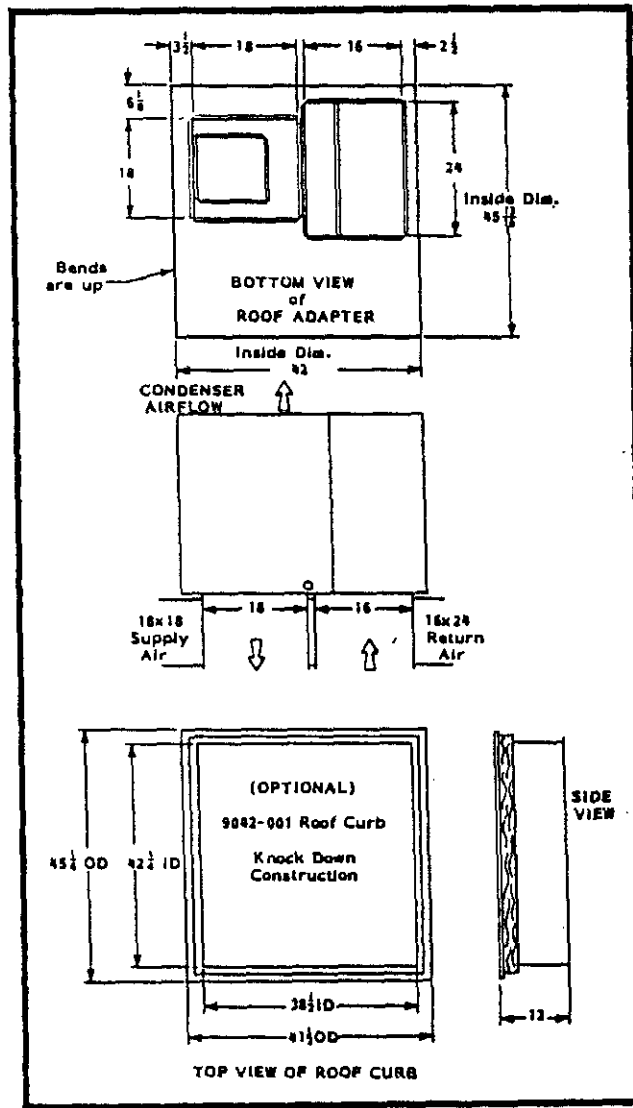
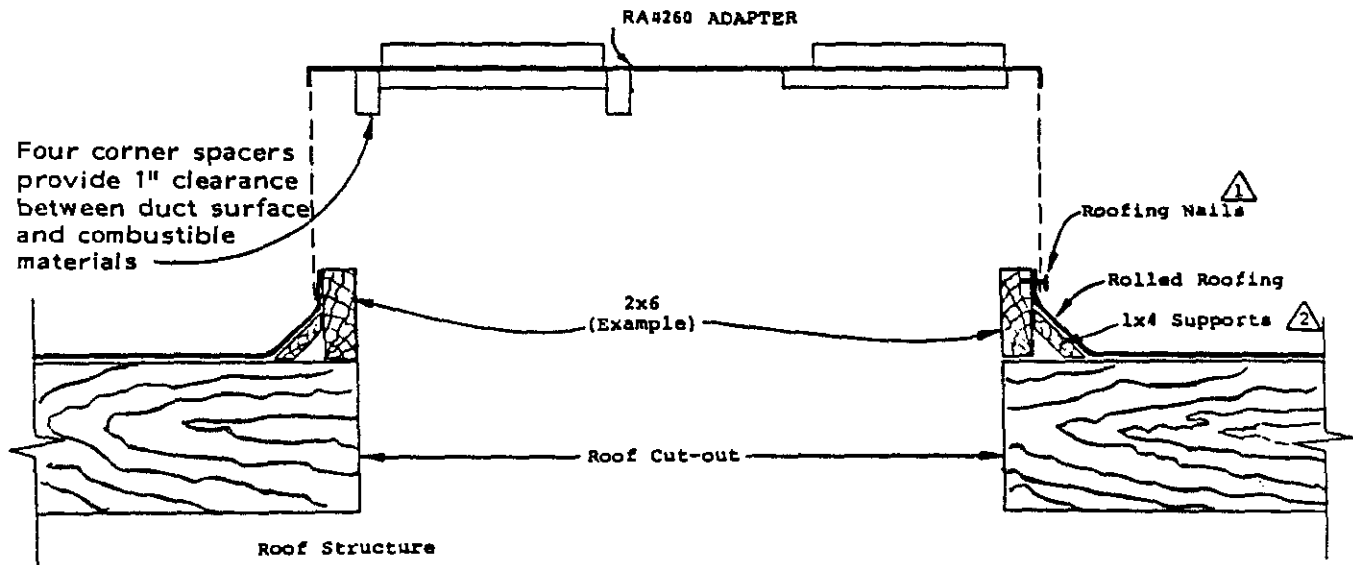


MODELS
RPMA 42, RPMA 48, RPMA 60
ROOF MOUNT
PACKAGED AIR CONDITIONER
INSTALLATION INSTRUCTIONS

SPECIALLY DESIGNED FOR ROOFTOP
HEATING / COOLING APPLICATIONS



TYPICAL CONSTRUCTION FOR DIMENSIONAL LUMBER EXTENSION CONSTRUCTION



- ⚠ Nail 3/4" from top.
- ⚠ Provides support to roofing material, prevents sharp bends and cracking.

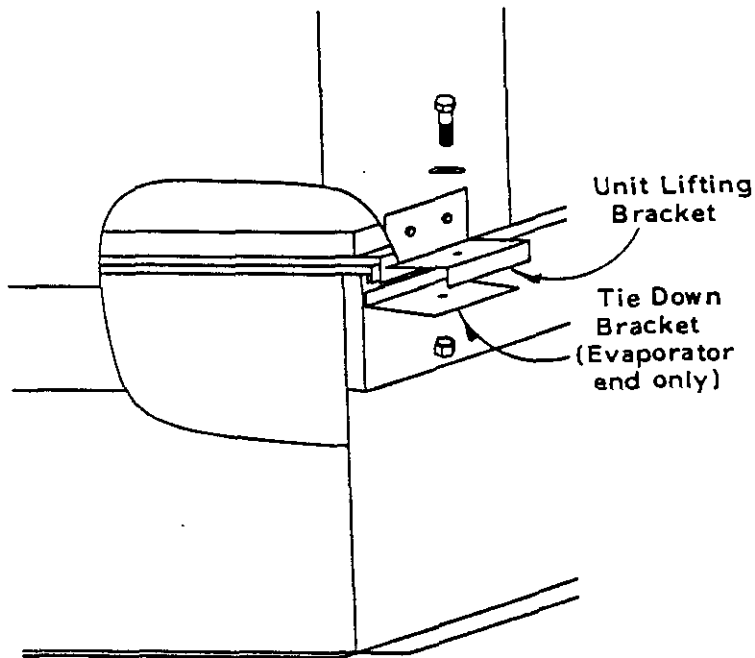
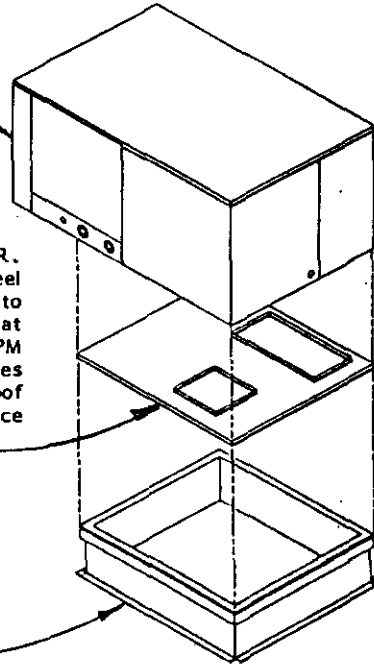
Easy 3-step installation for roof top applications. Saves installation labor, time, cost and provides leakproof installation. No special roof hood plenum assembly required.

RPMA 42, RPMA 48, RPMA 60
Packaged Roof Mount
Air Conditioner

RA4260 ROOF ADAPTER.
Painted galvanized steel
adapter permits installer to
rough-in the duct work at
the job site and install RPM
unit later. (Duct flanges
provided on bottom of roof
adapter). Special one piece
leakproof design.

(OPTIONAL)

9942-001 ROOF CURB
Leakproof, knockdown,
galvanized construction
with roofing nailer strip
- suitable for all flat
roofs.



UNIT LIFTING BRACKET

Four lifting brackets with fasteners are supplied with the basic unit. These brackets are inserted next to the unit control panel. Access to these brackets is gained by removing the outer control panel cover. These brackets can be installed using the mating holes along the unit base.

TIE DOWN BRACKET

Two tie down brackets are supplied. After the unit has been lifted on to the roof adapter/curb assembly, attach the tie down brackets to the lifting brackets as shown.

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 ductwork, supply and return, must be properly sized for the design air flow requirement of the equipment. Air Conditioning Contractors of America (ACCA) is an excellent guide to proper sizing. All ductwork 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.

UNPACKING THE SELF-CONTAINED UNIT

It is recommended that the unit be unpacked at the installation site to minimize damage due to handling.

1. Cut and remove the metal band from around unit.
2. Remove the carton from the unit.
3. The installation manual is contained in an envelope shipped with the unit. Make sure that it does not get lost.
4. Carefully block up the unit and remove the shipping skid.
5. CAUTION - DO NOT tip the unit on its side. Oil may enter the compressor cylinders and cause starting or operating trouble. If unit has set on its side, restore to upright position and do not run for several hours. Also run intermittently for a few seconds. Do this three or four times with three minutes in between. Observe abnormal compressor noise.

GENERAL

The refrigerant system is completely assembled and charged. All internal wiring is complete.

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 the unit for a proposed installation should be based on heat loss calculation made according to methods of National Warm Air Heating and Air Conditioning Association. The air duct should be installed in accordance with the Standards of the National Fire Protection Association for the Installation of Air Conditioning and Ventilating Systems of Other Than Residence Type, NFPA No. 90A, and Residence Type Warm Air Heating and Air Conditioning Systems, NFPA No. 90B. Where local regulations are at a variance with instructions, installer should adhere to local codes.

