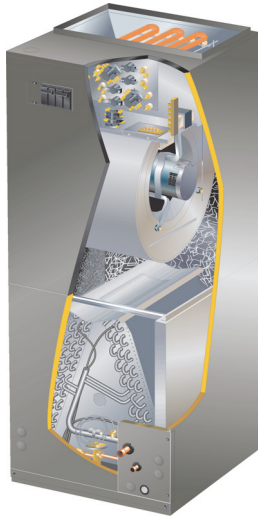


**Elite® Series CBA27UHE Units**



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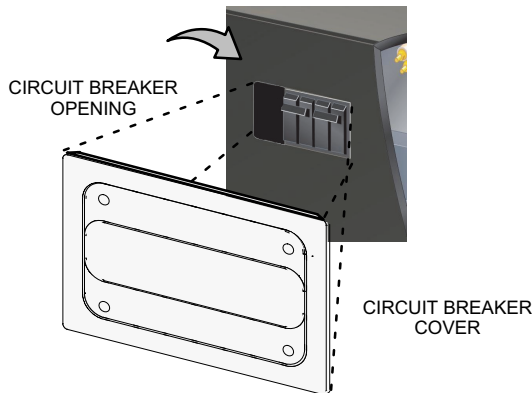
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IT IS HIGHLY RECOMMENDED IF THE AIR HANDLER IS INSTALLED IN A UNCONDITIONED SPACE THAT A CIRCUIT BREAKER COVER (ORDERED SEPARATELY) IS USED. ORDER LENNOX CATALOG # 82W01.



The Elite CBA27UHE units are high efficiency blower coils featuring **an all-aluminum coil**. Several models are available in sizes ranging from 1-1/2 through 5 tons (5.3 through 17.6 kW). The CBA27UHE is an upflow horizontal unit designed for HCFC-410A refrigerant. See unit installation instructions for more detail. A kit is available for downflow applications. CBA27UHE units come with a factory-installed check / expansion valve for cooling or heat pump applications.

CBA27UHE series units are designed to be matched with 14 SEER air conditioner or heat pump units. While these blower coil units are designed to be primarily matched with these outdoor units, they may be matched with other air conditioners or heat pumps as noted in the rating information.

ECB29 electric heat, in several voltages and kW sizes, can be field installed in the CBA27UHE cabinets.

Information contained in this manual is intended for use by experienced HVAC service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes.

**IMPORTANT:** Special procedures are required for cleaning the aluminum coil in this unit. See page 29 in this manual for information.

**⚠ WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

**⚠ CAUTION**

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

## SPECIFICATIONS

General Data		Model Number	CBA27UHE-018	CBA27UHE-024	CBA27UHE-030	CBA27UHE-036
Nominal tonnage			1.5	2	2.5	3
Connections	Suction (vapor) line (o.d.) - in. sweat		3/4	3/4	3/4	3/4
	Liquid line (o.d.) - in. sweat		3/8	3/8	3/8	3/8
	Condensate - in. fpt		(2) 3/4	(2) 3/4	(2) 3/4	(2) 3/4
Indoor Coil	Net face area - ft. <sup>2</sup>		4.44	4.44	5.0	5.0
	Tube outside diameter - in.		3/8	3/8	3/8	3/8
	Number of rows		3	3	3	3
	Fins per inch		12	12	12	12
Blower	Wheel nominal diameter x width - in.		10 x 8	10 x 8	11 x 8	11 x 8
	Blower motor output - hp		1/2	1/2	1/2	1/2
<sup>1</sup> Filters	Size of filter - in.		20 x 20 x 1	20 x 20 x 1	20 x 20 x 1	20 x 20 x 1
Shipping Data -1 package - lbs.			137	137	150	150

## ELECTRICAL DATA

	Voltage - 1 phase - 60hz	208/230V-1ph	208/230V-1ph	208/230V-1ph	208/230V-1ph
	Voltage - 3 phase - 60hz	---	---	---	<sup>3</sup> 460V-1ph
<sup>2</sup> Maximum Overcurrent Protection (unit only) - All voltages		15	15	15	15
Minimum Circuit Ampacity (unit only) - 208/230V		5	5	5	5
Blower Motor Full Load Amps - 208/230V		4.1	4.1	4.1	4.1
Minimum Circuit Ampacity (unit only) - 460V		---	---	---	2.6
Blower Motor Full Load Amps - 460V		---	---	---	2.1

<sup>1</sup> Disposable frame type filter.

<sup>2</sup> HACR type circuit breaker or fuse.

<sup>3</sup> Blower motor is 460V - 1 phase. Optional electric heat is 460V - 3 phase.

## SPECIFICATIONS

General Data		Model Number	CBA27UHE-042	CBA27UHE-048	CBA27UHE-060
	Nominal tonnage		3.5	4	5
Connections	Suction (vapor) line (o.d.) - in. sweat		7/8	7/8	7/8
	Liquid line (o.d.) - in. sweat		3/8	3/8	3/8
	Condensate - in. fpt		(2) 3/4	(2) 3/4	(2) 3/4
Indoor Coil	Net face area - ft. <sup>2</sup>		7.22	7.22	8.33
	Tube outside diameter - in.		3/8	3/8	3/8
	Number of rows		3	3	3
	Fins per inch		12	12	12
Blower	Wheel nominal diameter x width - in.		12 x 9	12 x 9	12 x 9
	Blower motor output - hp		1	1	1
<sup>1</sup> Filters	Size of filter - in.		20 x 24 x 1	20 x 24 x 1	20 x 24 x 1
Shipping Data -1 package lbs.			186	186	199

## ELECTRICAL DATA

	Voltage - 1 phase - 60hz		208/230V-1ph	208/230V- 1ph	208/230V- 1ph
	Voltage - 3 phase - 60hz		---	<sup>3</sup> 460V-1ph	<sup>3</sup> 460V-1ph
<sup>2</sup>	Maximum Overcurrent Protection (unit only) - All voltages		15	15	15
	Minimum Circuit Ampacity (unit only) - 208/230V		10	10	10
	Blower Motor Full Load Amps - 208/230V		7.6	7.6	7.6
	Minimum Circuit Ampacity (unit only)V - 460V		---	5	5
	Blower Motor Full Load Amps - 460V		---	4	4

<sup>1</sup> Disposable frame type filter.

