

CHP9 SERIES UNITS

I - INTRODUCTION

The CHP9 packaged heat pump is designed for residential or small commercial application. The unit can be slab mounted with end discharge or installed on an RMF9 roof mounting frame. Figure 1 shows a cutaway. Auxiliary electric heat is available (ECH9). Other options are listed in Table 1.

If a hard start kit is necessary, refer to the "Cross Reference Section" of the Lennox Repair Parts Handbook.

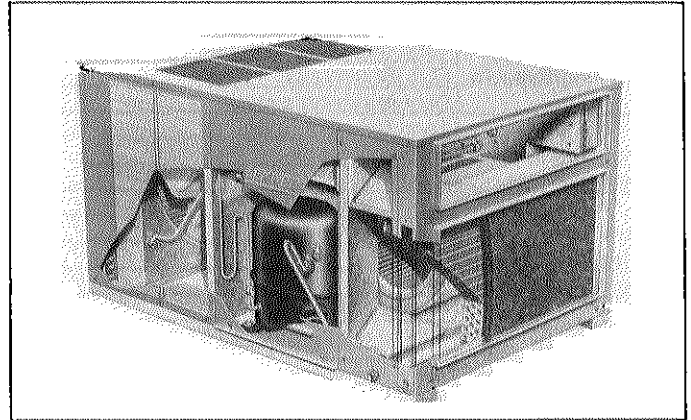


FIGURE 1

TABLE 1

Description	CHP9-260 CHP9-310 CHP9-410	CHP9-460 CHP9-510
Optional Supply & Return Fiberglass Duct Kit	BM-7820	BM-7820
Optional Combination Ceiling Supply And Return Step-Down Diffuser	RTD-41	RTD-65
Optional Combination Ceiling Supply And Return Flush Diffuser	FD-41 *FD-41D	FD-65 *FD-65-D
Optional Combination Supply & Return Plenum		SRP9-65
Optional Roof Mounting Frame		RMF9-65
Optional Duct Enclosure		RT9-65
Optional POWER SAVER		RD9-65
RT9/RD9 Adapter Kit For CHA9-261 & 311 #410		LB-29475B
Optional Minimum Fresh Air Damper		OAD3-46/65
Timed-off Control		77A24
Low Ambient Control		LB-44961BA
Outdoor Thermostat		M-1595

*Flush diffuser with adjustable baffle blades

II - UNIT INFORMATION

A - Electrical Data

Model No.		CHP9-261	CHP9-311	CHP9-411	CHP9-413	CHP9-461	CHP9-463	
Line voltage data		†208/230v 60hz — 1ph	†208/230v 60hz — 1ph	†208/230v 60hz — 1ph	††208/230v 60hz — 3ph	†208/230v 60hz — 1ph	††208/230v 60hz — 3ph	††460v 60hz — 3ph
Compressor	Rated load amps	14.9	17.3	23.9	15.4	25.1	15.4	7.1
	Power factor	.92	.92	.92	.85	.92	.85	.85
	Locked rotor amps	74.0	85.0	103.0	77.0	114.0	93.0	32.0
Outdoor Coil Fan	Full load amps	1.4	2.6	3.0	3.0	3.2	3.2	**3.2
	Locked rotor amps	2.9	5.4	6.3	6.3	5.8	5.8	**5.8
Indoor Coil Blower	Full load amps	2.2	2.3	3.9	3.9	3.9	3.9	**3.9
	Locked rotor amps	4.5	5.4	9.5	9.5	9.5	9.5	**9.5
Recommended maximum fuse size (amps)		35	45	60	35	60	40	15
*Minimum circuit ampacity		22.2	26.5	36.8	26.2	38.5	26.4	12.4

Model No.		CHP9-511	CHP9-513	
Line voltage data		†208/230v 60hz — 1ph	††208/230v 60hz — 3ph	††460v 60hz — 3ph
Compressor	Rated load amps	29.2	18.3	8.7
	Power factor	.92	.85	.85
	Locked rotor amps	132.0	103.0	38.0
Outdoor Coil Fan	Full load amps	5.2	5.2	**5.2
	Locked rotor amps	10.8	10.8	**10.8
Indoor Coil Blower	Full load amps	6.0	6.0	**6.0
	Locked rotor amps	14.7	14.7	**14.7
Recommended maximum fuse size (amps)		70	50	25
*Minimum circuit ampacity		47.7	34.0	16.5

*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements.

†Extremes of operating range are plus 10% and minus 5% of line voltage.

††Extremes of operating range are plus and minus 10% of line voltage.

**Motors are rated at 230 volts. FLA shown are for step-down transformer output.

B - Specifications

Model No.	CHP9-261	CHP9-311	CHP9-411 CHP9-413	CHP9-461 CHP9-463	CHP9-511 CHP9-513	
★ARI Standard 270 SRN	19	20	20	21	21	
*ARI Certified Cooling Capacity	Cooling Capacity (Btuh)	24,000	29,000	†34,500	42,000	48,000
	Total unit watts cooling	**3500	**4200	5400	**6000	7300
	EER (Btuh/Watts)	6.9	6.9	6.4	7.0	6.6
	Dehumidifying capacity	30%	30%	30%	29%	29%
*ARI Certified High Temperature Heating Capacity	Total Capacity (Btuh)	26,000	29,000	†37,000	42,000	51,000
	Total unit watts	**3000	**3700	4800	**5000	6200
	C.O.P.	2.5	2.3	2.3	2.5	2.4
*ARI Certified Low Temperature Heating Capacity	Total Capacity (Btuh)	16,000	17,000	†21,000	25,000	31,000
	Total unit watts	**2600	**3100	3850	***4300	5100
	C.O.P.	1.8	1.6	1.6	1.7	1.8
Refrigerant charge (R-22)	3 lbs. 11 oz.	4 lbs. 5 oz.	4 lbs. 9 oz.	7 lbs. 4 oz.	7 lbs. 0 oz.	
Indoor Coil	Net face area (sq. ft.)	3.0	3.0	3.0	4.5	4.5
	Tube diameter (in.) & No. of rows	3/8—2	3/8—3	3/8—3	3/8—3	3/8—3
	Fins per inch	16	16	16	16	16
Indoor Coil Blower	Wheel nominal diam x width (in.)	9 x 9	10 x 9	11 x 9	10 x 10	12 x 12
	Motor horsepower	1/4	1/3	1/2	1/2	3/4
Outdoor Coil	Net face area (sq. ft.)	4.5	4.5	4.5	6.75	6.75
	Tube diameter (in.) & No. of rows	3/8—2	3/8—3	3/8—3	3/8—3	3/8—3
	Fins per inch	16	15	15	15	15
Outdoor Coil Fan	Diameter (in.) and No. of blades	(1) 20—4	(1) 20—4	(1) 20—5	(2) 18—5	(2) 18—5
	Air Volume (factory setting)	2300	2500	2800	3200	3500
	Rpm (factory setting)	1040	1080	1045	1050	1050
	Motor horsepower	(1) 1/6	(1) 1/4	(1) 1/3	(2) 1/6	(2) 1/4
	Motor watts (factory setting)	290	420	555	570	710
Condensate drain size mpt (in.)	3/4	3/4	3/4	3/4	3/4	
No. & size of filters (in.)	(1) 16 x 25 x 1	(1) 16 x 25 x 1	(1) 16 x 25 x 1	(2) 16 x 20 x 1	(2) 16 x 20 x 1	
Net weight of basic unit (lbs.) (1 package)	290	320	325	460	480	

★Rated in accordance with ARI Standard 270.

*Rated in accordance with ARI Standard 240: At 450 cfm (maximum) indoor air volume per ton of cooling capacity.

Cooling Ratings — 95F outdoor air temperature and 80F db/67F wb entering indoor coil air.

High Temperature Heating Ratings — 47F db/43F wb outdoor air temperature and 70F db entering indoor coil air.

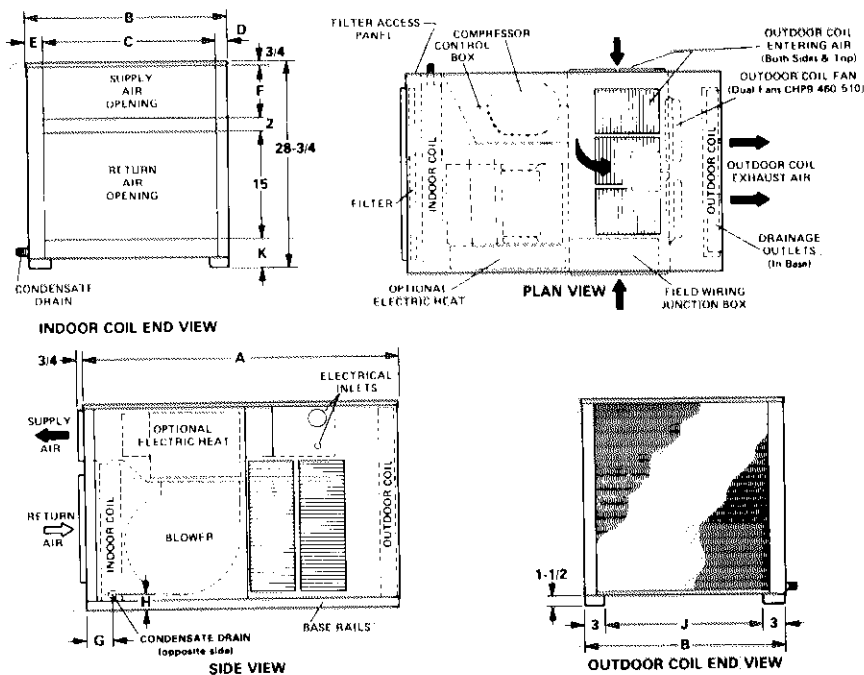
Low Temperature Heating Ratings — 17F db/15F wb outdoor air temperature and 70F db entering indoor coil air.

