MANUAL 2100-028 H

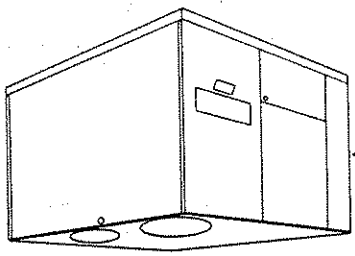
MODELS
RPMH30B & RPMH36B
ROOF MOUNT
PACKAGED HEAT PUMP

INSTALLATION INSTRUCTIONS

SPECIALLY DESIGNED FOR ROOFTOP HEATING / COOLING APPLICATIONS

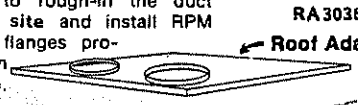
Easy 3-step installation for roof top applications. Saves installation labor, time, cost and provides leakproof installation. No special roof hood plenum assembly required.

RPM SERIES.
Packaged Roof Mount Heat Pump Unit.

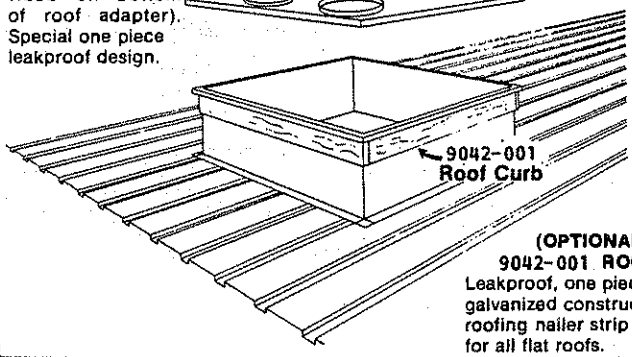


RPMH30B or RPMH36B

RA3036-1 ROOF ADAPTER. (Required Accessory)
Painted galvannealed 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.

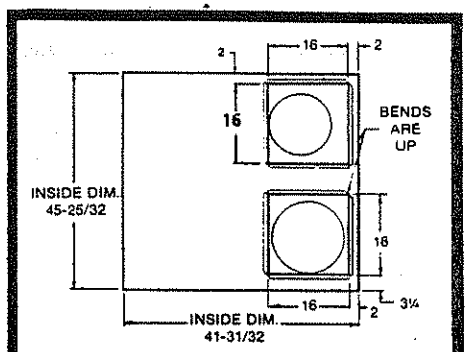


RA3036-1 Roof Adapter

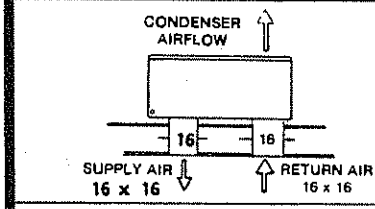


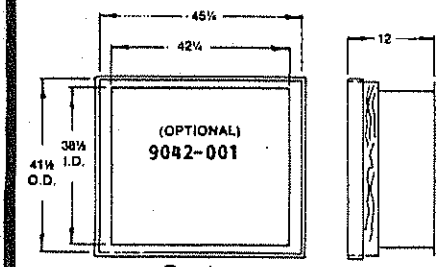
9042-001 Roof Curb

(OPTIONAL) 9042-001 ROOF CURB
Leakproof, one piece welded galvanized construction with roofing nailer strip - suitable for all flat roofs.