<sup>2</sup> HACR type circuit breaker or fuse.

<sup>3</sup> Blower motor is 460V - 1 phase. Optional electric heat is 460V - 3 phase.

## BLOWER DATA

### CBA27UHE-018 BLOWER PERFORMANCE

External Static Pressure in. w.g.	Air Volume and Motor Watts									
	Tap 1		Tap 2		Tap 3		Tap 4		Tap 5	
	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts
.10	717	66	707	63	735	74	781	81	959	133
.20	596	58	570	54	636	70	737	91	922	144
.30	473	56	430	48	603	77	697	101	877	150
.40	402	61	335	54	540	81	651	105	846	161
.50	358	67	302	60	492	92	607	117	811	173
.60	295	74	248	63	434	94	561	121	769	179
.70	262	79	202	72	399	103	507	131	727	187
.80	N/A	N/A	N/A	N/A	348	108	459	137	695	196

### CBA27UHE-024 BLOWER PERFORMANCE

External Static Pressure in. w.g.	Air Volume and Motor Watts									
	Tap 1		Tap 2		Tap 3		Tap 4		Tap 5	
	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts
.10	767	78	753	75	826	88	957	131	1095	189
.20	662	68	648	66	791	100	937	142	1063	199
.30	615	76	612	77	750	108	895	149	1040	211
.40	561	83	539	83	711	116	861	160	1010	226
.50	522	87	507	89	681	126	821	172	970	230
.60	450	96	438	93	628	134	778	175	944	237
.70	419	100	411	103	584	142	750	186	905	248
.80	365	110	358	108	521	147	702	194	864	256

### CBA27UHE-030 BLOWER PERFORMANCE

External Static Pressure in. w.g.	Air Volume and Motor Watts									
	Tap 1		Tap 2		Tap 3		Tap 4		Tap 5	
	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts
.10	1061	115	1104	126	1169	154	1212	166	1278	200
.20	941	103	973	118	1070	144	1157	173	1241	210
.30	789	90	848	104	1019	151	1121	185	1201	223
.40	640	83	789	111	991	165	1077	199	1169	233
.50	525	93	728	118	946	175	1038	209	1124	244
.60	469	101	629	128	900	181	1006	215	1100	256
.70	434	104	581	139	851	194	956	230	1051	268
.80	365	116	521	155	754	208	915	237	1000	275

### CBA27UHE-036 BLOWER PERFORMANCE

External Static Pressure in. w.g.	Air Volume and Motor Watts at 208V									
	Tap 1		Tap 2		Tap 3		Tap 4		Tap 5	
	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts
.10	1074	134	1099	147	1264	206	1343	240	1498	340
.20	962	121	1027	143	1222	220	1291	253	1467	344
.30	887	126	989	153	1192	234	1269	266	1433	364
.40	852	136	944	164	1144	242	1224	280	1391	378
.50	791	150	894	172	1111	257	1194	286	1365	383
.60	717	160	820	186	1067	266	1153	297	1320	398
.70	649	168	745	202	1037	270	1118	309	1290	407
.80	606	183	697	213	999	284	1081	317	1247	422

**BLOWER DATA**

**CBA27UHE-042 BLOWER PERFORMANCE**

External Static Pressure in. w.g.	Air Volume and Motor Watts									
	Tap 1		Tap 2		Tap 3		Tap 4		Tap 5	
	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts
.10	1282	177	1346	201	1497	261	1489	261	1723	396
.20	1143	159	1278	204	1475	281	1461	273	1690	408
.30	1067	162	1233	209	1447	297	1427	290	1656	434
.40	1024	175	1199	223	1406	315	1407	305	1639	436
.50	920	189	1154	235	1376	320	1360	324	1599	462
.60	923	197	1099	252	1345	338	1328	336	1573	473
.70	838	204	1022	267	1294	358	1303	351	1541	485
.80	815	218	1003	275	1238	375	1228	373	1494	515

**CBA27UHE-048 BLOWER PERFORMANCE**

External Static Pressure in. w.g.	Air Volume and Motor Watts									
	Tap 1		Tap 2		Tap 3		Tap 4		Tap 5	
	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts
.10	1359	190	1509	257	1718	362	1773	401	1903	511
.20	1238	174	1473	273	1690	380	1758	419	1899	515
.30	1135	172	1453	289	1658	397	1707	434	1868	535
.40	1090	180	1450	290	1619	412	1687	449	1830	553
.50	1032	195	1374	315	1588	431	1660	465	1801	558
.60	980	204	1336	331	1561	440	1618	472	1770	582
.70	929	223	1295	339	1510	457	1593	493	1733	600
.80	867	235	1227	363	1488	473	1552	508	1703	618