**Deduct 100 watts for 208 volt operation.

***Deduct 200 watts for 208 volt operation.

†Derate 500 Btuh for 208 volt operation.

C - Dimensions



Model No.	A	B	C	D	E	F	G	H	J	K
CHP9-261, 311, 411 & 413	42-3/4	28	24	1-13/16	2-3/16	7	4-7/8	2-3/8	22	4
CHP9-461, 463, 511 & 513	49-3/4	40-3/4	34	2-3/4	4	8	6	2-1/2	34-3/4	3

D - Heating Performance Charts

CHP9-260 HEATING PERFORMANCE AT 900 CFM INDOOR COIL AIR VOLUME

*Outdoor Temperature (Degrees F)	Compressor Motor Watts Input	Total Output (Btuh)
65	2850	34,500
60	2730	32,000
55	2610	29,600
50	2480	27,400
45	2380	24,900
40	2290	23,100
35	2220	21,300
30	2160	19,700
25	2090	17,900
20	2030	16,200
15	1940	14,500
10	1870	12,900
5	1810	11,200
0	1740	9600

*Outdoor temperature at 70% relative humidity. Indoor temperature at 70°.

CHP9-310 HEATING PERFORMANCE AT 1125 CFM INDOOR COIL AIR VOLUME

*Outdoor Temperature (Degrees F)	Compressor Motor Watts Input	Total Output (Btuh)
65	3400	35,400
60	3270	33,400
55	3140	31,500
50	3010	29,500
45	2880	27,600
40	2770	25,800
35	2660	23,900
30	2540	22,000
25	2430	20,500
20	2320	18,100
15	2240	16,100
10	2160	14,200
5	2090	12,300
0	2020	10,500

*Outdoor temperature at 70% relative humidity. Indoor temperature at 70°.

CHP9-410 HEATING PERFORMANCE AT 1350 CFM INDOOR COIL AIR VOLUME

*Outdoor Temperature (Degrees F)	Compressor Motor Watts Input	Total Output (Btuh)
65	4290	49,000
60	4070	45,700
55	3860	42,300
50	3650	39,000
45	3450	35,600
40	3080	30,700
35	2990	28,600
30	2890	26,500
25	2780	24,400
20	2670	22,300
15	2570	20,200
10	2470	18,000
5	2370	15,900
0	2270	13,900

*Outdoor temperature at 70% relative humidity. Indoor temperature at 70°.

CHP9-460 HEATING PERFORMANCE AT 1575 CFM INDOOR COIL AIR VOLUME

*Outdoor Temperature (Degrees F)	Compressor Motor Watts Input	Total Output (Btuh)
65	4900	53,500
60	4610	50,100
55	4320	46,600
50	4180	43,000
45	3850	39,500
40	3690	35,800
35	3520	33,200
30	3400	30,700
25	3300	28,100
20	3180	25,500
15	3070	22,800
10	2990	20,400
5	2930	18,300
0	2870	16,800

*Outdoor temperature at 70% relative humidity. Indoor temperature at 70°.

CHP9-510 HEATING PERFORMANCE AT 1800 CFM INDOOR COIL AIR VOLUME

*Outdoor Temperature (Degrees F)	Compressor Motor Watts Input	Total Output (Btuh)
65	5800	60,700
60	5530	57,800
55	5260	54,900
50	5010	52,000
45	4800	49,100
40	4580	46,100
35	4390	42,600
30	4210	39,200
25	4030	37,800
20	3910	32,300
15	3730	28,800
10	3560	25,400
5	3400	21,900
0	3260	18,700

*Outdoor temperature at 70% relative humidity. Indoor temperature at 70°.

E - Blower Data

CHP9-260 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium-Low	Low
CHP9-260 UNITS ONLY			
0	1175	960	770
.05	1150	930	750
.10	1120	900	725
.15	1085	865	700
.20	1050	830	675
.25	1000	800	650
.30	950	760	625
.40	850	680	570
.50	740	595	500
.60	620	505	----
WITH ELECTRIC HEAT			
0	1070	890	725
.05	1035	865	705
.10	1000	830	680
.15	960	800	655
.20	920	765	635
.25	880	730	605
.30	840	695	570
.40	750	620	520
.50	645	535	----
.60	540	----	----
WITH RT9-65 OR RD9-65 AND DUCT DISTRIBUTION			
0	1170	940	705
.05	1110	870	670
.10	1050	805	625
.15	990	750	585
.20	925	700	540
.25	865	650	500
.30	800	600	----
.40	665	----	----
.50	510	----	----
WITH ELECTRIC HEAT RT9-65 OR RD9-65 AND DUCT DISTRIBUTION			
0	1010	800	630
.05	960	755	595
.10	900	710	555
.15	840	670	515
.20	780	625	----
.25	720	580	----
.30	650	530	----
.40	520	----	----

NOTE - All CFM is measured external to unit with air filter in place.
NOTE - Do not operate unit heating cycle at air volumes within shaded areas.

CHP9-310 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds			
	High	Med-High	Med-Low	Low
CHP9-310 UNITS ONLY				
0	1390	1325	1175	1040
.05	1355	1295	1150	1015
.10	1325	1265	1125	995
.15	1295	1235	1100	970
.20	1265	1205	1075	950
.25	1235	1175	1050	925
.30	1200	1145	1025	905
.40	1140	1085	970	860
.50	1070	1020	895	----
WITH ELECTRIC HEAT				
0	1310	1240	1120	990
.05	1280	1215	1095	970
.10	1255	1190	1065	950
.15	1225	1165	1040	925
.20	1195	1140	1015	905
.25	1165	1110	990	880
.30	1135	1080	960	850
.40	1070	1015	900	795
.50	1005	990	----	----
WITH RT9-65 OR RD9-65 AND DUCT DISTRIBUTION				
0	1352	1275	1130	980
.05	1287	1210	1060	920
.10	1215	1145	990	855
.15	1150	1080	930	800
.20	1087	1020	880	755
.25	1025	965	840	725
.30	970	915	795	680
.40	865	820	705	585
.50	755	715	590	----
WITH ELECTRIC HEAT RT9-65 OR RD9-65 AND DUCT DISTRIBUTION				
0	1245	1155	960	840
.05	1210	1075	910	795
.10	1165	1010	865	755
.15	1080	965	820	715
.20	1025	890	785	675
.25	965	845	740	595
.30	915	800	695	----
.40	820	705	----	----
.50	715	590	----	----

NOTE - All CFM is measured external to unit with air filter in place.
NOTE - Do not operate unit heating cycle at air volumes within shaded areas.

CHP9-260 With RT9-65 or RD9-65 And Ceiling Supply & Return

Blower Speed Setting	Cfm @ Various Speeds							
	With Various Discharge Grille Arrangements							
	FD-41 or FD-41-D Flush Model		RTD-41 Step-Down Model					
			2 Sides Open		3 Sides Open		4 Sides Open	
	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.
High	893	1000	815	915	835	940	860	965
Medium-Low	770	815	735	785	745	795	755	805
Low	630	670	602	640	615	650	620	660

NOTE - Do not operate unit in heating cycle at air volumes within shaded areas.

CHP9-310 With RT9-65 or RD9-65 And Ceiling Supply & Return

Blower Speed Setting	Cfm @ Various Speeds							
	With Various Discharge Grille Arrangements							
	FD-41 or FD-41-D Flush Model		RTD-41 Step-Down Model					
			2 Sides Open		3 Sides Open		4 Sides Open	
	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.
High	1055	1170	1000	1110	1050	1160	1055	1175
Medium-High	1015	1115	990	1070	1010	1100	1020	1120
Medium-Low	890	1000	870	965	885	985	895	1000
Low	800	890	780	850	795	880	805	895

NOTE - Do not operate unit in heating cycle at air volumes within shaded areas.

CHP9-410 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium-Low	Low
CHP9-410 UNITS ONLY			
0	1630	1365	1080
.05	1600	1345	1070
.10	1570	1320	1060
.15	1540	1300	1050
.20	1510	1275	1035
.25	1475	1250	1020
.30	1440	1230	1005
.40	1360	1175	965
.50	1265	1115	925
.60	1170	1050	---
.70	1050	---	---
WITH ELECTRIC HEAT			
0	1440	1290	1060
.05	1415	1270	1050
.10	1395	1245	1035
.15	1370	1220	1020
.20	1340	1195	1000
.25	1315	1165	980
.30	1285	1140	960
.40	1220	1085	915
.50	1160	1030	870
.60	1100	975	---
WITH RT9-65 OR RD9-65 AND DUCT DISTRIBUTION			
0	1510	1300	1050
.05	1425	1235	990
.10	1350	1175	940
.15	1285	1120	890
.20	1225	1000	845
.25	1170	945	805
.30	1115	900	---
.40	1005	805	---
.50	905	---	---
WITH ELECTRIC HEAT RT9-65 OR RD9-65 AND DUCT DISTRIBUTION			
0	1340	1225	1020
.05	1270	1160	975
.10	1205	1095	925
.15	1105	1040	875
.20	1080	995	835
.25	1020	950	---
.30	970	910	---
.40	875	820	---

NOTE - All CFM is measured external to unit with air filter in place.
 NOTE - Do not operate unit heating cycle at air volumes within shaded areas.