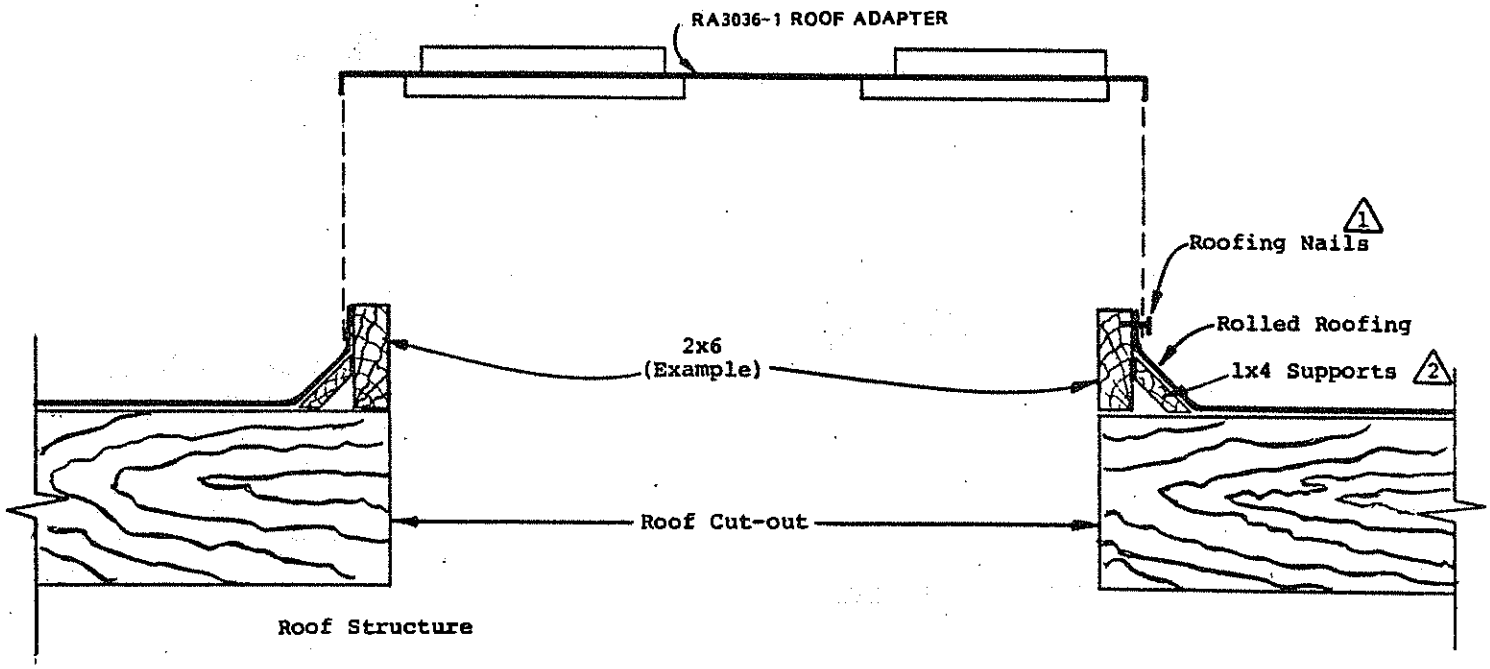
Bottom view
RA3036-1 ROOF ADAPTER





Top view Side view

TYPICAL CONSTRUCTION FOR DIMENSIONAL LUMBER EXTENSION CONSTRUCTION



1 Nail 3/4" from top.

2 Provides support to roofing material, prevents sharp bends and cracking.

INDOOR BLOWER PERFORMANCE
CFM – Dry Coil With Filter

E.S.P. In H_2O	RPMH30B and RPMH36B		
	High Speed	Medium Speed	Low Speed
.0	1425	1225	1130
.10	1385	1190	1115
.20	1330	1150	1085
.30	1275	1100	1050
.40	1205	1050	1005
.50	1130	995	950
.60	1060	935	890

BASIC UNIT ELECTRICAL DATA

Model	Rated Volts & Ph	Operating Voltage Range	Max. Unit Amps 230/208	Maximum Fuse or Circuit Breaker* Ckt.A	Minimum Circuit Ampacity Ckt.A	Field** Power Wiring Ckt.A	Ground** Wire Size Ckt.A
RPMH30B	230/208-1	197-253	19.3/20.3	40	25	10	10
RPMH30B-B	230/208-3	187-253	13.8/14.3	30	19	12	10
RPMH30B-C+	460-3	414-506	8.2	15	15	14	14
RPMH36B	230/208-1	197-253	19.7/21.6	40	27	10	10
RPMH36B-B	230/208-3	187-253	14.3/15.3	30	19	12	10
RPMH36B-C+	460-3	414-506	7.7	15	15	14	14