**CBA27UHE-060 BLOWER PERFORMANCE**

External Static Pressure in. w.g.	Air Volume and Motor Watts									
	Tap 1		Tap 2		Tap 3		Tap 4		Tap 5	
	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts
.10	1404	206	1704	340	1886	453	1928	481	2268	800
.20	1295	194	1658	349	1849	467	1905	510	2228	829
.30	1256	204	1631	365	1806	489	1869	525	2192	830
.40	1199	217	1594	386	1784	505	1842	546	2169	856
.50	1145	236	1549	394	1751	523	1799	548	2136	870
.60	1091	248	1508	413	1720	534	1775	569	2106	894
.70	978	270	1474	433	1683	549	1741	592	2089	907
.80	946	279	1440	453	1655	566	1709	611	2050	925

**REPLACEMENT CIRCUIT BREAKERS**

Voltage	Description	Catalog No.	Voltage	Description	Catalog No.
208/240V – 1 Phase	25 amp, 2 pole	<b>41K13</b>	208/240V – 3 Phase	30 amp, 3 pole	<b>64W47</b>
	30 amp, 2 pole	<b>17K70</b>		35 amp, 3 pole	<b>41K14</b>
	35 amp, 2 pole	<b>72K07</b>		40 amp, 3 pole	<b>41K16</b>
	40 amp, 2 pole	<b>49K14</b>		45 amp, 3 pole	<b>18M86</b>
	45 amp, 2 pole	<b>17K71</b>		50 amp, 3 pole	<b>41K15</b>
	50 amp, 2 pole	<b>41K12</b>		60 amp, 3 pole	<b>41K17</b>
	60 amp, 2 pole	<b>17K72</b>			

# CBA27UHE PARTS ARRANGEMENT

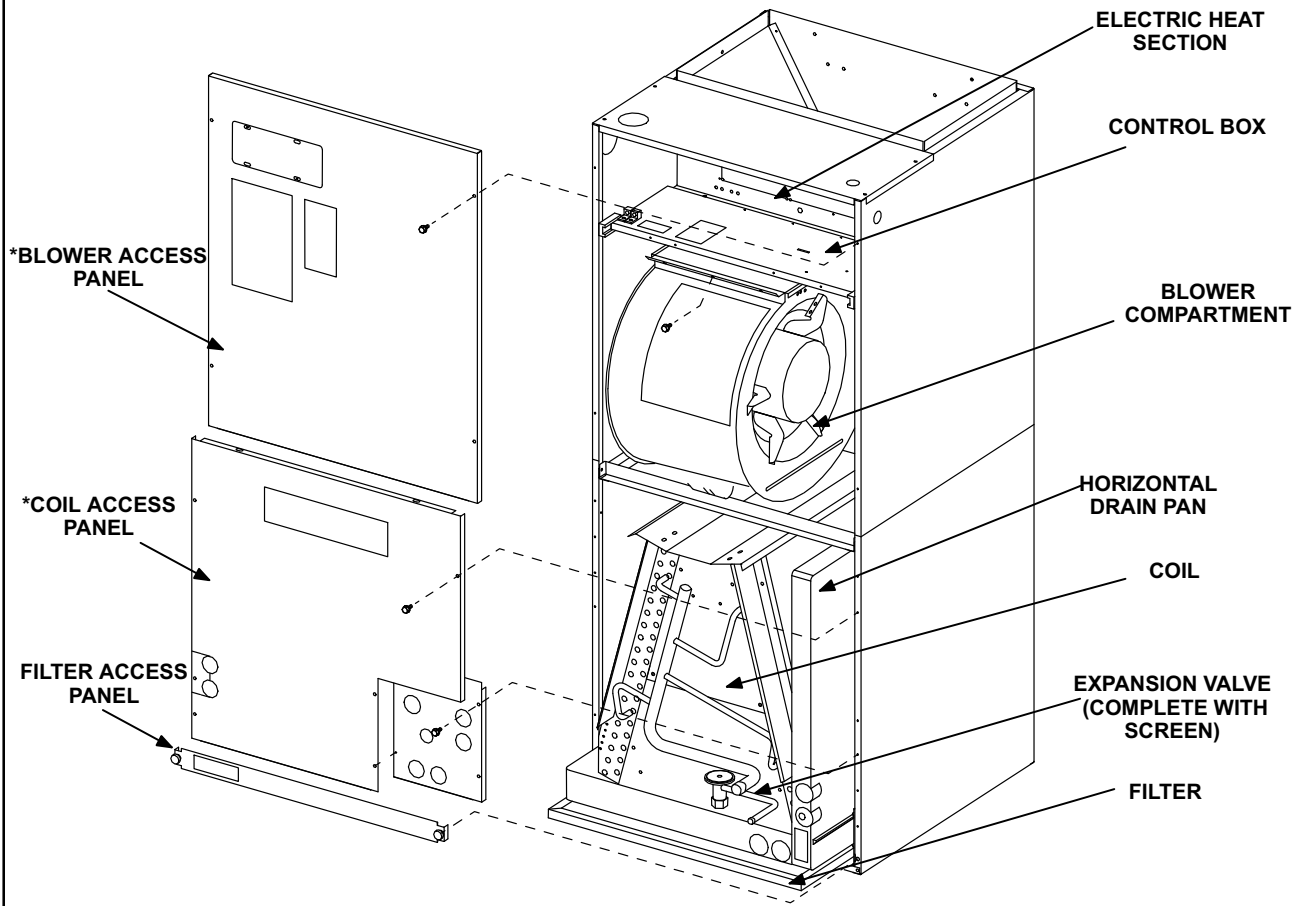
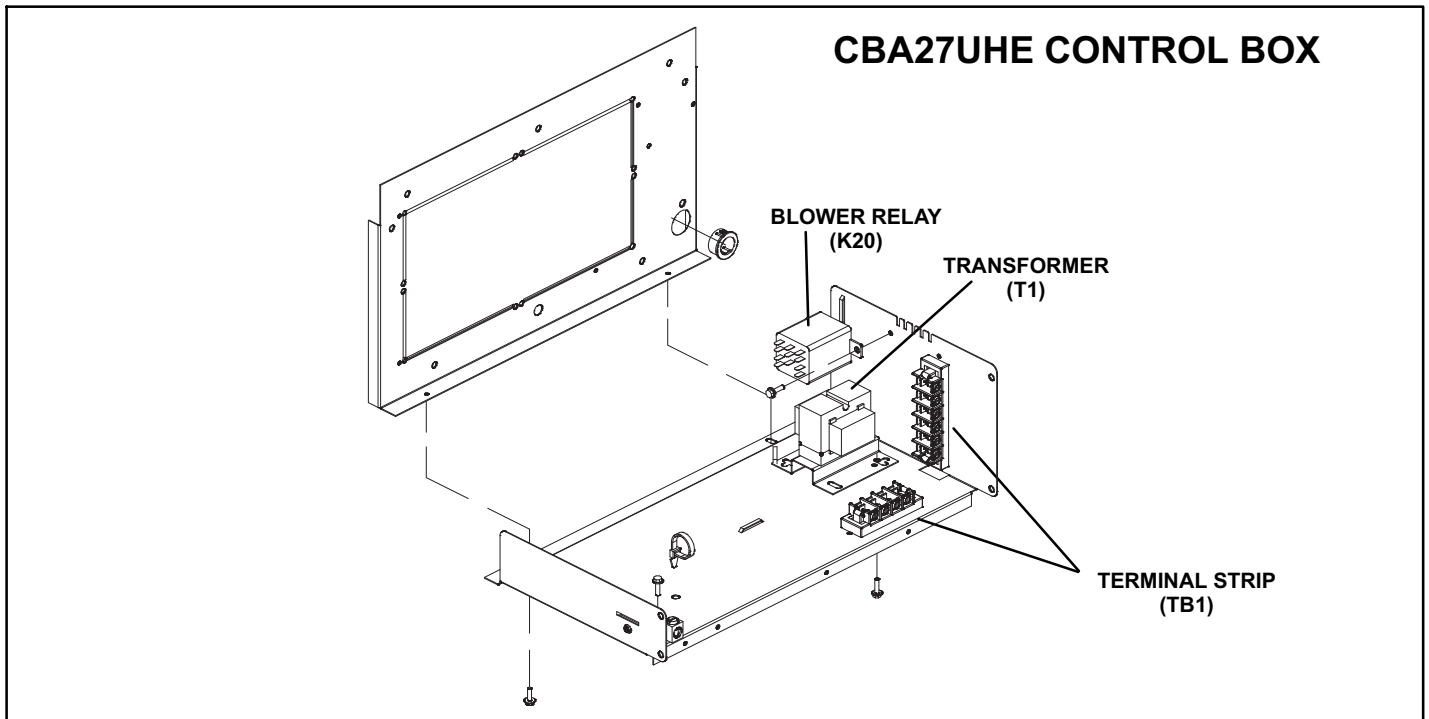


