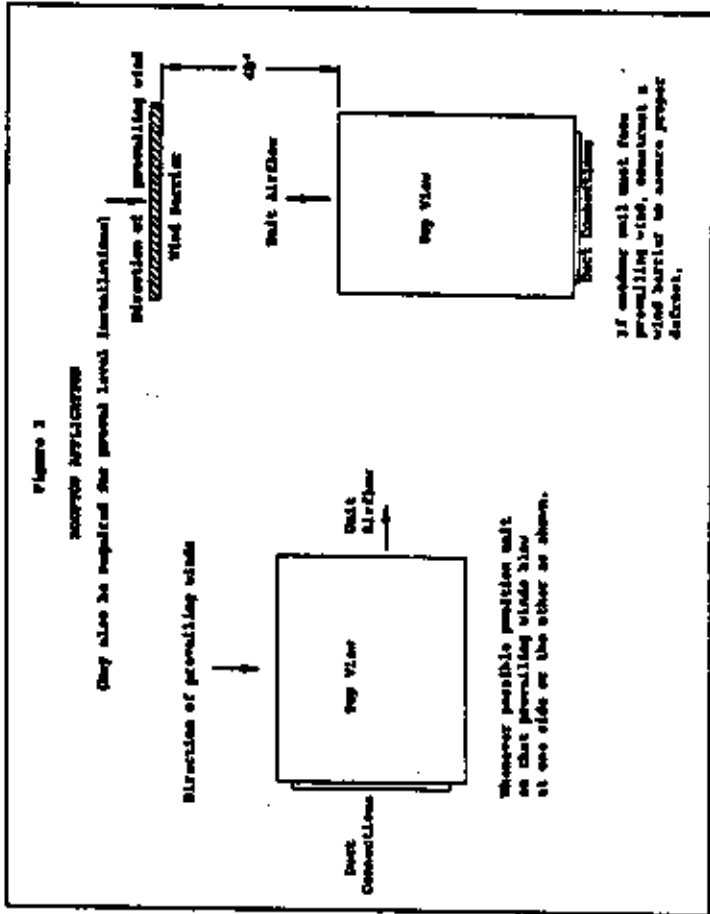
These packaged air conditioners are manufactured without supplementary electric heaters. Supplementary heaters EH3PA series to fit P25A, P31A1 & P36A3 and EH5PA series (to fit P46A3 and P66A6) are available for simple, fast field installation.

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

Refer to the electrical data shown on page 1 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.

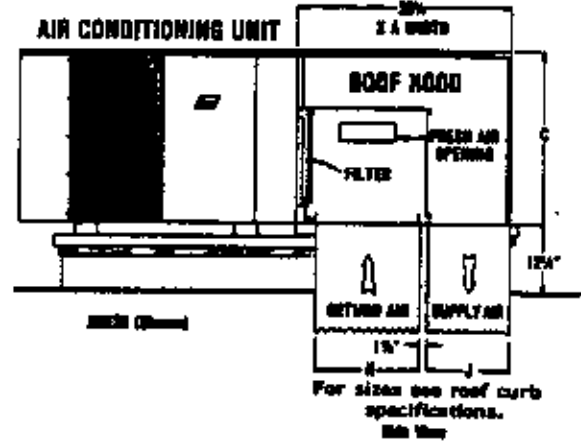
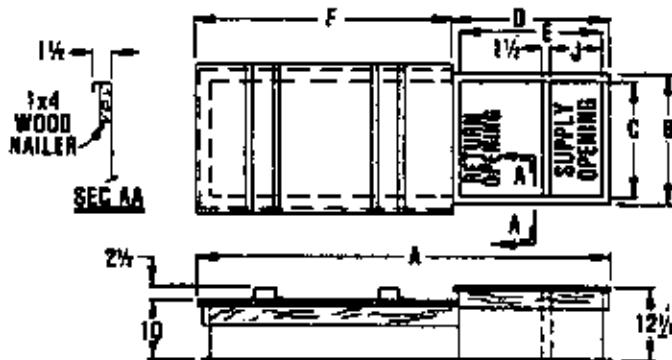
Refer to the installation instructions packed with the heater for details on how to insert it into the basic unit.

If this unit is operated in cooling below a 65° outdoor ambient temperature, the installation of low ambient control (LAC-1) to unit is required.



## PRE-FABRICATED ROOF CURB SPECIFICATIONS

**HEAVY GAUGE GALVANIZED WITH WOOD NAILING STRIP, WELDED/LEAKPROOF  
ONE PIECE CONSTRUCTION - READY TO INSTALL**



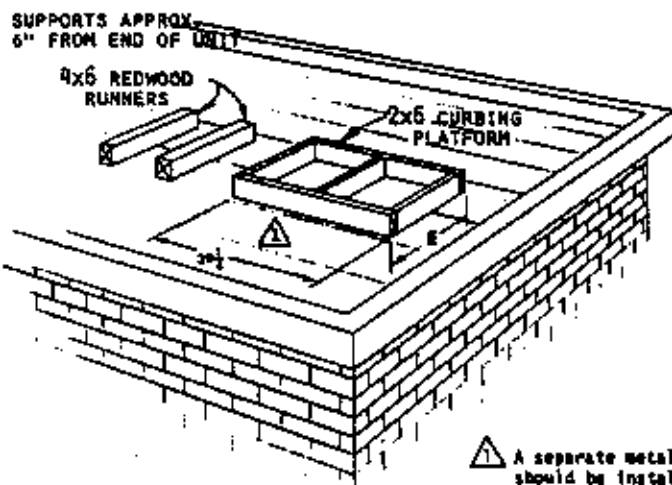
**CURB AND ROOF HOOD DETAILS**

	A	B	C*	D	E	F	J*	H*	Roof Hood Model	Heat Pump and Air Conditioning Units
P36 Curb	86-3/8	48-1/8	37-1/8	38-3/8	35-3/8	42	18-3/8	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	18-3/4	19-1/8	RHE60	PH42, P48A, PH48, P60A, PH60

**\*Duct Sizing Information**

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

## FIELD FABRICATED CURBING



ROOF HOOD MODEL	UNIT MODEL	E
RHE36	P25A	41
	PH25	
	P31A	
	PH31	
RHE60	P36A	44-7/8
	PH36	
	PH42	
	P48A	
RHE60	PH48	44-7/8
	P60A	
	PH60	

**PARTS LIST**  
**SINGLE PACKAGE AIR CONDITIONERS**

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PART NO.	DESCRIPTION	P25A	P31A1	P31A1-C 460V	P36A5	P36A5-B	P36A5-C 460V	P36A5-B
* 5152-008	Blower Housing	x	x	x	x	x	x	x
5152-010	Blower Wheel DD10-4A	x						x
5152-013	Blower Wheel DD10-7A		x	x				
5152-013	Blower Wheel DD10-8A				x	x	x	
8552-032	Capacitor - Comp. 35/370V	x						
8552-007	Capacitor - Comp. 20/15-370V		x					
8552-035	Capacitor - Comp. 40/370V				x			
8552-002	Capacitor - Fan & Blower 5/370V	x	x	x	x	x	x	x
5811-009	Capillary Tube - Cool	(2)						(2)
5811-014	Capillary Tube - Cool		(2)	(2)				
5811-033	Capillary Tube - Cool				(2)	(2)	(2)	
8000-090	Compressor - H22B233ABCA	x						
8000-070	Compressor - AB233HT		x					
8000-054	Compressor - CRG3-0250-TFD			x				
8000-055	Compressor - CRH3-0275-PFV				x			
8000-056	Compressor - CRH3-0275-TF5					x		
8000-057	Compressor - CRH3-0275-TFD						x	
5051-034	Condenser Coil	x						x
5051-035	Condenser Coil		x	x	x	x	x	
8401-007	Contactator - Comp. 1P25A	x	x		x			
8401-002	Contactator - Comp. 3P25A			x		x	x	x
5060-037	Evaporator Coil	x	x	x	x	x	x	x
5151-034	Fan Blade BT2026-2	x						x
5151-004	Fan Blade TP2026		x	x	x	x	x	
8105-027	Motor - Blower 1/3 hp ccw	x						x
8105-024	Motor - Blower 1/3 hp ccw		x		x	x		
8103-016	Motor - Fan 1/5 hp cw	x						x
8103-009	Motor - Fan 1/5 hp cw				x	x		
8105-016	Motor - Blower 1/3 hp ccw			x			x	
8103-014	Motor - Fan 1/5 hp cw			x			x	
8200-003	Motor Mount - Blower	x	x	x	x	x	x	x
8200-001	Motor Mount - Fan	x	x	x	x	x	x	x
5451-011	Motor Mounting Parts	x	x	x	x	x	x	x
7051-015	Wire Grille - Inlet	(2)	(2)	(2)	(2)	(2)	(2)	(2)
7051-001	Condenser Grille	x	x	x	x	x	x	x
8201-008	Relay - Blower	x	x	x	x	x	x	x
5210-004	Strainer	x	x	x	x	x	x	x
8607-006	Terminal Board 24V	x	x	x	x	x	x	x
8607-013	Terminal Block	x	x		x			
8607-014	Terminal Block			x		x	x	x
8607-015	Phenolic Insulator			x			x	
8407-034	Transformer 40VA	x	x		x	x		x
8407-027	Transformer 48VA			x			x	
8000-097	Compressor AB260RT							x
4063-110	Wiring Diagram				x			
4063-111	Wiring Diagram		x					
4063-114	Wiring Diagram	x						
4063-210	Wiring Diagram					x		
4063-212	Wiring Diagram							x
4063-310	Wiring Diagram			x			x	

\*Please order by model number. Minimum net billing \$15.00.  
Supersedes all previous lists. Subject to change without notice.

**PARTS LIST**  
**SINGLE PACKAGE AIR CONDITIONERS**

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Part No.	Description	P48A5	P48A5-B	P60A6	P60A6-B	P48A5-C 460V	P60A6-C 460V
*	Blower Housing 10-10	x	x	x	x	x	x
5152-015	Blower Wheel DD10-10A	x	x	x	x	x	x
8552-030	Capacitor 40/440V	x					
8552-005	Capacitor 10/370V	x	x	x	x	x	x
8552-026	Capacitor 15/370V	x	x			x	
8552-031	Capacitor 45/440V			x			
8552-004	Capacitor 7 1/2/370V			x	x		x
5811-033	Capillary Tube - Cool	(3)	(3)			(3)	
5811-032	Capillary Tube - Cool			(2)	(2)		(2)
8000-081	Compressor AV168ET	x					
8000-082	Compressor AV169RT		x				
8000-083	Compressor AV169TT					x	
8000-091	Comp. 703006-18-0733			x			
8000-031	Compressor AG122RT				x		
8000-048	Compressor AG122UT						x
5051-027	Condenser Coil	x	x			x	
5051-028	Condenser Coil			x	x		x
8401-007	Contactator 1P25A	x					
8401-002	Contactator 3P25A		x			x	x
8401-016	Contactator 1P35A			x			
8401-011	Contactator 3P30A				x		
5060-036	Evaporator Coil	x	x			x	
5151-029	Fan Blade T10H08-2436	x	x			x	
5151-030	Fan Blade T10H08-2428			x	x		x
7051-007	Wire Grille - Inlet	(2)	(2)	(2)	(2)	(2)	(2)
7051-005	Condenser Grille	x	x	x	x	x	x
8106-015	Motor - Blower 1/2 hp	x	x	x	x	x	x
8105-021	Motor - Fan 1/3 hp	x	x			x	
8106-016	Motor - Fan 1/2 hp			x	x		x
5451-011	Motor Mounting Parts	x	x	x	x	x	x
8200-004	Motor Mount - Fan	x	x	x	x	x	x
8200-028	Motor Mount - Blower	x	x	x	x	x	x
8201-008	Relay - Blower	x	x	x	x	(2)	(2)
5210-009	Strainer	x	x			x	
5210-005	Strainer			x	x		x
8607-006	Terminal Board 24V	x	x	x	x	x	x
8607-013	Terminal Block	x		x			
8607-014	Terminal Block		x		x	x	x
8407-034	Transformer 40VA	x	x	x	x	x	x
8407-004	Stepdown Transformer					x	x
5060-039	Evaporator Coil			x	x		x
8607-017	Terminal Block					x	x
4064-110	Wiring Diagram	x					
4064-210	Wiring Diagram		x		x		
4064-310	Wiring Diagram					x	
4064-111	Wiring Diagram			x			x

\*Please order by model number. Minimum net billing \$15.00.  
Supersedes all previous lists. Subject to change without notice.