CHP9-460 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium-Low	Low
CHP9-460 UNITS ONLY			
0	1945	1630	1305
.05	1905	1610	1305
.10	1870	1585	1300
.15	1825	1565	1290
.20	1780	1540	1280
.25	1745	1510	1260
.30	1695	1485	1240
.40	1610	1420	1190
.50	1525	1335	1125
.60	1435	1240	1040
.70	1340	1130	---
WITH ELECTRIC HEAT			
0	1710	1540	1295
.05	1680	1510	1280
.10	1650	1480	1265
.15	1610	1450	1250
.20	1575	1420	1230
.25	1535	1385	1210
.30	1495	1355	1185
.40	1415	1285	1125
.50	1335	1205	1035
.60	1250	1110	---
WITH RT9-65 OR RD9-65 AND DUCT DISTRIBUTION			
0	1815	1575	1280
.05	1750	1530	1260
.10	1690	1485	1220
.15	1635	1440	1190
.20	1590	1395	1155
.25	1540	1350	1120
.30	1490	1305	1080
.40	1390	1210	1000
.50	1280	1110	---
.60	1165	1010	---
.70	1040	---	---
WITH ELECTRIC HEAT RT9-65 OR RD9-65 AND DUCT DISTRIBUTION			
0	1655	1510	1230
.05	1600	1460	1250
.10	1550	1420	1220
.15	1500	1370	1190
.20	1450	1320	1155
.25	1400	1275	1120
.30	1345	1225	1080
.40	1240	1120	1000
.50	1130	1010	---
.60	1010	---	---

NOTE - All CFM is measured external to unit with air filter in place.
 NOTE - Do not operate unit heating cycle at air volumes within shaded areas.

CHP9-410 With RT9-65 or RD9-65 And Ceiling Supply & Return

Blower Speed Setting	Cfm @ Various Speeds With Various Discharge Grille Arrangements							
	FD-41 or FD-41-D Flush Model		RTD-41 Step-Down Model					
			2 Sides Open		3 Sides Open		4 Sides Open	
	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.
High	1175	1290	1130	1250	1160	1270	1170	1280
Medium	1055	1140	1045	1110	1050	1120	1055	1135
Low	905	945	890	925	900	935	909	945

NOTE - Do not operate unit in heating cycle at air volumes within shaded areas.

CHP9-460 With RT9-65 or RD9-65 And Ceiling Supply & Return

Blower Speed Setting	Cfm @ Various Speeds With Various Discharge Grille Arrangements							
	FD-65 or FD-65-D Flush Model		RTD-65 Step-Down Model					
			2 Sides Open		3 Sides Open		4 Sides Open	
	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.
High	1490	1640	1495	1650	1505	1670	1515	1685
Medium	1360	1470	1360	1475	1380	1485	1395	1500
Low	1160	1230	1165	1235	1170	1240	1175	1245

NOTE - Do not operate unit in heating cycle at air volumes within shaded areas.

CHP9-510 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds				
	High	Med-High	Medium	Med-Low	Low
CHP9-510 UNITS ONLY					
0	2480	2340	2150	1885	1630
.05	2435	2300	2120	1850	1600
.10	2395	2265	2085	1820	1570
.15	2355	2225	2045	1785	1535
.20	2315	2190	2010	1755	1500
.25	2275	2150	1975	1720	1470
.30	2235	2110	1940	1685	1435
.40	2155	2035	1860	1620	1360
.50	2055	1955	1785	1545	1290
.60	1955	1865	1705	1470	1215
.70	1860	1770	1620	1380	1135
WITH ELECTRIC HEAT					
0	2045	1965	1820	1605	1375
.05	2005	1925	1785	1575	1345
.10	1970	1890	1750	1540	1315
.15	1930	1850	1710	1510	1285
.20	1890	1815	1675	1475	1255
.25	1850	1775	1640	1440	1220
.30	1815	1735	1600	1410	1190
.40	1735	1655	1515	1335	1120
.50	1650	1570	1425	1260	-----
.60	1555	1475	1335	1180	-----
.70	1450	1380	1230	1095	-----

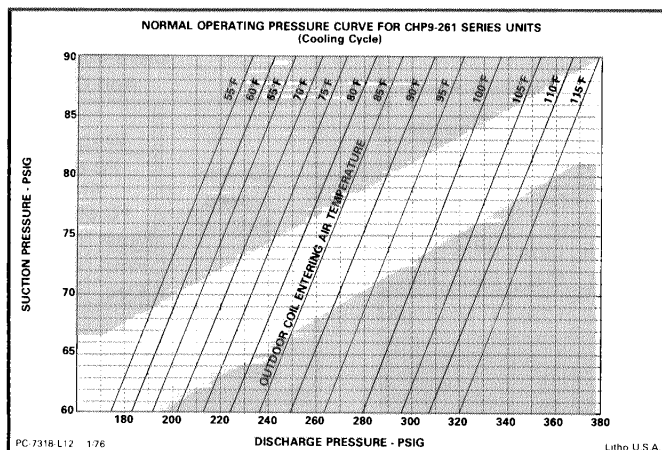
External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds				
	High	Med-High	Medium	Med-Low	Low
WITH RT9-65 OR RD9-65 AND DUCT DISTRIBUTION					
0	2280	2185	2010	1800	1560
.05	2210	2120	1950	1745	1505
.10	2150	2060	1900	1690	1460
.15	2100	2005	1850	1640	1410
.20	2045	1950	1800	1590	1360
.25	1995	1900	1745	1550	1320
.30	1945	1850	1700	1505	1270
.40	1840	1755	1620	1415	1180
.50	1735	1660	1535	1335	1100
.60	1620	1560	1445	1260	-----
.70	1510	1455	1355	1185	-----
WITH ELECTRIC HEAT RT9-65 OR RD9-65 AND DUCT DISTRIBUTION					
0	1880	1830	1740	1590	1360
.05	1815	1760	1670	1520	1335
.10	1740	1690	1605	1435	1305
.15	1690	1630	1540	1365	1245
.20	1630	1570	1475	1300	1180
.25	1570	1515	1410	1250	1125
.30	1520	1460	1350	1200	-----
.40	1420	1350	1220	1105	-----
.50	1320	1245	1135	-----	-----
.60	1210	1135	-----	-----	-----

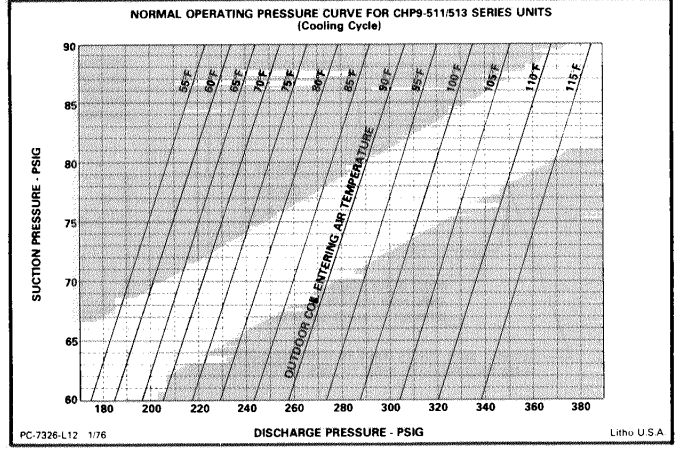
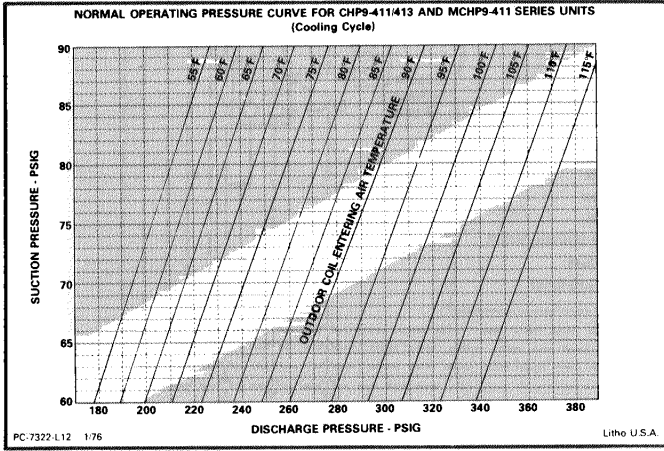
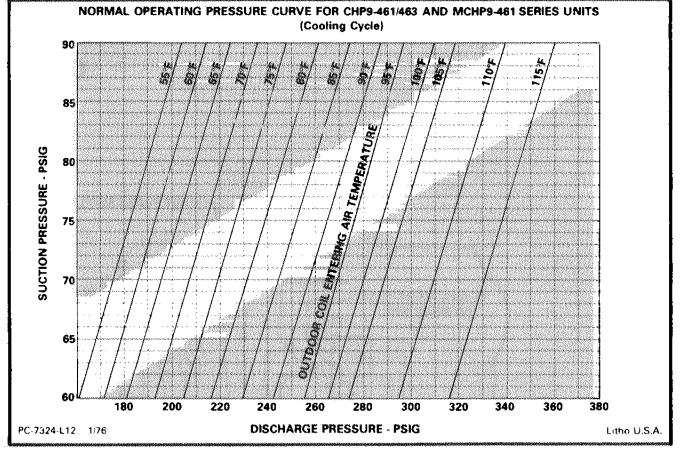
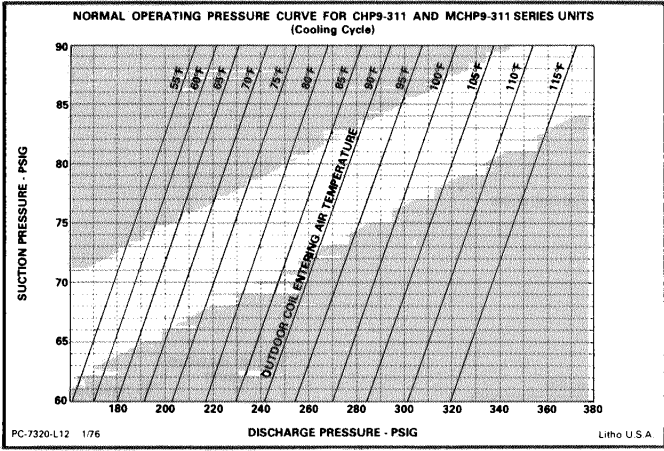
NOTE - All CFM is measured external to unit with air filter in place.
 NOTE - Do not operate unit heating cycle at air volumes within shaded areas.