DUCTWORK

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

LOCATING THE UNIT

A location on the roof must be chosen that will provide adequate support to the unit, while at the same time allowing clearance for the supply air and return air duct connections to the RA4260 roof adapter (see layout and dimensions). NOTE: The RA4260 roof adapter **MUST BE USED** to assure a leak-free installation and the UL approval is contingent upon the use of this mating adapter.

ROOF CURB FABRICATION

The roof curb (extension section between actual roof and RA4260 roof adapter) could be fabricated from either sheet steel or nominal dimensional lumber. In either case, the OD dimension of the extension section must be sized to fit the RA4260 adapter dimensions as shown.

All corners, seams or joints must be sealed to assure a leak-free installation. The height of the curb section is determined by installation requirements such as degree slope of roof, direction that the outdoor (exposed) coil faces, and geographic location. The unit **MUST SET LEVEL** when installed, and should be high enough to provide proper defrost drainage from outdoor coil during heating cycle.

A suggested design for a wood frame type construction is shown on page 1.

OPTIONAL ELECTRIC HEATER PACKAGES

The EH5RA-Series electric heater packages are available as options. Each package comes complete with heaters and controls.

IMPORTANT: A separate power entrance is required for the heater package. DO NOT attempt to wire a basic unit and a heater package to one power circuit.

INSTALLATION

Installation of the heat package requires removing the unit blower from its securing slide mount, inserting the heat package into the same mount and reinstalling the unit blower into a similar mount on the heat package. A minimal amount of wiring is required. Refer to the heat package installation instructions for detailed installation information.

WIRING - MAIN POWER

Refer to the unit rating plate for wire sizing information and maximum fuse or "HACR Type" circuit breaker size. Each unit is marked with a "Minimum Circuit Ampacity." This means that the field wiring used must be sized to carry that amount of current. Refer to the National Electrical Code for complete current carrying capacity data on the various insulation grades of wiring material.

If an optional heater package is installed, a separate power circuit must be added. Refer to the Electrical Information Chart for circuit information. **DO NOT ATTEMPT TO COMBINE A BASIC UNIT AND A HEATER PACKAGE TO ONE POWER SUPPLY CIRCUIT.**

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 motor.

CONDENSATE DRAINAGE

A 3/4" FPT coupling is provided to connect a condensate drain line to, and is located on side opposite outdoor coil.

**INDOOR BLOWER PERFORMANCE
CFM - Dry Coil With Filter**

E. S. P. in H ₂ O	RPMA 42			RPMA 48			RPMA 60	
	High Speed	Medium Speed	Low Speed	High Speed	Medium Speed	Low Speed	High Speed	Low Speed
.0	1995	1920	1775	2160	2075	1860	2250	2100
.10	1935	1870	1735	2080	1980	1810	2180	2045
.20	1865	1800	1670	1995	1920	1735	2100	1975
.30	1770	1700	1600	1910	1840	1670	2020	1910
.40	1680	1610	1525	1820	1745	1590	1925	1840
.50	1580	1525	1430	1715	1650	1510	1845	1750
.60	1480	1420	1340	1615	1550	1420	1740	1660

BASIC UNIT ELECTRICAL DATA

Model	Rated Volts & Ph	Operating Voltage Range	Max. Unit Amps 230/208	Maximum Fuse or Circuit Breaker*	Minimum Circuit Ampacity	Field** Power Wiring	Ground Wire ** Size
				Ckt. A	Ckt. A	Ckt. A	Ckt. A
RPMA 42	230/208-1	197-253	24/26	50	34	8	10
RPMA 42-B	230/208-3	187-253	18/19.5	35	25	10	10
RPMA 42-C+	460-3	414-506	10.0	15	15	14	14
RPMA 48	230/208-1	197-253	28.6/31.1	60	38	8	10
RPMA 48-B	230/208-3	187-253	21.5/23	40	27	10	10
RPMA 48-C+	460-3	414-506	12.0	20	15	14	14
RPMA 60	230/208-1	197-253	34.8/38.8	60	47	6	10
RPMA 60-B	230/208-3	187-253	26.3/28.3	50	34	8	10
RPMA 60-C+	460-3	414-506	13.4	25	16	12	12

* Maximum time delay fuse or HACR type circuit breaker, HACR not applicable to 460 volt.
 ** 60°C copper wire size, basic unit only.
 + 460V not UL listed.

OPTIONAL FIELD-INSTALLED ELECTRIC HEATER TABLE

Heater Package Model No.	Heater Package Volts Phase	Htr. Kw & Capacity @ 240V (or 480V if applicable)		Heater Kw & Capacity @ 208 Volts		Heater Amps @ 240/208 (or 480V if applicable)	Heater Internal Fuses	CIRCUIT B				
		Kw	Btuh	Kw	Btuh			Number Field Ckts.	Minimum Circuit Ampacity	Max. Over-Current Protection	Field Power Wiring	Ground Wire Size
EH5RA-A10	240/208-1	10	34,100	7.5	25,600	41.6/36.2	30/60	1	53/46	60/50	6/6	10
EH5RA-A15	240/208-1	15	51,200	11.25	38,400	62.5/54.1	60/60	1	79/68	80/70	3/4	8
EH5RA-A20	240/208-1	20	68,200	15.0	51,200	83.2/72.1	30/60/60	1	104/91	110/100	2/3	6
EH5RA-A25	240/208-1	25	85,300	18.75	64,000	104.2/90.1		1	130/113	150/125	1/2	6
EH5RA-B09	240/208-3	9	30,700	6.75	23,000	21.7/18.7	40/40/40	1	28/24	30/25	10/10	10
EH5RA-B15	240/208-3	15	51,200	11.25	38,400	36.2/31.2		1	46/39	50/40	6/8	10
EH5RA-B24	240/208-3	24	81,900	18.0	61,400	57.9/50.0		1	73/63	80/70	3/4	8
EH5RA-C09	480-3	9	30,700	6.75	23,000	10.8		1	15	15	14	14
EH5RA-C15	480-3	15	51,200	11.25	38,400	18.0		1	23	25	10	10
EH5RA-C24	480-3	24	81,900	18.0	61,400	28.8		1	36	40	8	10

① Based on wire suitable for 60°C. Other wiring materials must be rated for marked "Minimum Circuit Ampacity" or greater.
 ② Based upon Table 250-95 of N.E.C. 1984.
 ③ For ampacities over 100 amperes use wire suitable for at least 75°C.
 See electrical data for basic air conditioning for Circuit A wiring specification requirements.

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

Heater Model Number	Volts & Phase	RPMA 42	RPMA 42-B	RPMA 42-C	RPMA 48	RPMA 48-B	RPMA 48-C	RPMA 60	RPMA 60-B	RFMA 60-C
EH5RA-A10	240/208-1	S	A	A	S	A	A	S	A	A
EH5RA-A15	240/208-1	S	A	A	S	A	A	S	A	A
EH5RA-A20	240/208-1	S	A	A	S	A	A	S	A	A
EH5RA-A25	240/208-1	S	A	A	S	A	A	S	A	A
EH5RA-B09	240/208-3	A	S	A	A	S	A	A	S	A
EH5RA-B15	240/208-3	A	S	A	A	S	A	A	S	A
EH5RA-B24	240/208-3	A	S	A	A	S	A	A	S	A
EH5RA-C09	480-3	A	A	S	A	A	S	A	A	S
EH5RA-C15	480-3	A	A	S	A	A	S	A	A	S
EH5RA-C24	480-3	A	A	S	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.

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. It is imperative to match the correct pressure curve to the unit by model number.

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:

Model	Rated Airflow	95°F O.D. Temp.	82°F O.D. Temp.
RPMA42	1500	53 - 55	63 - 65
RPMA48	1700	56 - 58	64 - 66
RPMA60	1900	49 - 51	58 - 60

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

AIR FILTER

Two 16"x30"x1" disposable fiberglass type filters are located inside the unit for air filtration of both return air from structure and for optional fresh air intake (see below).

Access to the filter is by removing the panel located next to the condensate drain connection.

FRESH AIR INTAKE

The fresh air intake cover is a manual damper operated device to allow intake of fresh air whenever indoor blower is operating. The damper position can be manually set and locked in position with a wing nut. It is held in place by two screws and has a hardware cloth screen to prevent entry of birds or rodents. An optional cover plate is available if fresh air intake is not used.

CRANKCASE HEATERS

All 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.

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 units detailing the 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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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. The 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.
3. Check all power fuses or circuit breakers to be sure that they are the correct rating.
4. Periodic cleaning of the outdoor coil to permit full and unrestricted airflow circulation is essential.

PARTS LIST
SINGLE PACKAGE AIR CONDITIONERS

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Part No.	Description	RPMA42	RPMA42-B	RPMA42-C	RPMA48	RPMA48-B	RPMA48-C	RPMA60	RPMA60-B	RPMA60-C
* 5152-014 5152-049	Blower Housing Blower Wheel 10-9 Blower Wheel 10-10	x x	x x	x x	x x	x x	x x	x x	x x	x x
8552-030 8552-043 8552-004	Capacitor - Comp. 40/440V Capacitor - Comp. 45/370V Capacitor - Blower 7½/370V				x			(2)		
8552-026 8552-028 5811-012	Capacitor - Blower/Fan 15/370V Capacitor - Comp. 35/440V Capillary Tube	x x (4)	x x (4)	x x (4)	x x	x x	x x	(2)	(2)	(2)
5811-007 5811-017 8000-058	Capillary Tube Capillary Tube Compressor CRJ3-0300-PFV				(3)	(3)	(3)	(4)	(4)	(4)
8000-059 8000-060 8000-081	Compressor CRJ3-0300-TF5 Compressor CRJ3-0300-TFD Compressor AV168ET	x	x	x						
8000-082 8000-083 8000-074	Compressor AV169RT Compressor AV169TT Compressor AG134ET					x	x	x		
8000-075 8000-049 5051-027	Compressor AG134RT Compressor AG133UT Condenser Coil								x	x
8401-007 8401-003 8401-016	Contactors 25A 1P Contactors 30A 1P Contactors 35A 1P	x			x			x		
8401-002 8401-011 5060-030	Contactors 25A 3P Contactors 30A 3P Evaporator coil		x	x		x	x		x	x
5060-029 5060-038 5151-026	Evaporator coil Evaporator coil Fan Blade	x	x	x	x	x	x	x	x	x
8106-017 8106-020 8106-021	Motor - Blower Motor - Blower Motor - Fan	x	x	x	x	x	x	x	x	x
8200-003 8200-027 5451-011	Motor Mount - Blower Motor Mount - Fan Motor Mounting Parts	x	x	x	x	x	x	x	x	x
5153-022 8201-008 5210-006	Rain Shield Relay - Blower Strainer	x	x	(2)	x	x	(2)	x	x	(2)
5210-003 8607-013 8607-014	Strainer Terminal Block Terminal Block				x	x	x	x		
8607-006 7004-019 8607-015	Terminal Board Filter 16x30x1 Phenolic Insulator	x (2)	x (2)	x (2)	x (2)	x (2)	x (2)	x (2)	x (2)	x (2)
8407-034 8407-004 7051-017	Transformer (40VA) Transformer (2KVA) Condenser Grille	x x	x x	x x	x x	x x	x x	x x	x x	x x
8200-028 8607-017	Motor Mount Terminal Block			x			x	x	x	x