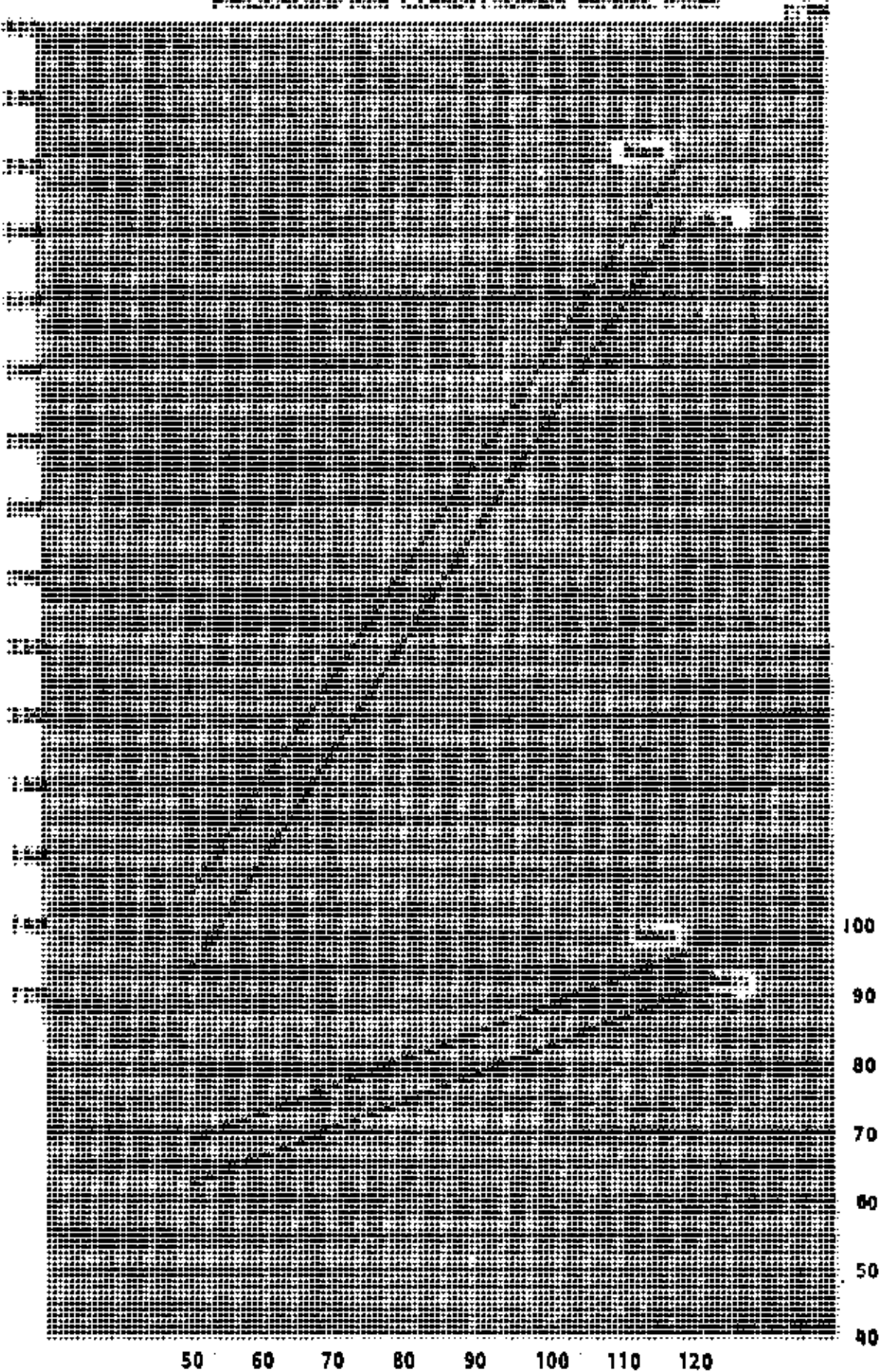


PACKAGED AIR CONDITIONER MODEL 225A

These values are based upon 80°DB, 67°WB R.A. Temp. and rated CFM (airflow) across the evaporator coil and should be used for reference purposes only. Special Information can 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 according to serial plate instructions.

HIGH SIDE (DISCHARGE LINE) PRESSURE--PSIG

LOW SIDE PRESSURE--PSIG  
(SUCTION LINE)



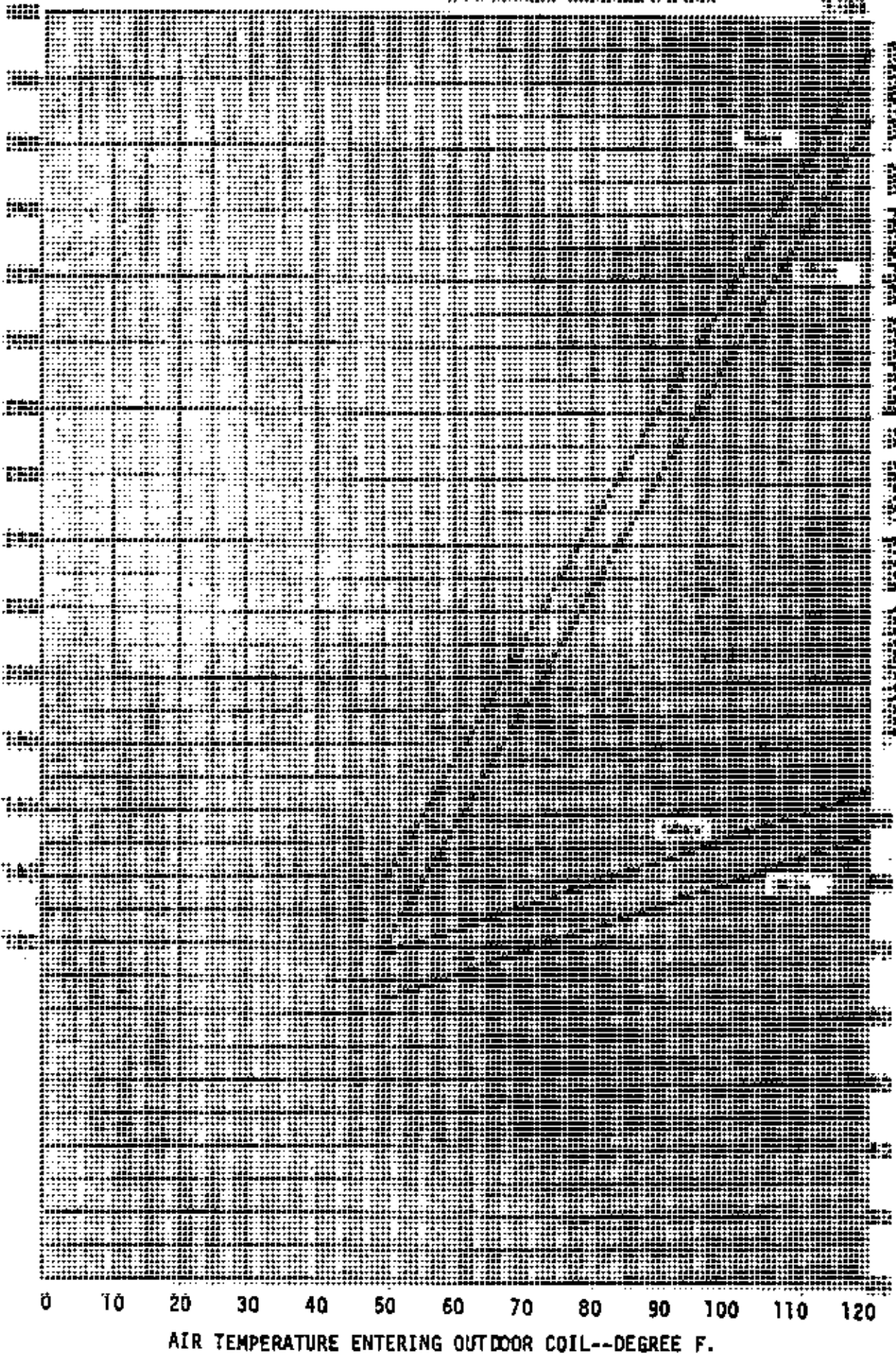
AIR TEMPERATURE ENTERING OUTDOOR COIL--DEGREE F.

# PACKAGED AIR CONDITIONER MODEL P31A1

These curves are based upon 80°F DB, 67°F WB R.A. Temp. and Rated CFM (airflow) across the evaporator coil and should be used for reference purposes only. Special information can 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 according to the label instructions.

LOW SIDE PRESSURE--PSIG  
(SUCTION LINE)

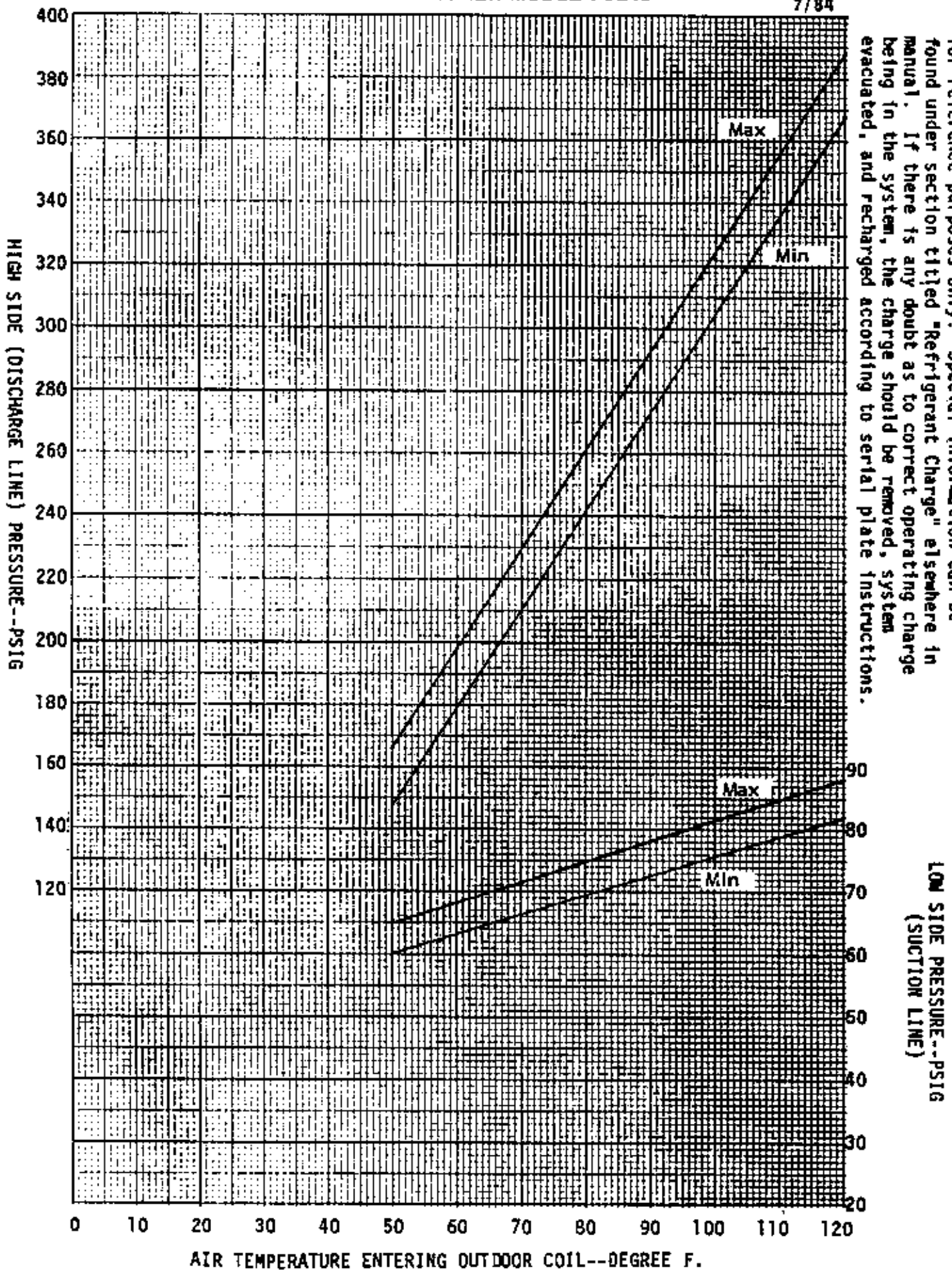
HIGH SIDE (DISCHARGE LINE) PRESSURE--PSIG



0 10 20 30 40 50 60 70 80 90 100 110 120  
AIR TEMPERATURE ENTERING OUTDOOR COIL--DEGREE F.