*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) Kw	Btuh	Heater Kw & Capacity @ 208 Volts Kw	Btuh	Heater Amps @ 240/208 (or 480V if applicable)	Heater Internal Fuses	CIRCUIT B Number Field Ckts.	Minimum Circuit Ampacity	Max. Over-Current Protection	Field① Power Wiring	Ground Wire Size ②
EH3RA-A05	240/208-1	5	17,100	3.75	12,800	20.8/18.1		1	26/23	30/25	10/10	10
EH3RA-A10	240/208-1	10	34,100	7.5	25,600	41.6/36.2		1	53/46	60/50	6/6	10
EH3RA-A15	240/208-1	15	51,200	11.25	38,400	62.5/54.1	30/60	1	79/68	80/70	3/4	8
EH3RA-A20	240/208-1	20	68,200	15.0	51,200	83.2/72/1	60/60	1	104/91	110/100	2/3③	6
EH3RA-B09	240/208-3	9	30,700	6.75	23,000	21.7/18.7		1	28/24	30/25	10/10	10
EH3RA-B15	240/208-3	15	51,200	11.25	38,400	36.2/31.2		1	46/39	50/40	6/8	10
EH3RA-B18	240/208-3	18	61,400	13.5	46,100	43.3/37.5		1	55/47	60/50	6/6	10
EH3RA-C09	480-3	9	30,700	6.75	23,000	10.8		1	15	15	14	14
EH3RA-C15	480-3	15	51,200	11.25	38,400	18.0		1	23	25	10	10
EH3RA-C18	480-3	18	61,400	13.5	46,100	21.7		1	28	30	10	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	① RPMH30B	① RPMH30B-B	① RPMH30B-C	① RPMH36B	① RPMH36B-B	① RPMH30B-C
EH3RA-A05	240/208-1	S	A	A	S	A	A
EH3RA-A10	240/208-1	S	A	A	S	A	A
EH3RA-A15	240/208-1	S	A	A	S	A	A
EH3RA-A20	240/208-1	S	A	A	S	A	A
EH3RA-B09	240/208-3	A	S	A	A	S	A
EH3RA-B15	240/208-3	A	S	A	A	S	A
EH3RA-B18	240/208-3	A	S	A	A	S	A
EH3RA-C09	480-3	A	A	S	A	A	S
EH3RA-C15	480-3	A	A	S	A	A	S
EH3RA-C18	480-3	A	A	S	A	A	S

① Max. amount of electric heat which operated in with the compressor during heating mode is 10Kw on 1 phase and 12Kw on 3 phase. The balance of the heat can be operated only during compressor cutoff or emergency heat mode.

S - Standard application - heater volts and phase same as basic unit.
A - Alternate application - heater volts and phase different from basic unit.

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.

CRANKCASE HEATERS

All single and three phase models have an insertion well-type crankcase 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 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.

7981-061

AIR FILTER

A 24"x24"x1" disposable fiberglass type filter is 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 corner panel where either the fresh air blank off panel or fresh air intake hood is located.

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.

DEFROST CYCLE

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

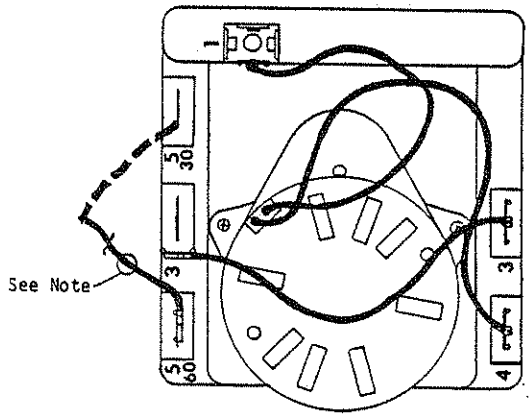
During the defrost mode, the refrigerant cycle switches back to the cooling cycle, the outdoor motor stops, electric heaters are energized, and hot gas passing through the outdoor coil melts any accumulated frost. When the temperature rises to approximately 57°F, the defrost thermostat opens, de-energizing 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, contacts 3-5 of the defrost timer will open after 7 minutes and restore the system to heating operations automatically.