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

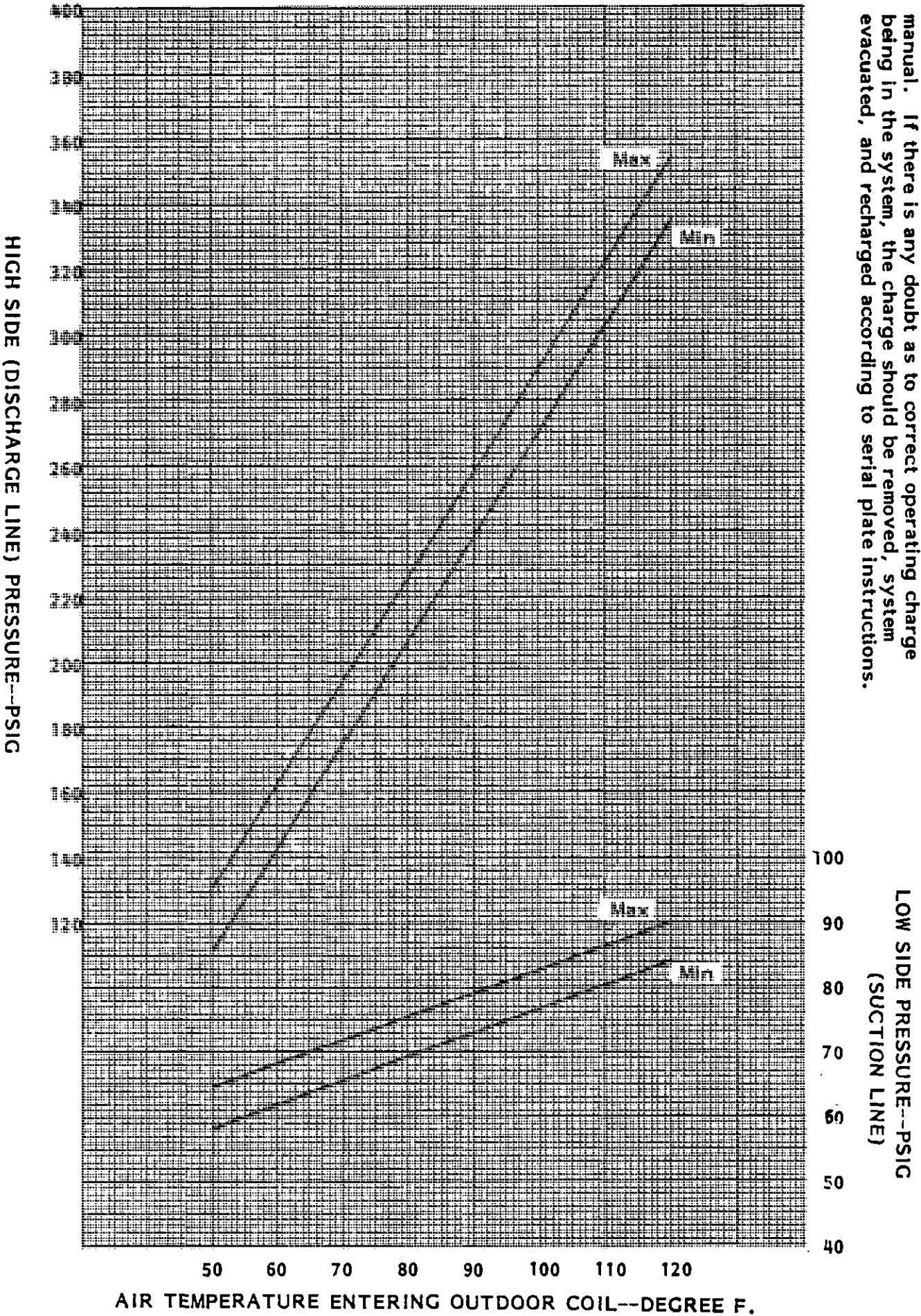
PARTS LIST
SINGLE PACKAGE AIR CONDITIONERS

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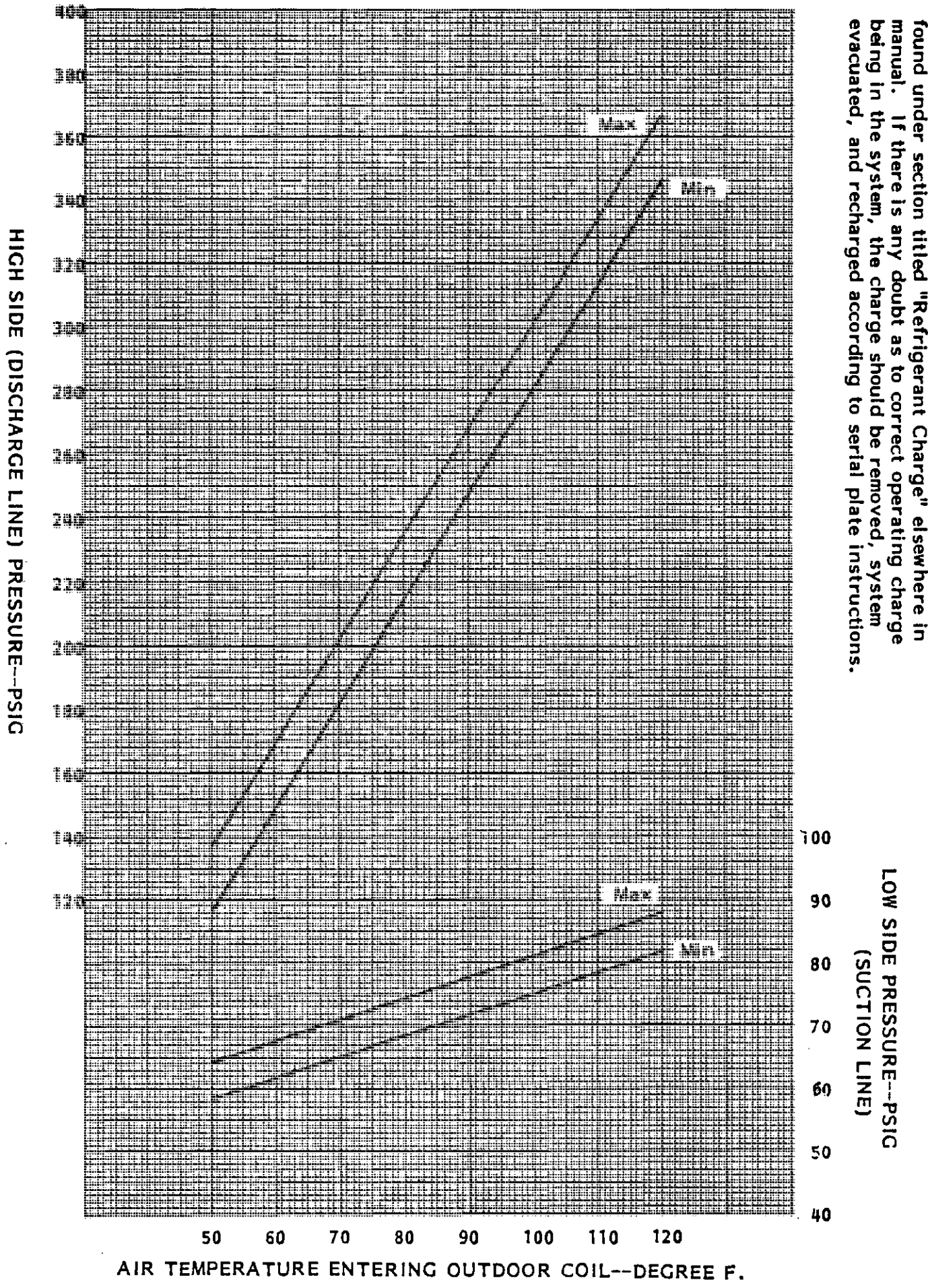
Part No.	Description	RPMA 42	RPMA 42-B	RPMA 42-C	RPMA 48	RPMA 48-B	RPMA 48-C	RPMA 60	RPMA 60-B	RPMA 60-C
4075-110	Wiring Diagram	x								
4075-120	Wiring Diagram				x					
4075-130	Wiring Diagram							x		
4075-210	Wiring Diagram		x							
4075-220	Wiring Diagram					x				
4075-230	Wiring Diagram								x	
4075-310	Wiring Diagram			x						
4075-320	Wiring Diagram						x			
4075-330	Wiring Diagram									x

Minimum net billing \$15.00. Supersedes all previous lists.
 Subject to change without notice.