CHP9-510 With RT9-65 or RD9-65 And Ceiling Supply & Return								
Blower Speed Setting	Cfm @ Various Speeds With Various Discharge Grille Arrangements							
	FD-65 or FD-65-D Flush Model		RTD-65 Step-Down Model					
			2 Sides Open		3 Sides Open		4 Sides Open	
	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.	With Elec.	Less Elec.
High	1680	2060	1725	2020	1730	2040	1745	2055
Medium-High	1665	1970	1670	1930	1685	1950	1690	1965
Medium	1555	1840	1580	1820	1590	1830	1615	1845
Medium-Low	1455	1670	1455	1625	1460	1635	1470	1665
Low	1360	1465	1365	1460	1370	1470	1385	1475

NOTE - Do not operate unit in heating cycle at air volumes within shaded areas.

F - Pressure Curves





CHP9 FIELD WIRING

"G" VOLTAGE UNITS

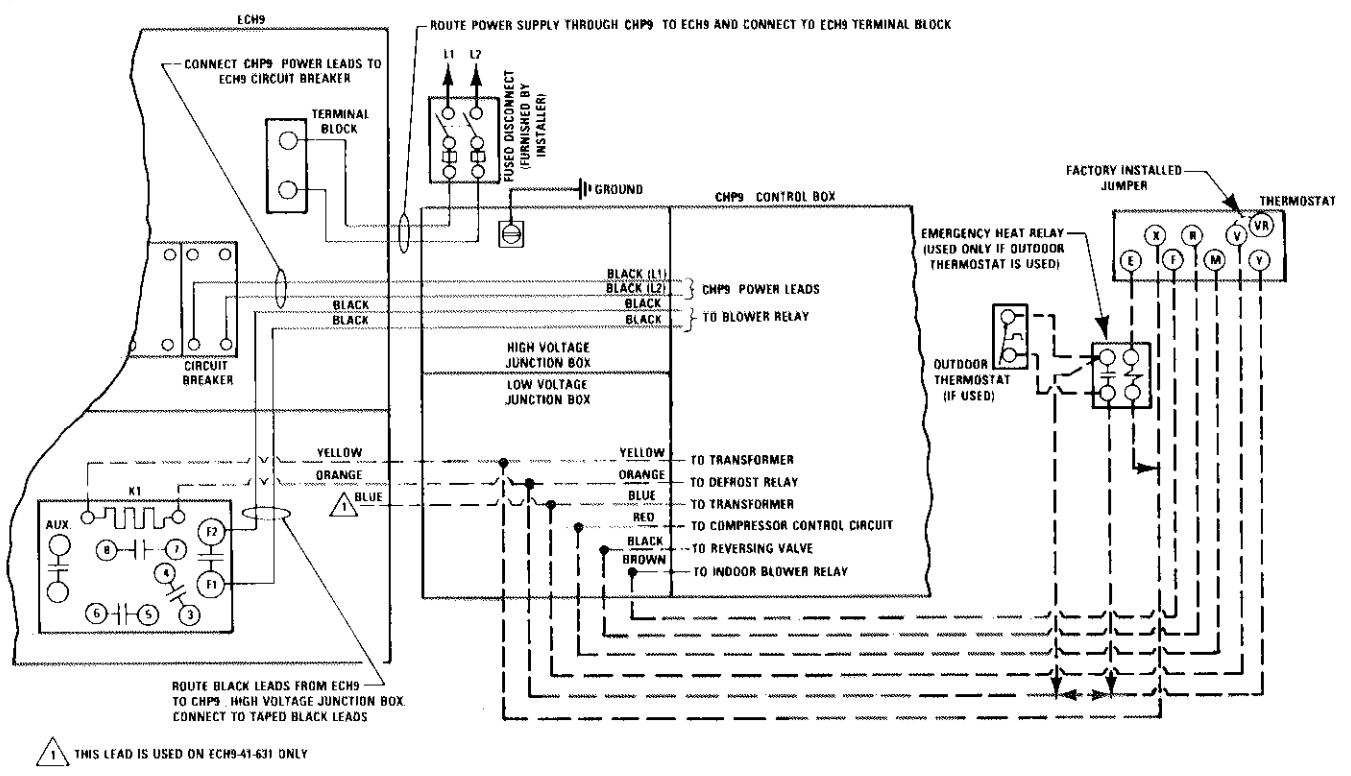
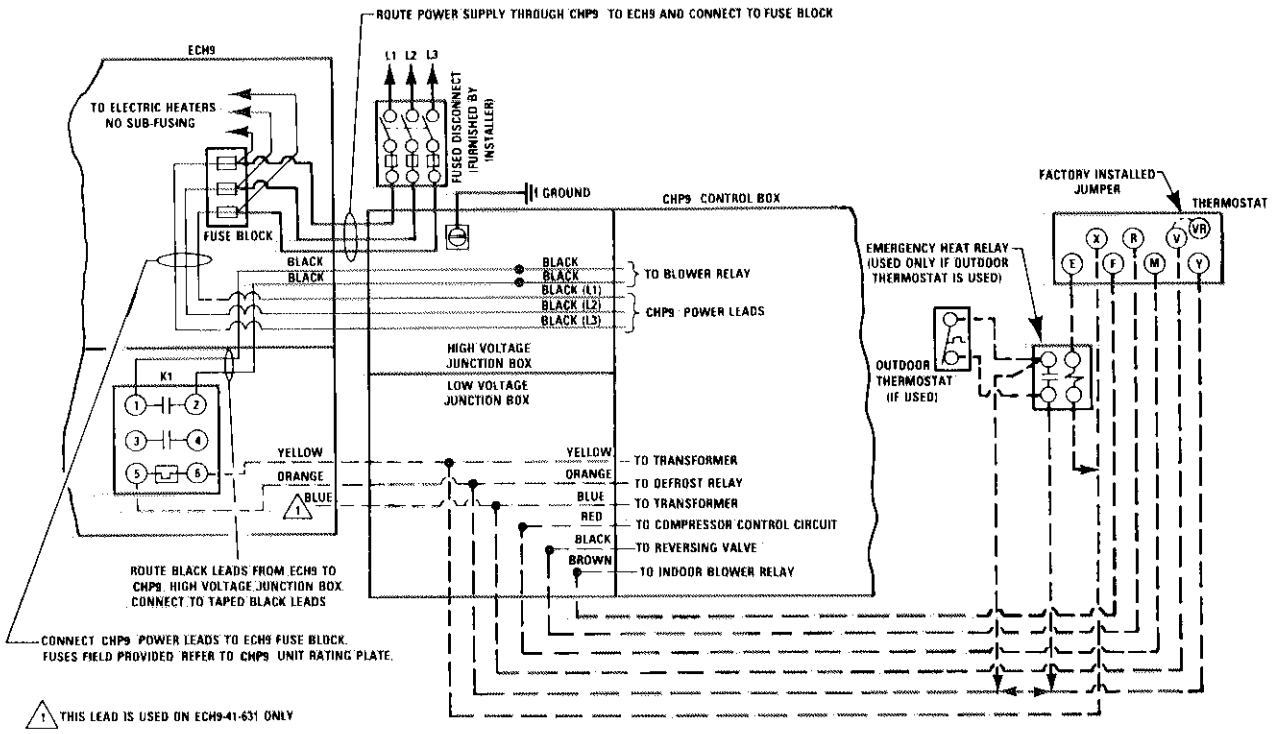


FIGURE 2

G - Field Wiring

Without ECH9

Connect line voltage power supply to leads in CHP9 high voltage junction box from a properly sized fused disconnect. Refer to CHP9 unit rating plate for maximum fuse size.

With ECH9 (Figure 2)

On "G" voltage applications, bring power supply leads through CHA9 electrical knockout, route leads to ECH9 and connect to fuse block. The "Heater Installed" plate on CHP9 access panel lists the minimum circuit ampacity and maximum fuse size for the CHP9 combined with the various heaters. Next route the CHP9 power leads from high voltage junction box to ECH9 and connect to fuse block. The fuses must be field provided. Refer to CHP9 unit rating plate for maximum fuse size.

On all other voltage units, bring power leads through CHP9 electrical knockout, route leads to ECH9 and connect to terminal block. The "Heater Installed" plate on CHP9 access panel lists the minimum circuit and maximum fuse size for the CHP9 combined with the various heaters. Next route the CHA9 power leads from high voltage junction box to the circuit in the ECH9 and connect.

On all CHA9/ECH9 applications route the 2 black leads from the ECH9 to the CHA9 high voltage junction box. Connect to the taped black leads.

