

## CB11 SERIES UNITS

### I - INTRODUCTION

The CB11 series blower/coil is designed for either horizontal or upflow installation with a matching 1-1/2, 2, 2-1/2 or 3 ton Lennox condensing unit. It is ideally suited to meet reduced space requirements in apartments, motel and residential applications. Figure 1 shows a unit cutaway.

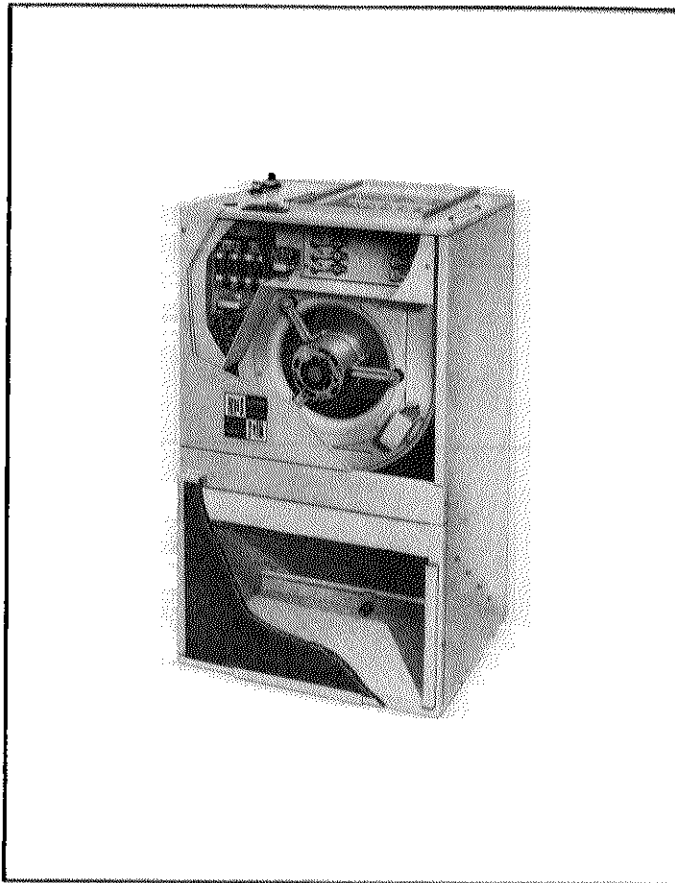


FIGURE 1

The CB11 is available in three blower sizes: CB11-21, CB11-26 and CB11-31. In addition, factory installed electric heat is also available. The heating output table lists the Kw output for each unit at various voltages. The complete CB11 model number identifies the approximate amount of Btuh output. Figure 2 explains the model number designation.

The CB11 was originally produced in dash 1 and 2 models using Robertshaw heat relays. Current production is dash 3 using Honeywell relays. The larger dash 1 and 2 units could be two staged. A special single pole-double throw outdoor thermostat and an anticipation resistor were used. Figure 3 shows the two stage wiring for dash 1 and 2 units. Dash 3 is only single stage. Refer to the Robertshaw and Honeywell sections within this manual for further information on the heat relays.

CB11 up-flow applications with bottom return air require a field installed condensate eliminator assembly. CB11-21/26 use LB-33361BA while CB11-41 uses LB-33361BB. Figure 4 explains the installation procedure.

