CHA9 SERIES UNITS

I - INTRODUCTION

The CHA9 packaged air conditioning units are 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.

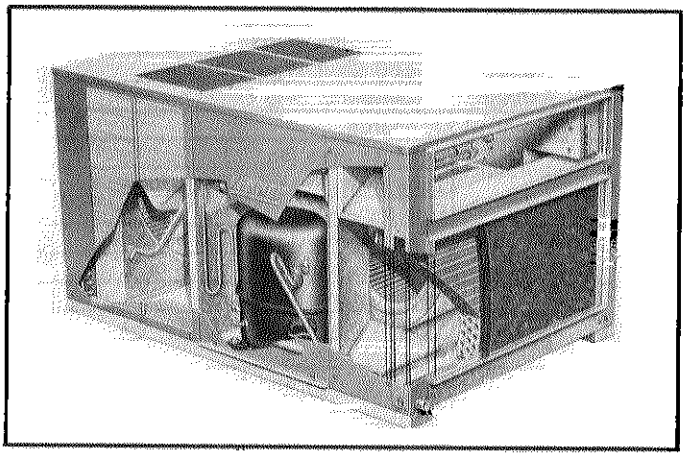


FIGURE 1

TABLE 1

Description	CHA9-261 CHA9-311 & CHA9-410	CHA9-460 CHA9-510
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-41-D	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	BM-3434	
Crankcase Heater	P-8-8852	

*Flush diffuser with adjustable baffle blades

II - UNIT INFORMATION

A - Electrical Data

Model No.		CHA9-261	CHA9-311	CHA9-411	CHA9-413	CHA9-461	CHA9-463	
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	18.2	23.6	13.2	25.1	15.4	7.2
	Power factor	.92	.92	.92	.85	.92	.85	.85
	Locked rotor amps	74.0	85.0	111.0	77.0	114.0	93.0	32.0
Condenser Coil Fan	Full load amps	1.4	2.6	2.6	2.6	2.6	2.6	**2.8
	Locked rotor amps	2.9	5.4	5.4	5.4	5.4	5.4	**5.4
Evaporator 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 fuse size (amps)		35	45	50	35	60	40	15
*Minimum circuit ampacity		22.2	27.7	36.0	23.0	37.9	25.8	12.6

Model No.		CHA9-511	CHA9-513	
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
Condenser Coil Fan	Full load amps	3.2	3.2	**3.2
	Locked rotor amps	5.8	5.8	**5.8
Evaporator Coil Blower	Full load amps	6.0	6.0	**6.0
	Locked rotor amps	14.7	14.7	**14.7
Recommended fuse size (amps)		70	50	20
*Minimum circuit ampacity		45.7	32.0	15.5

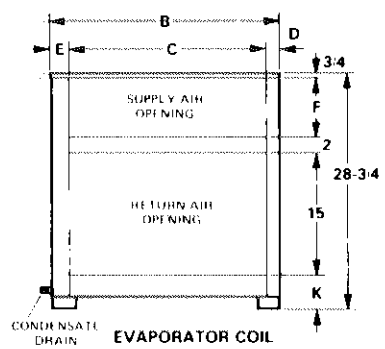
*Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements.
†Extremes of operating range are plus 10% and minus 5% of line voltage.
††Extremes of operating range are plus and minus 10% of line voltage.
**Motors are rated at 230 volts. FLA shown are for step-down transformer output.

B - Specifications

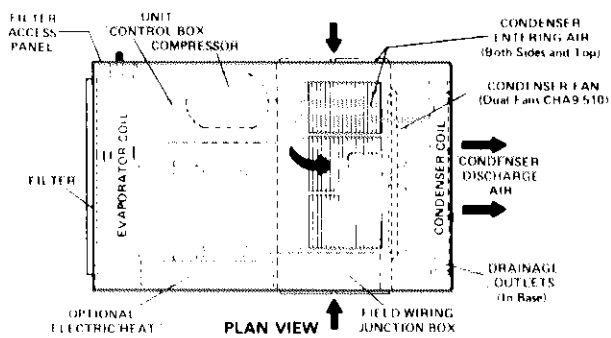
Model No.		CHA9-261	CHA9-311	CHA9-411 CHA9-413	CHA9-461 CHA9-463	CHA9-511 CHA9-513
★ARI Standard 270 SRN		19	20	20	21	21
*ARI Standard 210 Ratings	Total cooling capacity (Btuh)	25,500	30,000	35,500	45,000	50,000
	Total unit watts	3600	4300	5700	†5900	7100
	EER (Btuh/Watt)	7.1	7.0	6.2	7.6	7.0
	Dehumidifying capacity	30%	30%	32%	29%	29%
Refrigerant (R-22) charge		2 lbs. 10 oz.	4 lbs. 2 oz.	3 lbs. 14 oz.	6 lbs. 1 oz.	6 lbs. 6 oz.
Evaporator Coil	Net face area (sq. ft.)	3.0	3.0	3.0	4.5	4.5
	Tube diam. (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
Evaporator 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
Condenser Coil	Net face area (sq. ft.)	4.5	4.5	4.5	6.75	6.57
	Tube diam. (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
Condenser Fan	Diameter (in.) and No. of blades	(1) 20 — 4	(1) 20 — 4	(1) 20 — 4	(1) 20 — 4	(2) 18 — 5
	Air volume (factory setting)	2300	2500	2500	2700	3200
	Rpm (factory setting)	1040	1080	1080	1050	1050
	Motor horsepower	(1) 1/6	(1) 1/4	(1) 1/4	(1) 1/4	(2) 1/6
	Motor watts (factory setting)	290	420	420	400	570
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 (lbs.) (1 package)		280	310	312	420	460

★Rated in accordance with ARI Standard 270.
*Rated in accordance with ARI Standard 210; 450 cfm (maximum) evaporator air volume per ton of cooling capacity, 95F outdoor air temperature and 80F db/67F wb entering evaporator air.
†Deduct 100 watts at 208 volt operation.