PACKAGED AIR CONDITIONER MODEL P36A5

7/84



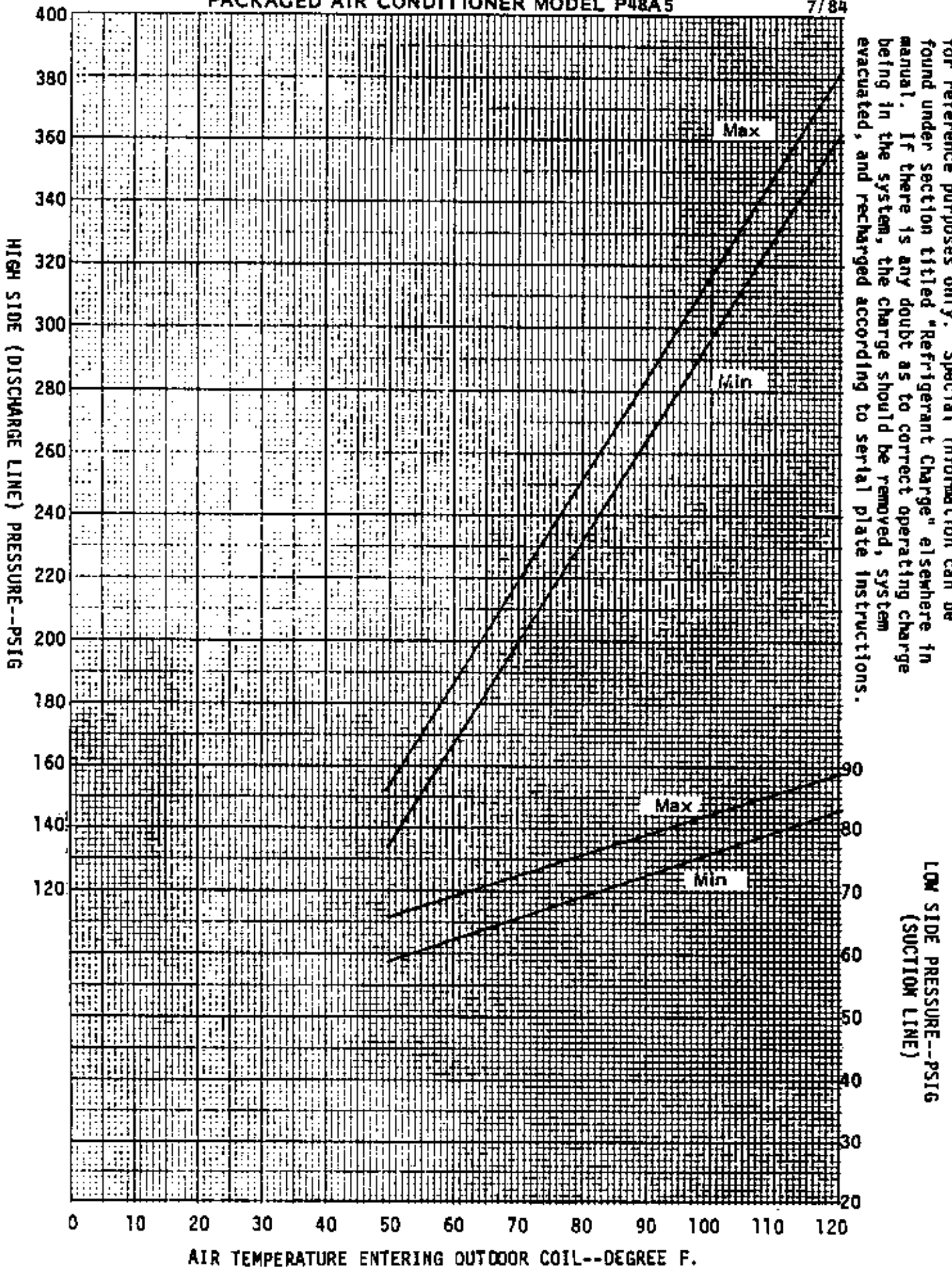
These values are based upon 80°DB, 67°WB R.A. Temp. and R. CFM (airflow) across the evaporator coil and should be used for reference purposes only. Special information can be found under section titled "Refrigerant Charge" elsewhere in manual. If there is any doubt as to correct operating charge being in the system, the charge should be removed, system evacuated, and recharged according to serial plate instructions.

LOW SIDE PRESSURE--PSIG  
(SUCTION LINE)

AIR TEMPERATURE ENTERING OUTDOOR COIL--DEGREE F.

PACKAGED AIR CONDITIONER MODEL P48A5

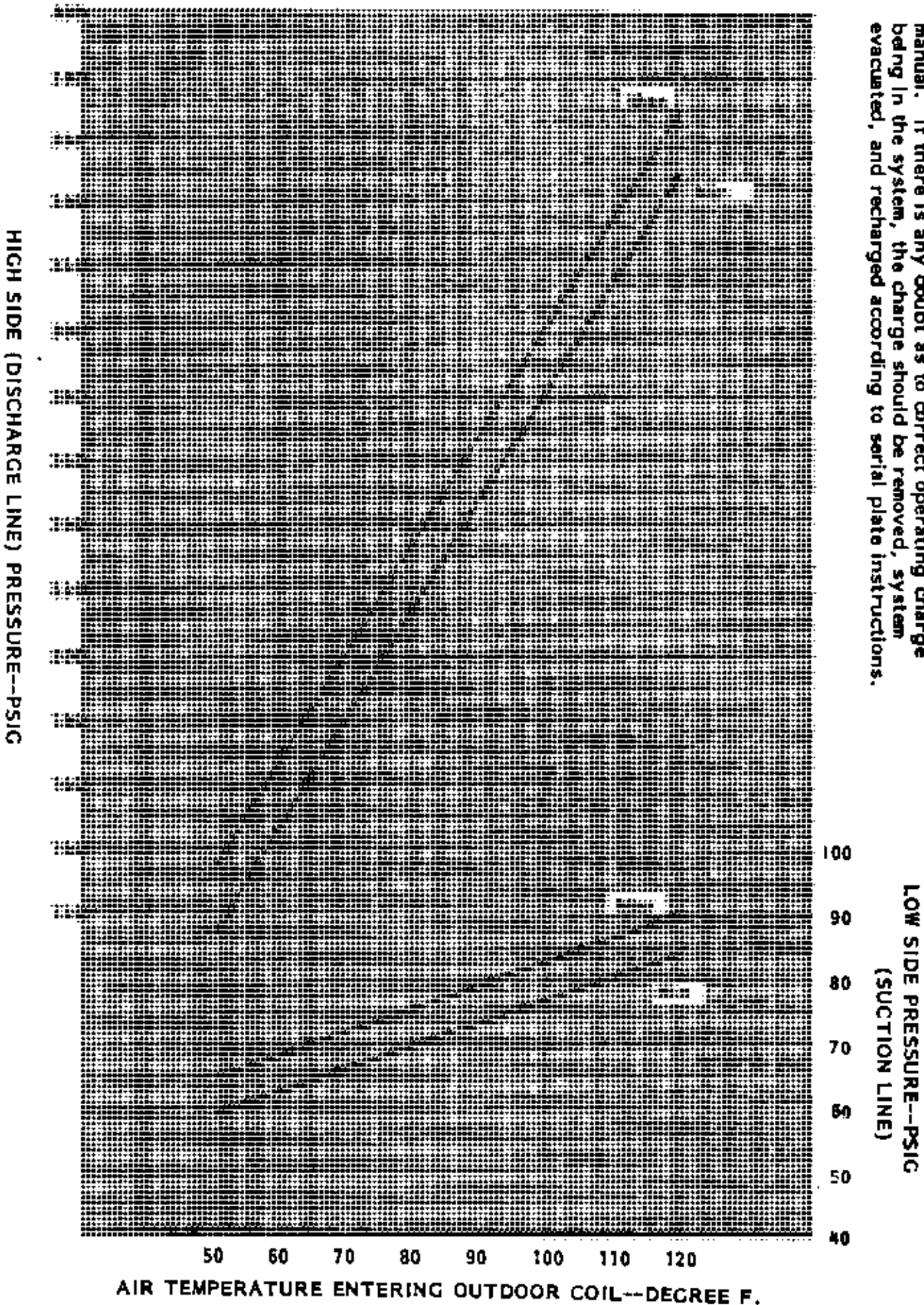
7/84



These curves are based upon 80°DB, 67°WB R.A. Temp. and Rated CFM (airflow) across the evaporator coil and should be used for reference purposes only. Special information can 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 according to serial plate instructions.

LOW SIDE PRESSURE--PSIG  
(SUCTION LINE)

These curves are based upon 80°DB, 67°WB R.A. Temp. at rated CFM (airflow) across the evaporator coil and should be used for reference purposes only. Special information can 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 according to serial plate instructions.



LOW SIDE PRESSURE--PSIG  
(SUCTION LINE)

HIGH SIDE (DISCHARGE LINE) PRESSURE--PSIG

AIR TEMPERATURE ENTERING OUTDOOR COIL--DEGREE F.

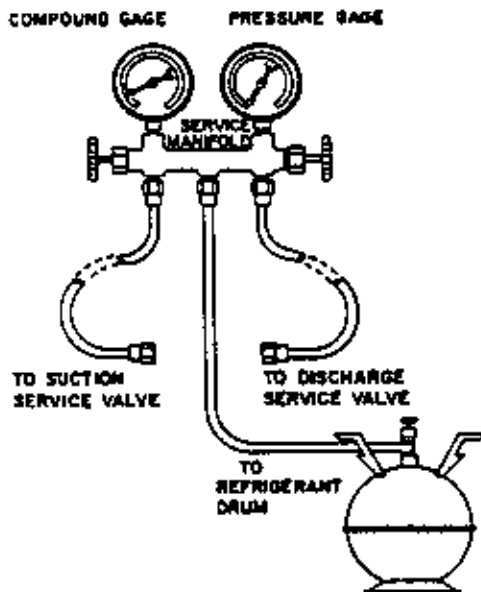
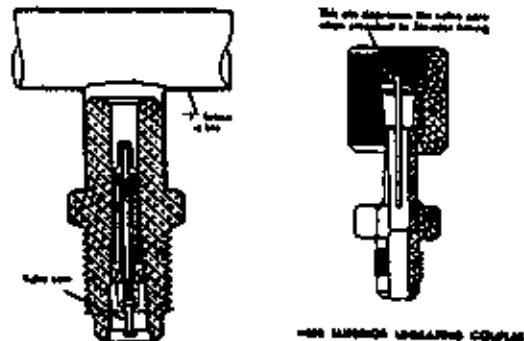


# AIR CONDITIONING PROCEDURE FOR LEAK TEST-EVACUATION-CHARGING

## GAUGE MANIFOLD

A necessary instrument in checking and servicing air conditioning and heat pump equipment is the gauge manifold. Its purpose is to determine the operating refrigerant pressures in order for the serviceman to analyze the condition of the system.

The valving on the manifold is so arranged that when the valves are closed (front-seated) the center port on the manifold is closed to the gauges and gauge ports. With the valves in the closed position, the gauge ports are still open to the gauges, permitting the gauges to register system pressures. Opening either valve opens the center port to that side of the manifold and system.



4. Make sure coupler is lined up straight with Schrader valve. Screw coupler on to valve.
5. Open gauge manifold valve slightly and purge air from hose with refrigerant.
6. Read the suction pressure on compound gauge and heat pressure on pressure gauge.
7. To remove, push end of hose tight against end of Schrader valve and hold in place while quickly unscrewing coupler nut from Schrader valve.
8. Remove coupler from Schrader valve. Replace caps on valve.

**WARNING**

As a safety measure, it is wise to detach refrigerant hoses at the lowest pressure readings on the system. To do this:

- (a) Remove the suction pressure hose (A) first. (Unit is running).
- (b) Remove the high pressure hose (B) next. (Unit is not running).

## ATTACHING GAUGE MANIFOLD

For leak testing, purging, checking charge, charging liquid or evacuating, connect high pressure side of gauge manifold to Schrader valve on liquid or discharge line. Connect suction side of gauge manifold to Schrader valve on suction line. On heat pumps the suction line is between compressor and reversing valve.

## ATTACHING MANIFOLD NOSE TO SCHRADER VALVE

**WARNING**

As a safety measure, it is wise to attach refrigerant hoses at the lowest pressure readings on the system. To do this:

- (a) Put high pressure hose (B) on first. (Unit should not be running).
- (b) Put low pressure hose (A) on second. (Unit should be running).

1. Remove cap from valve.
2. Make sure gauge manifold valves are closed.
3. If hose does not have an unseating pin, a number 399 Superior or equivalent unseating coupler must be used.