III - REFRIGERANT SYSTEM

CHP9 units have a single compressor in a single refrigeration system. The units use a cap tube assembly as the metering method. The service ports are located in compressor compartment as shown in Figure 3.

A - Checking Refrigerant Charge Above 60°F

Place the unit into the cooling mode and use the normal operating pressure curves for cooling.

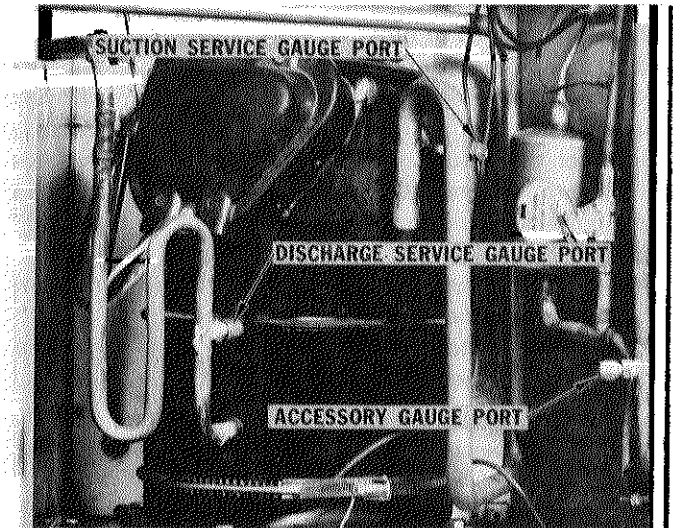


FIGURE 3

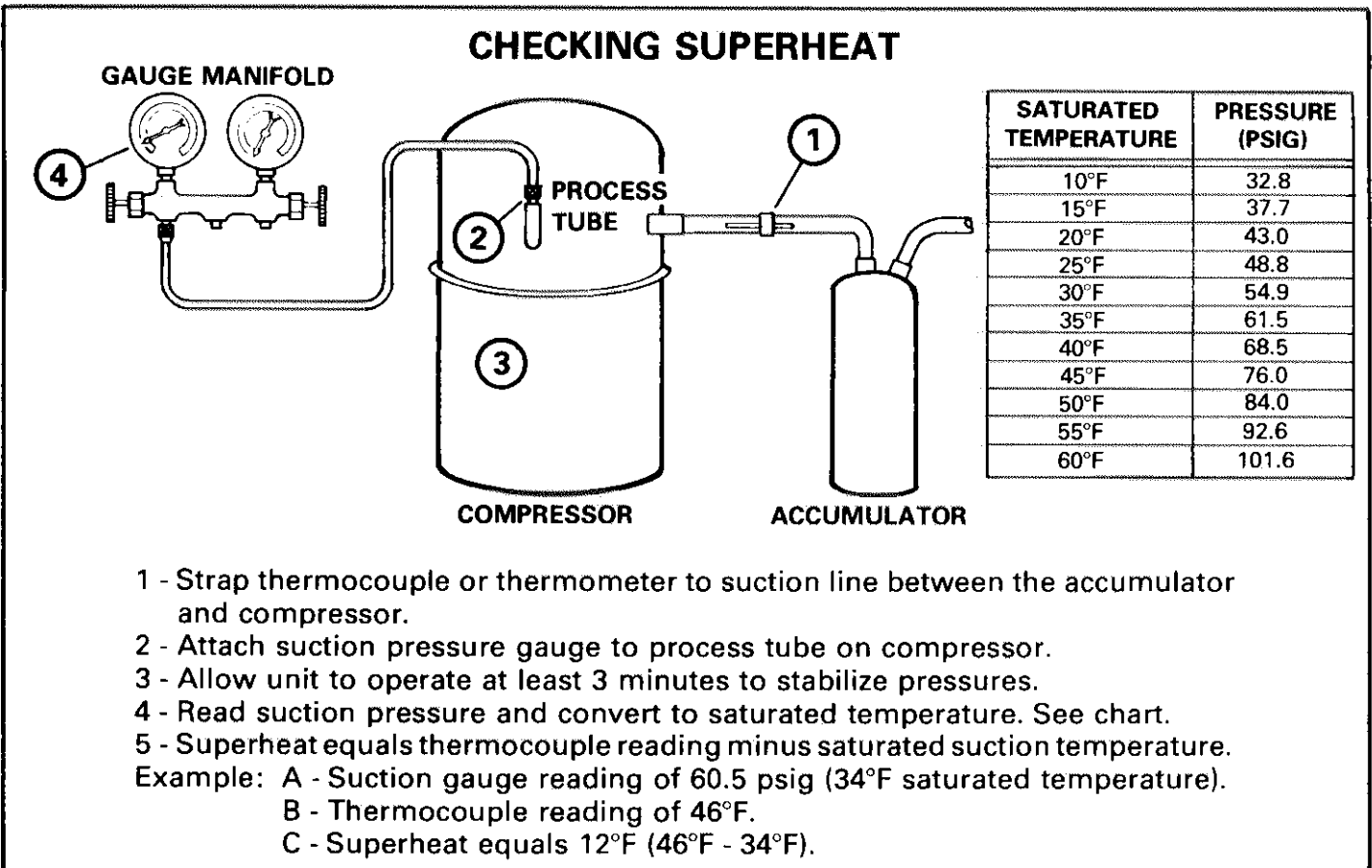


FIGURE 4

B - Checking Refrigerant Charge Below 60°F

- 1 - The indoor temperature must be raised to 75°F minimum. It may be necessary to jumper electric heat to achieve this.
- 2 - Place thermostat in cooling mode.
- 3 - Block outdoor coil air flow to obtain a 200 psig head pressure. Allow system to operate a minimum of 3 minutes to stabilize pressures.
- 4 - Strap thermometer or thermocouple to the suction line between accumulator and compressor. Use a silver thermometer clip or other suitable device.
- 5 - Read suction pressure and convert to saturated temperature with a "refrigerant pressure - temperature conversion chart.
- 6 - Subtract the actual temperature recorded from saturated temperature. This is the superheat. Under these test conditions, normal superheat will range from 10°F to 15°F.
- 7 - If superheat is less than 10°F, remove refrigerant from system until value is obtained.
- 8 - If superheat is more than 15°F, add refrigerant until the reading is between 10°F and 15°F.

This method works satisfactory down to 10°F ambient.

Caution - Head pressure must be maintained at a minimum 200 psig.

IV - COMPONENTS

Figure 5 shows an exploded view of a CHP9.

A - Control Box (Figure 6)

1 - Compressor Contactor

Powers the compressor. On "Y" voltage units it also powers the outdoor fan motor through the outdoor fan and defrost relay.

2 - Defrost Control

CHP9 series units are equipped with a solid-state circuit board which initiates the defrost cycle. Thermistors within the solid-state system sense the difference between ambient air and refrigerant temperatures. When the temperature difference exceeds the differential band, the defrost cycle is activated until the defrost pressure switch opens at 275 psig to terminate the cycle. The switch automatically resets at 200 psig.

3 - Indoor Blower Relay

Powers indoor blower motor.

4 - Outdoor Fan Relay

On CHP9-460/510 "P" and "G" voltage units, this relay powers the outdoor fan motor(s) through N.C. contacts of the outdoor fan & defrost relay.

5 - Outdoor Fan & Defrost Relay

Switches the unit into defrost cycle upon demand by defrost control.