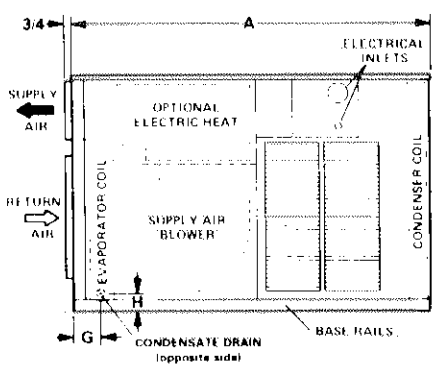
C - Dimensions



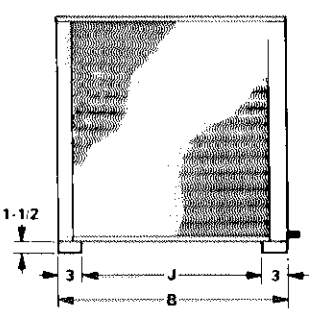
EVAPORATOR COIL END VIEW



PLAN VIEW



SIDE VIEW



CONDENSER COIL END VIEW

Model No.	A	B	C	D	E	F	G	H	J	K
CHA9 261, 311, 411 & 413	42 3/4	28	24	1 13/16	2 3/16	7	4 7/8	2 3/8	22	4
CHA9-461, 463, 511 & 513	49-3/4	40-3/4	34	2-3/4	4	8	6	2-1/2	34 3/4	3

D - Blower Data

CHA9-261 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium-Low	Low
CHA9-261 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 the unit with the air filter in place.

CHA9-311 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds			
	High	Med-High	Med-Low	Low
CHA9-311 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	955	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 the unit with the air filter in place.

CHA9-261 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

CHA9-311 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

CHA9-410 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
CHA9-410 UNIT 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 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.

CHA9-460 BLOWER PERFORMANCE

External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
CHA9-460 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	1250
.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 the unit with the air filter in place.

CHA9-410 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

CHA9-460 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

CHA9-510 BLOWER PERFORMANCE

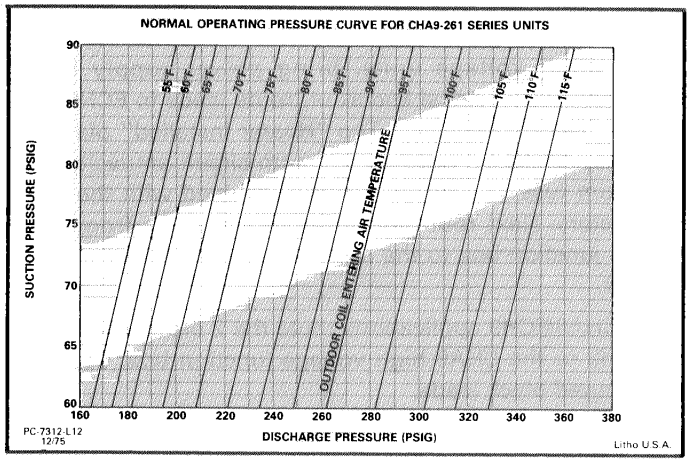
External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds				
	High	Med-High	Medium	Med-Low	Low
CHA9-510 UNITS ONLY					
0	2480	2340	2150	1885	1630
.05	2435	2300	2120	1850	1600
.10	2395	2265	2085	1820	1570
.15	2355	2225	2045	1785	1535
.20	2315	2190	2010	1755	1500
.25	2275	2150	1975	1720	1470
.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	----

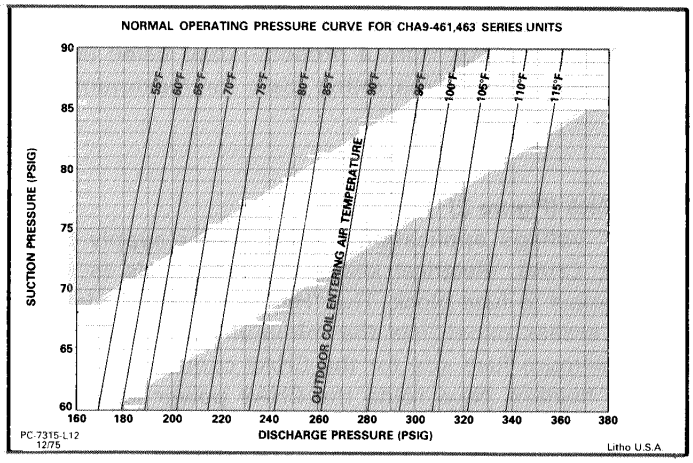
External Static Pressure (in. wg)	Air Volume (cfm) @ Various Speeds				
	High	Med-High	Medium	Med-Low	Low
WITH RT9-65 OR RD9-65 AND DUCT DISTRIBUTION					
0	2280	2185	2010	1800	1560
.05	2210	2120	1950	1745	1505
.10	2150	2060	1900	1690	1460
.15	2100	2005	1850	1640	1410
.20	2045	1950	1800	1590	1360
.25	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	----	----	----