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

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

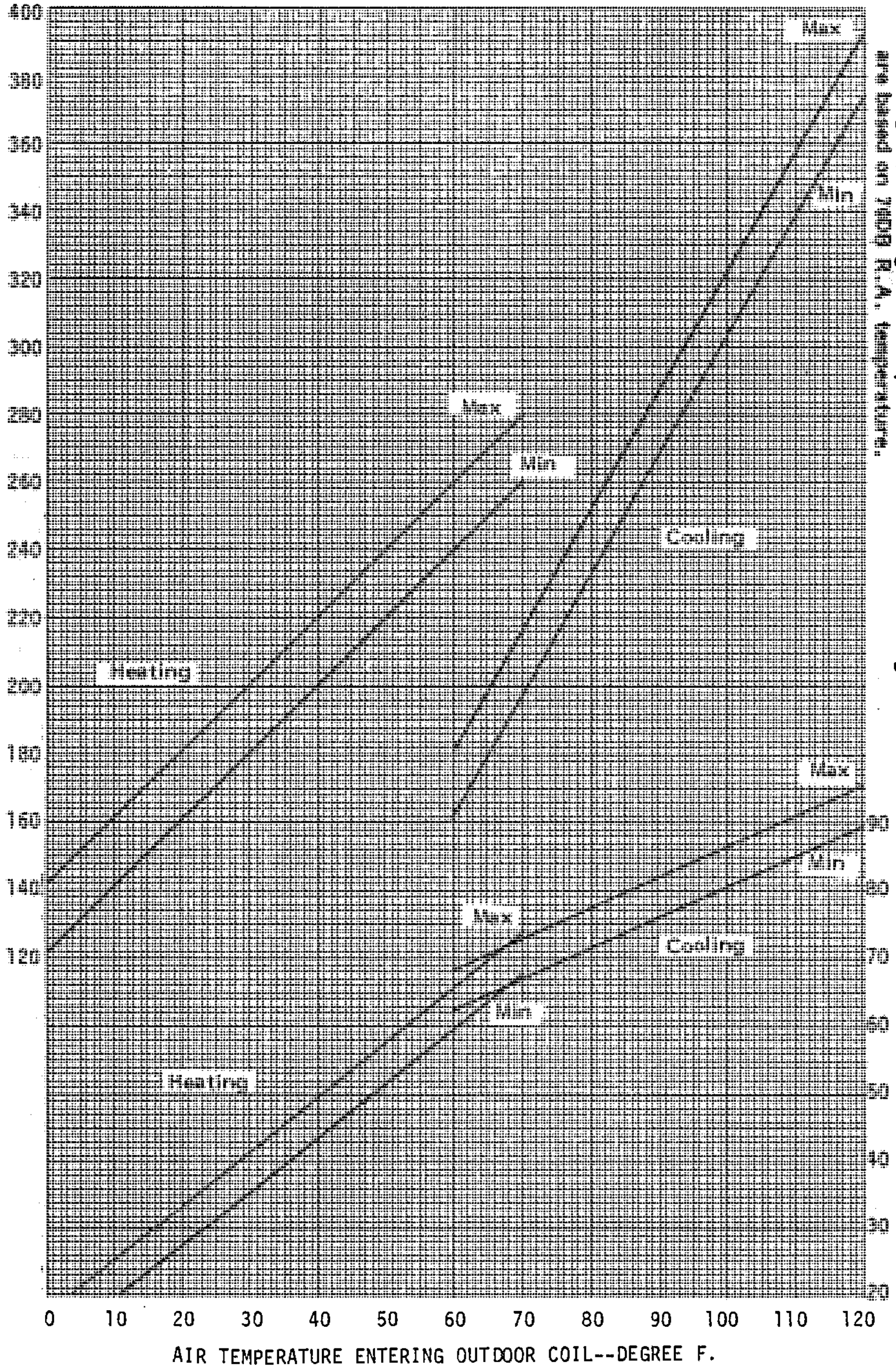
DEFROST TIMER WIRING



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

PARTS LIST
SINGLE PACKAGE HEAT PUMPS

PART NO.	DESCRIPTION	RPMH30B	RPMH30B-B	RPMH36B	RPMH36B-B	RPMH30B-C	RPMH36B-C
5202-003	Accumulator	x	x			x	
5202-004	Accumulator			x	x		x
*	Blower Housing 10-8	x	x	x	x	x	x
5152-010	Blower Wheel DD10-7A	x	x	x	x	x	x
8552-035	Capacitor 40/370V	x		x			
8552-019	Capacitor 5/440V	x	x	x	x	x	x
8552-002	Capacitor 5/370V	x	x	x	x	x	x
5811-033	Capillary Tube - Cool	(2)	(2)	(2)	(2)	(2)	(2)
5811-016	Capillary Tube - Heat	x	x			x	
5811-021	Capillary Tube - Heat			x	x		x
8000-052	Compressor - CRG3-0250-PFV-270	x					
8000-053	Compressor - CRG3-0250-TF5-270		x				
8000-054	Compressor - CRG3-0250-TFD-270					x	
8000-055	Compressor - CRH3-0275-PFV-270			x			
8000-056	Compressor - CRH3-0275-TF5-270				x		
8000-057	Compressor - CRH3-0275-TFD-270						x
5051-003	Condenser Coil	x	x	x	x	x	x
8401-007	Contactor 1P25A	x		x			
8401-002	Contactor 3P35A		x		x	x	x
8607-017	Terminal Block					x	x
8408-016	Defrost Thermostat	x	x	x	x	x	x
5060-022	Evaporator Coil	x	x	x	x	x	x
5151-031	Fan Blade	x	x	x	x	x	x
7051-014	Fan Guard	x	x	x	x	x	x
8406-011	High Pressure Switch	x	x	x	x	x	x