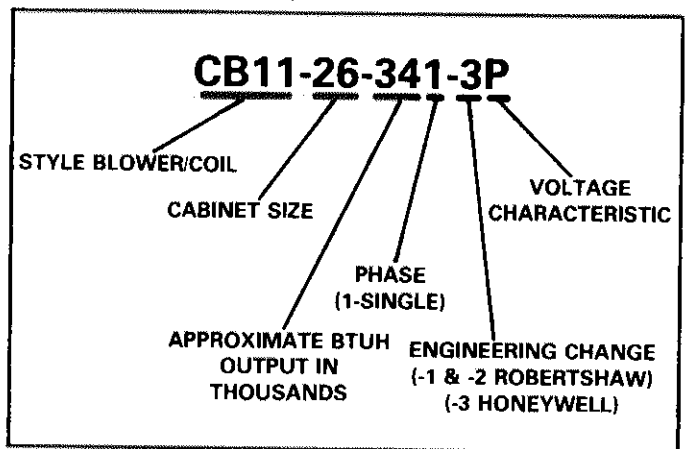


FIGURE 2

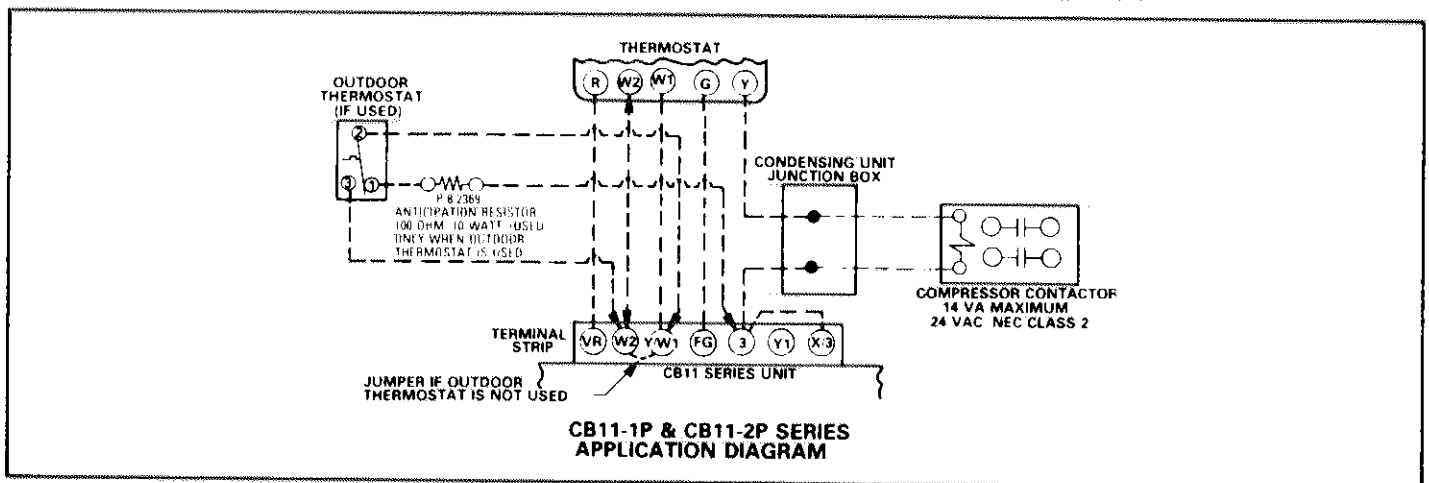
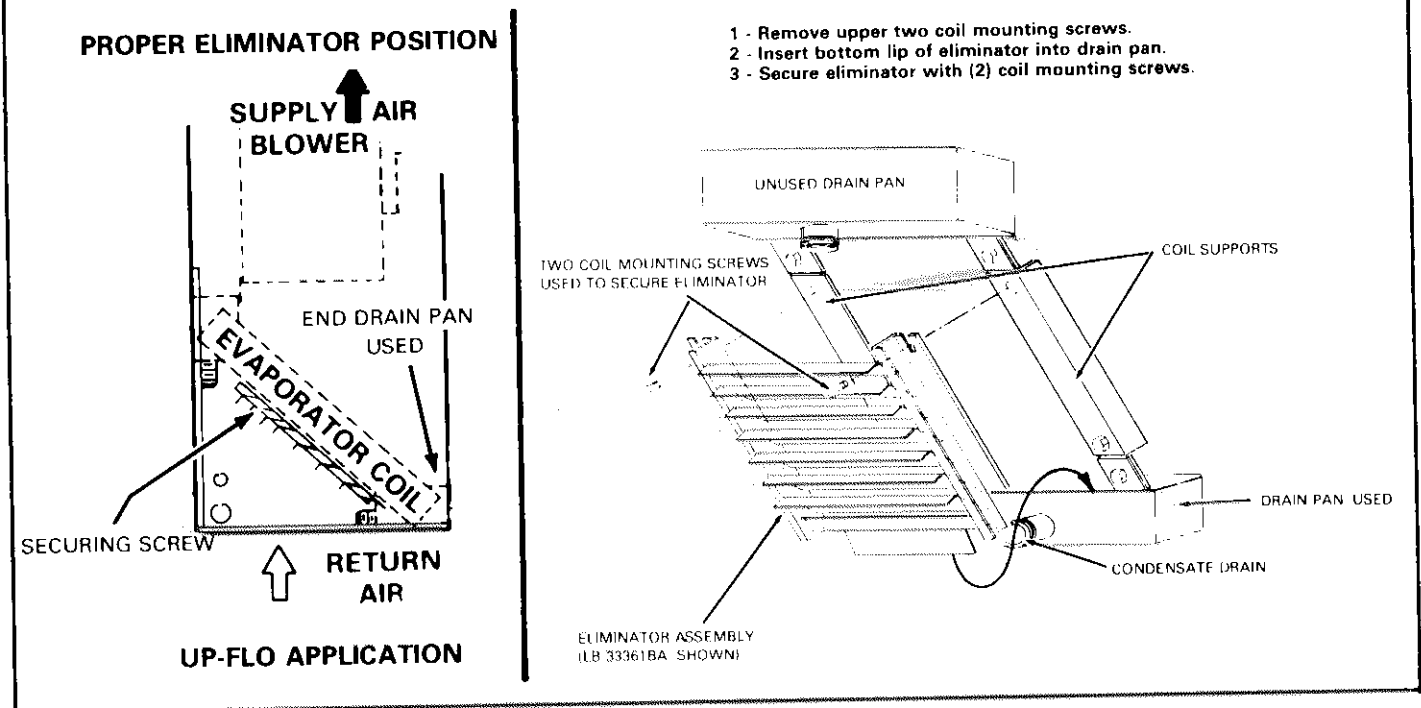