FIGURE 1



**FIGURE 2**

**I-APPLICATION**

All major blower coil components must be matched according to Lennox recommendations for the unit to be covered under warranty. Refer to the Product Specifications (EHB) for approved system matchups. A misapplied system will cause erratic operation and can result in early unit failure. The units come with factory installed check / expansion valve for all applications. The TXV valve has been installed internally for a cleaner installation and is accessible if required.

**ELECTROSTATIC DISCHARGE (ESD)  
Precautions and Procedures**

**⚠ CAUTION**

**Electrostatic discharge can affect electronic components. Take precautions during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hand and all tools on an unpainted unit surface before performing any service procedure.**

**II-UNIT COMPONENTS**

**A-Control Box**

See figure 2 for CBA27UHE control box. Line voltage and electric heat connections are made in the control box. Optional electric heat fits through an opening located in the center of the control box. When electric heat is not used, knock out plates cover the opening. The electric heat control arrangement is detailed in the electric heat section of this manual.

**B-Terminal Strip (TB1)**

CBA27UHE units are equipped with a low voltage terminal strip (TB1) located in the control box. See figure 2. The strip is used for making up all indoor thermostat wires. The outdoor unit low voltage wiring connections to TB1 may be spliced with wire nuts inside the CB units.

*Y1 to Y2 Jumper*

A factory installed jumper will be installed between "Y1 and "Y2" for single-stage stage cooling. Remove the jumper for two-stage cooling.

*R to W2 Jumper*

A factory installed jumper will be installed between "R" and "W2" for single-stage heat pump applications. Remove the jumper for two-stage non-heat-pump application.

## C-Transformer (T1)

CBA27UHE series units use a single line voltage to 24VAC transformer mounted in the control box. The transformer supplies power to the control circuits in the indoor and outdoor unit. Transformers are rated at 70VA. 208/240VAC single phase transformers use two primary voltage taps as shown in figure 3.