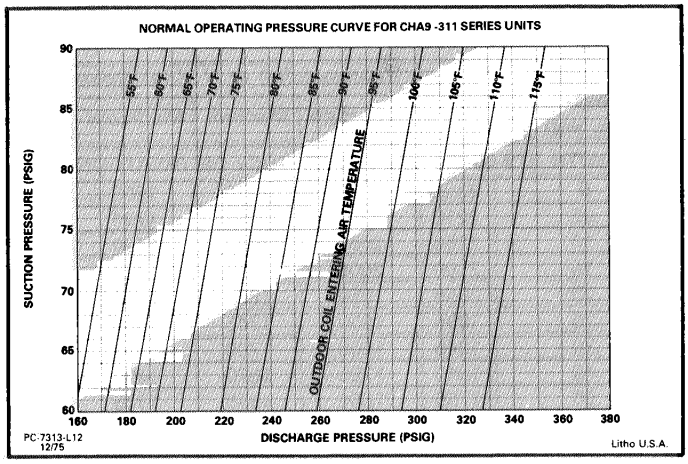
NOTE — All Cfm is measured external to the unit with the air filter in place.

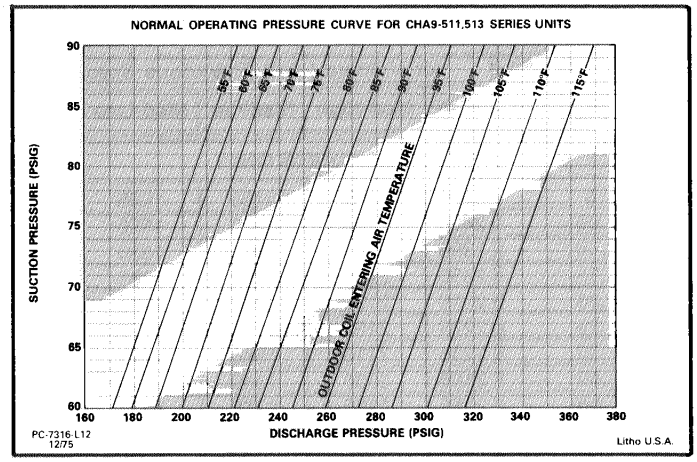
Blower Speed Setting	CHA9-510 With RT9-65 or RD9-65 And Ceiling Supply & Return — Cfm @ Various Speeds With Various Discharge Grille Arrangements							
	FD-65 or FD-65-D Flush Model		RTD-65 Step-Down Model					
			2 Sides Open		3 Sides Open		4 Sides Open	
	With Elec.	Less Elec.	With Elec.	Less Elec.	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

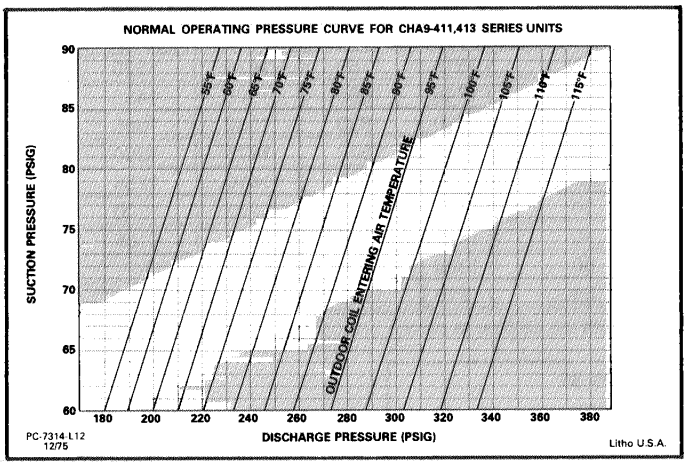
E - Pressure Curves

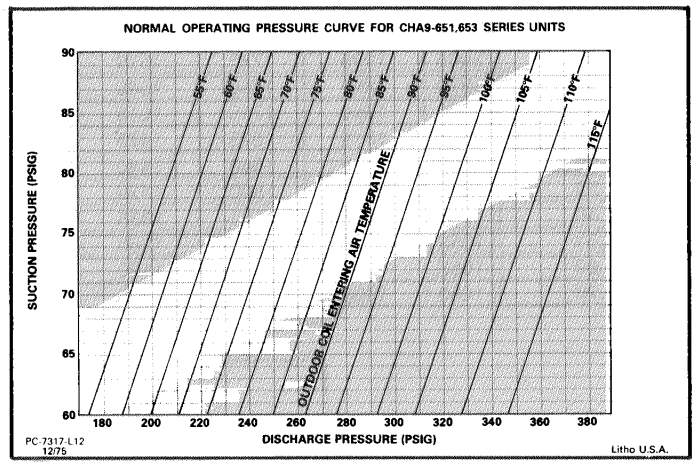












F - Field Wiring

Without ECH9

Connect line voltage power supply to leads in CHA9 high voltage junction box from a properly sized fused disconnect. Refer to CHA9 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 CHA9 access panel lists the minimum circuit ampacity and maximum fuse size for the CHA9 combined with the various heaters. Next route the CHA9 power leads from high voltage junction box to ECH9 and connect to fuse block. The fuses must be field provided. Refer to CHA9 unit rating plate for maximum fuse size.