## LEAK TEST

1. Remove gauge port cap from suction and liquid service valve ports and attach manifold gauge hoses. Connect an upright R12 drum to center port of gauge manifold. Open refrigerant drum valve and manifold high pressure gauge valve to pressurize system. Pressurize the complete system with R22 until the pressure reaches 100 psig. DO NOT exceed 155 psig.
2. Close manifold high pressure gauge valve. Check all soldered joints, including those on the evaporator coil with an Electronic Leak Detector. If a leak is found which requires soldering, pressure in the system must be bled off since it is impossible to solder with unit pressurized. Be sure all leaks are located and marked before bleeding pressure from system.
3. Close drum valve and disconnect from center port. Release refrigerant into the atmosphere through suction line of gauge manifold.
4. Correct any leaks and recheck. When leaks, if any have been repaired, system is ready to be evacuated and charged. Relieve all pressure from the system down to 0 psig.

## EVACUATION

1. Evacuate the system to less than 1000 microns, using a good vacuum pump and an accurate high vacuum gauge. Operate the pump below 1000 microns for 60 minutes and then close valve to the vacuum pump. Allow the system to stand for 30 additional minutes to be sure a 1000 micron vacuum or less is maintained.
2. An alternate method of removing moisture and noncondensables from the system is:
  - a) Evacuate system to 29 inches vacuum for ten minutes per ton of system. Break vacuum with refrigerant to be used for final charging of system and vapor charge to 35-50 lbs. gauge pressure. Leave vapor charge in system for a minimum of five minutes. Reduce pressure to five to zero gauge pressure.
  - b) Repeat step (a) two more times.
  - c) Evacuate system to 30 inches vacuum for twenty minutes per ton. Charge system with the specified kind and quantity of refrigerant (charge into vacuum).

### WARNING

At no time use the compressor to evacuate the system or any part of it.

3. Disconnect charging line at vacuum pump and connect to refrigerant supply. (Dial-A-Charge Cylinder) crack valve and purge charging line at center on manifold. Then close valve.
4. The system is now ready for the correct operating charge of Refrigerant R22.

## CHARGING

1. **SINGLE PACKAGE UNITS** - Refer to the unit serial plate for the full operating charge.
2. **SPLIT SYSTEMS** - The outdoor unit factory charge is shown on the unit serial plate. The total system charge required to recharge the system after service repairs should be marked on the serial plate under TOTAL R22 CHARGE. This is normally marked by the Installer and is determined from the R22 System Charge Table located on the inside of the outdoor unit access panel.
3. **CTO ADAPTER KITS** - When using CTO adapters and field tubing, use the procedure outlined on the bottom of page 3, Manual 2100-002. This determines the correct ounces of R22 for the tubing only.
4. **FILTER-DRIER CHARGES** - If a liquid line filter-drier is used, either in conjunction with field tubing and a CTO adapter kit, or as part of procedure for system clean-up after a compressor burn-out, additional R22 must be added to the system when recharging. This is in addition to the amount determined from the R22 System Charge Table.

PART NO.	MODEL NO.	OZ. of R22
5202-001	C-0835	8
5202-002	C-1635	10
5201-009	BFK-0835	7
5201-010	BFK-1635	13

## PRELIMINARY CHARGING STEPS

If the system has been open to the atmosphere, it should be first evacuated. Then proceed as follows:

1. Attach a drum of proper, clean refrigerant to the center port of the charging manifold with one of the charging hoses.
2. Attach a second charging hose to the suction gauge (low pressure) side of the gauge manifold.
3. Remove the cap from the suction line valve.
4. Loosely attach the suction gauge hose to the line valve. Open the valve on the refrigerant drum and the suction valve on the charging manifold slightly to purge the air from the manifold and hoses before tightening the fitting.
5. Attach the third hose to the high pressure side of the manifold and the liquid line valve. Repeat steps 3 and 4 above.

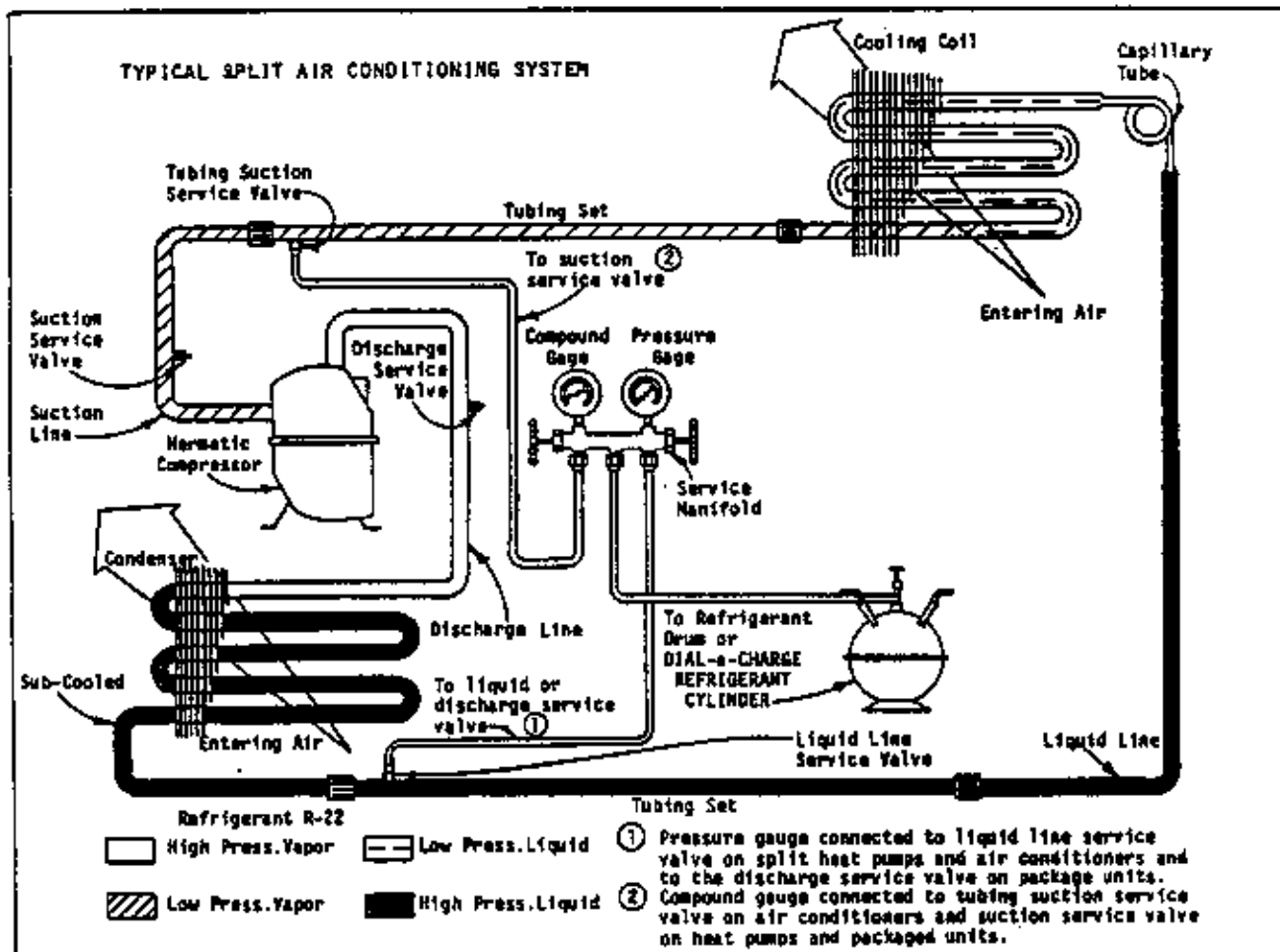
## CHARGING THE SYSTEM BY WEIGHT\*

1. Connect manifold as instructed.
2. Place refrigerant drum upright on scale and determine exact weight of the refrigerant and cylinder or use a Dial-A-Charge cylinder.
3. With manifold suction valve closed and manifold discharge valve open, open refrigerant cylinder valve and allow pressure in system to balance with pressure of cylinder. For charging in the liquid phase, drum is placed upside down (valve down).
4. When there is approximately a full charge, front seat (close) the discharge manifold valve and let the system stabilize for about five minutes.
5. Start compressor by setting thermostat.
6. Finish charging with vapor by placing drum upright (valve up). Open drum valve and manifold low pressure valve to allow refrigerant to flow into the system. Throttle refrigerant drum valve to keep pressure about 160 psig for R22.
7. When the correct weight of refrigerant has been added to the unit, close refrigerant cylinder valve and allow unit to run for 30 minutes. Refer to Start-Up Procedure and Check List for further start-up details. Check the charge against the allowable head pressure as shown in the Head Pressure Chart and correct if needed.
8. Front seat gauge manifold valves, disconnect charging and gauge hoses and replace all valve caps.

### WARNING

To speed refrigerant flow, it may be necessary to place refrigerant drum in a pan of warm water (not greater than 130°F). Remember to either consider the total weight of the pan of water or remove the drum for weighing frequently to keep track of the charging process.

\*This charging method requires the scales or Dial-A-Charge cylinder to be extremely accurate since the charge in this type of system is quite critical.



### AIR CONDITIONING AND HEAT PUMP ON COOLING CYCLE

#### TROUBLESHOOTING — SYSTEM PRESSURE CHECK

##### Low Suction — Low Head Pressure

1. Restricted air flow over indoor coil.
2. Defective indoor fan motor.
3. Low indoor and outdoor temperature.
4. Iced indoor coil.
5. Restricted liquid line, drier, or capillary tube.
6. Low charge.

##### High Suction — Low Head Pressure

1. Defective or broken valves.
2. IPRV valve open.

##### Low Suction — High Head Pressure

1. Partial restriction and then overcharged.

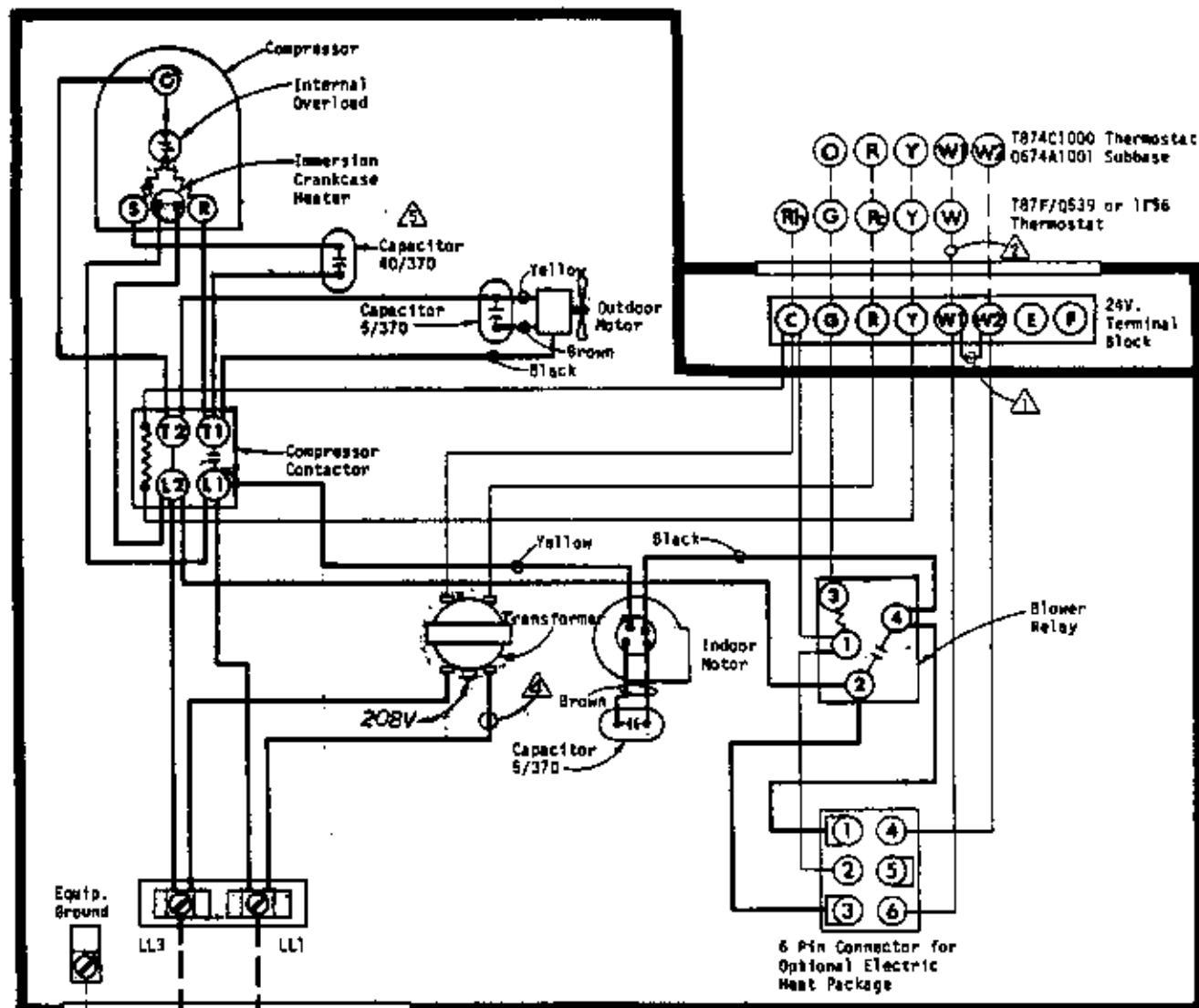
Note: On a split heat pump the vapor line should be within 10 psig of the pressure in liquid line on heating mode and within 10 psig of suction line on cooling mode. If not, check for sticking check valves.