FIGURE 3

## CB11 ELIMINATOR PACKAGE USED IN UP-FLOW APPLICATIONS WITH BOTTOM RETURN AIR



**FIGURE 4**

### A - Specifications

Model Number	CB11-21 -171FF	CB11-21 -261FF	CB11-21 -341FF	CB11-26 -171FF	CB11-26 -261FF	CB11-26 -341FF	CB11-41 -261FF	CB11-41 -341FF	CB11-41 -511F	CB11-41 -601FF
†Output Btuh	16,000	23,000	30,000	16,000	23,000	30,000	23,000	30,000	45,000	53,000
†A.F.U.E.	98.5%	99.0%	99.2%	98.5%	99.0%	99.2%	99.4%	99.5%	99.5%	99.5%
Nominal cooling capacity (tons)	1-1/2			2			3			
Evaporator Coil	2.11		2.11		2.64					
	3/8 — 2		3/8 — 3		3/8 — 3					
	15		13		15					
	5/8 (flare)		5/8 (flare)		3/4 (flare)					
	3/8 (flare)		3/8 (flare)		1/2 (flare)					
Refrigerant	R-22			R-22			R-22			
Condensate drain (mpt) (in.)	3/4			3/4			3/4			
Blower wheel nom. diam. x width (in.)	10 x 4			10 x 4			10 x 8			
Blower motor hp	1/4			1/4			1/3			
Shipping weight (lbs.) (1 package)	92			95			117			
Electrical characteristics	208/230 volts — 60 hertz — 1 phase									
Optional Filter	(1) 12 x 22 x 1			(1) 12 x 22 x 1			(1) 16 x 24 x 1			
Optional Expansion Valve Kit (Bleed Port)	LB-25778CA			LB-25778CA			LB-25778CB			

†Annual Fuel Utilization Efficiency based on D.O.E. test procedures and F.T.C. labeling regulations.

**B - Blower Performance**

**CB11-21FF BLOWER PERFORMANCE**

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
<b>Less Electric Heat</b>			
0	1070	865	667
.05	1061	856	661
.10	1055	854	659
.15	1045	846	652
.20	1036	838	648
.25	1025	828	639
.30	1013	819	631
.40	981	793	606
.50	938	755	570
.60	877	705	520
<b>With Electric Heat</b>			
0	1030	840	655
.05	1015	830	645
.10	1000	820	635
.15	980	805	630
.20	960	790	620
.25	940	775	610
.30	915	760	600
.40	870	725	580
.50	805	685	550
.60	730	640	500

**CB11-26FF BLOWER PERFORMANCE**

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds		
	High	Medium	Low
<b>Less Electric Heat</b>			
0	1015	845	650
.05	1010	843	648
.10	1005	840	645
.15	1000	835	642
.20	990	830	637
.25	978	823	632
.30	965	815	625
.40	930	795	610
.50	893	770	588
.60	848	735	560
<b>With Electric Heat</b>			
0	975	817	626
.05	964	809	620
.10	942	800	614
.15	920	784	608
.20	897	769	598
.25	875	751	589
.30	852	732	578
.40	802	696	534
.50	745	644	524
.60	680	579	490

NOTE - All measurements are less filter.