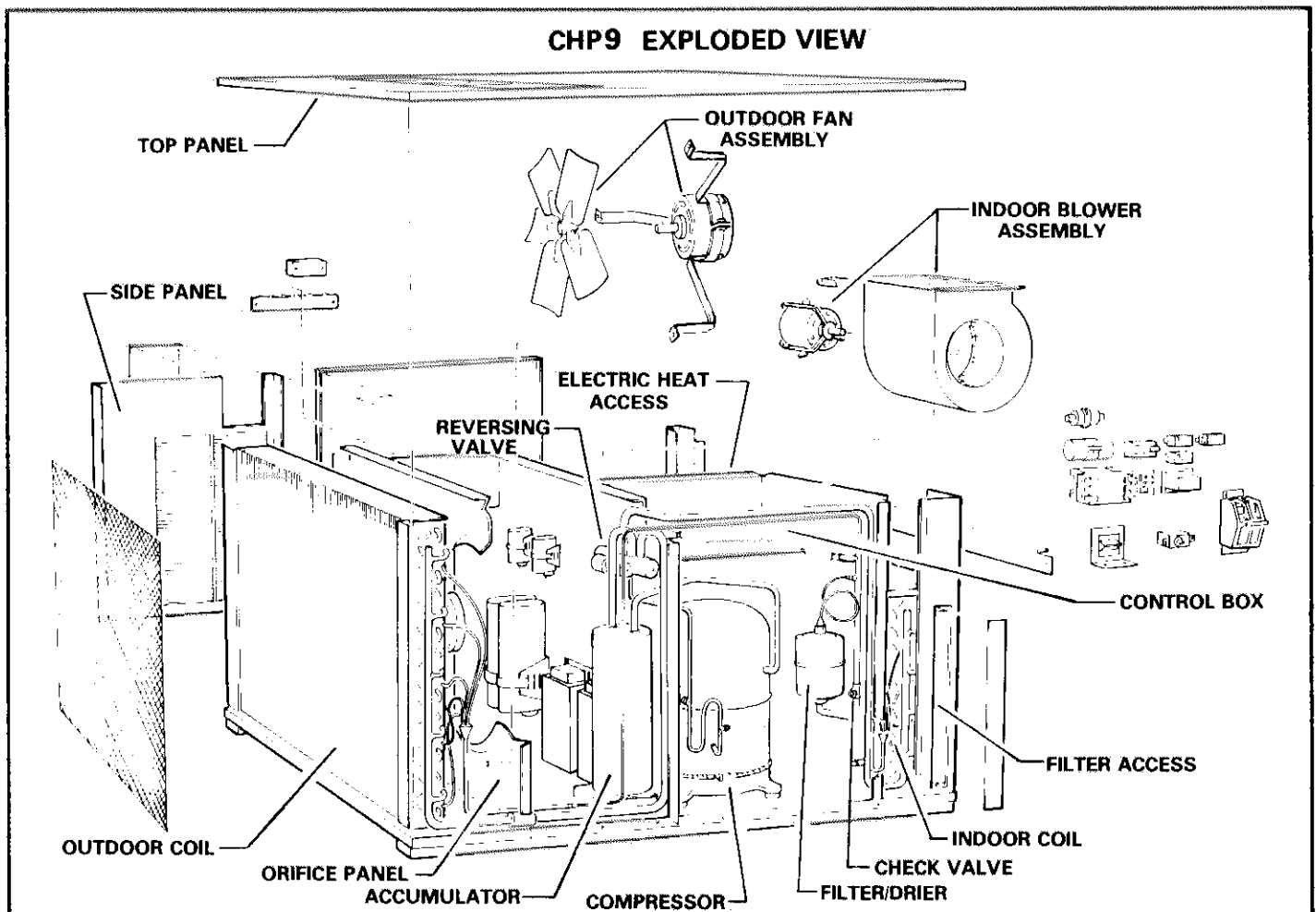


FIGURE 5

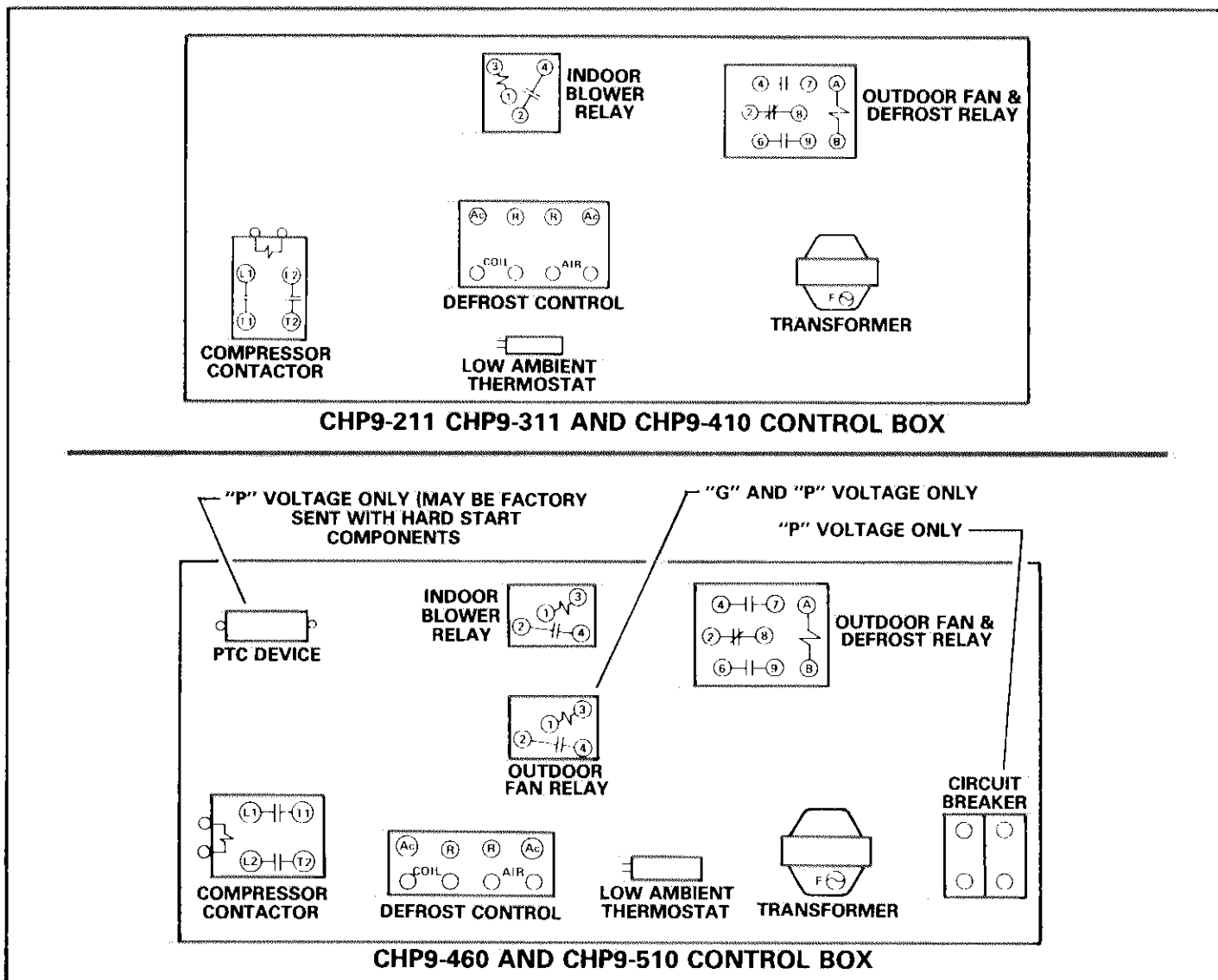


FIGURE 6

6 - Potential Relay and Start Capacitor

On CHP10-461 and CHP9-511 units, these compressor start components may come factory installed in place of the PTC start assist device.

7 - PTC Start Assist Device

On CHP9-461 and CHP9-511 units this solid-state PTC provides extra starting torque to solve most compressor hard starting problems.

8 - Low Ambient Thermostat

De-energizes compressor control circuit whenever ambient temperature drops below setting. Control is adjustable from the factory setting of 0°F to 20°F with a reset differential of 6°F.

9 - Transformer

Provides 24V for the control circuit. Circuit is fused at transformer.

10 - Circuit Breaker

On CHP9-461 and 511 units ("P" voltage), the circuit breaker protects the outdoor fan motor, indoor blower motor and transformer.

B - Compressor Compartment (Figure 7)

1 - Compressor

Compressor uses an internal overload and a pressure

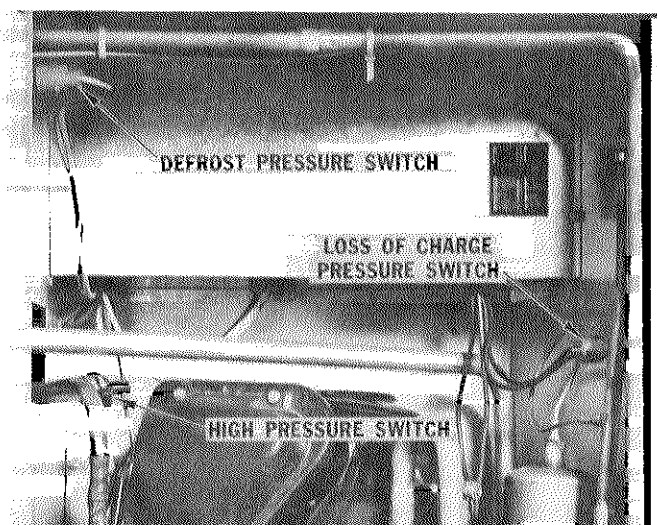


FIGURE 7

relief valve. The relief valve opens at a discharge and suction differential of 450 psig \pm 50. Tecumseh 3-1/2 and 4 ton compressors employ an internal self-regulating crankcase heater.

2 - Defrost Pressure Switch

Terminates defrost cycle. Cutout point 275 psig and cut in point 200 psig.

3 - High Pressure Switch

This switch mounts in the discharge line. It cuts out at 410 psig and must be manually reset when pressure drops below 180 psig.

4 - Loss of Charge Pressure Switch

De-energizes compressor control circuit when suction pressure drops below 10 psig and automatically resets at 30 psig.

C - Indoor Blower Compartment

CHP9 units are equipped with direct drive blowers. Table 2 shows the speed selection chart for these units.

TABLE 2

SPEED	CHP9-261	CHP9-311	CHP9-410 CHP9-460	CHP9-510
COMMON	ORANGE	ORANGE	ORANGE	ORANGE
LOW	RED	RED	RED	RED
MED. LOW	YELLOW	YELLOW	---	YELLOW
MED.	---	---	YELLOW	BLUE
MED. HI.	---	BROWN	---	BROWN
HIGH	BLACK	BLACK	BLACK	BLACK

D - Condenser Coil

Air enters from the top and sides of unit and is blown through the outdoor coil. CHP9-260 through 410 models are equipped with a single fan. CHP9-460/510 models use dual fans.

For fan service access, remove the bolts securing fan assembly. Figure 8 illustrates the outdoor fan and motor assembly.

V - BLOWER SPEED ADJUSTMENT

Blower speed adjustment is based on the charts in "Blower Data" section. These charts list the external pressure and corresponding unit CFM for the various applications.

Checks are made with clean filters in place, unit panels in place and a dry evaporator coil (blower only operating). Readings are measured across supply and return ducts external to unit with a manometer.