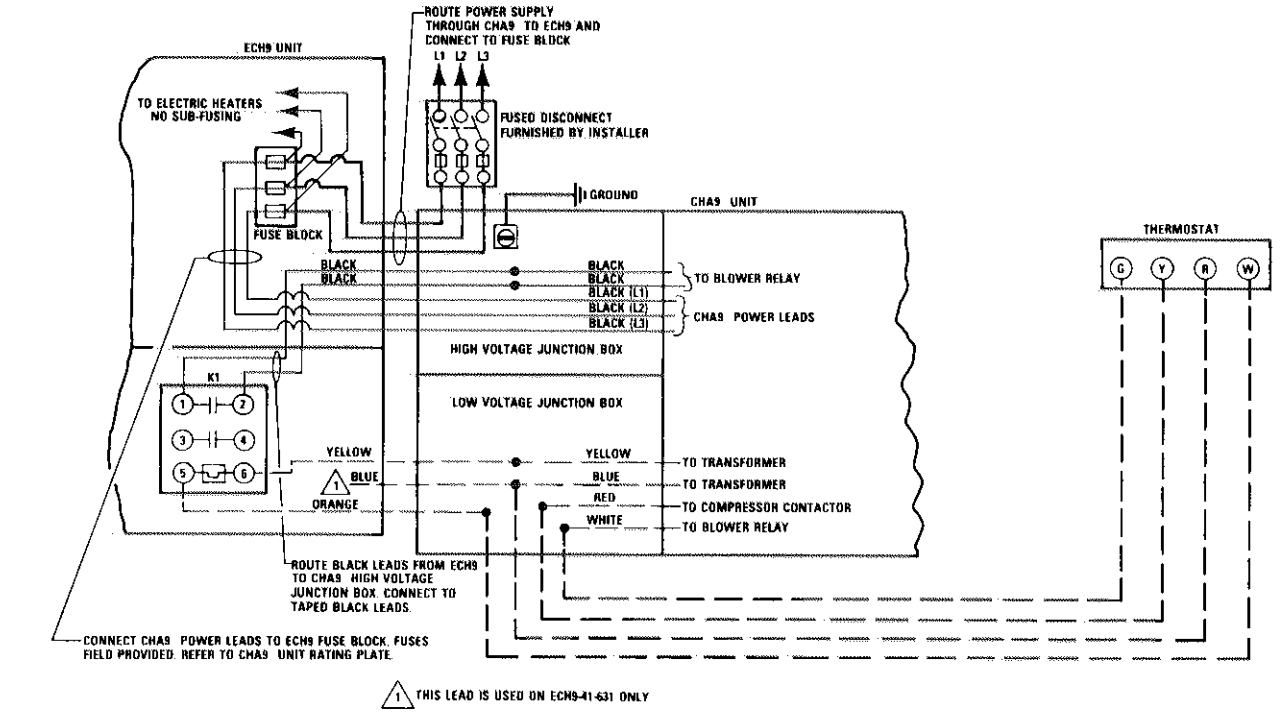
On all other voltage units, bring power supply leads through CHA9 electrical knockout, route leads to ECH9 and connect to terminal block. The "Heater Installed" plate on CHA9 access panel lists the minimum circuit ampacity and maximum fuse size for the CHA9 combined with the various heaters. Next route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

Figure 2 illustrates the field wiring.