8607-015	Phenolic Insulator					x	x
8105-010	Motor - Blower 1/3 hp	x	x	x	x	x	x
8103-013	Motor - Fan 1/5 hp	x	x	x	x	x	x
7004-015	Filter	x	x	x	x	x	x
5651-036	Check Valve	x	x	x	x	x	x
8200-003	Motor Mount - Blower	x	x	x	x	x	x
8200-022	Motor Mount - Fan	x	x	x	x	x	x
5451-011	Motor Mounting Parts	x	x	x	x	x	x
5451-009	Motor Mounting Parts - Fan	x	x	x	x	x	x
5153-022	Rain Shield	x	x	x	x	x	x
8201-008	Relay - Blower	x	x	x	x	x	x
8201-013	Relay - Emergency Heat	x	x	x	x		
8201-047	Relay - Defrost	x	x	x	x	x	x
8201-031	Relay - Compressor Fault	x		x			
5650-005	Reversing Valve	x	x			x	
5650-014	Reversing Valve			x	x		x
5650-012	Solenoid Coil	x	x	x	x	x	x
5210-004	Strainer	x	x	x	x	x	x
5210-002	Strainer	x	x	x	x	x	x
8607-010	Terminal Board	x	x	x	x	x	x
8607-013	Terminal Block	x		x			
8607-014	Terminal Block		x		x	x	x
8612-012	Timer w/7 Min. Time Safe	x	x	x	x	x	x
8407-035	Transformer	x	x	x	x	x	x
8407-003	Transformer - Stepdown 1.5 KVA					x	x
4071-110	Wiring Diagram	x		x			
4071-210	Wiring Diagram		x		x		
4071-310	Wiring Diagram					x	x



Cooling curves are based upon 80DB, 67WB Temp. and rated CFM (airflow) across the evaporator coil and should be used for reference purposes only. Specific 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. Heating curves are based on 70DB R.A. temperature.

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.