##### High Suction — High Head Pressure

1. High ambient.
2. Low outdoor air flow
3. Overcharged.
4. Air in system.
5. Restricted condenser.







- ⚠ Remove Jumper for two stage heat
- ⚠ Not required when optional Heat Packages are not installed

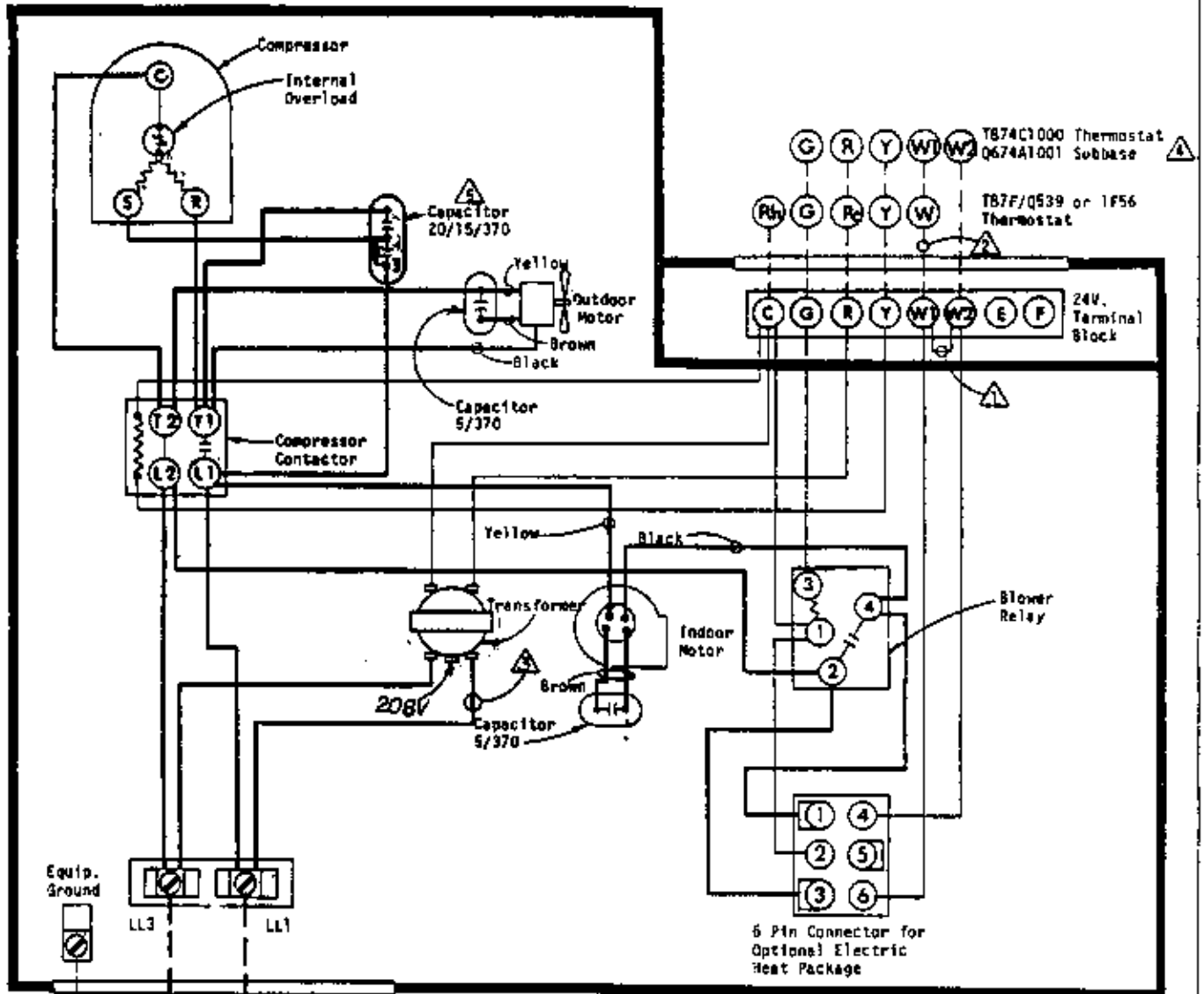
⚠ **Required only for use with Optional Electric Heat Packages:**  
 EH3PA-A15, EH3PA-B12, EH3PA-B15. When two stage heat is desired.

- ⚠ For 208V operation move this wire to 208V transformer tap.
- ⚠ Compressor Run Capacitor is located on the back of the Blower Partition

230/208V 60Hz 1-Ph

**USE COPPER OR ALUMINUM WIRE**

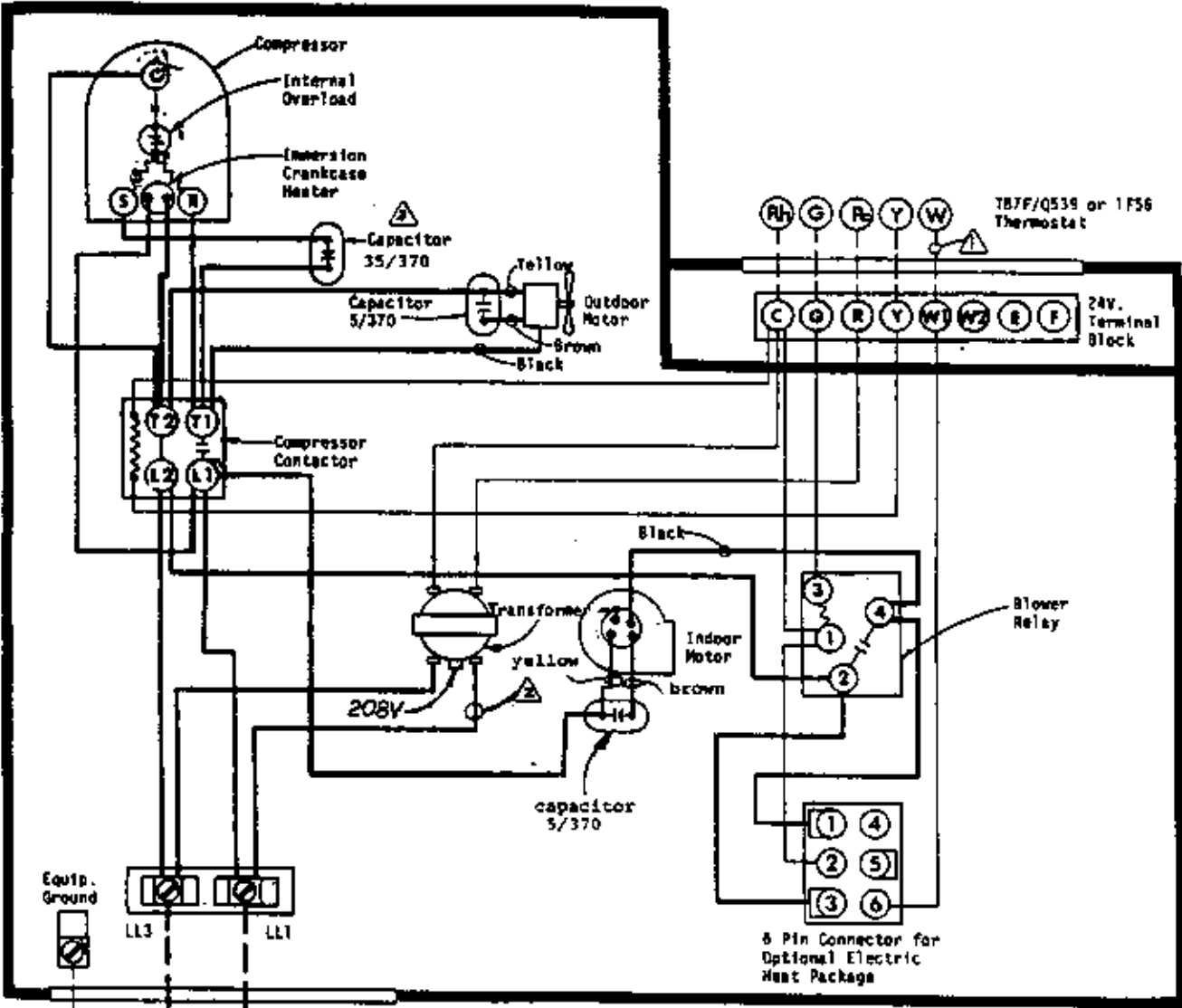
FACTORY WIRING	FIELD WIRING
Low Voltage	-----
High Voltage	-----



- ⚠ Remove Jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ For 208V operation move this wire to 208V transformer tap.
- ⚠ Required only for use with Optional Electric Heater Packages: ENSPA-A15, ENSPA-B12, ENSPA-B15. When two stage heat is desired.
- ⚠ Compressor Run Capacitor is located on back of the Blower Partition, Capacitor provides off-cycle crackcase heat.

USE COPPER OR ALUMINUM WIRE

FACTORY WIRING	FIELD WIRING
Low Voltage ———	-----
High Voltage ———	-----



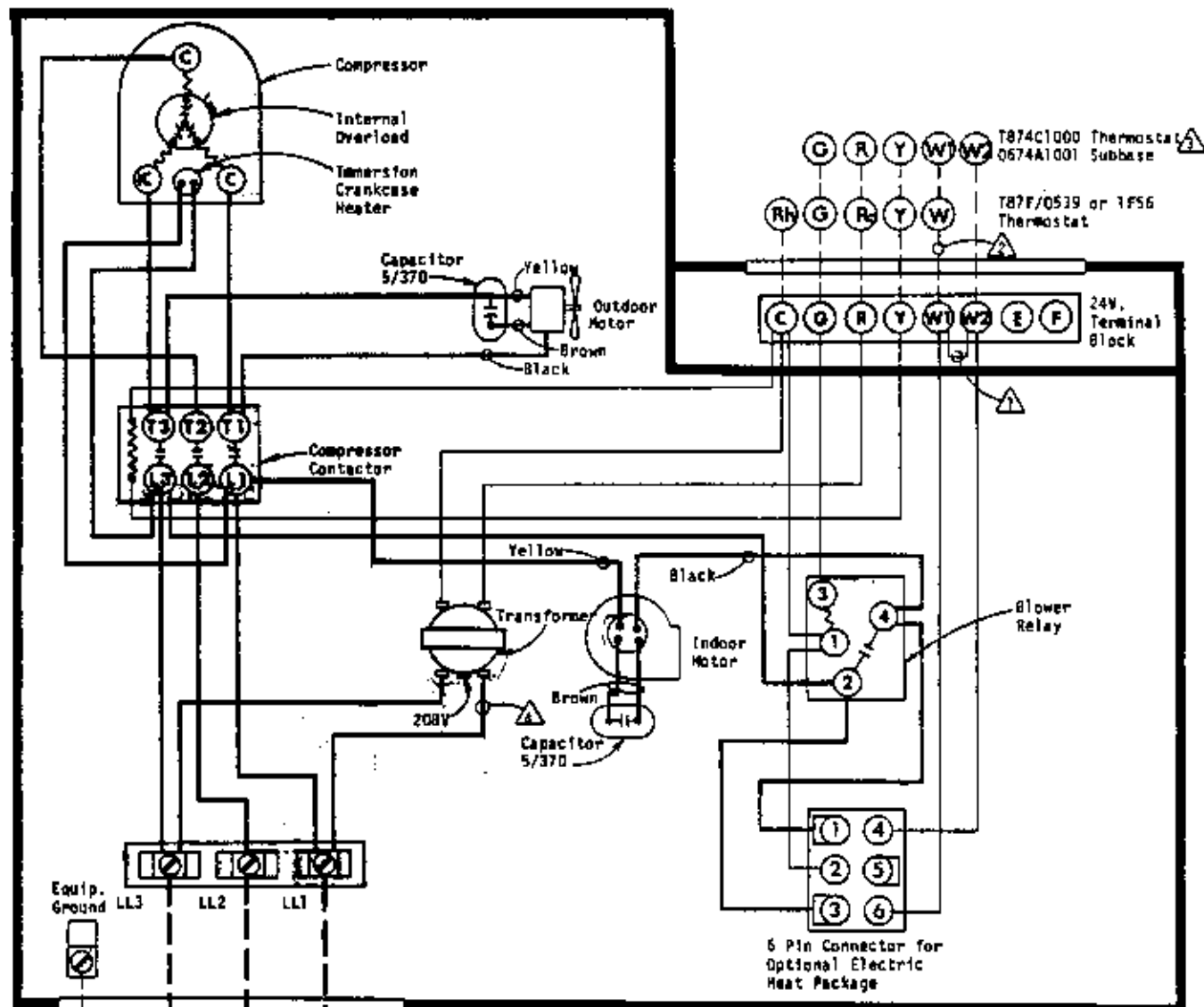
⚠ Not required when Optional Heat Packages are not installed

⚠ For 208V operation move this wire to 208V transformer tap.