CHA9 FIELD WIRING

"G" VOLTAGE UNITS



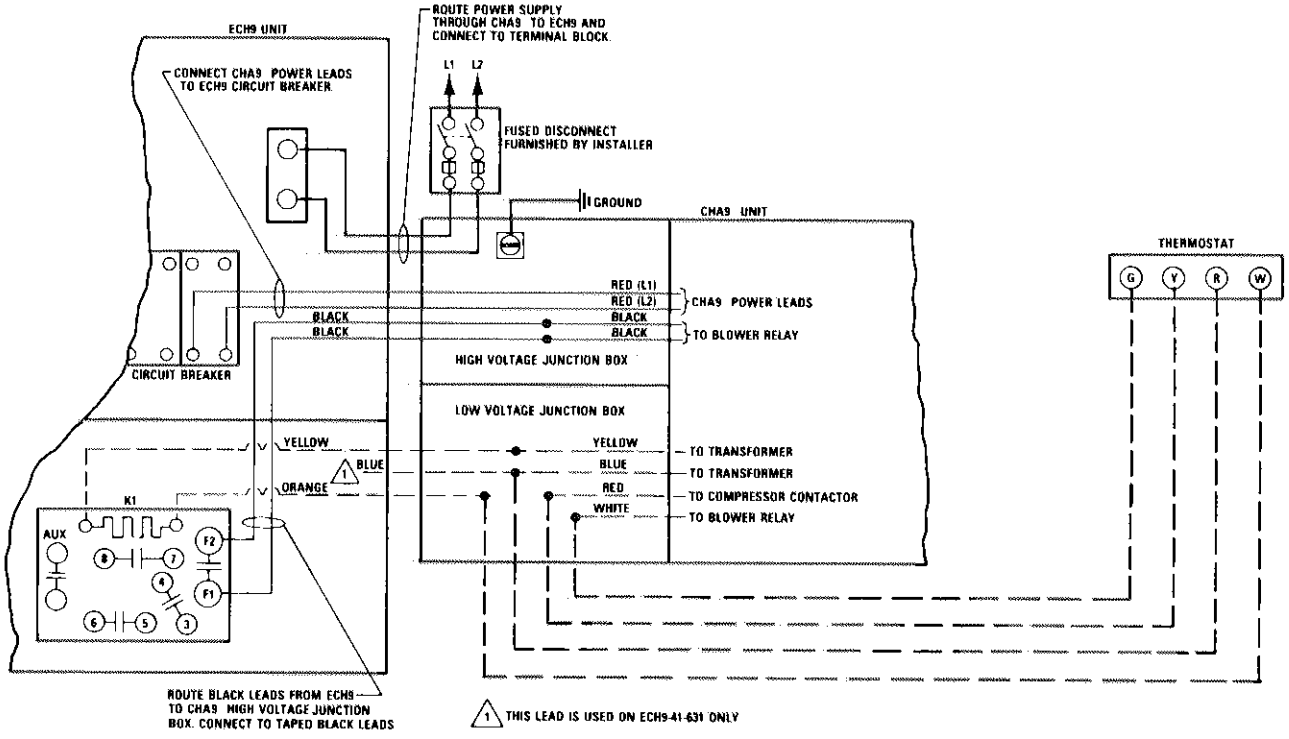


FIGURE 2

III - REFRIGERANT SYSTEM

CHA9 units have a single compressor in a single refrigeration system. The units use a cap tube assembly for the metering device. The suction line and discharge line service ports are located in compressor compartment. See Figure 3. The head pressure given on operating curves is based on discharge pressure.

Each unit is furnished with a normal operating pressure curve. The curve uses suction pressure, discharge pressure and outdoor temperature comparison. To use the chart, first check suction pressure, then move over to the outdoor temperature and finally down to the discharge pressure. If the discharge pressure is within five pounds of this reading, the unit is properly charged, providing the three conditions meet in the unshaded area of the chart. If they meet in the shaded area, there is something wrong with the system and further checks are needed.