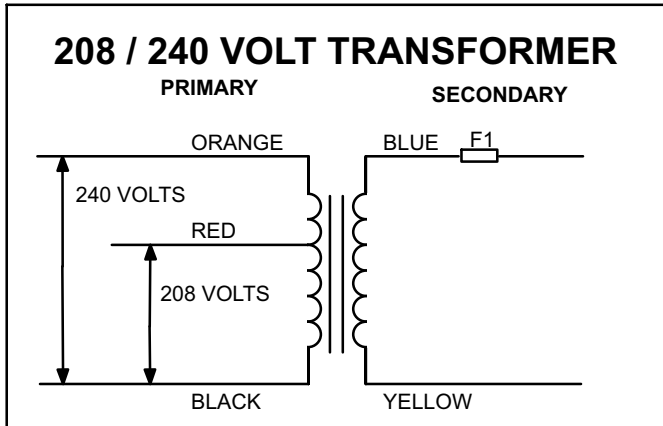


FIGURE 3

## D- Fuse (F1)

All transformers used in the CBA27UHE series units have a fuse (F1) wired in series on the low secondary side. See figure 3. F1 provides secondary voltage overcurrent protection and is rated at 3 amps.

## E-Blower Relay (K20)

CBA27UHE units use a DPDT relay to energize the blower motor during a call for *electric heat only*. When the relay coil is energized on an electric heat call, a set of N.O. contacts closes to energize the blower motor on heating speed.

## F-Dehumidification Relay (K183)

Relay K183 is used for dehumidification during cooling demand. K183 decreases blower speed resulting in an increase in the amount of moisture taken from the air. See wiring diagram on page Page 44 and operation sequence on Page 44 for more detail.

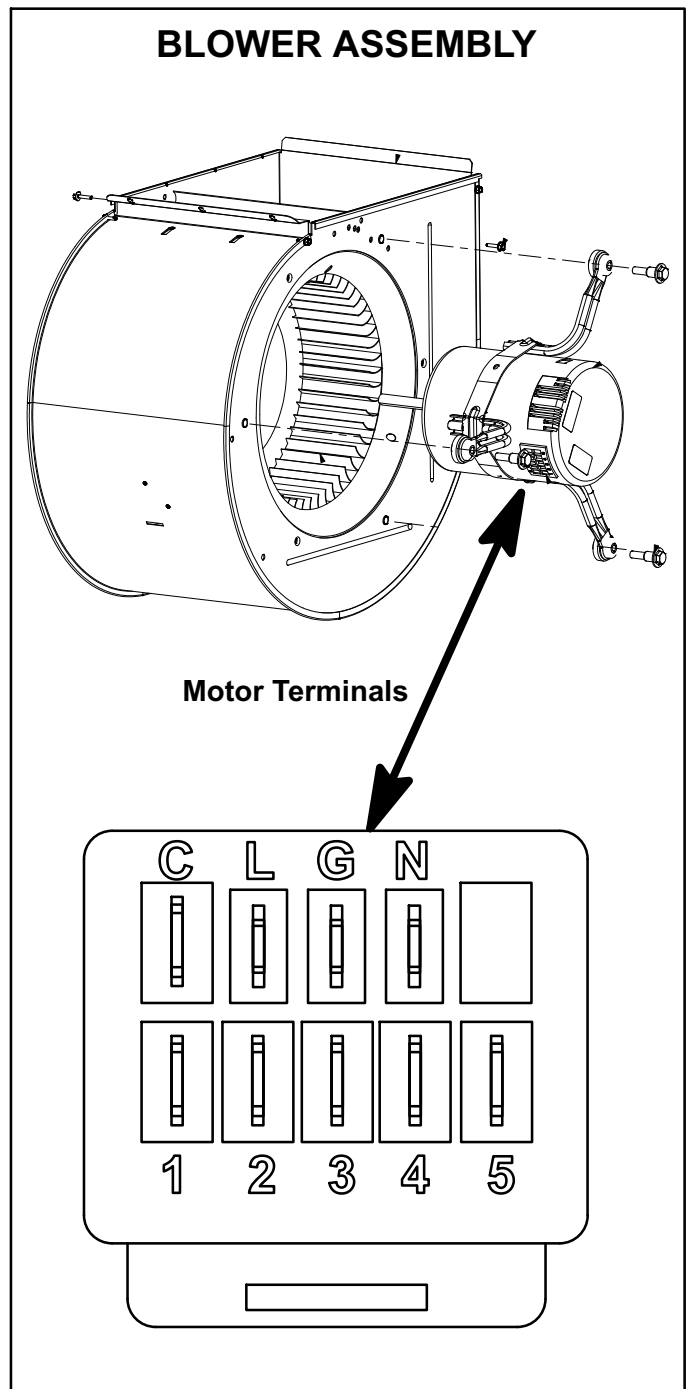


FIGURE 4

## G-Blower Motor (B3)

### ⚠ IMPORTANT

Blower motor features programmed electronic braking. The integral control brakes the motor near the end of the supply air blower operation, allowing the motor to maintain a more controlled ramping shut-down. Each blower is statically and dynamically balanced as an assembly before installation in the unit.



CBA27UHE units are equipped with an indoor blower motor that is permanent magnetic with constant torque. The motor has 5 signal level speed taps, all referenced to the same signal common. Each tap requires 24 volts to energize.

### Multiple Taps Energized

It is acceptable to have more than one tap energized at once but the micro-controller (integrated in the motor) will default to the highest tap. For example tap five will have precedence over tap four.

### Input Voltage Requirements

The circuit is designed to be operated with AC voltage. To enable a tap requires 12 to 33VAC. Expected current draw will be less than 20mA.

### Troubleshooting

Troubleshooting the motor is an easy process. Follow steps below.