- 1 - Measure tap locations on supply and return ducts at least 24 inches from unit and centered top to bottom. See Figure 9.
- 2 - Punch approximately 1/4 inch diameter holes in ducts. Insert manometer hoses flush with inside edge of duct or insulation. Seal around hoses with permagum or sealing compound. Connect zero end of manometer to supply side of system. Refer to Figure 9.
- 3 - With only the indoor blower operating, observe manometer reading and compare to the blower performance data.

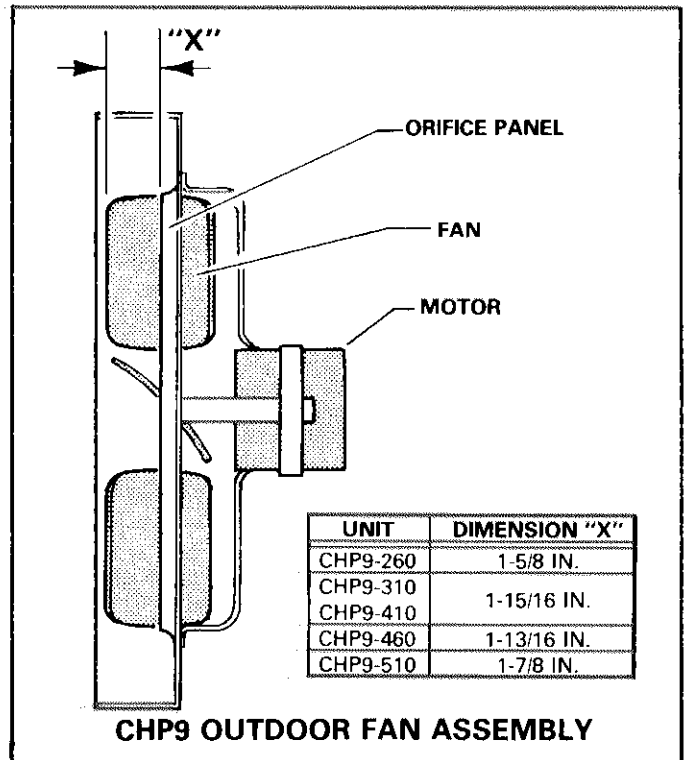


FIGURE 8

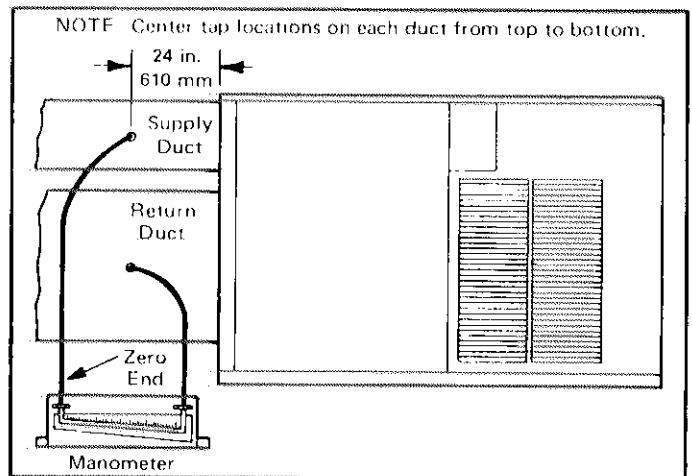


FIGURE 9

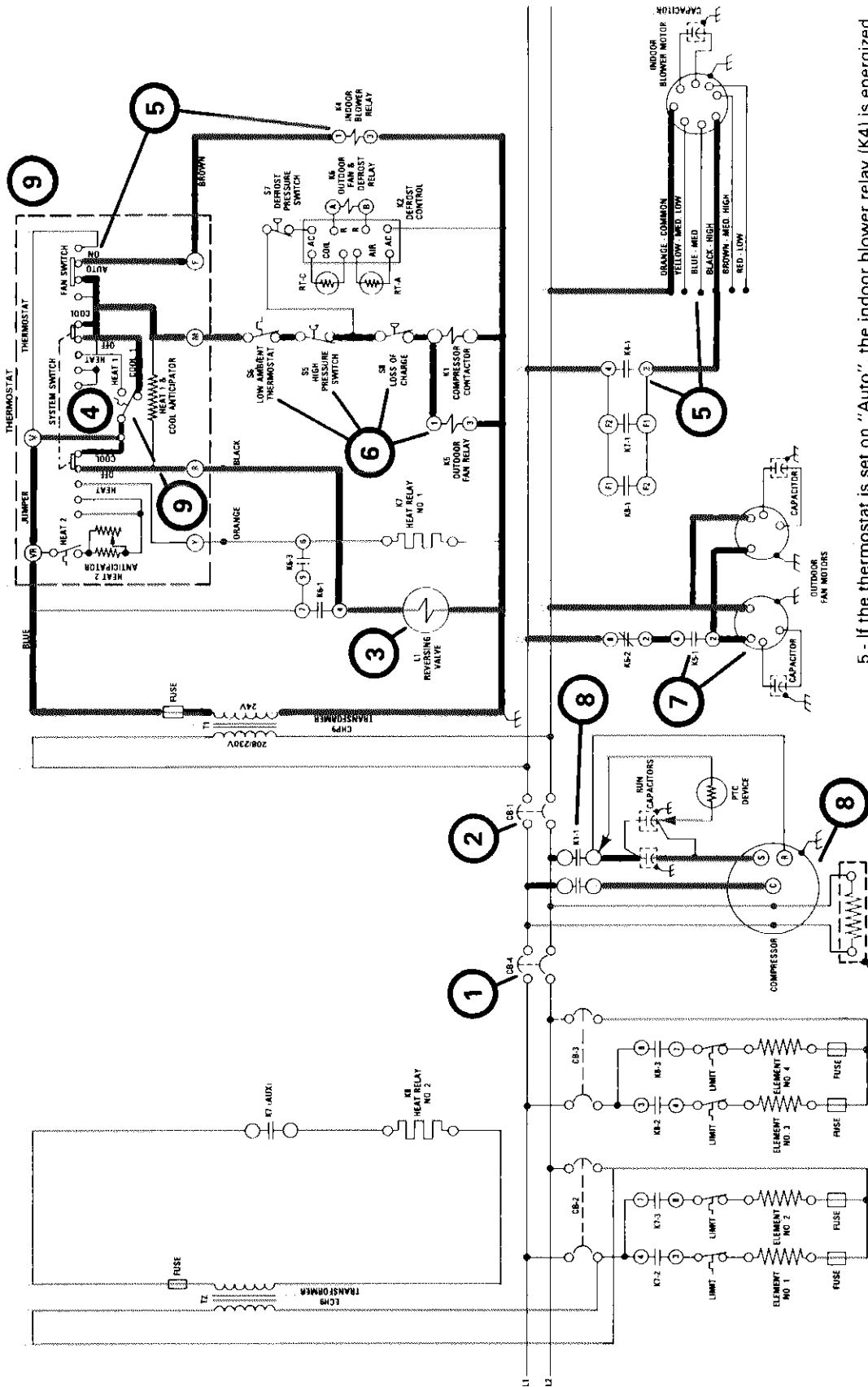
If reading is below air volume required, increase blower speed. If reading is above air volume required, decrease blower speed.

- 4 - After check is completed, seal testing holes.

VI - SCHEMATIC WIRING DIAGRAM OPERATING SEQUENCE

The following diagrams explain the operating sequence for a typical CHP9-511/ECH9 application. To simplify the illustration, the components in the electric heat section where assigned key numbers in sequence to the CHP9-511.