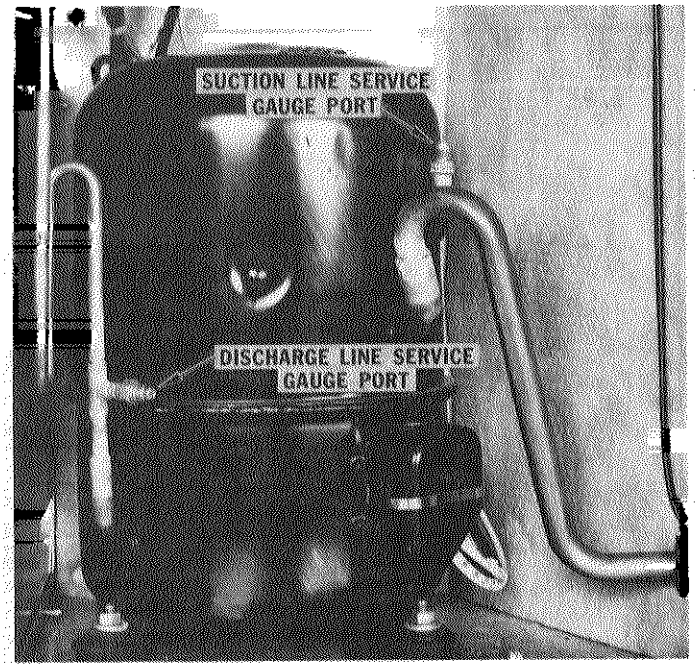


FIGURE 3

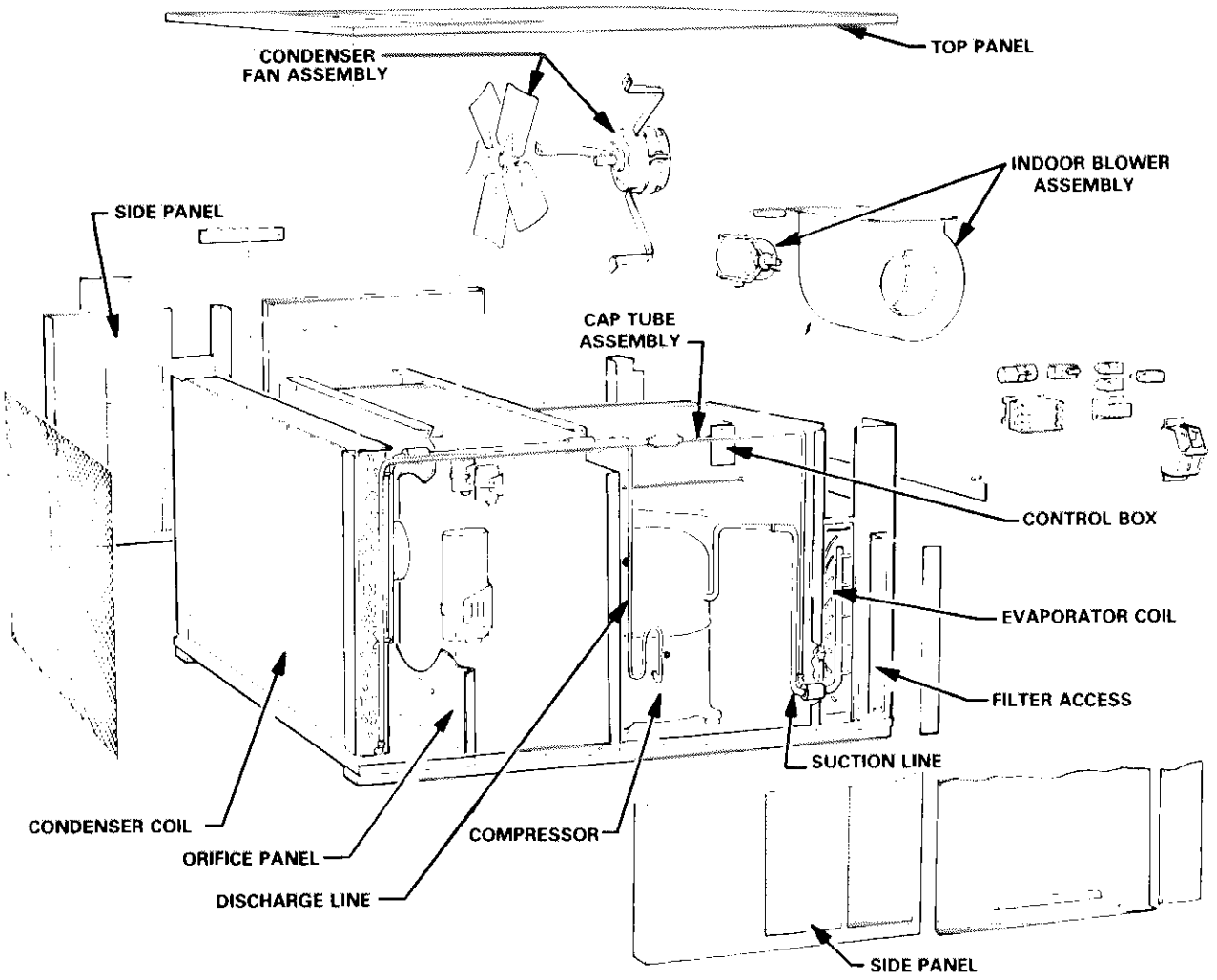
IV - COMPONENTS

Figure 4 shows an exploded view of a CHA9.

A - Control Box (Figure 5)

1 - Compressor Contactor (K1)

Energizes compressor and on "Y" voltage units it also energizes outdoor fan motors.



CHA9 EXPLODED VIEW

FIGURE 4

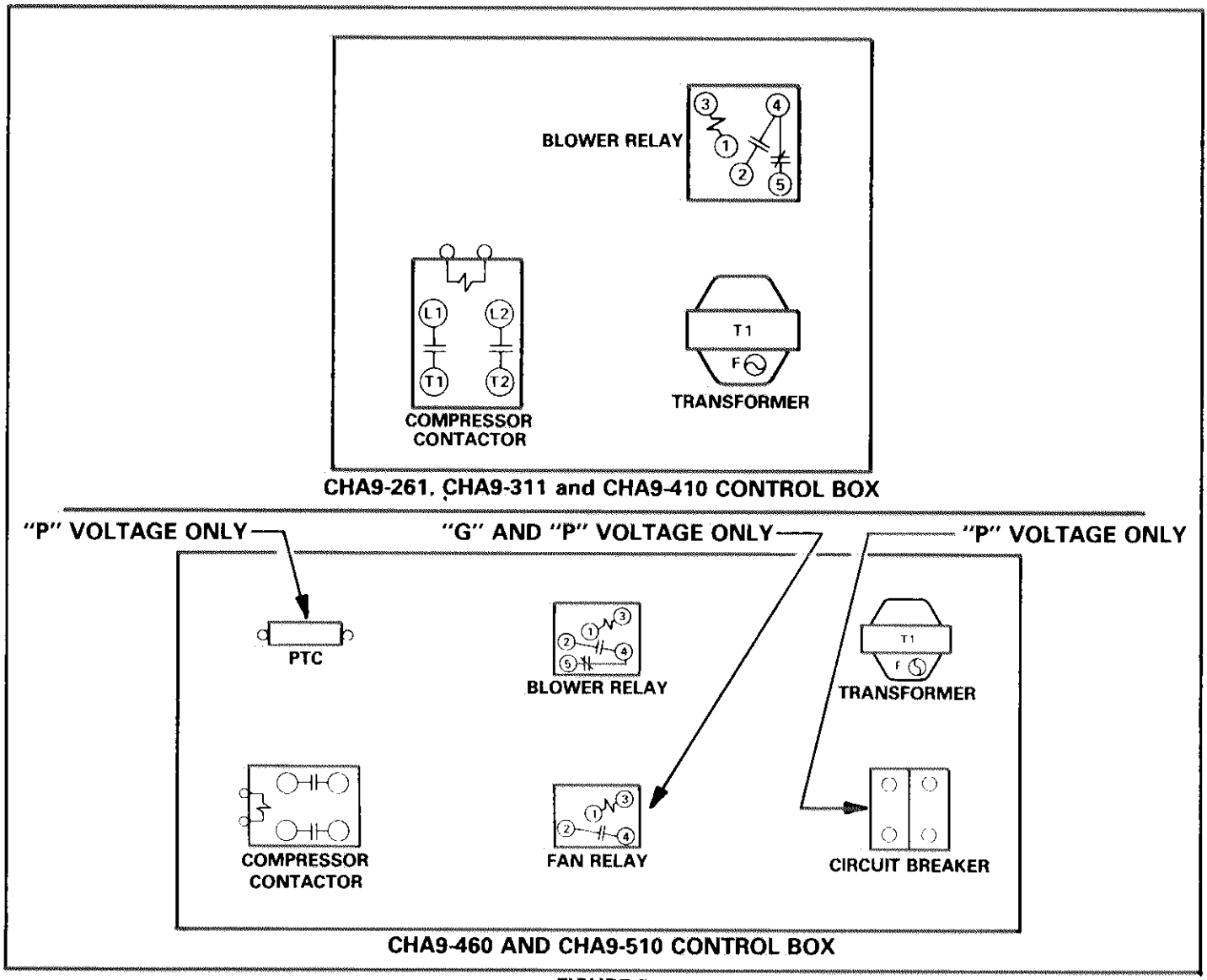


FIGURE 5

2 - Indoor Blower Relay (K2)
Energizes indoor blower motor.

3 - Outdoor Fan Relay (K3)
On CHA9-460/510 "P" and "G" voltage units, K3 energizes the outdoor fan motor(s).

4 - Potential Relay (K4)
On CHA9-461 and CHA9-511 units, K4 may come factory installed in place of the PTC start assist device.