⚠ Compressor Run Capacitor is located on the back of the Blower Partition

USE COPPER OR ALUMINUM WIRE

FACTORY WIRING	FIELD WIRING
Low Voltage	-----
High Voltage	-----



- ⚠ Remove Jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Required only for use with Optional Electric Heat Packages: EHSPA-A15, EHSPA-B12, EHSPA-B15. When two stage heat is desired.
- ⚠ For 208V operation move this wire to 208V transformer top.

Equip. Ground

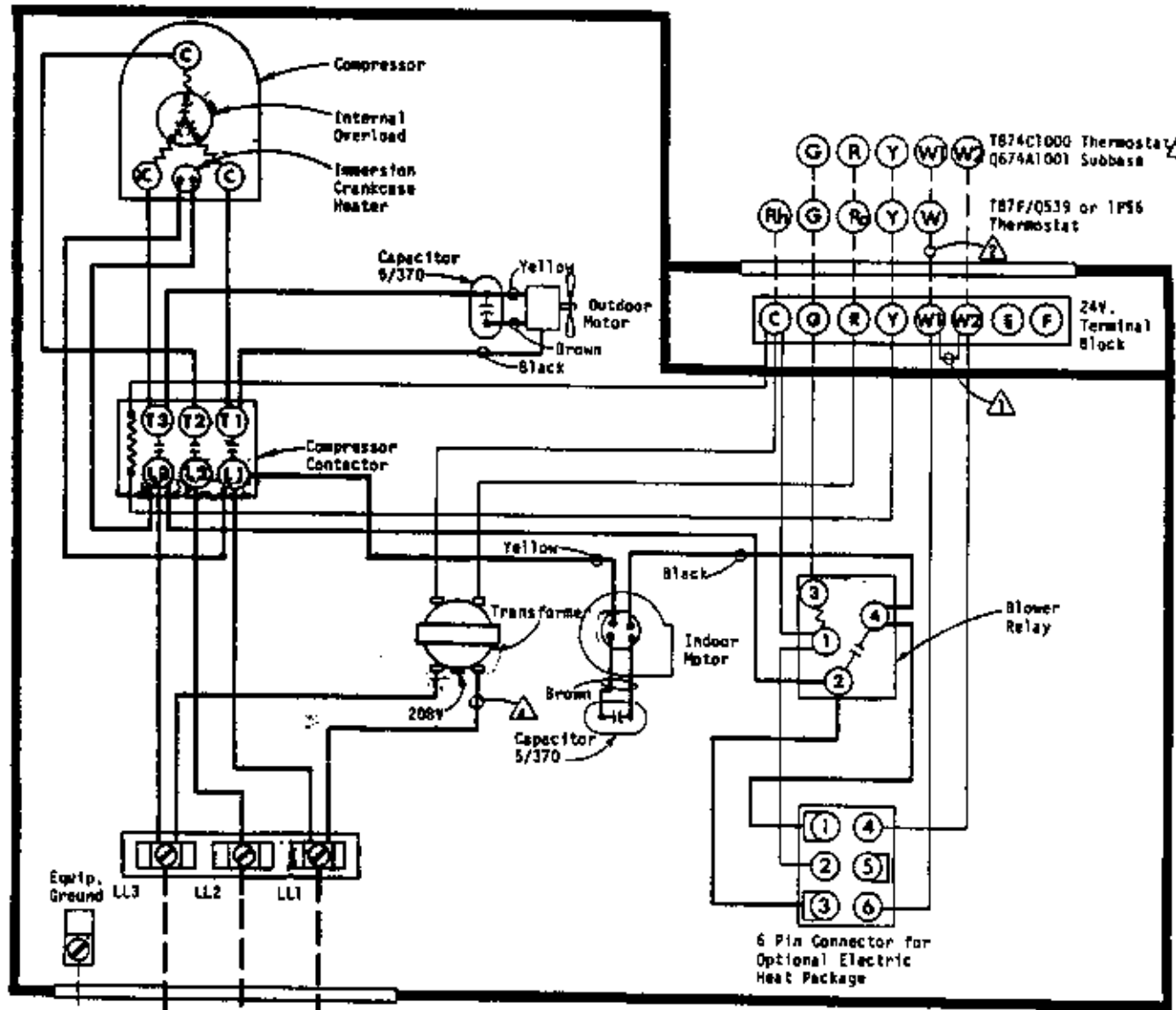
LL3 LL2 LL1



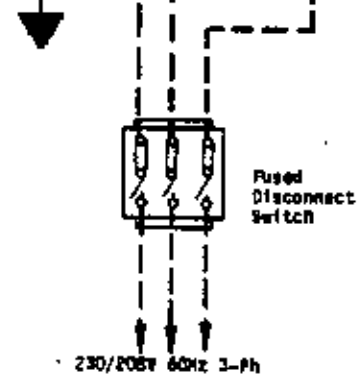
230/208V 60Hz 3-Ph

USE COPPER OR ALUMINUM WIRE

FACTORY WIRING	FIELD WIRING
Low Voltage	-----
High Voltage	-----

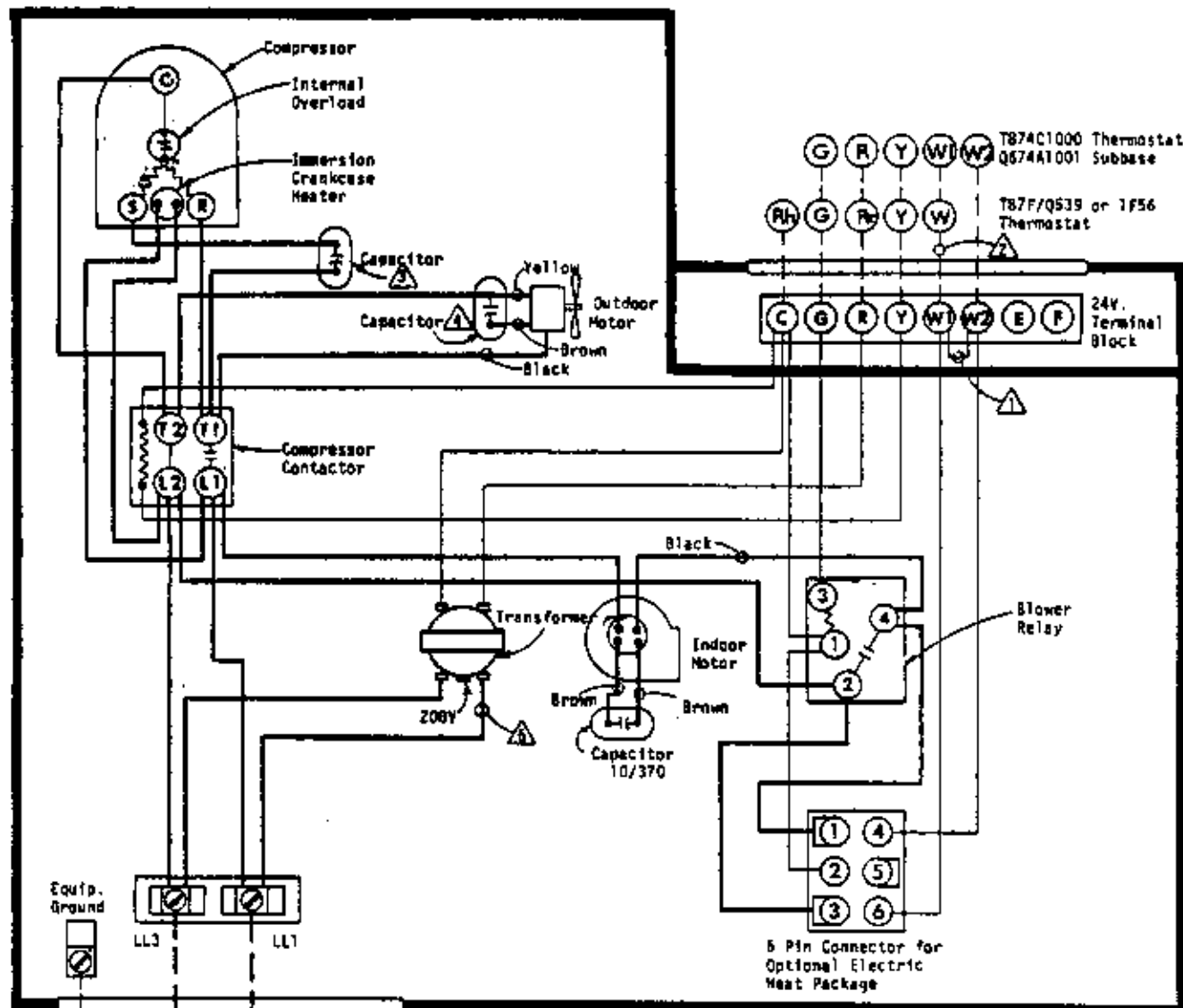


- ⚠ Remove Jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Required only for use with Optional Electric Heat Packages: ENSPA-A15, ENSPA-B12, ENSPA-B15. When two stage heat is desired.
- ⚠ For 208V operation move this wire to 208V transformer tap.



USE COPPER OR ALUMINUM WIRE

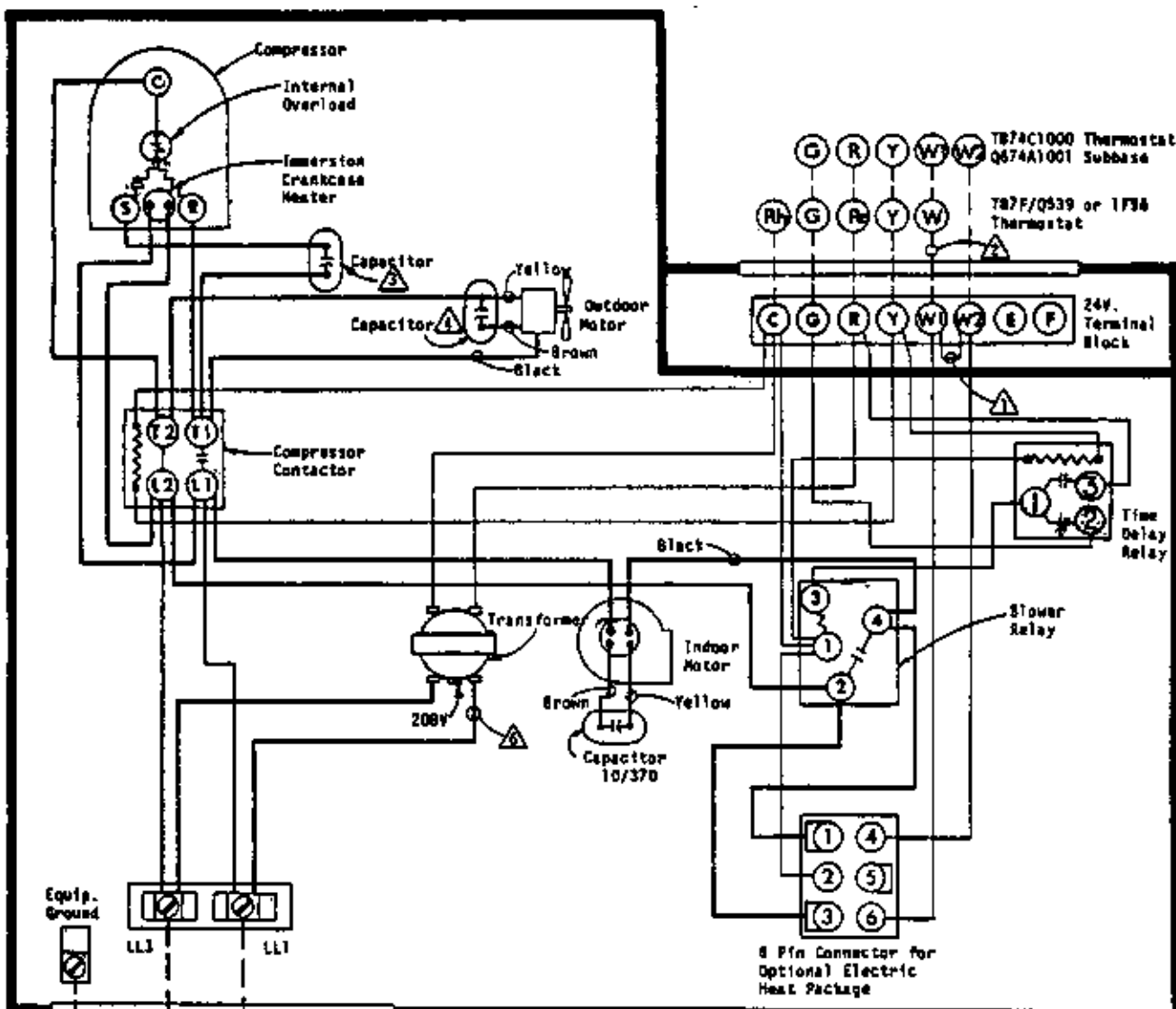
FACTORY WIRING	FIELD WIRING
Low Voltage	-----
High Voltage	-----



- ⚠ Remove jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ P48A5 - 40/440V P48A5-D - 40/440V  
P60A5 - 45/440V
- ⚠ P48A5 - 15/370V P48A5-D - 10/370V  
P60A5 - 7-1/2/370V
- ⚠ Required only for use with optional electric heat packages:  
EHSPA-A05, EHSPA-A10, EHSPA-A15, EHSPA-A20, EHSPA-B09,  
EHSPA-B12, EHSPA-B15, EHSPA-B18.
- ⚠ For 208V operation move this wire to 208V transformer tap.