**CB11-41FF BLOWER PERFORMANCE**

External Static Pressure (in. wg.)	Air Volume (cfm) @ Various Speeds			
	High	Med-High	Med-Low	Low
<b>Less Electric Heat</b>				
0	1550	1405	1110	945
.05	1540	1390	1105	945
.10	1530	1375	1100	940
.15	1510	1360	1095	940
.20	1490	1345	1090	935
.25	1470	1330	1085	930
.30	1450	1310	1080	925
.40	1405	1275	1065	910
.50	1350	1230	1035	885
.60	1265	1170	1000	830
<b>With Electric Heat</b>				
0	1505	1355	1105	945
.05	1485	1345	1105	945
.10	1472	1335	1100	940
.15	1443	1320	1095	935
.20	1420	1305	1090	930
.25	1400	1286	1085	925
.30	1375	1265	1075	915
.40	1328	1218	1050	895
.50	1266	1163	1015	860
.60	1198	1100	955	795

**C - Heating Output**

MODEL NUMBER	OUTPUT	
	VOLTAGE	KW
CB11-21 171FF CB11-26-171FF	208	3.8
	220	4.2
	230	4.6
CB11-21-261FF CB11-26-261FF CB11-41-261FF	240	5.0
	208	5.6
	220	6.3
CB11-21-341FF CB11-26-341FF CB11-41-341FF	230	6.9
	240	7.5
	208	7.5
CB11-41-511FF	220	8.4
	230	9.2
	240	10.0
CB11-41-601FF	208	11.3
	220	12.6
	230	13.8
CB11-41-601FF	240	15.0
	208	13.1
	220	14.7
CB11-41-601FF	230	16.1
	240	17.5

### III - COMPONENTS

Figure 5 shows a CB11 exploded view. Figures 6 and 7 show the control box arrangements for the various units.

#### 1 - Elements

Each element is protected by both a thermal fuse and a limit control. The thermal fuse has a cut-off temperature of 333°F and a resistive interrupt current of 40A. The limit control de-energizes the element at excessive temperatures.

#### 2 - Transformer

230 Volt primary/24 volt secondary — 30VA. The secondary uses an internal 7/8 amp fuse (non-replaceable).

#### 3 - Filter

Filter brackets are provided with CB11 unit. The brackets have a hemmed edge that slides over the flanges of inlet opening. Use a 12 x 22 x 1 filter (P-8-7816) on CB11-21/26 and a 16 x 24 x 1 filter (P-8-7821) on CB11-41. Slide filter in from top.