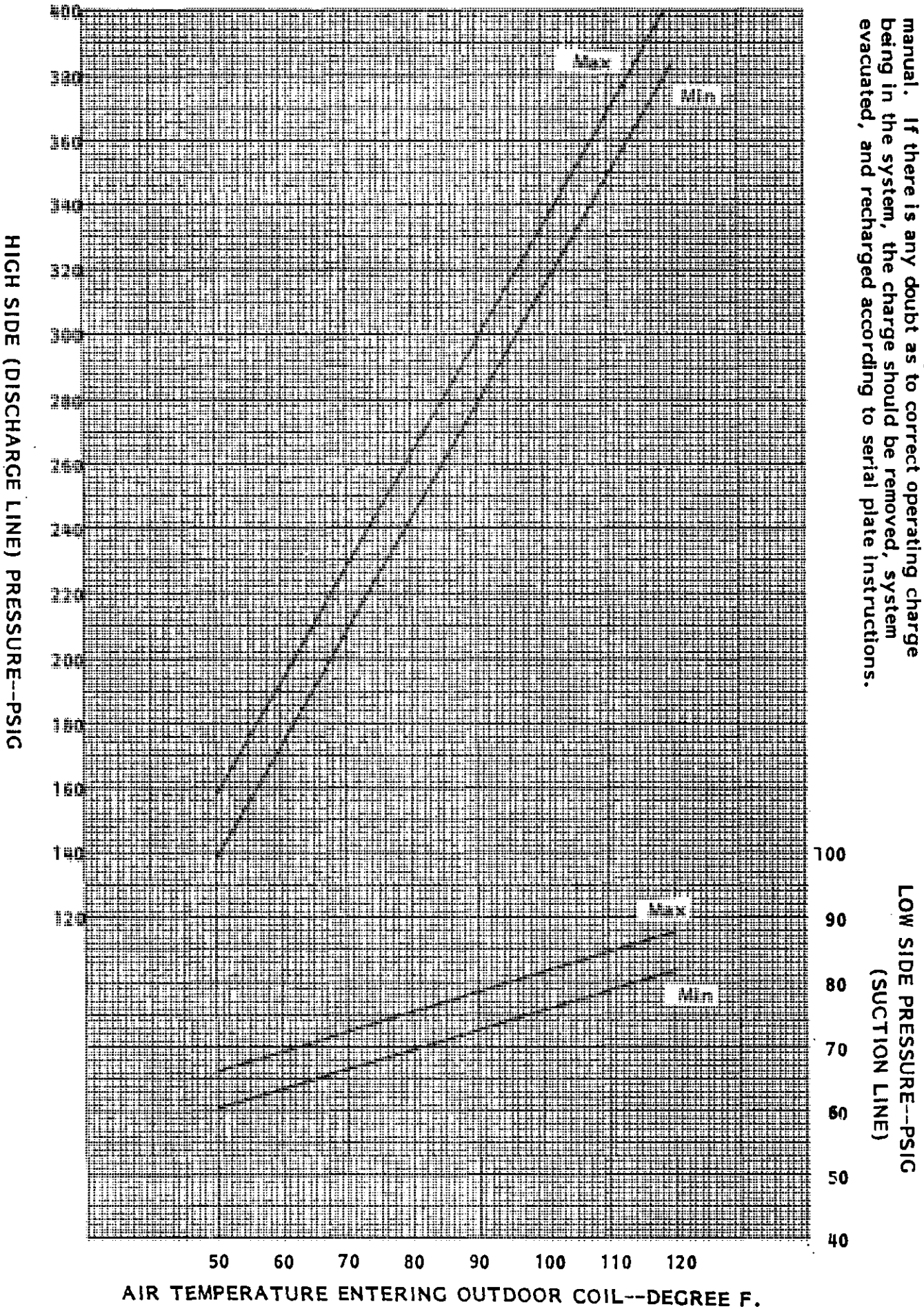
These curves are based upon 80°DB, 67°WB R.A. Temp. and rated CFM (airflow) across the evaporator coil and should be used for reference purposes only. Special information can be found under section titled "Refrigerant Charge" elsewhere in manual. If there is any doubt as to correct operating charge being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



The curves are based upon 80°DB, 67°WB R.A. Temp. rate. 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.



These curves are based upon 80°DB, 67°WB R.A. Temp. and rated CFM (air-flow) 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.

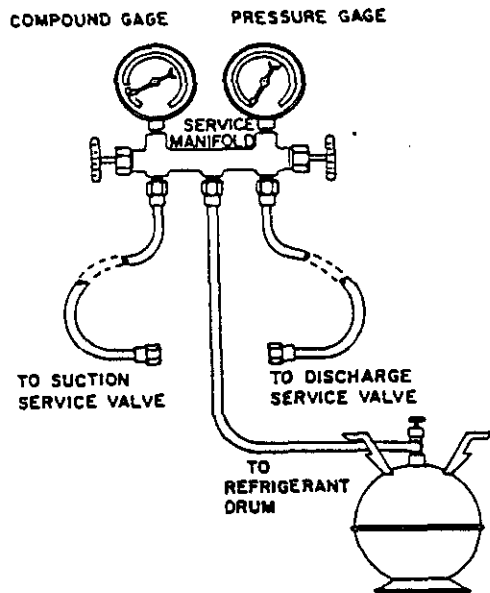
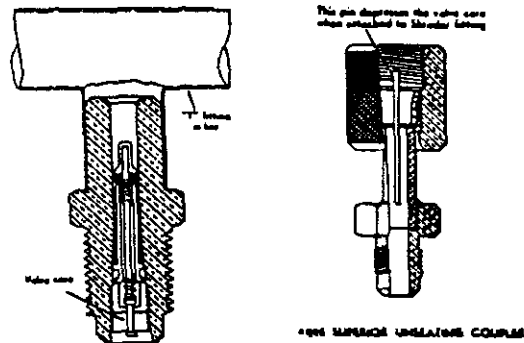


AIR CONDITIONING PROCEDURE FOR LEAK TEST-EVACUATION-CHARGING

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 HOSE 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 395 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 R22 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 150 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 22.

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-083S	8
5202-002	C-163S	10
5201-009	BFK-083S	7
5201-010	BFK-163S	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.

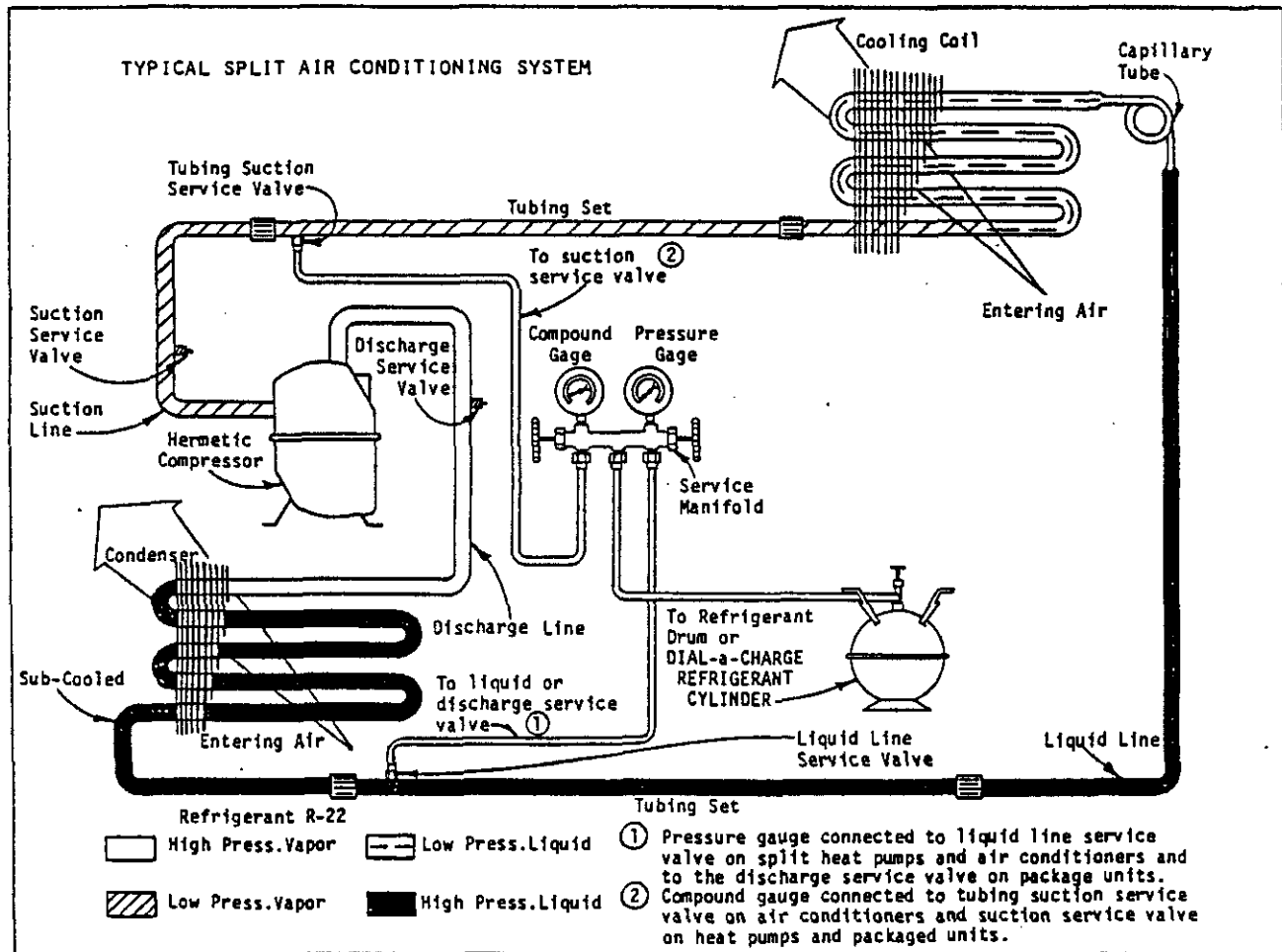
CHARGING THE SYSTEM BY WEIGHT*

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 100 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