5 - PTC Start Assist Device
On CHA9-461 and CHA9-511 units, this solid-state PTC provides extra starting torque to solve most compressor hard starting problems.

6 - Transformer (T1)
Provides 24V for the control circuit. Circuit is fused at transformer.

7 - Circuit Breaker (CB)
On CHA9-461 and 511 units the circuit breaker protects the outdoor fan motor, indoor blower motor and transformer.

B - Compressor Compartment

1 - Low Pressure Switch
CHA9-460 and CHA9-510 units are protected by a switch in the suction line. It cuts out at 25 psig ± 5 and automatically resets at 55 psig ± 5.

2 - Compressor
Compressor uses an internal overload and a pressure relief valve. The relief valve opens at a discharge and suction differential of 450 psig ± 50. Four and five ton Tecumseh compressors employ an internal self-regulating crankcase heater.

C - Indoor Blower Compartment

CHA9 units are equipped with direct drive blowers. Table 2 shows the speed selection chart for these units.

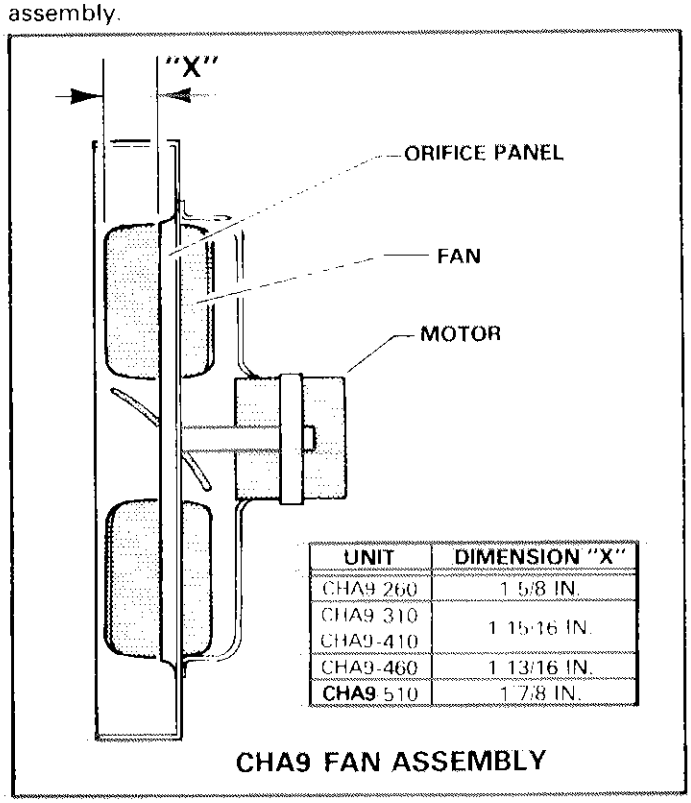
TABLE 2

SPEED	CHA9-261	CHA9-311	CHA9-410 CHA9-460	CHA9-510
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 condenser coil. CHA9-260 through 410 models are equipped with a single fan. CHA9 460/510 models use dual fans.

Fan motor is prelubricated for an extended period of operation. Some motors employ ball bearing motors which need no further lubrication. Check motor for lubrication requirements. For fan service access, remove the bolts securing fan assembly. Figure 6 illustrates the condenser fan and motor assembly.



CHA9 FAN ASSEMBLY

FIGURE 6

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.

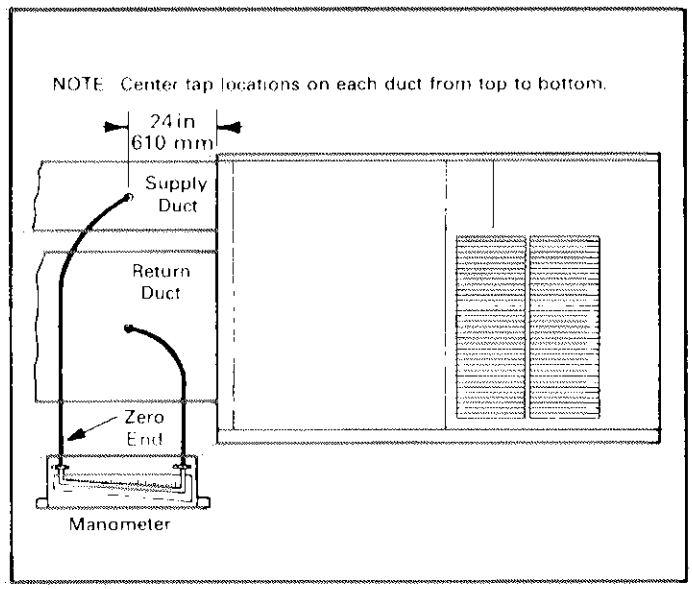


FIGURE 7

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 an inclined manometer.

1 - Measure tap locations on supply and return ducts at least 24 inches from unit and centered top to bottom. See Figure 7.

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 7.

3 - With only the indoor blower operating, observe manometer reading and compare to the blower performance data. If reading is below air volume required, increase blower speed. If reading is above air volume required, decrease blower speed.