USE COPPER OR ALUMINUM WIRE

FACTORY WIRING	FIELD WIRING
Low Voltage ———	-----
High Voltage ———	-----



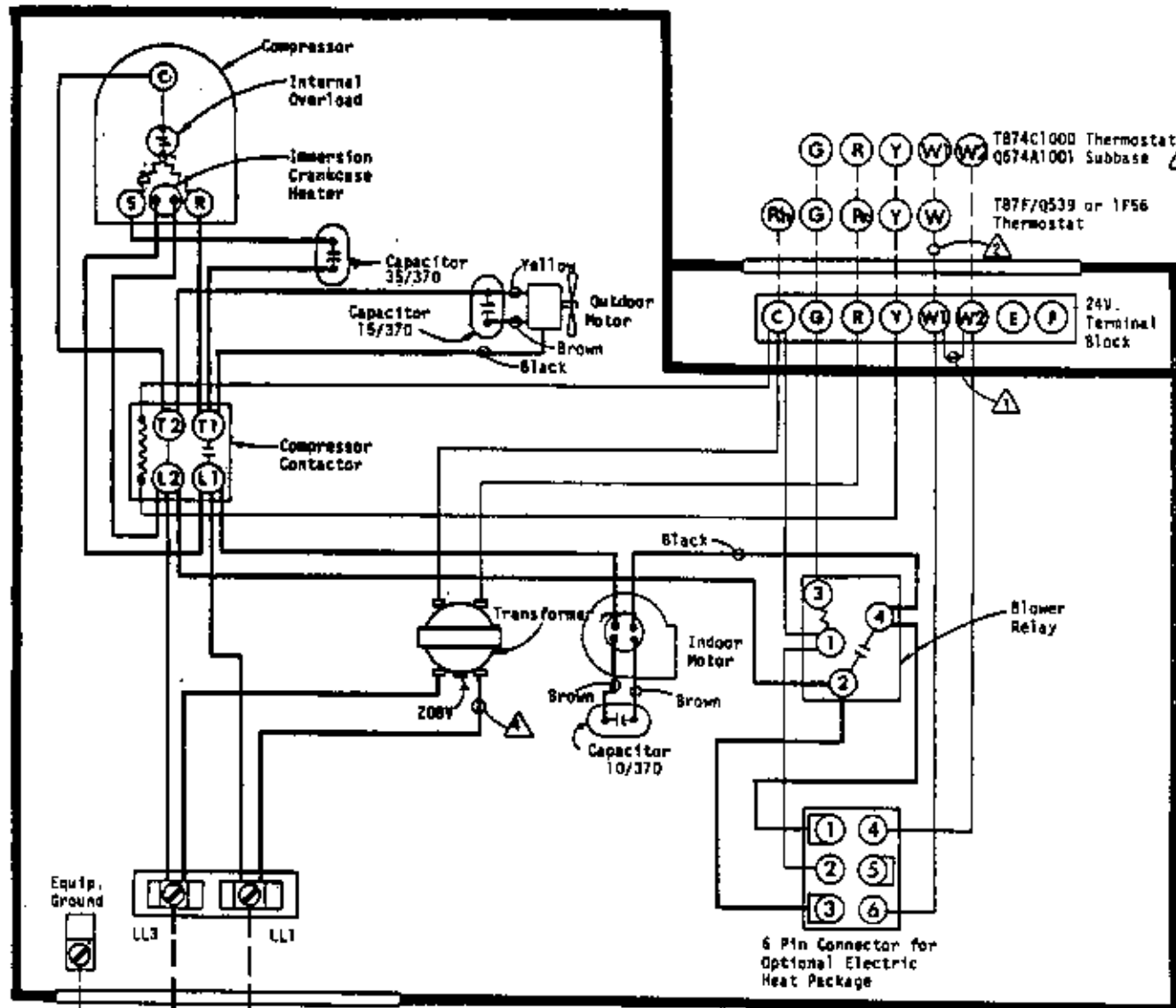
- ⚠ Remove Jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ P6BA5 - 40/440V  
P6DA5 - 45/440V
- ⚠ P4BA5 - 15/370V  
P6DA5 - 7-1/2/370V
- ⚠ Required only for use with Optional Electric Heat Packages: EH5PA-1-5A, EH5PA-1-10A, EH5PA-1-15A, EH5PA-1-20A, EH5PA-3-9B, EH5PA-3-12B, EH5PA-3-15B, EH5PA-3-18B.
- ⚠ For 208V operation move this wire to 208V transformer tap.

MODELS  
P6DA5

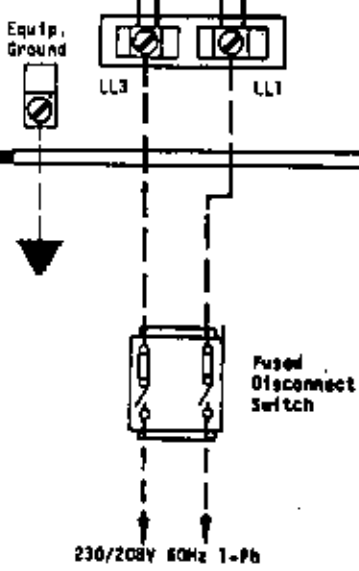
USE COPPER OR ALUMINUM WIRE

FACTORY WIRING	FIELD WIRING
Low Voltage ———	-----
High Voltage ———	-----



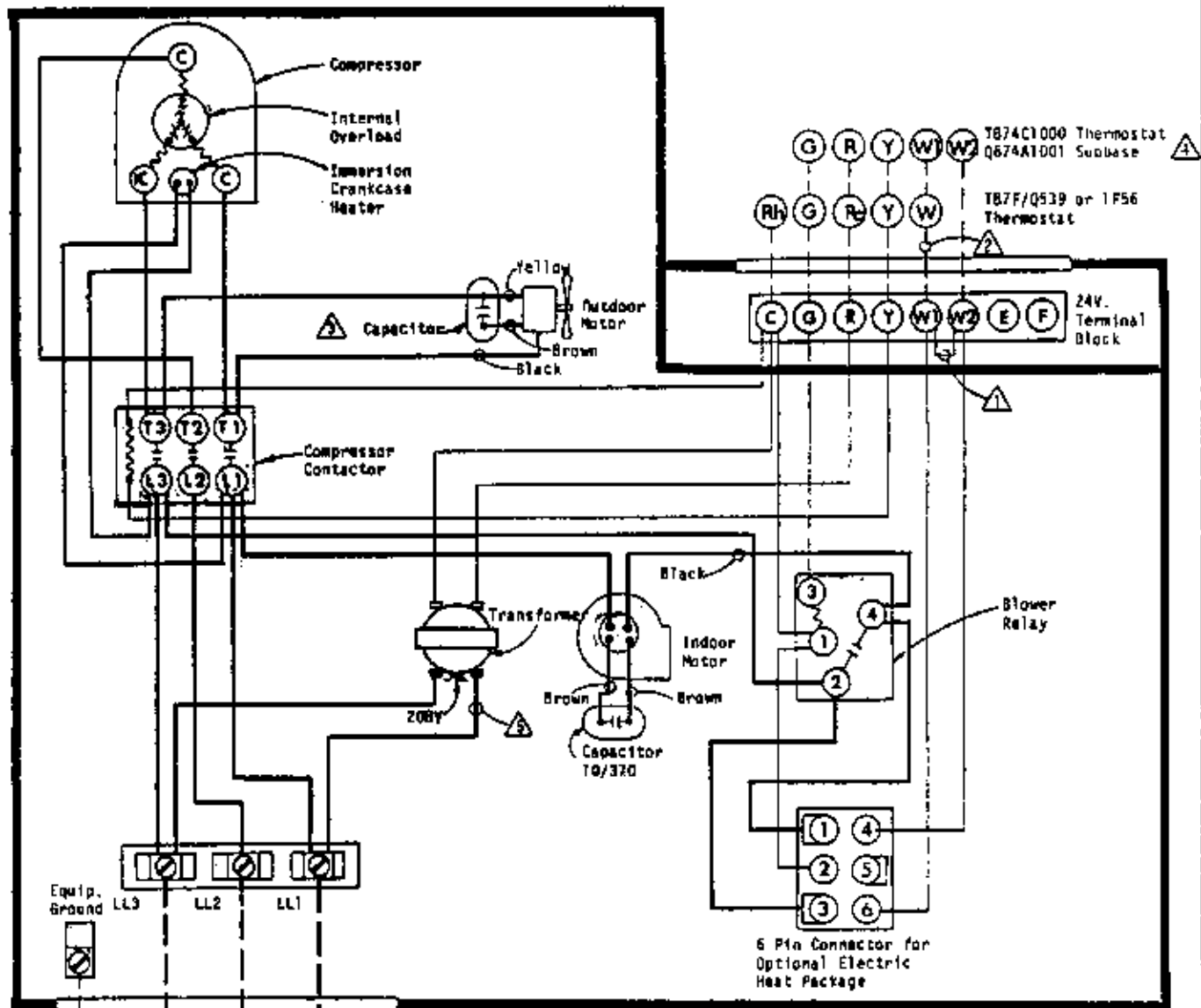


- ⚠ Remove Jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Required only for use with Optional Electric Heat Packages: EHSPA-A15, EHSPA-A20, EHSPA-B12, EHSPA-B16, EHSPA-B18
- ⚠ For 208V. operation move this wire to 208V. transformer tap.