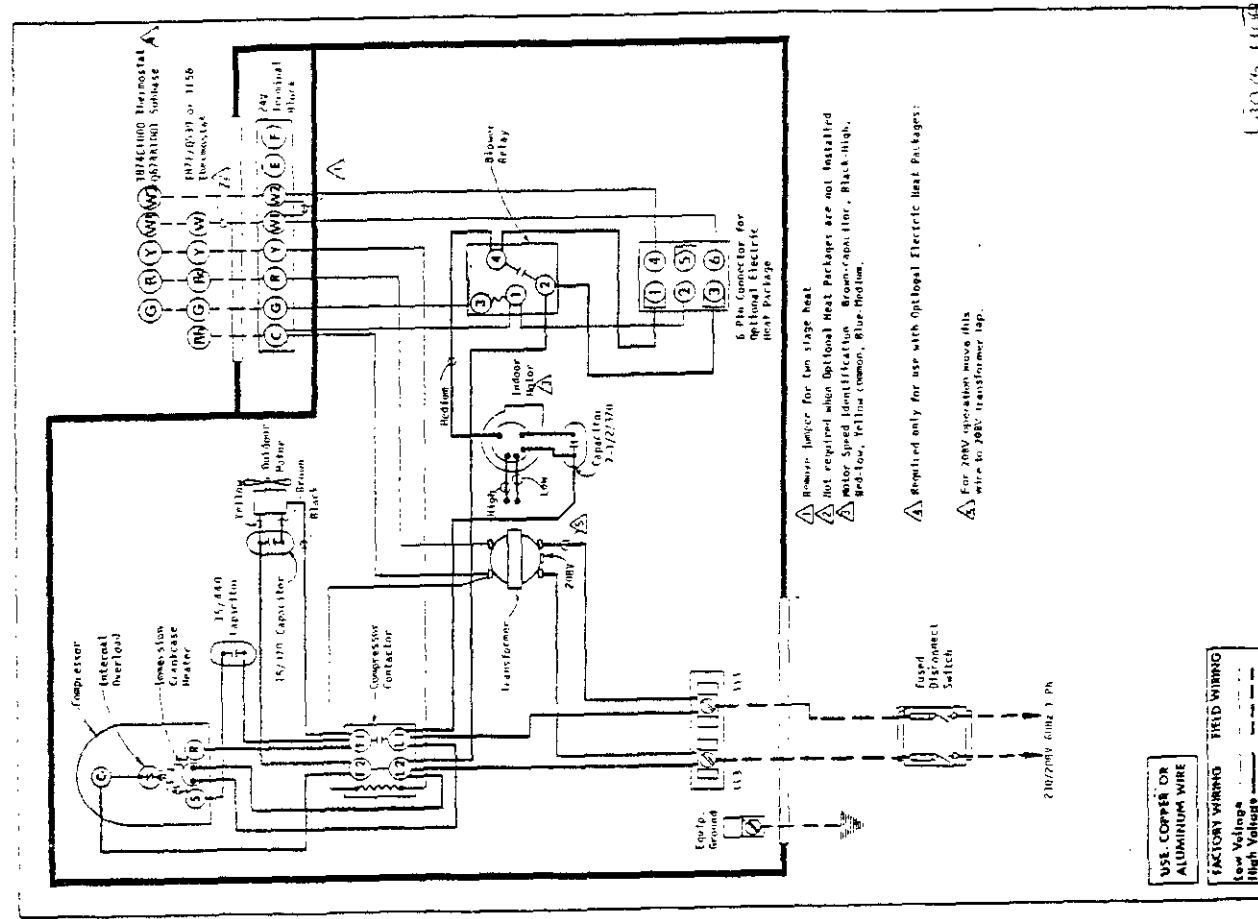
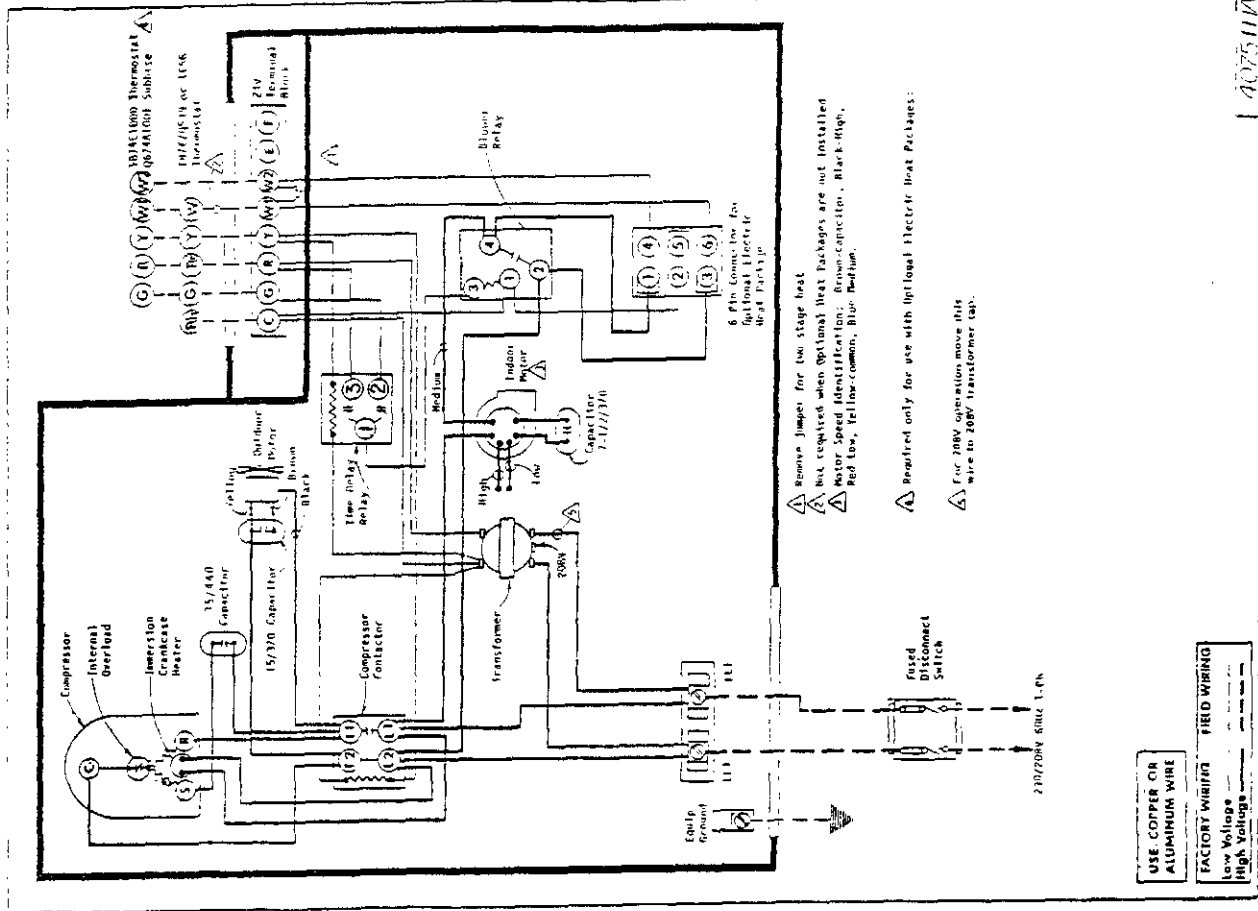
TROUBLESHOOTING — SYSTEM PRESSURE CHECK