- 1- Shut off power to unit.
- 2- Remove input plug from motor. Turn power back on to unit.
- 3- Check for 230 volts across terminals "L" and "N" on the input plug. See figure 4. If voltage is present continue. If voltage is not present problem may be up stream of the motor input plug.
- 4- Check for 24 volts across terminals "C" and speed tap used (1, 2, 3, 4 or 5) on the input plug. See figure 4. If 24 volts is not present problem may be up stream of the motor input plug.

If correct voltage is present in steps 3 and 4 and motor is not operating properly, replace motor. The motor is not field repairable.

### H-Coil

CBA27UHE units have dual slab coils arranged in an "A" configuration. Each coil has two or three rows of aluminum tubes fitted with ripple-edged aluminum fins. An expansion valve complete with screen, feeds multiple parallel circuits through the coils. The coil is designed to easily slide out of the unit cabinet.

### I-Condensate Drain Pans

Both upflow/downflow and horizontal drain pans are provided and installed on the CBA27UHE units. The drain pans are made from fiberglass filled plastic. The drain hole on horizontal pans are used for right-hand discharge only, and must be plugged when the unit is configured for left-hand discharge.

## III-OPTIONAL ECB29 ELECTRIC HEAT

### A-Matchups and Ratings

The Electric Heat Data on pages 15-25 show all approved

CBA27UHE to ECB29 matchups and electrical ratings.

### B-Electric Heat Components

ECB29 parts arrangement is shown in figures 5 through 10. All electric heat sections consist of components mounted to the electric heat vestibule panel and electric heating elements exposed directly to the air stream. 208/230V electric heat sections may be equipped with circuit breakers. The circuit breakers are designated by CB in the model number. The electric heat section is connected to the unit via jack J2, which plugs into plug P2 of the unit.

### Electric Heat Sequencer Relays

#### (K32, K33, K34, K35, K116, K117) (208/230 volt only)

Relays K32, K33, K34, K35, K116 and K117 are N.O. sequencer relays with a resistive element for a coil and a bi-metal disk which actuates the contacts. The relays are located on the electric heat vestibule panel and are energized by a 24V heating demand (W1, W2, and W3) via jack/plug 2. When energized, the internal resistance heats the bi-metal disk causing the contacts to close. When the relay is de-energized, the disk cools and the contacts open. The relays energize different stages of heat, as well as the blower. The blower is always first on and last off.

### Primary(S15) & Secondary(S20) Temperature Limits

Both the primary (S15) and secondary (S20) limits are located on the electric heat vestibule panel and are exposed directly to the air stream through an opening in the panel. The high temperature limits are SPST N.C. limits with the primary limit being an auto-reset limit and the secondary limit being a "one-time" limit. One-time limits need to be replaced when opened. The limits are factory set and are not adjustable.

### 208/230 Volt Electric Heat Sections

Each stage of the 208/230 electric heat is protected by a primary (S15) and secondary (S20) high temperature limit. Both S15 and S20 are located in the same housing. Each stage use the same style of limits. Both the primary and secondary limits are wired in series with a heat element. When either S15 or S20 opens, the corresponding heat element is de-energized. All other heating elements remain energized. The primary high temperature limit opens at 150°F ± 5°F (65.5°C ± 2.8°C) on a temperature rise and automatically resets at 110°F ± 9°F (43.3°C ± 5.0°C) on a temperature fall. The secondary high temperature limit opens at 333°F ± 10°F (167.2°C ± 5.6°C) on a temperature rise. If the secondary limit opens it will need to be replaced.

### Circuit Breaker (CB1, CB2, and CB3) (208/230 volt only)

Line voltage connections are made to circuit breakers CB1, CB2, and CB3 in the electric heat sections with circuit breakers (designated by CB in the model numbers) then routed to the CB unit through J/P2. The Electric Heat Data on pages 15-25 show the amp rating for each circuit breaker used. Single-phase electric heat uses two-pole circuit breakers; while three-phase electric heat uses three-pole circuit breakers.

### Terminal Strip (TB2) 208/230 volt only

For the electric heat sections without circuit breakers or fuses, line voltage connections are made to terminal strip

TB2 then routed to the CB unit through J/P2. The terminal strip is located in the lower left corner of the electric heat vestibule panel. Single-phase electric heat uses two-pole terminal strips; while three-phase electric heat uses three-pole terminal strips.

### Heating Elements (HE1 through HE6)

Heating elements are composed of helix wound bare nichrome wire exposed directly to the air stream. The elements are supported by insulators mounted to the wire frame. For single-phase applications, one element is used per stage. Each stage is energized independently by the corresponding relay located on the electric heat vestibule panel. All three-phase heating elements are arranged in a three-phase delta. Once energized, heat transfer is instantaneous. High temperature protection is provided by primary and secondary high temperature limits.