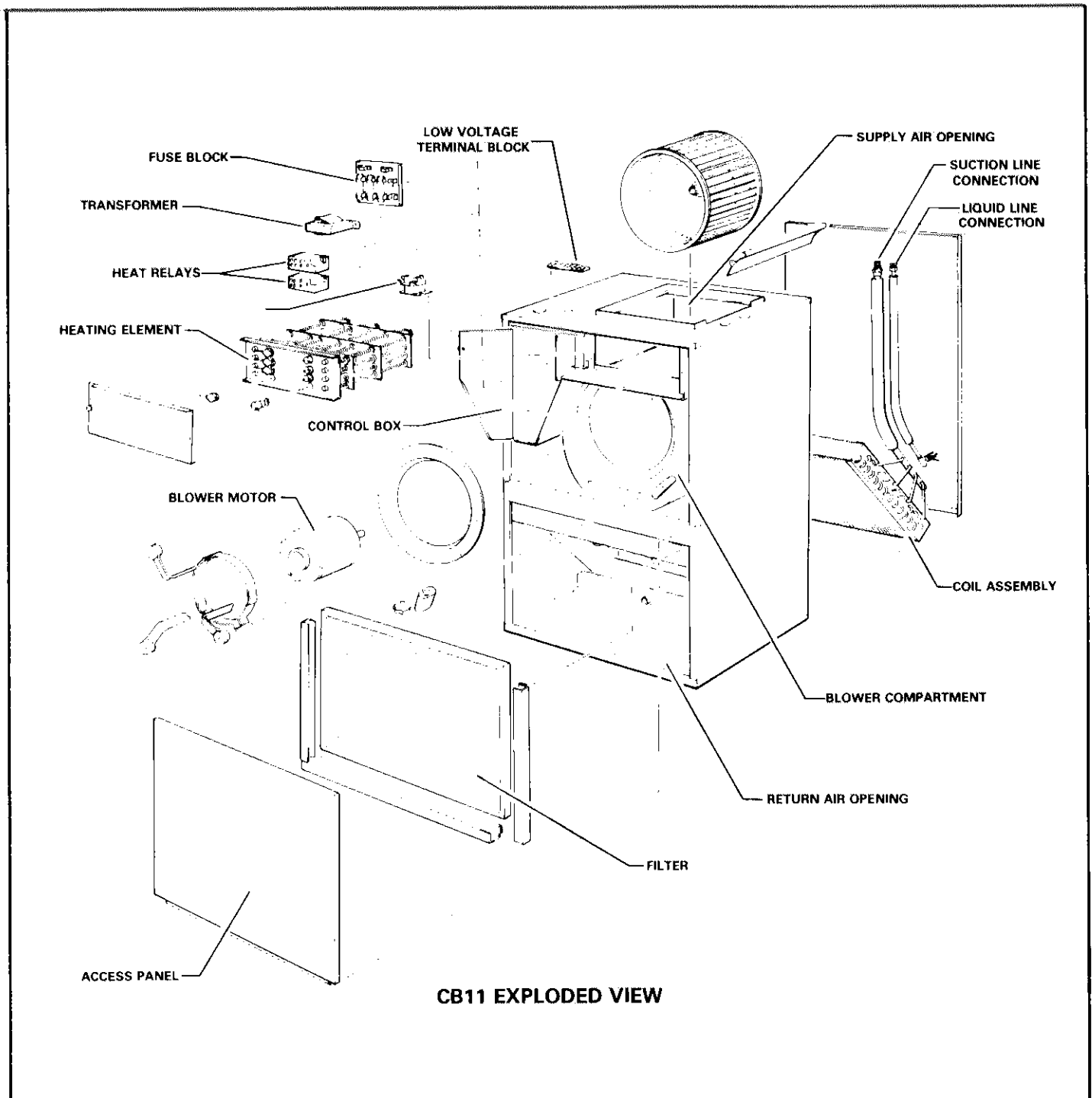
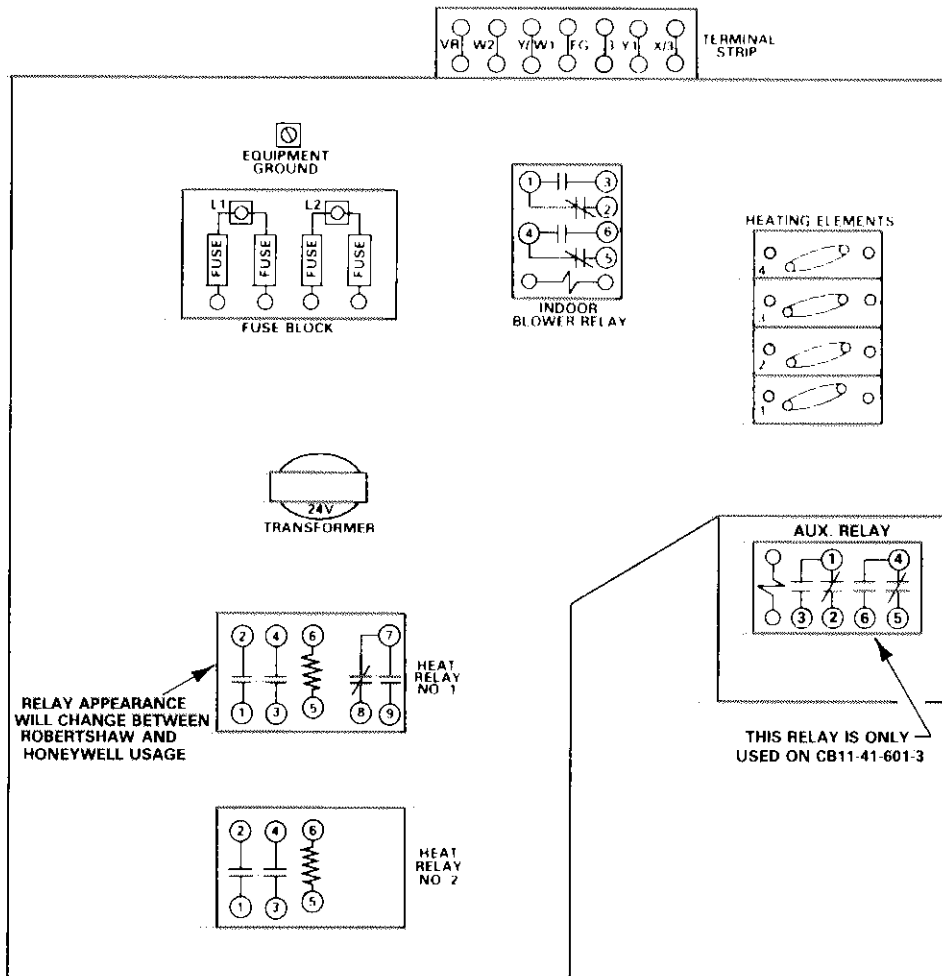