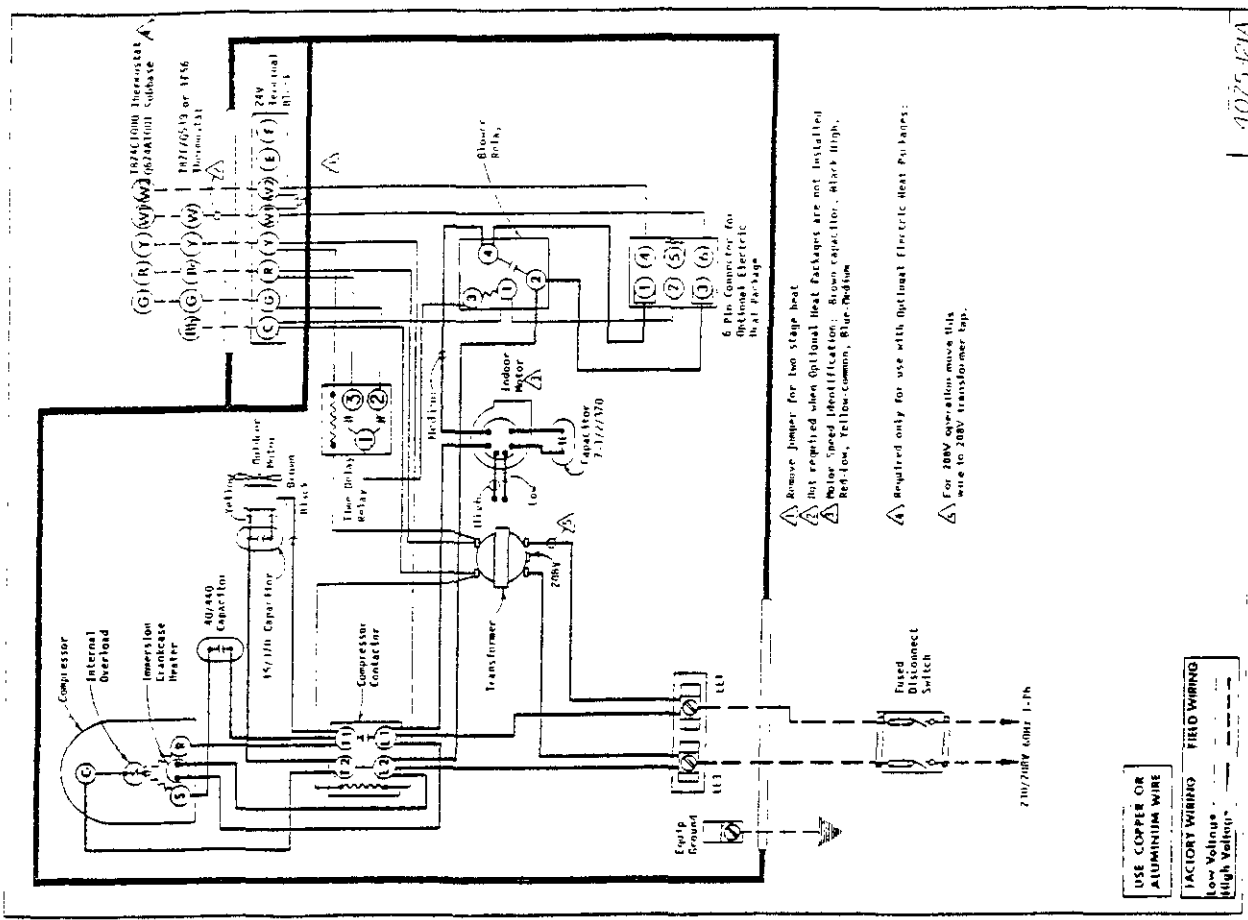
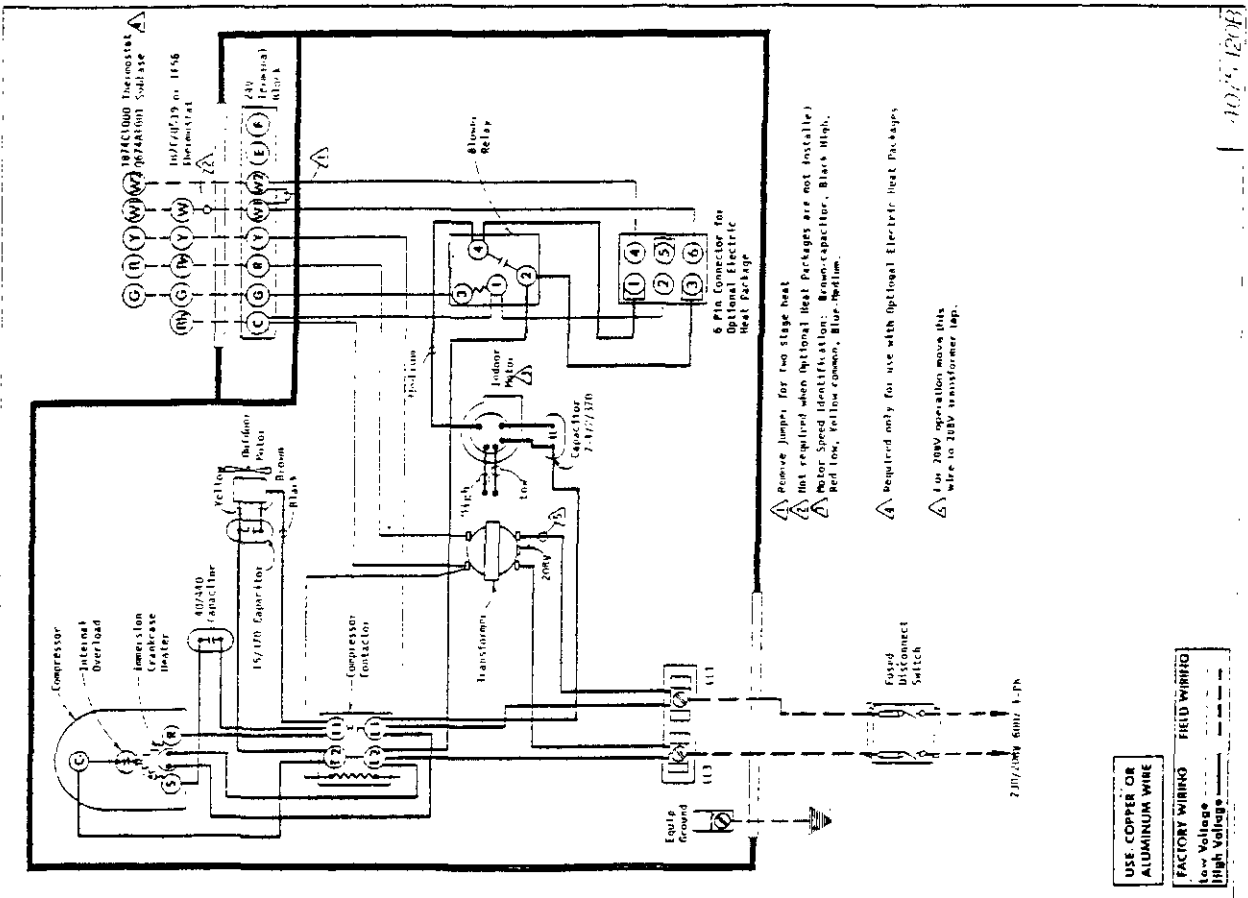
<p><u>Low Suction — Low Head Pressure</u></p> <ol style="list-style-type: none"> 1. Restricted air flow over indoor coil. 2. Defective indoor fan motor. 3. Low indoor and outdoor temperature. 4. Iced indoor coil. 5. Restricted liquid line, drier, or capillary tube. 6. Low charge. <p><u>High Suction — Low Head Pressure</u></p> <ol style="list-style-type: none"> 1. Defective or broken valves. 2. IPRV valve open. 	<p><u>Low Suction — High Head Pressure</u></p> <ol style="list-style-type: none"> 1. Partial restriction and then overcharged. <p>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.</p> <p><u>High Suction — High Head Pressure</u></p> <ol style="list-style-type: none"> 1. High ambient. 2. Low outdoor air flow 3. Overcharged. 4. Air in system. 5. Restricted condenser.
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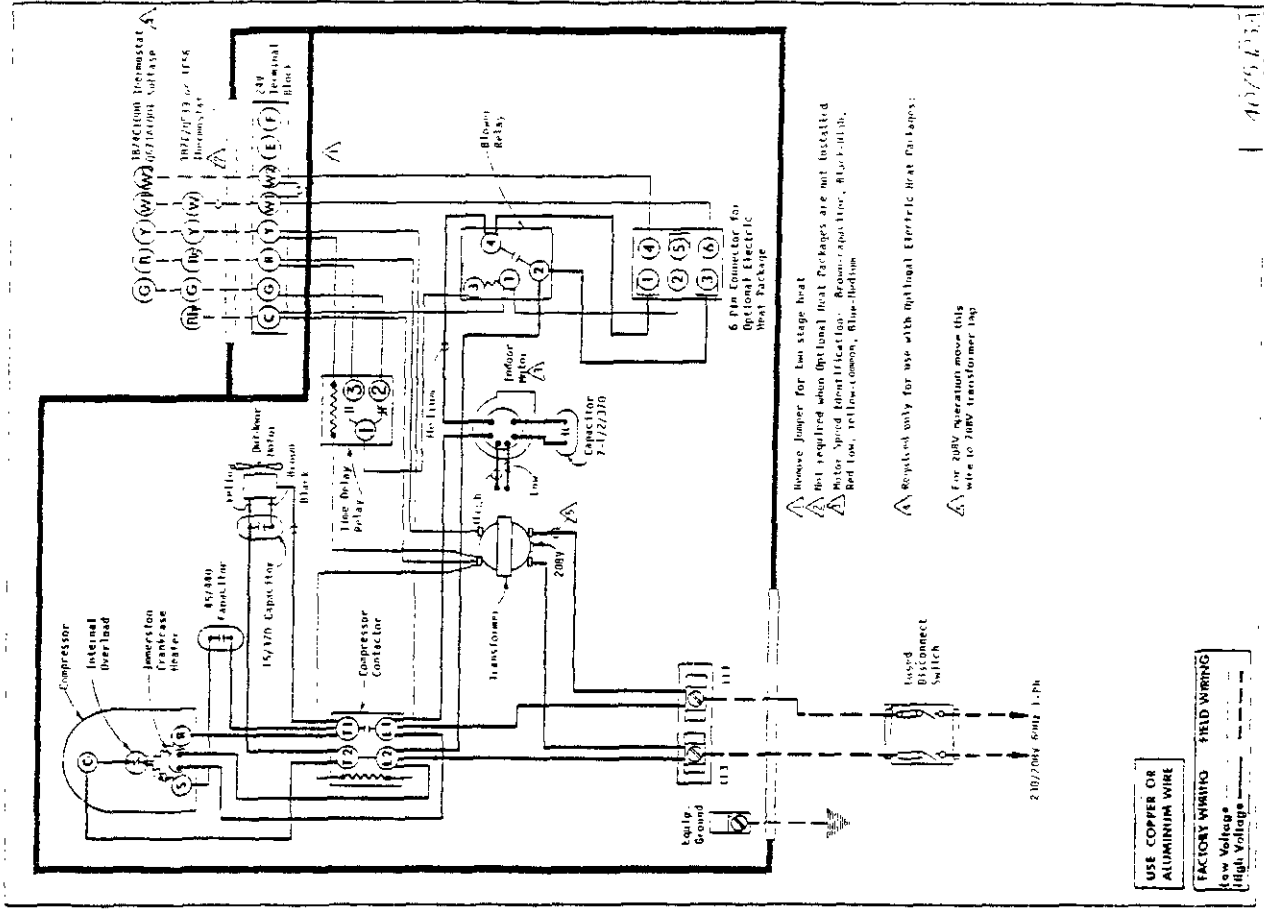
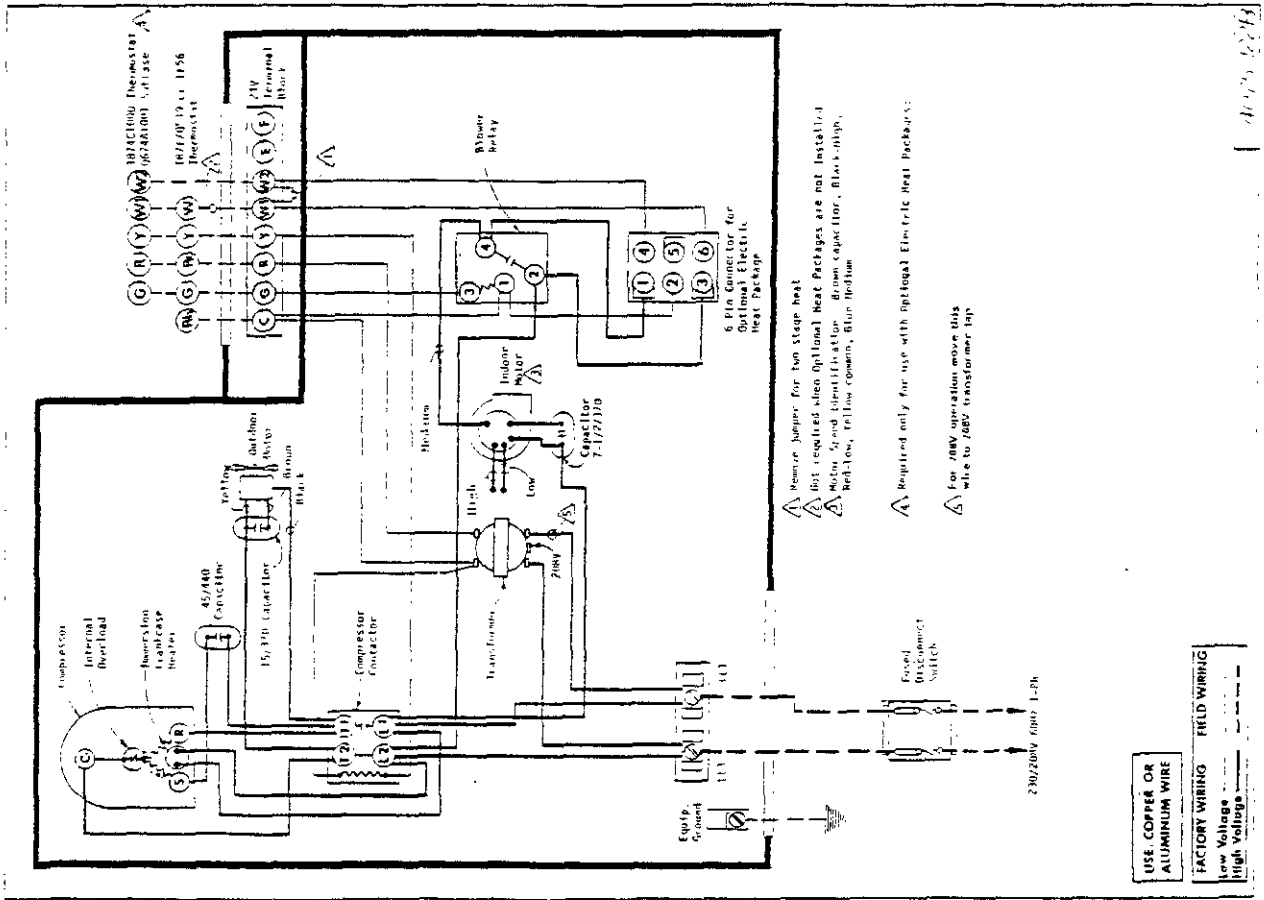
TROUBLE-SHOOTING CHART FOR AIR CONDITIONERS