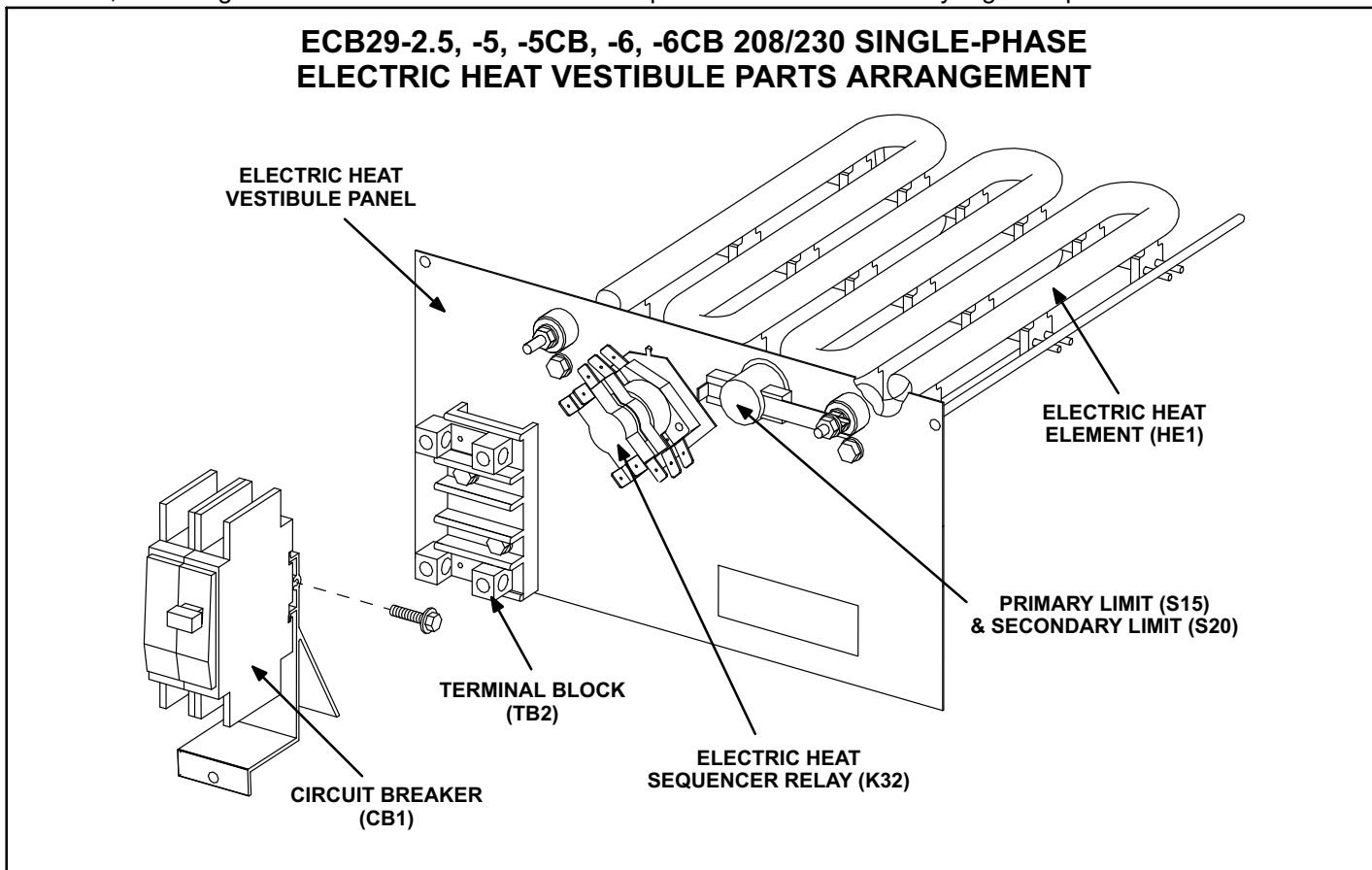


FIGURE 5

ECB29-8, -8CB, 9CB, -10, -10CB 208/230  
SINGLE-PHASE  
ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