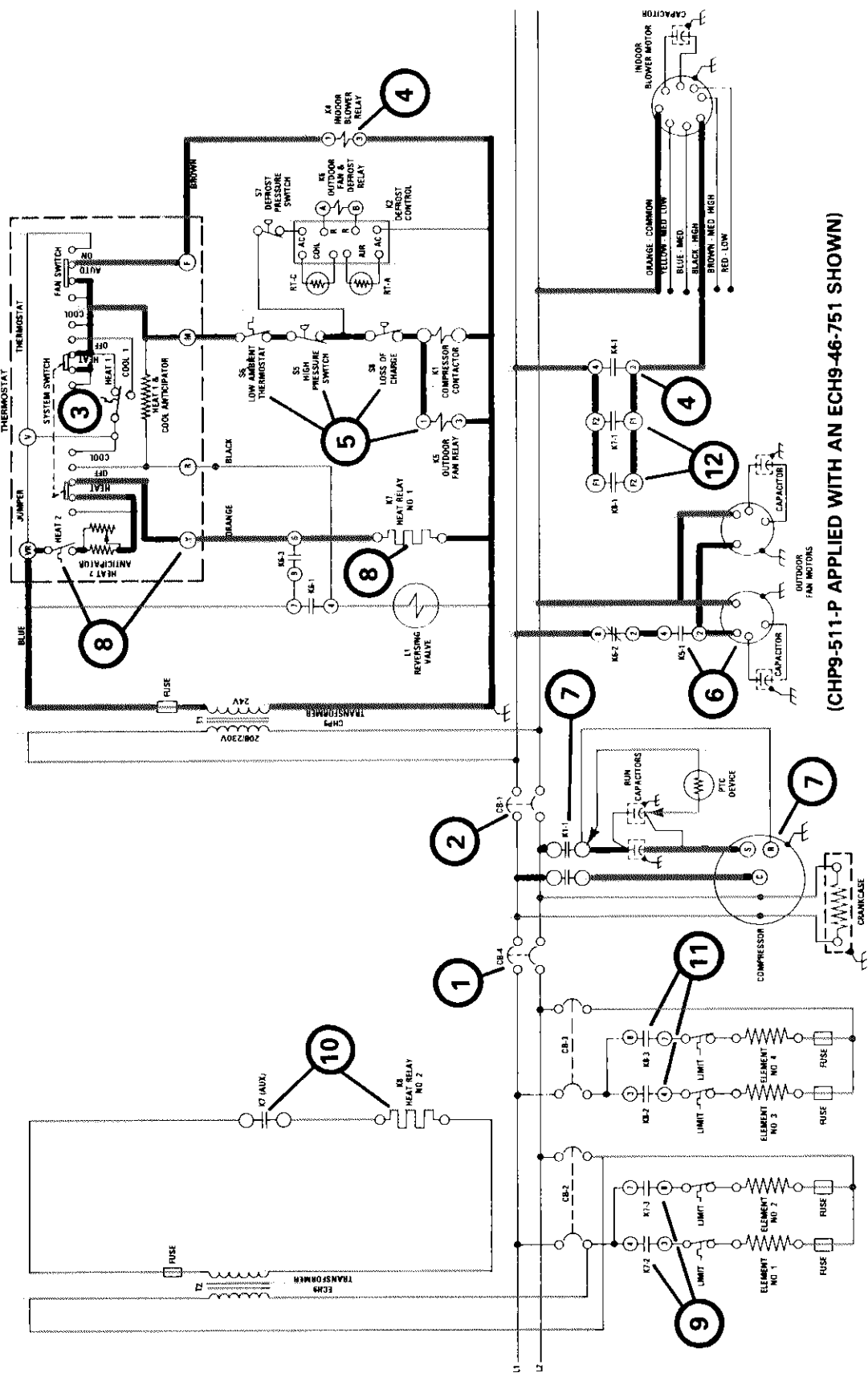
TYPICAL CHP9 COOLING CYCLE SEQUENCE OF OPERATION



(CHP9-511-P APPLIED WITH AN ECH9-46-751 SHOWN)

- 1 - If the unit includes electric heat, power is fed through CB-4 circuit breaker in the ECH9.
- 2 - The circuit breaker (CB-1) in CHP9-461 and CHP9-511 models power all the unit components except the compressor.
- 3 - When the thermostat is placed in the cooling mode. This energizes the reversing valve through the "R" leg. The reversing valve switches the refrigerant flow to the cooling cycle and the outdoor coil becomes a condenser.
- 4 - Thermostat cooling bulb makes on a cooling demand.
- 5 - If the thermostat is set on "Auto", the indoor blower relay (K4) is energized. N.O. K4-1 contacts close to power the indoor blower motor. If the application includes power saver, blower motor operation activates it. See RD9 section under accessories.
- 6 - As the cooling bulb makes, it also energizes the compressor contactor (K1) and outdoor fan relay (K5) through "M" leg of thermostat, S6, S5, and S8.
- 7 - N.O. K5-1 contacts close to power the outdoor fan motors through the N.C. K6-2 contacts.
- 8 - N.O. K1-1 contacts close to power compressor. The PTC device provides extra starting torque. It switches itself out of the circuit after start-up.
- 9 - When the cooling demand is satisfied, the cooling bulb breaks to de-energize the system.

TYPICAL CHP9 HEATING CYCLE SEQUENCE OF OPERATION



(CHP9-511-P APPLIED WITH AN ECH9-46-751 SHOWN)

Heating Cycle

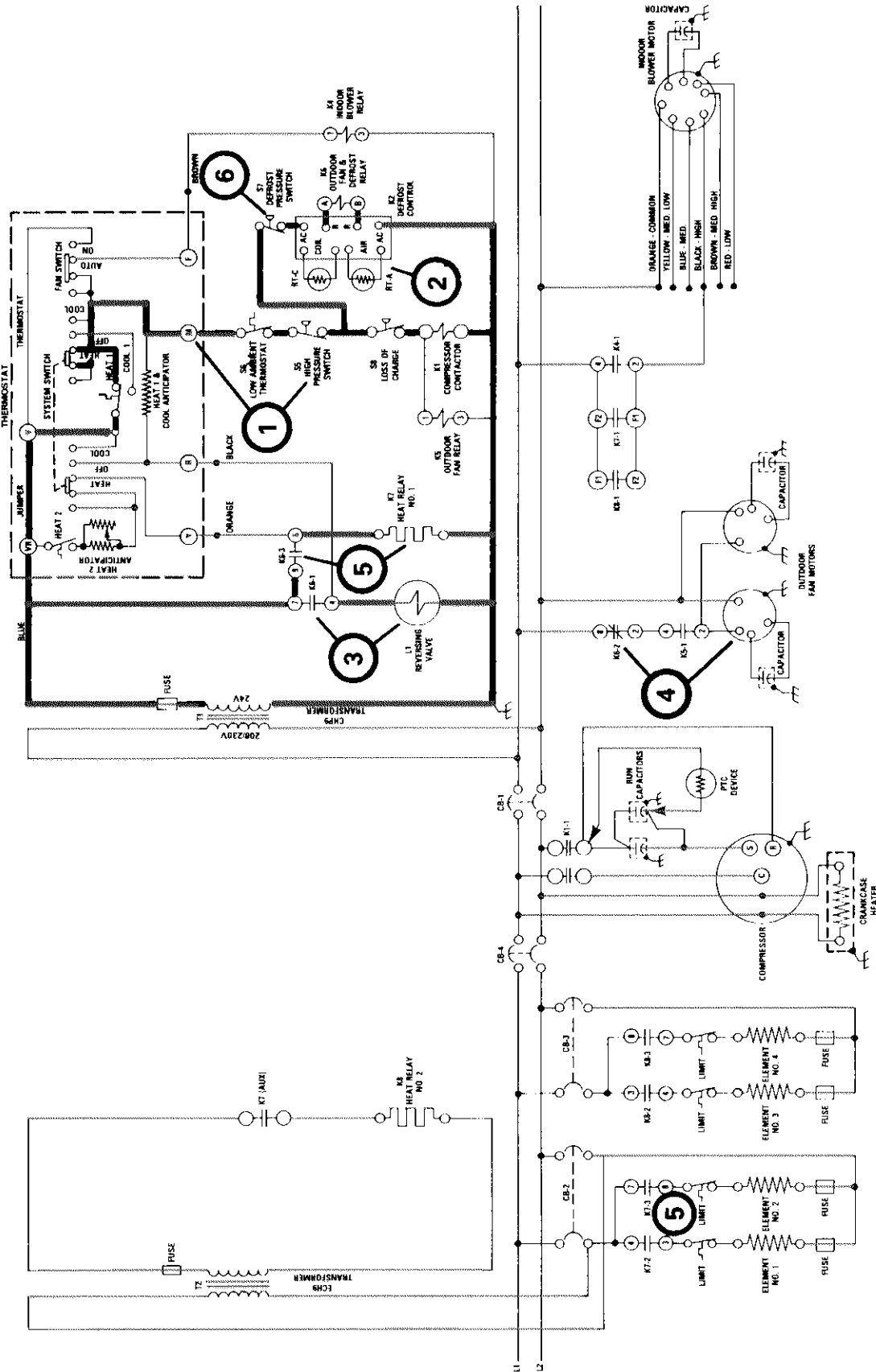
- 1 - Power is fed through CB-4 circuit breaker in ECH9.
- 2 - The circuit breaker (CB-1) in CHP9-461 and CHP9-511 models powers all the unit components except the compressor.
- 3 - Thermostat first stage heating bulb makes on a heat demand.
- 4 - If thermostat is set on "Auto", the indoor blower relay (K4) is energized. N.O. K4-1 contacts close to power the indoor blower motor.
- 5 - As the heating bulb makes, it also energizes the compressor contactor (K1) and outdoor fan relay (K5) through "M" leg of thermostat, S6, S5 and S8.
- 6 - N.O. K5-1 contacts close to power the outdoor fan motors through the N.C. K6-2 contacts.

- 7 - N.O. K1-1 contacts close to power compressor. The PTC device provides extra starting torque. It switches itself out of the circuit after start-up.

SUPPLEMENT HEAT

- 8 - On a further heating demand, the second stage heat bulb makes. This energizes heat relay no. 1 (K7) through the "Y" leg of thermostat.
- 9 - K7 closes its N.O. contacts in sequence to power elements 1 and 2.
- 10 - K7 auxiliary contacts also close to energize heat relay no. 2 (K8).
- 11 - K8 closes its N.O. contacts in sequence to power elements 3 and 4.
- 12 - If the heat pump transformer is de-energized, the heat relay fan contacts maintain indoor blower motor operation.

TYPICAL CHP9 DEFROST CYCLE SEQUENCE OF OPERATION
 (CHP9-511-P APPLIED WITH AN ECH9-46-751 SHOWN)



- 1 - The defrost control is powered through "M" leg of thermostat, S6, S5 and S7.
- 2 - The defrost control (K2) initiates the defrost cycle in response to RT-C and RT-A thermistors. With a need for defrost, K2 energizes the outdoor fan & defrost relay (K6).
- 3 - N.O. K6-1 contacts close to energize reversing valve. This recirculates hot gas to outdoor coil to melt the ice.
- 4 - N.C. K6-2 contacts open to de-energize outdoor fan motors.
- 5 - N.O. K6-3 contacts close to energize heat relay No. 1 (K7) and activate supplemental heat.
- 6 - Defrost pressure switch (S7) contacts break at 275 psig. This indicates a warm enough coil to melt the ice. This terminates the defrost cycle and the unit returns to normal heat pump operation. S7 contacts reset at 200 psig. and the circuit is again complete to K2.