USE COPPER OR ALUMINUM WIRE

FACTORY WIRING	FIELD WIRING
Low Voltage ———	-----
High Voltage ———	-----



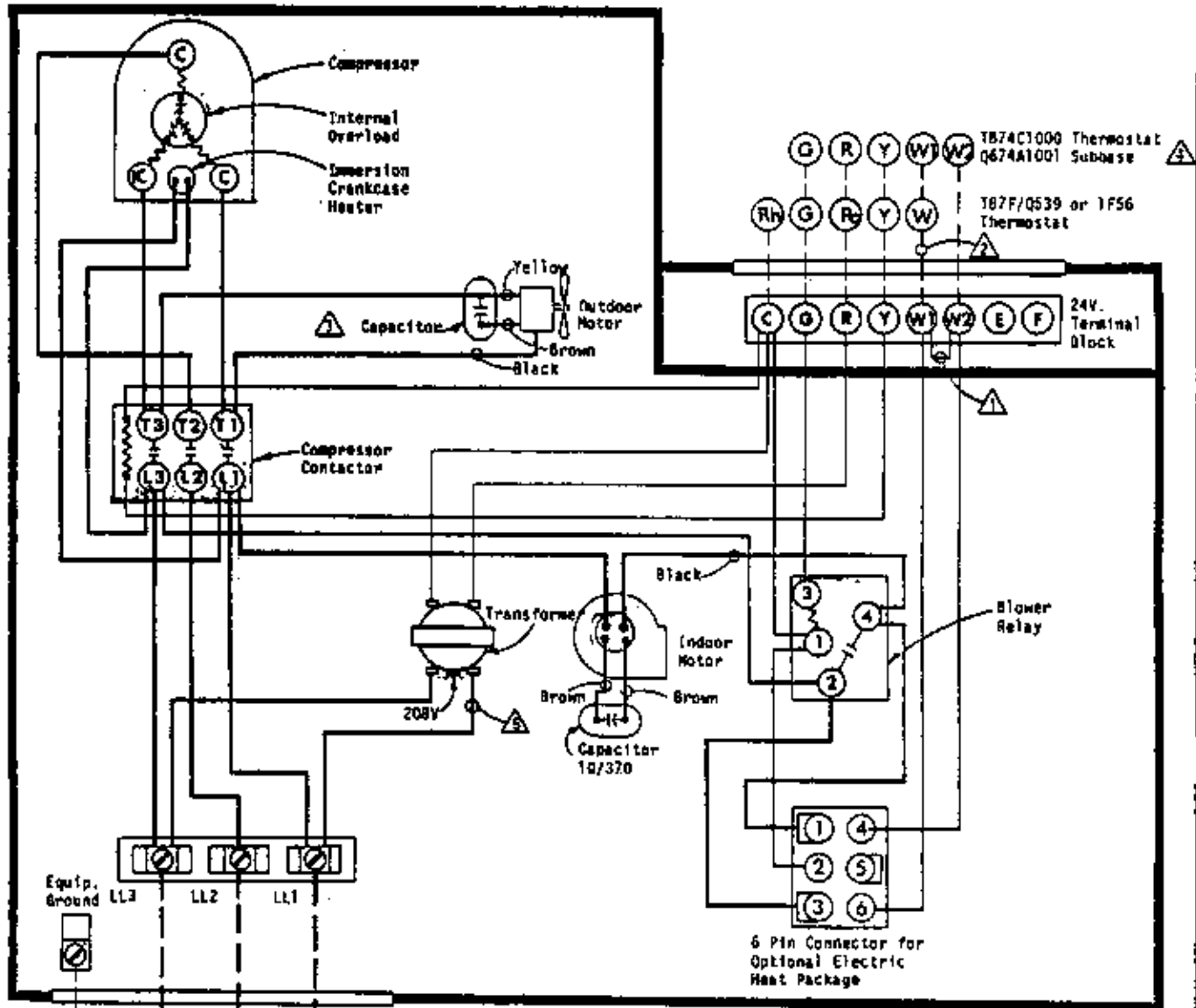
- ⚠ Remove jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ P40A5 - 15/370
- ⚠ P60A6 - 7-1/2 / 370
- ⚠ Required only for use with optional electric heat packages:  
EHSPA-A05, EHSPA-A10, EHSPA-A15, EHSPA-A20, EHSPA-B09,  
EHSPA-B12, EHSPA-B15, EHSPA-B18.
- ⚠ For 208V operation move this wire to 208V transformer tap.



230/208V 60 Hz 3-Ph

USE COPPER OR ALUMINUM WIRE

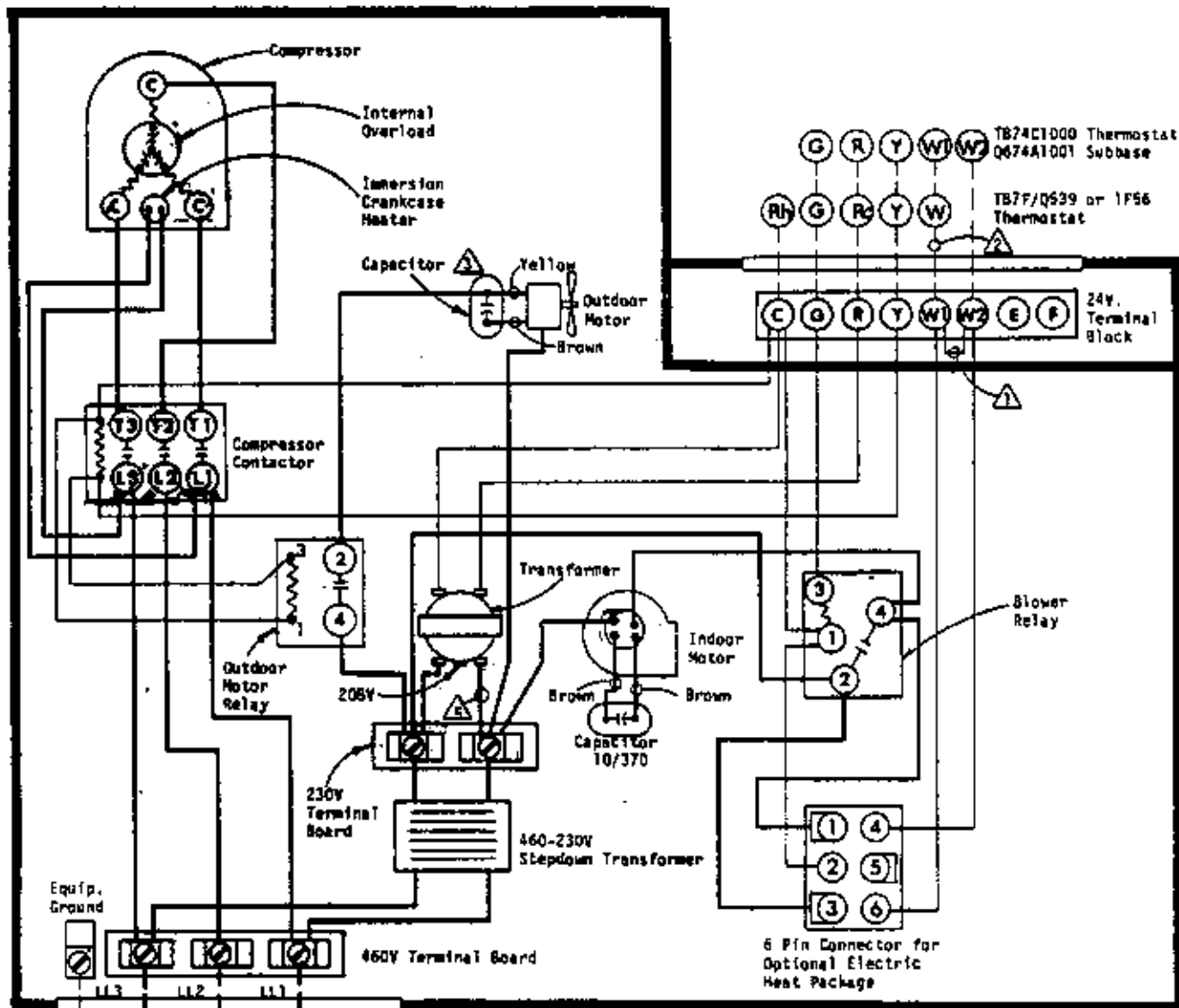
FACTORY WIRING	FIELD WIRING
Low Voltage	-----
High Voltage	-----



- ⚠ Remove Jumper for two stage heat.
- ⚠ Not required when Optional Heat Packages are not installed.
- ⚠ PASAS - 15/370  
P60A 6- 7-1/2 / 370
- ⚠ Required only for use with optional electric heat packages:  
ENSPA-A05, ENSPA-A10, ENSPA-A15, ENSPA-A20, ENSPA-B09,  
ENSPA-B12, ENSPA-B15, ENSPA-B18.
- ⚠ For 2-w/ operation move this wire to 208V transformer tap.

USE COPPER OR ALUMINUM WIRE

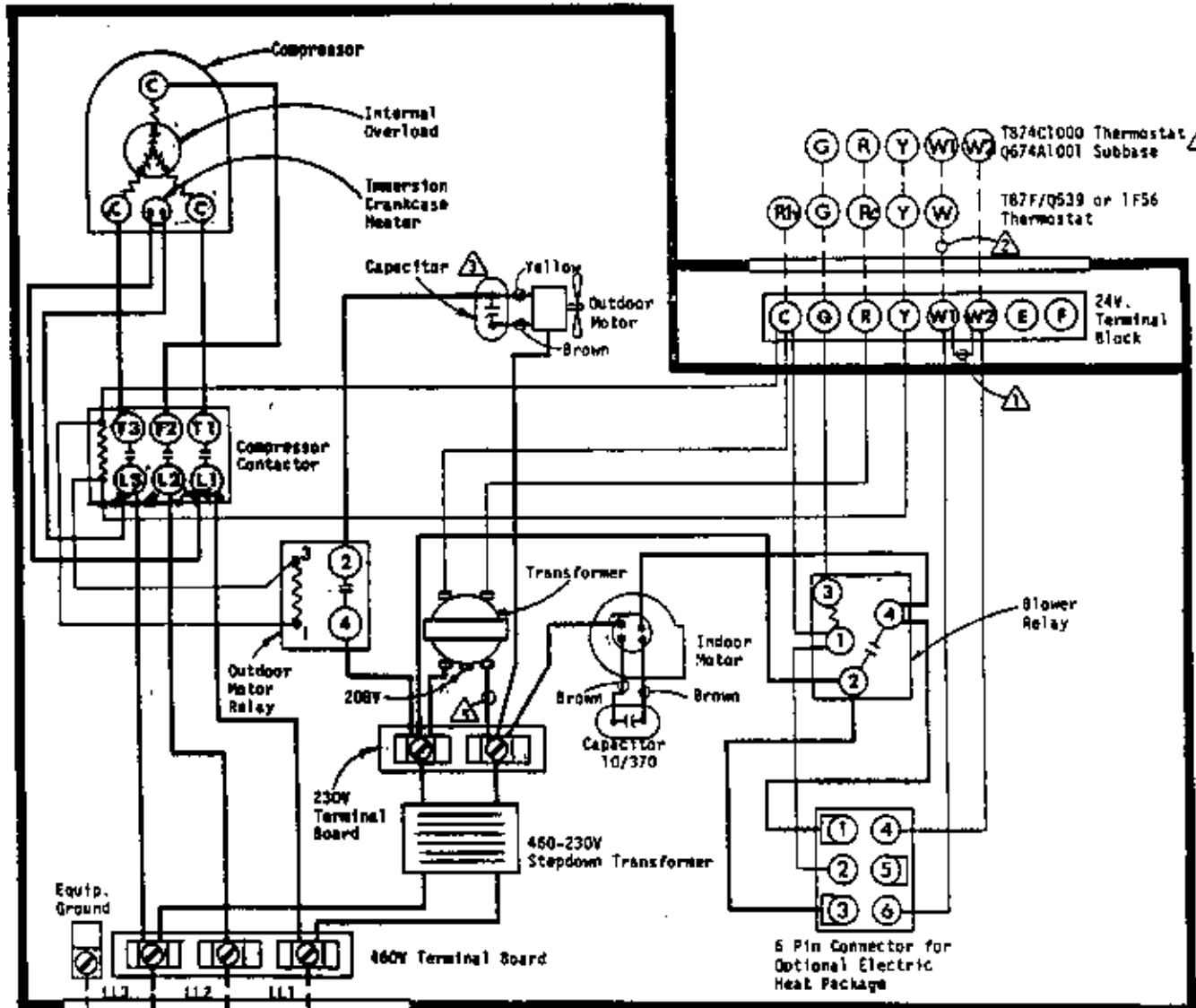
FACTORY WIRING	FIELD WIRING
Low Voltage	-----
High Voltage	-----



- ⚠ Remove jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ P40A5 - 15/370  
P60A6 - 7-1/2/370
- ⚠ Required only for use with Optional Electric Heat Packages:  
EHSPA-A05, EHSPA-A10, EHSPA-A15, EHSPA-A20, FHSPA-B09,  
EHSPA-B12, EHSPA-B15, EHSPA-B18, EHSPA-C09, EHSPA-C12,  
EHSPA-C15, EHSPA-C18.
- ⚠ For 208V operation move this wire to 208V transformer tap.

USE COPPER OR ALUMINUM WIRE

FACTORY WIRING	FIELD WIRING
Low Voltage	-----
High Voltage	-----



- ⚠ Remove jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ P48AS - 15/370  
P6DA6 - 7-1/2/370
- ⚠ Required only for use with Optional Electric Heat Packages:  
EHSPA-A05, EHSPA-A10, EHSPA-A15, EHSPA-A20, EHSPA-B09,  
EHSPA-B12, EHSPA-B15, EHSPA-B18, EHSPA-C09, EHSPA-C12,  
EHSPA-C15, EHSPA-C18.
- ⚠ For 208V operation move this wire to 208V transformer tap.

USE COPPER OR ALUMINUM WIRE

FACTORY WIRING	FIELD WIRING
Low Voltage _____	Low Voltage _____
High Voltage _____	High Voltage _____