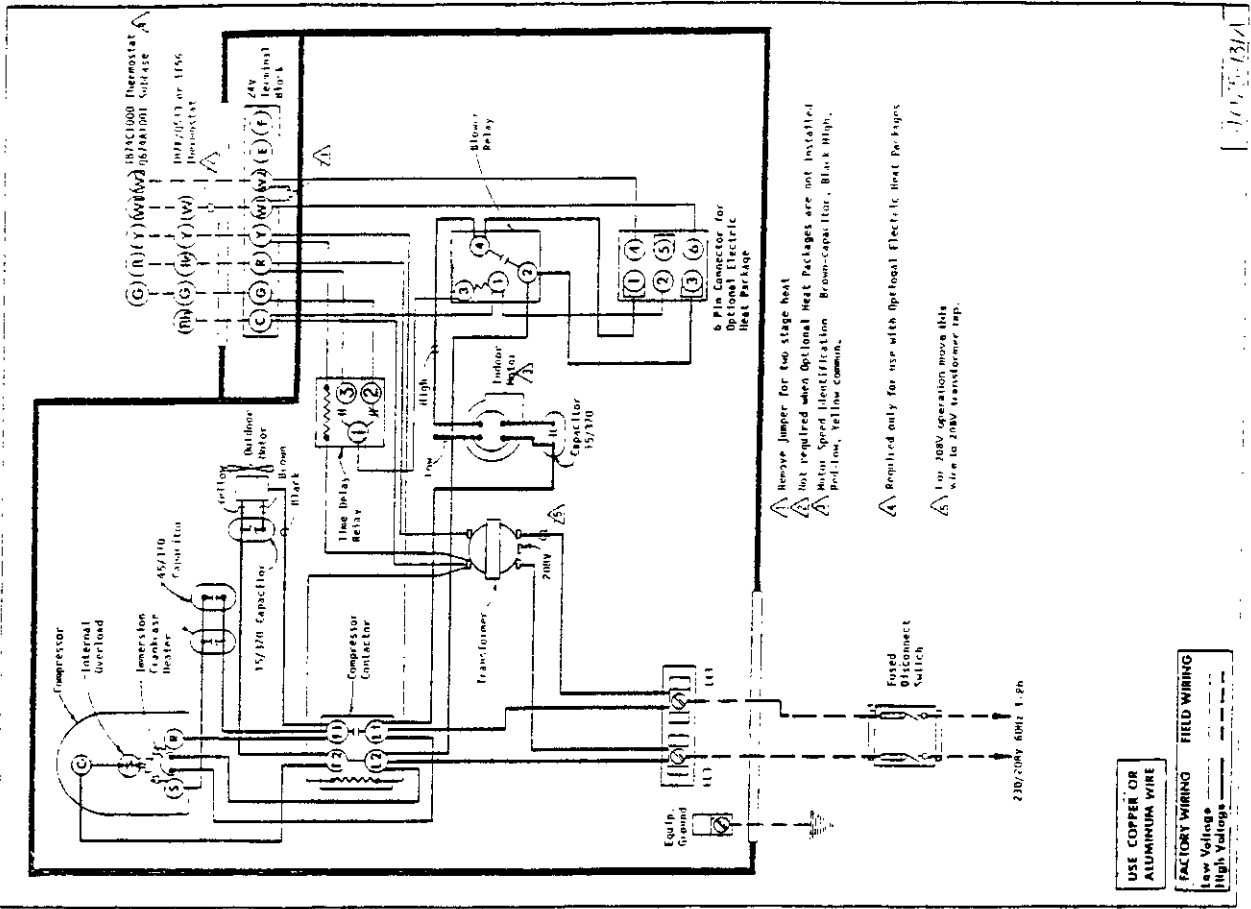
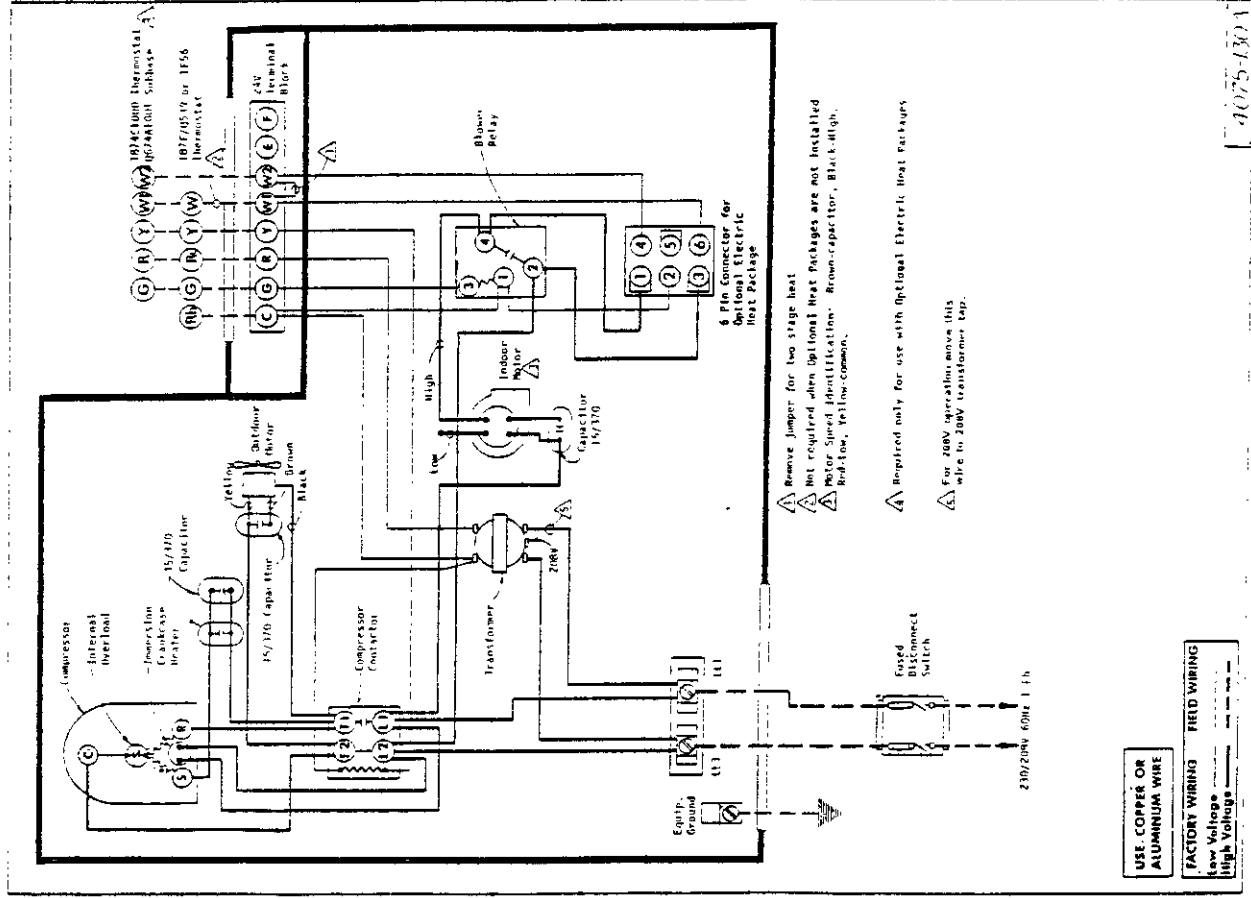
METER TO LINE SIDE OF CONTACTOR OF CONTACTOR	POWER SUPPLY										HIGH PRESSURE SIDE OF SYSTEM										LOW SIDE					GENERAL																																					
	LOAD SIDE OF CONTACTOR TO MOTOR TERMINAL					CONTROL CIRCUIT					MOTORS					COMPRESSOR					SYSTEM OPERATION					CONDENSER AIR					EVAPORATOR AIR																																
POWER FAILURE	BLOWN FUSES OR TRIPPED CIRCUIT BREAKER	FAULTY WIRING	LOOSE TERMINALS	LOW VOLTAGE	SINGLE PHASE FAILURE OF 3Ø	UNBALANCED POWER SUPPLY 3Ø	VOLTAGE TOO HIGH	OPEN DISCONNECT SWITCH	FAULTY WIRING	LOOSE TERMINAL	FAULTY WIRING	LOOSE TERMINAL	DEFECTIVE CONTACTS IN CONTACTOR	COMPRESSOR OVERLOAD	POTENTIAL RELAY FAILS TO OPEN	POTENTIAL RELAY FAILS TO CLOSE	RUN CAPACITOR	START CAPACITOR	FAULTY WIRING	LOOSE TERMINALS	CONTROL TRANSFORMER	LOW VOLTAGE	THERMOSTAT	CONTACTOR COIL	CONTACTOR CONTROL	CONDENSER FAN RELAY	EVAPORATOR FAN RELAY	COMPRESSOR MOTOR	CONDENSER MOTOR	EVAPORATOR MOTOR	COMP. OFF ON INTERNAL OVERLOAD	HOLD DOWN BOLTS	DEFECTIVE COMPRESSOR BEARINGS	SEIZED COMPRESSOR	DEFECTIVE COMPRESSOR VALVES	COMPRESSOR OIL LEVEL	OPEN OR SHORT MOTOR WINDINGS	REFRIGERANT CHARGE LOW	OVERCHARGE OF REFRIGERANT	HIGH HEAD PRESSURE	HIGH SUCTION PRESSURE	LOW SUCTION PRESSURE	TEMPERATURES	NON-CONDENSABLES (AIR ETC.)	EXCESSIVE LOAD IN SPACE	LIQUID VALVE PARTIALLY CLOSED	CONDENSER FAN BELT OR PLUGGED	CONDENSER FAN BELT SLIPPING	CONDENSER AIR SHORT CIRCUITING	LOW CONDENSER AIR VOLUME	CONDENSER AIR TEMPERATURE LOW	PLUGGED OR RESTRICTED CAP-TURE	EVAPORATOR FINS DIRTY OR PLUGGED	EVAPORATOR BELT SLIPPING	LOW EVAPORATOR AIR VOLUME	DIRTY FILTERS	DUCTWORK SMALL OR RESTRICTED	RESTRICTIONS	THERMOSTAT SETTING	THERMOSTAT LOCATION	STRATIFIED AIR IN SPACE	INCORRECT REFRIG. PIPING	SYSTEM TOO SMALL
COMPRESSOR AND CONDENSER FAN MOTOR WILL NOT START	COMPRESSOR WILL NOT START BUT CONDENSER FAN WILL RUN	CONDENSER FAN MOTOR WILL NOT START	COMPRESSOR "HUMS" BUT WILL NOT START	COMPRESSOR CYCLES OR OVERLOAD	COMPRESSOR SHORT CYCLES ON LOW PRESSURE	COMPRESSOR RUNS CONTINUOUSLY—NO COOLING	COMPRESSOR RUNS CONTINUOUSLY—COOLING	COMPRESSOR NOISY	COMPRESSOR LOSES OIL	HEAD PRESSURE TOO HIGH	HEAD PRESSURE TOO LOW	LIQUIDLINE FROSTING OR SWEATING	SUCTION PRESSURE TOO HIGH	SUCTION PRESSURE TOO LOW	EVAPORATOR FROSTING	SUCTION LINE FROSTING OR SWEATING	EVAPORATOR BLOWER WILL NOT START	CONDENSER FAN MOTOR RUNS CONTACTOR NOT PULLED IN	LIQUID NEAR FLOODING BACK TO COMP.—(CAP TUBE SYSTEM)	SPACE TEMP. TOO HIGH																																											