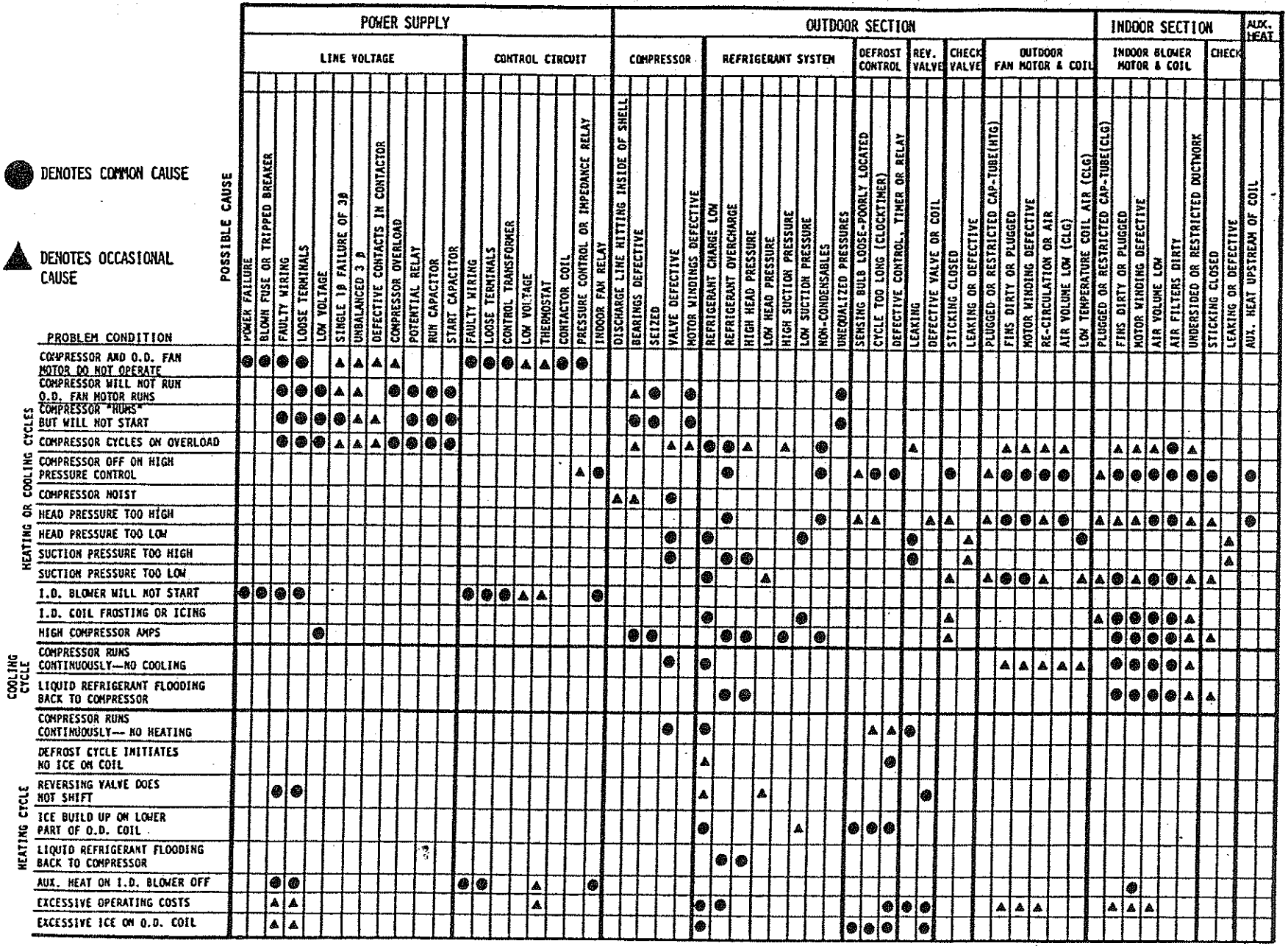
7. When the correct weight of refrigerant has been added to the unit, close refrigerant cylinder valve and allow unit to run for 30 minutes. Refer to Start-Up Procedure and Check List for further start-up details. Check the charge against the allowable head pressure as shown in the Head Pressure Chart 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 necessery 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.