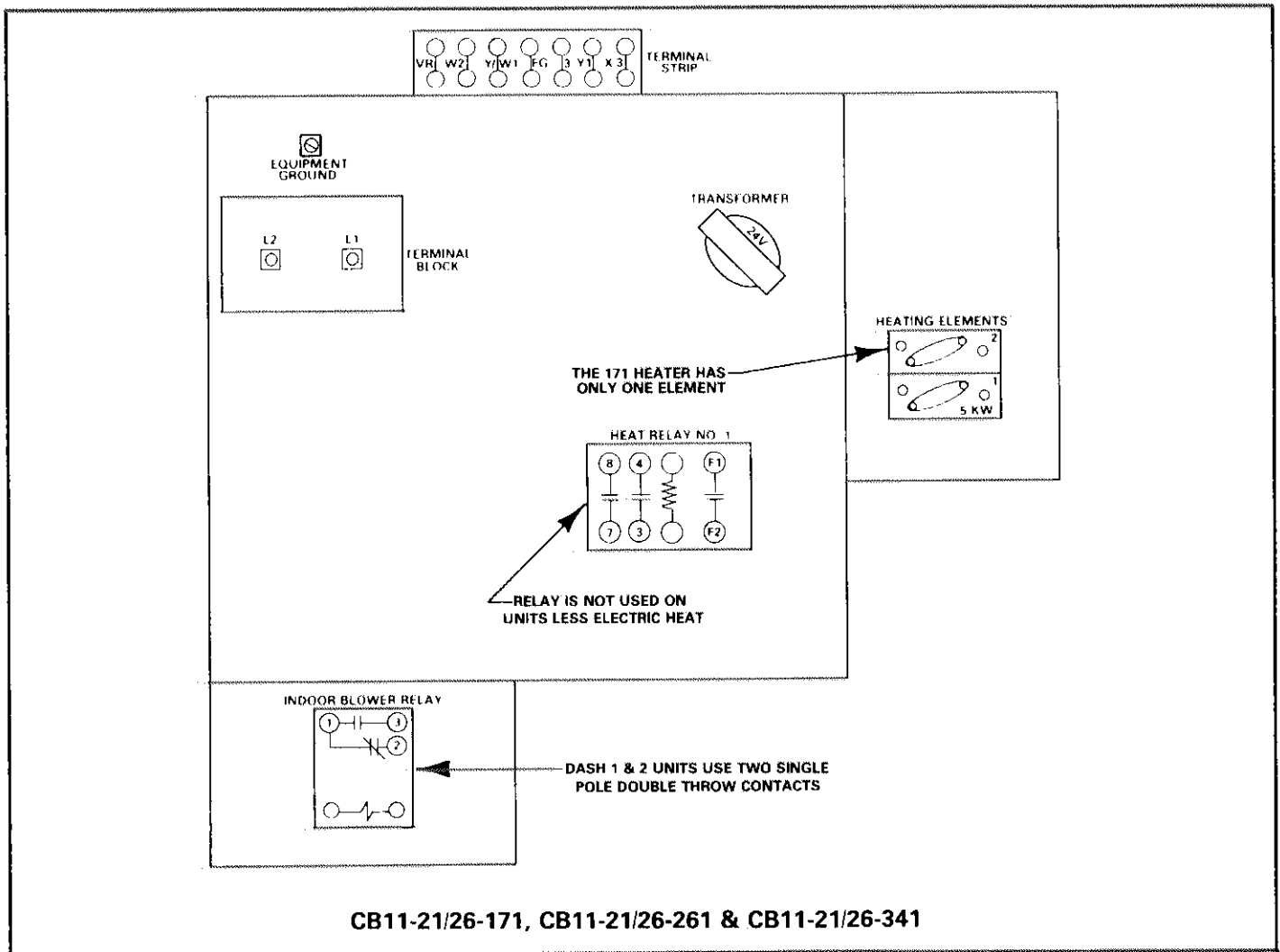