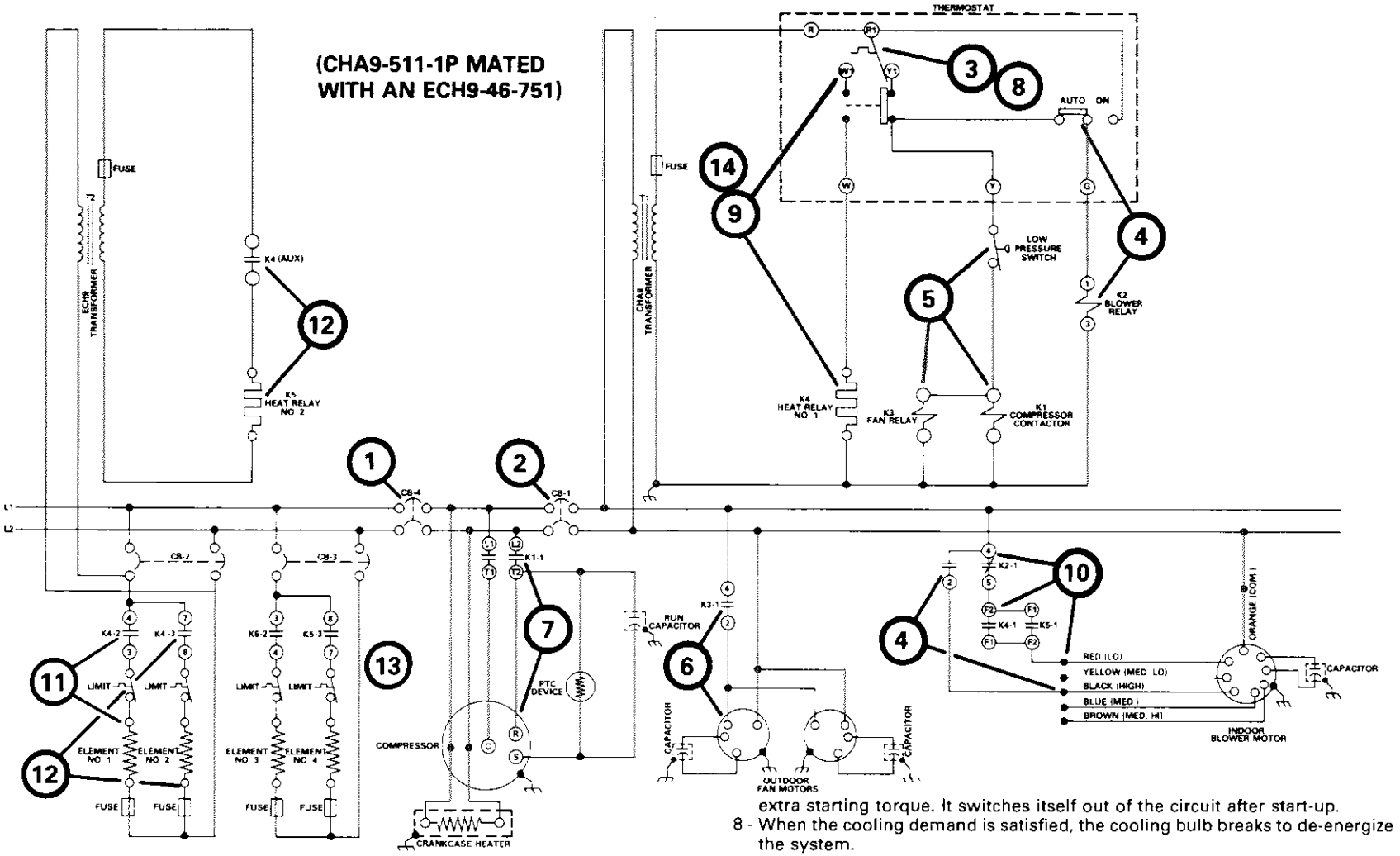
NOTE - For ECH9 electric heat, refer to the unit wiring diagram for minimum blower speed.

4 - After check is completed, seal testing holes.

VI - SCHEMATIC WIRING DIAGRAM OPERATING SEQUENCE

Figure 8 illustrates a typical CHA9 sequence of operation for the cooling cycle and heating cycle (when used). To simplify the illustration, the components in the electric heat section are assigned key numbers in sequence to the CHA9.

TYPICAL CHA9 OPERATING SEQUENCE



COOLING CYCLE

1 - If unit includes electric heat, power is fed through CB-4 circuit breaker in the ECH9.

2 - The circuit breaker in CHA9-461 and CHA9-511 power all the unit components except compressor.

3 - On a cooling demand, the cooling bulb makes at thermostat.

4 - If the thermostat is set on "Auto", the Blower Relay (K2) is energized. K2 closes its N.O. contacts to bring the Indoor Blower Motor up to cooling speed. If the application includes power saver, blower motor operation activates it. See RD9 section under accessories.

5 - As the cooling bulb makes, it also energizes the Compressor Contactor (K1) and Outdoor Fan Relay (K3) through the Low Pressure Switch.

6 - N.O. K3-1 contacts close to power the Outdoor Fan Motors.

7 - The 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.

8 - When the cooling demand is satisfied, the cooling bulb breaks to de-energize the system.

HEATING CYCLE

9 - The thermostat makes "W1" leg on a heating demand. This energizes (K4) Heat Relay No. 1.

10 - The K4-1 fan contacts close. If the thermostat is set on "Auto", the Indoor Blower Motor will run at heating speed through K2-1.

11 - The K4-2 contacts also make to power element no. 1.

12 - After a short delay (10 second minimum), K4-3 contacts close to power element no. 2. The K4 auxiliary contacts also close to energize (K5) Heat Relay No. 2.

12 - K5 closes its contacts to power the remaining elements in sequence.

14 - As the heating demand is satisfied the thermostat breaks the heating control circuit. The control relays de-energize the elements in reverse order. The blower will continue to operate until both fan contacts on the relays have opened.

FIGURE 8