QUICK REFERENCE TROUBLE-SHOOTING CHART FOR AIR TO AIR HEAT PUMP



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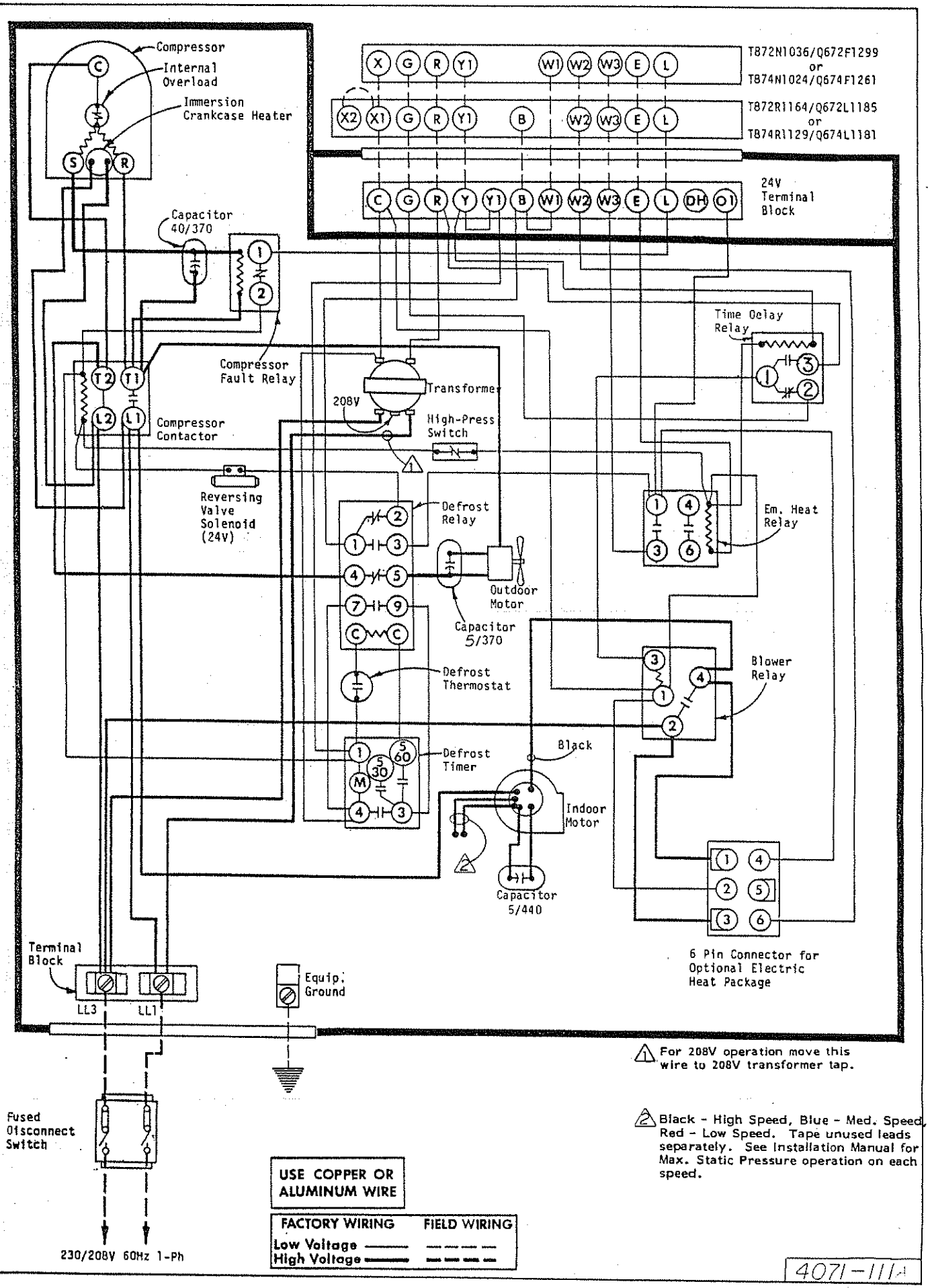
Compressor
Internal Overload
Immersion Crankcase Heater
C
S
R
T872N1036/Q672F1299
or
T874N1024/Q674F1261
T872R1164/Q672L1185
or
T874R1129/Q674L1181
X
G
R
Y1
W1
W2
W3
E
L
X2
X1
B
24V Terminal Block
C
G
R
Y
Y1
B
W1
W2
W3
E
L
DH
O1
Capacitor 40/370
1
2
Time Delay Relay
3
Compressor Fault Relay
T2
T1
L2
L1
Compressor Contactor
Transformer
208V
High-Press Switch
Reversing Valve Solenoid (24V)
Defrost Relay
2
1
3
4
5
7
9
C
C
Em. Heat Relay
6
Outdoor Motor
Capacitor 5/370
Defrost Thermostat
Blower Relay
Defrost Timer
5
60
30
M
Black
Indoor Motor
Capacitor 5/440
Terminal Block
LL3
LL1
Equip. Ground
6 Pin Connector for Optional Electric Heat Package
Fused Disconnect Switch
230/208V 60Hz 1-Ph
USE COPPER OR ALUMINUM WIRE
FACTORY WIRING
FIELD WIRING
Low Voltage
High Voltage
1 For 208V operation move this wire to 208V transformer tap.
2 Black - High Speed, Blue - Med. Speed, Red - Low Speed. Tape unused leads separately. See Installation Manual for Max. Static Pressure operation on each speed.