FIGURE 5



MODEL NUMBER	TOTAL ELEMENTS	ELEMENTS PER STAGE		HEAT RELAY USAGE		POWER CONNECTION	
		1ST STAGE	2ND STAGE	NO. 1	NO. 2	TERMINAL BLOCK	FUSE BLOCK
CB11-41	---	---	---	NO	NO	YES	NO
CB11-41-261-1 & -2	2	2	---	YES	NO	YES	NO
CB11-41-341-1 & -2	2	2	---	YES	NO	YES	NO
CB11-41-511-1 & -2	3	2	1	YES	YES	NO	YES
CB11-41-601-1 & -2	4	2	2	YES	YES	NO	YES
CB11-41-261-3	2	2	---	YES	NO	YES	NO
CB11-41-341-3	2	2	---	YES	NO	YES	NO
CB11-41-511-3	3	3	---	YES	NO	NO	YES
CB11-41-601-3	4	4	---	YES	NO	NO	YES

FIGURE 6

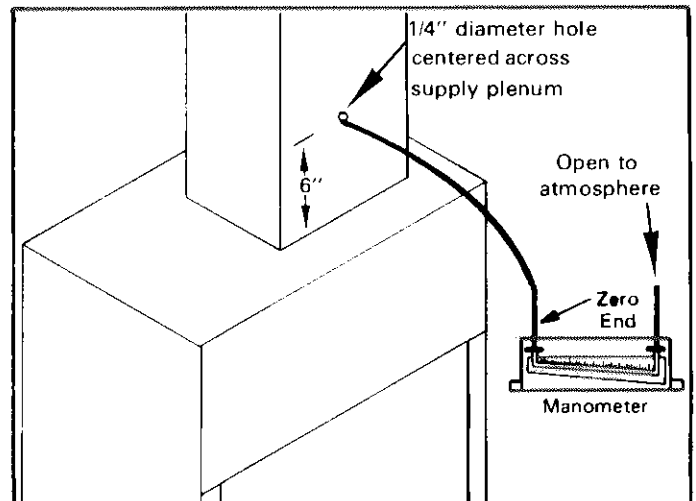


**FIGURE 7**

#### IV - BLOWER SPEED ADJUSTMENTS

Proper air volumes must be maintained to achieve optimum system performance. ARI testing is based on 450 CFM per nominal ton of cooling. To find actual CFM, measure the external static pressure as follows and compare to the blower performance charts. Readings are measured from supply plenum to atmosphere.

- 1 - Drill a 1/4 inch air test hole in plenum as specified in Figure 8.
- 2 - Insert the zero end of an inclined manometer so the hose is flush with the inside edge of hole or insulation. Seal around hose with permagum.



**FIGURE 8**

- 3 - Start CB11 blower motor by placing thermostat fan switch to "on" without a heating or cooling demand. This check must be made with a dry coil. Remove the system filter. The values listed in the blower performance charts are less filter.

**TABLE 1**

COLOR	UNIT MODEL NO.		
	CB11-21	CB11-26	CB11-41
ORANGE	COMMON	COMMON	COMMON
RED	LOW	LOW	LOW
YELLOW	---	---	MED LOW
BLUE	MED	MED	---
BROWN	---	---	MED HIGH
BLACK	HIGH	HIGH	HIGH