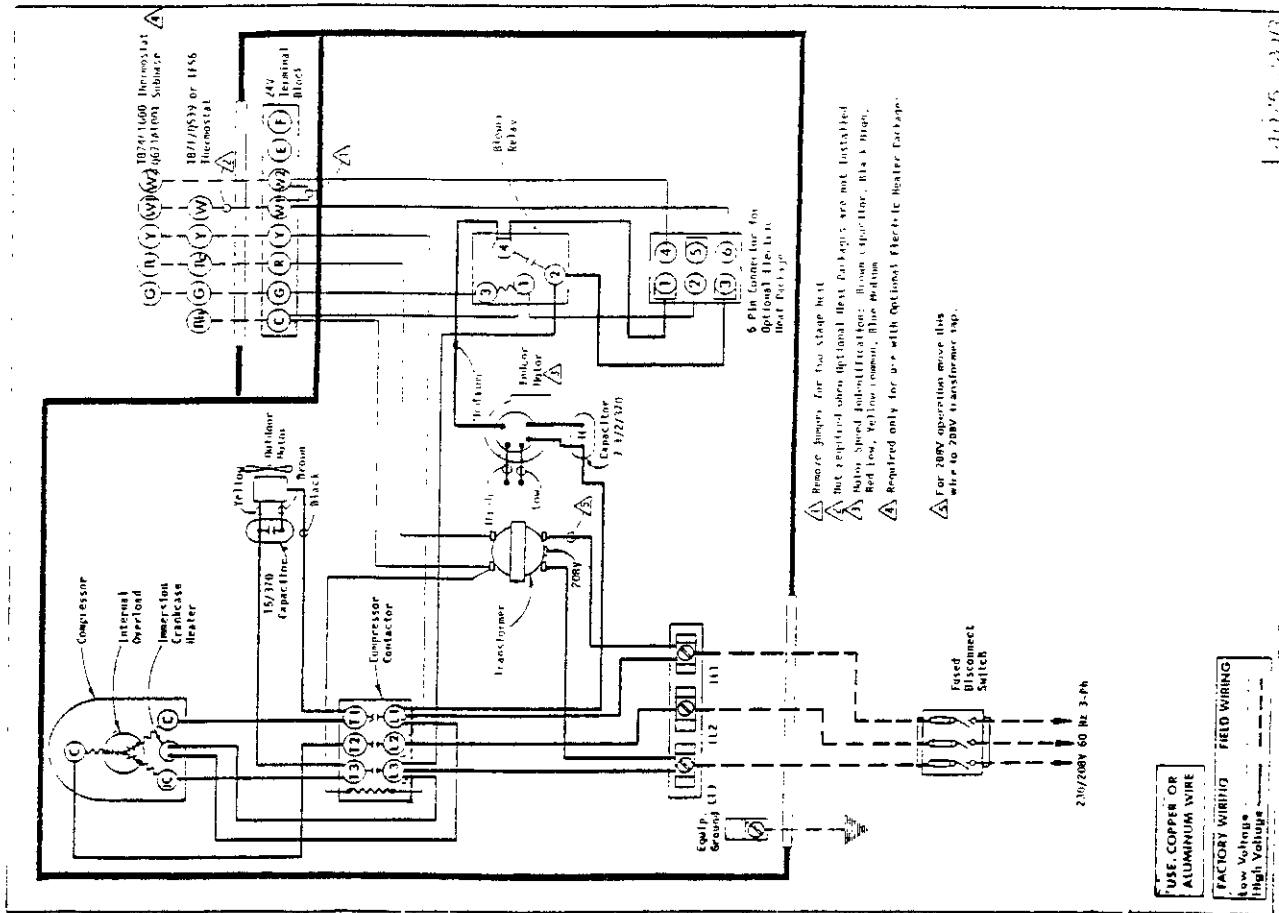
GENERALLY THE CAUSE—ALWAYS MAKE THESE CHECKS FIRST.
 OCCASIONALLY THE CAUSE. MAKE THESE CHECKS ONLY IF FIRST CHECKS FAIL TO LOCATE TROUBLE.
 RARELY THE CAUSE, MAKE THIS CHECK ONLY IF PREVIOUS CHECKS FAIL TO LOCATE TROUBLE.



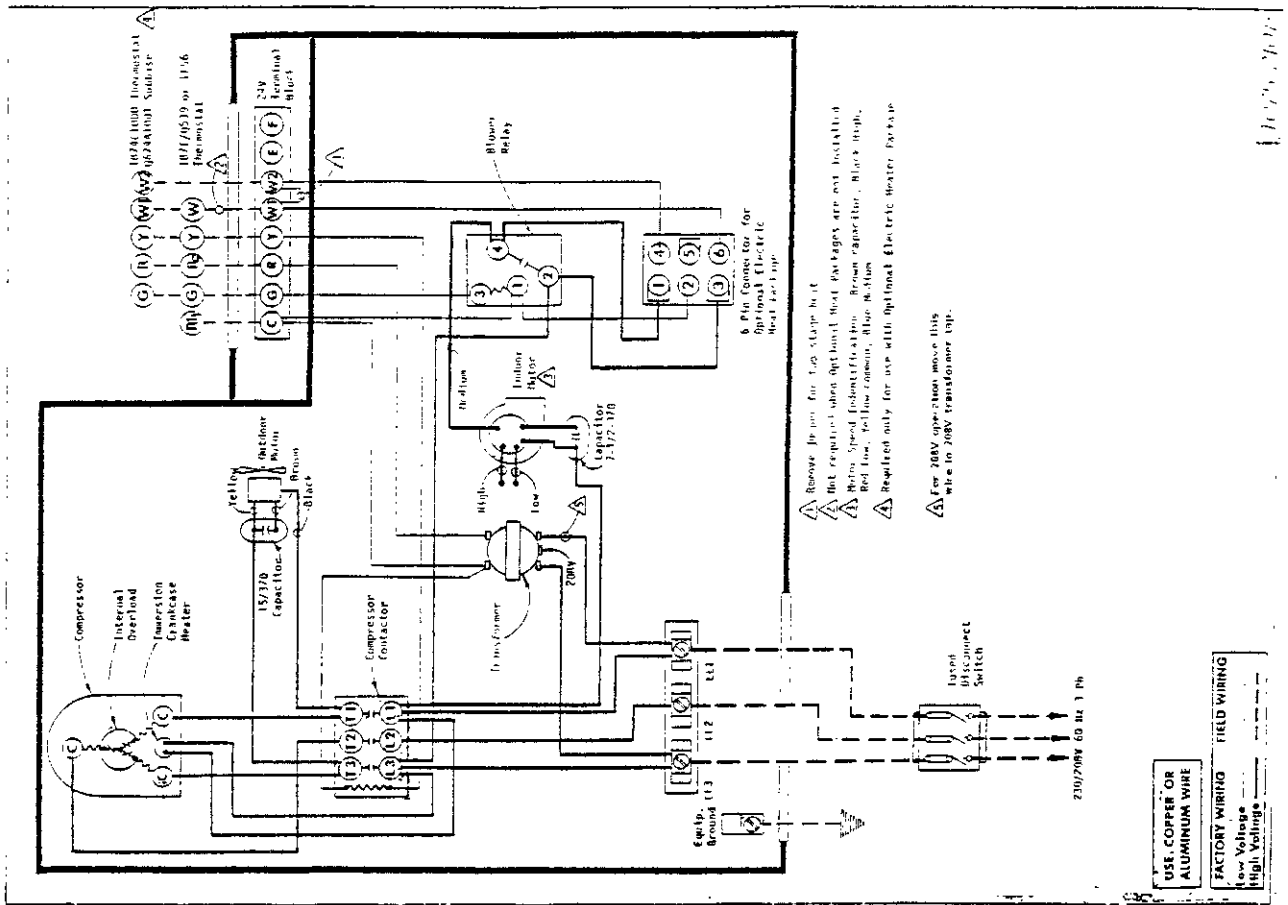








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