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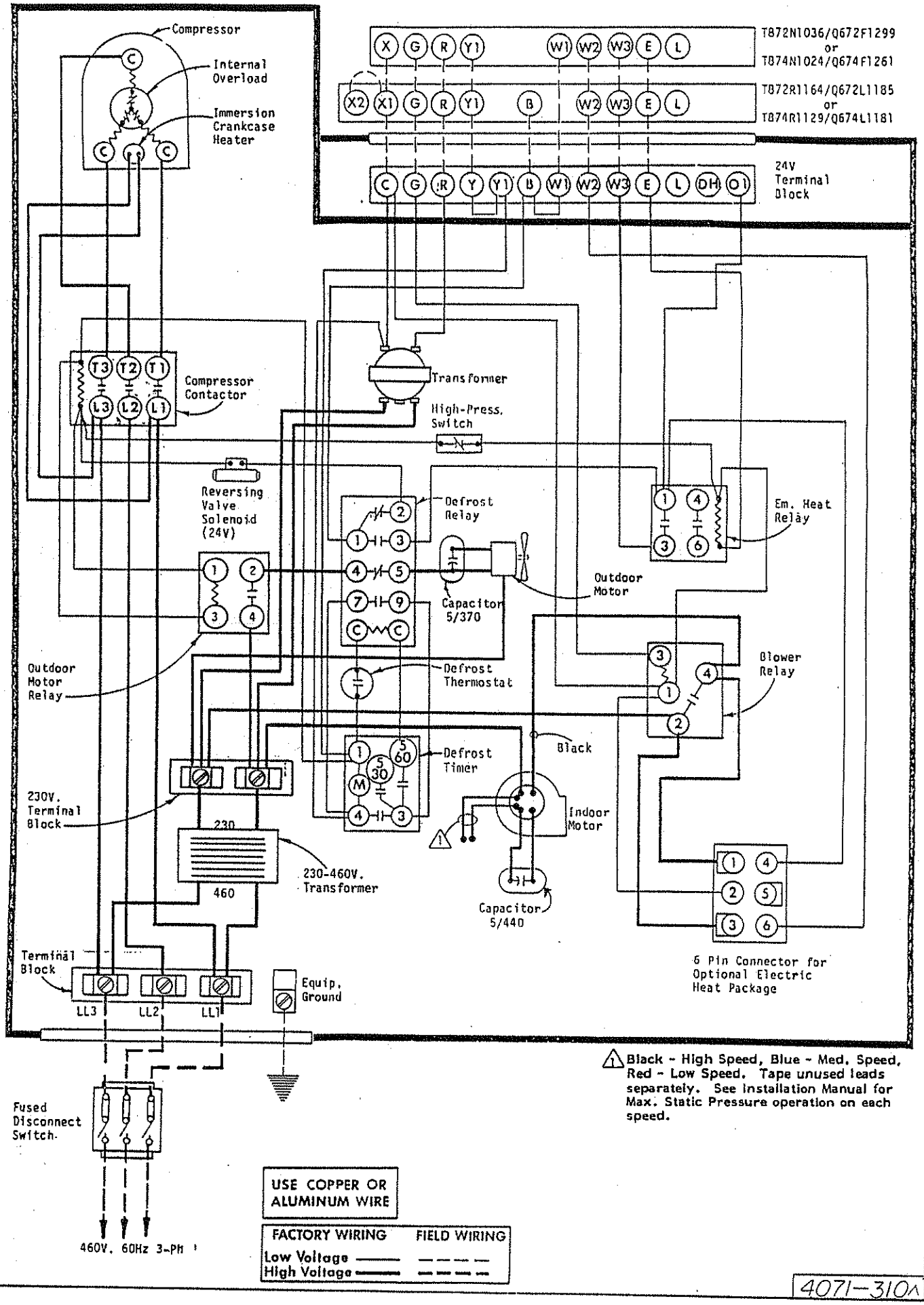

⚠1 Black - High Speed, Blue - Med. Speed, Red - Low Speed. Tape unused leads separately. See Installation Manual for Max. Static Pressure operation on each speed.

4071-310A