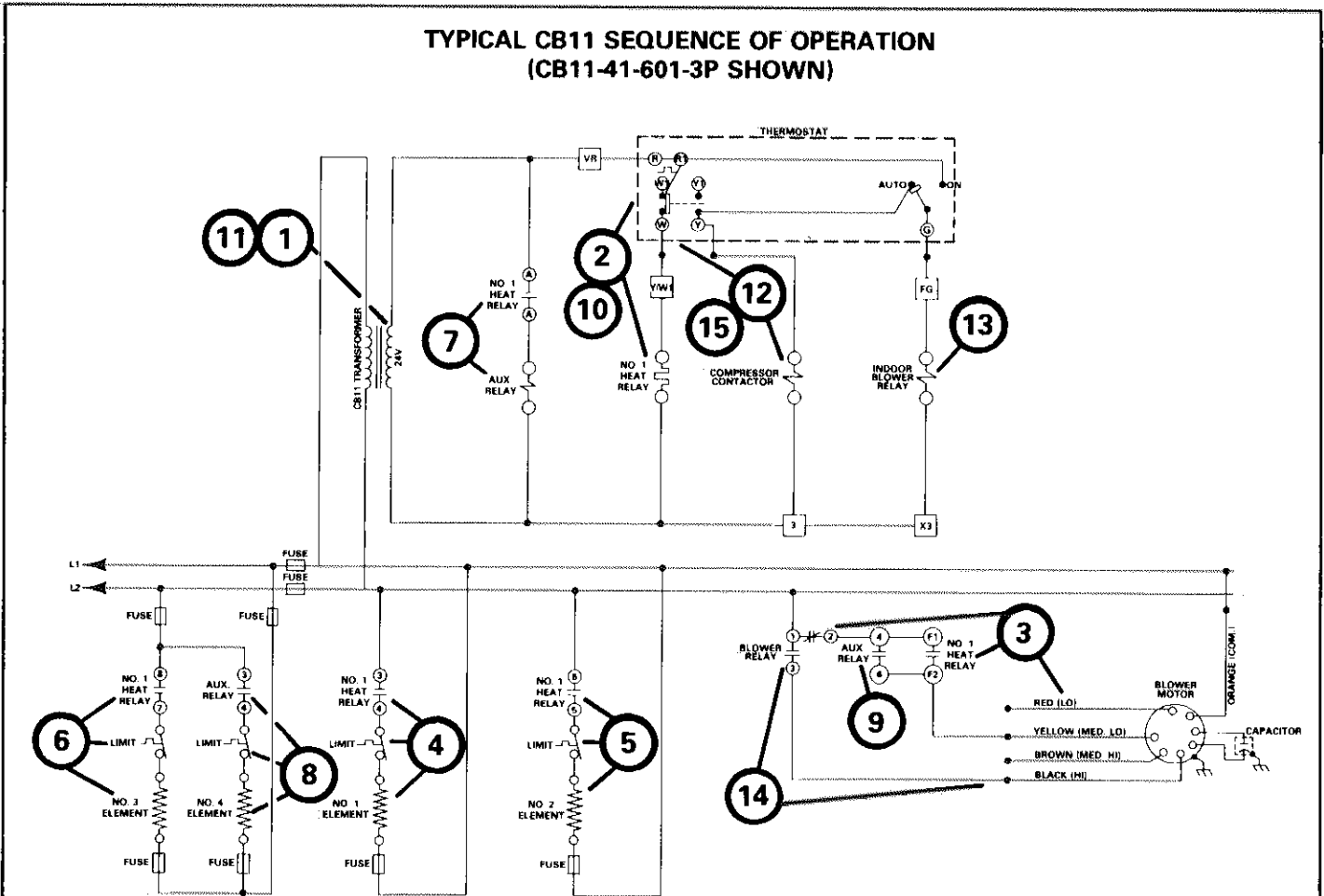
- 4 - Observe manometer reading and compare to charts. If reading is above desired air volume, decrease blower speed. If reading is below desired air volume, increase blower speed. Table 1 shows the CB11 blower speeds.

- 5 - The minimum heating speed is "Med. Low".

- 6 - Seal air test hole when check is completed. Replace system filter.

## V - SCHEMATIC WIRING DIAGRAM OPERATING SEQUENCE

Figure 9 shows a typical sequence of operation for a CB11-41-601-3.



### HEATING SEQUENCE

- 1 - The CB11 transformer provides 24 volts to thermostat.
- 2 - The thermostat's heating bulb makes to the "W" leg on a heating demand. This energizes the No. 1 Heat Relay.
- 3 - This closes the relay's fan contacts. The blower motor is energized on the heating speed through the N.C. blower relay contacts.
- 4 - The No. 1 Heat Relay simultaneously closes its first set of N.O. contacts. This powers the No. 1 Element.
- 5 - After a short delay, the No. 1 Heat Relay closes its second set of N.O. contacts. This powers No. 2 Element.
- 6 - After an additional delay, the No. 1 Heat Relay closes its third set of N.O. contacts to power the No. 3 Element.
- 7 - When the third set of contacts close in step 6, the No. 1 Heat Relay also closes an auxiliary set of contacts. This energizes the Auxiliary Relay. This relay is only used on CB11-41-601-3 units.
- 8 - The Auxiliary Relay closes its first set of N.O. contacts to power No. 4 Element.

- 9 - The Auxiliary Relay also closes its second set of N.O. contacts. This assures blower operation when element is powered.
- 10 - When the heating demand is satisfied, the thermostat breaks the heating control circuit. The relays sequence the elements off. The contacts to the blower motor are the last to break.

### COOLING SEQUENCE

- 11 - The CB11 transformer provides 24 volts to thermostat.
- 12 - On a cooling demand, the thermostat's cooling bulb makes to the "Y" leg. This energizes the compressor contactor, which in turn energizes the compressor and the condenser fan.
- 13 - If the fan switch is set in the intermittent position (Auto), the thermostat also energizes the Blower Relay on a cooling demand.
- 14 - The Blower Relay closes its N.O. contacts to energize blower motor on cooling speed.
- 15 - When the cooling demand is satisfied, the thermostat breaks the cooling control circuit.

FIGURE 9