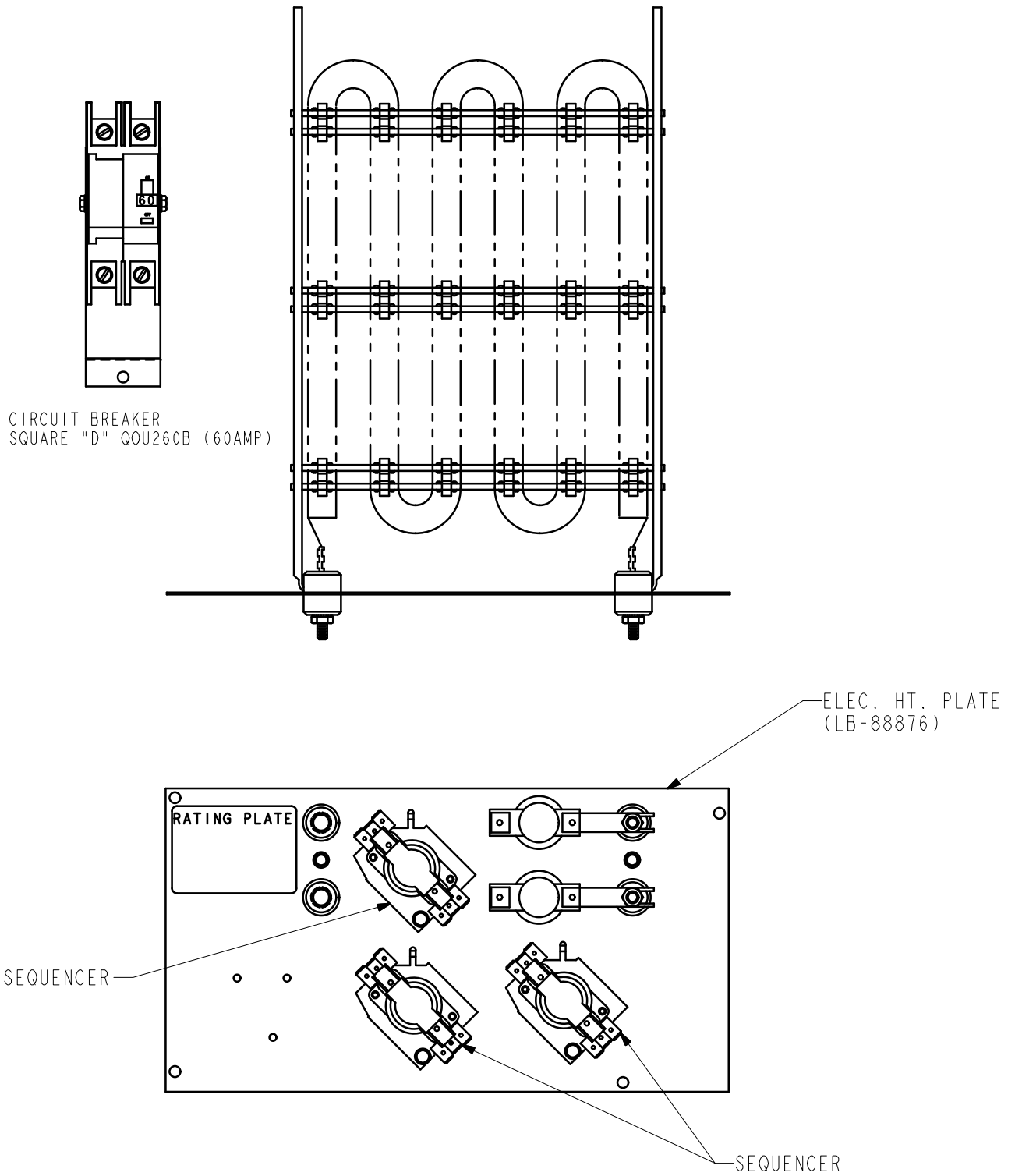
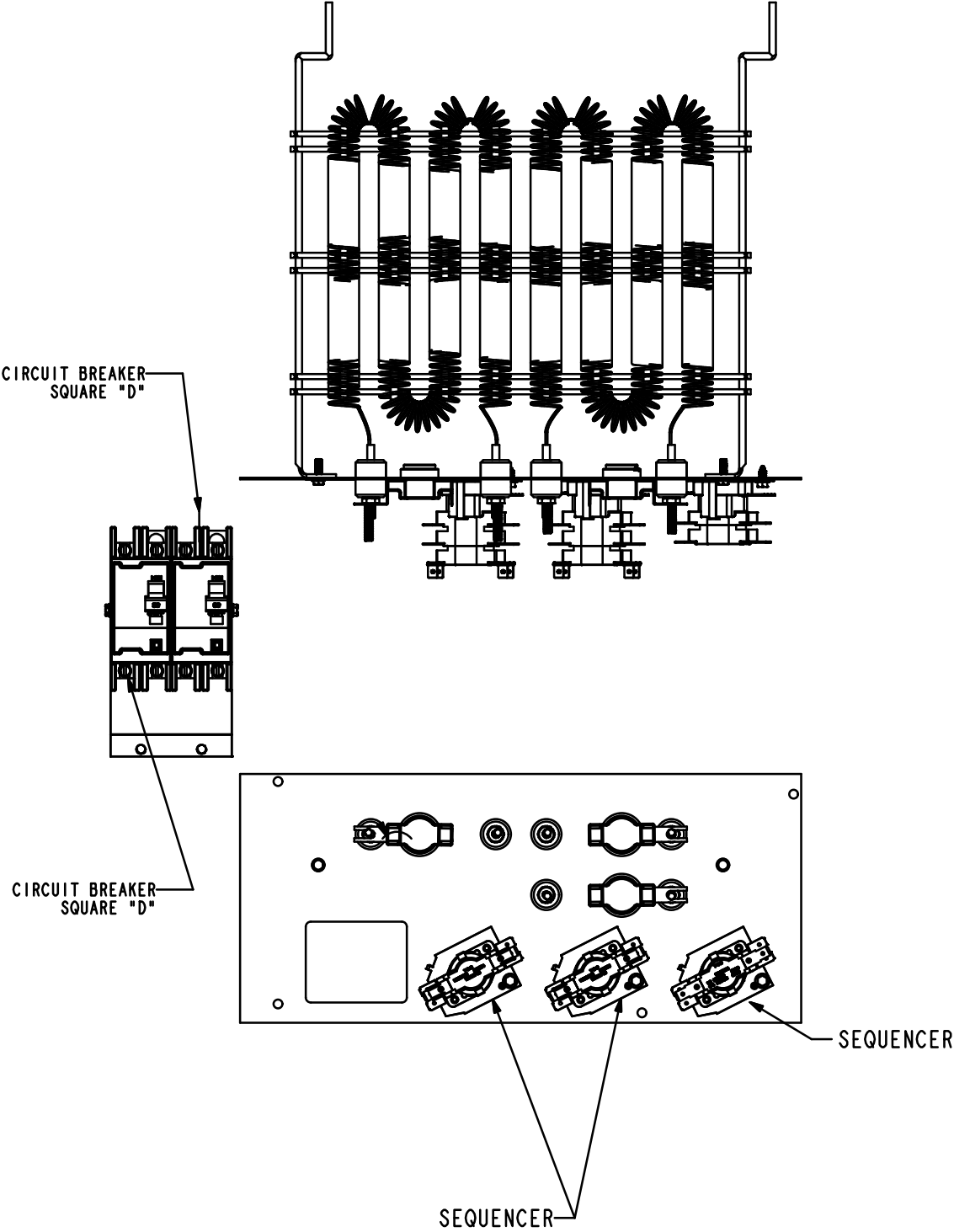


FIGURE 6

**ECB29-12.5CB, -15CB 208/230 SINGLE PHASE  
ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT**



**FIGURE 7**

ECB29-8, -10 208/230 THREE PHASE  
ECB29-15CB 208/230 THREE PHASE  
ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

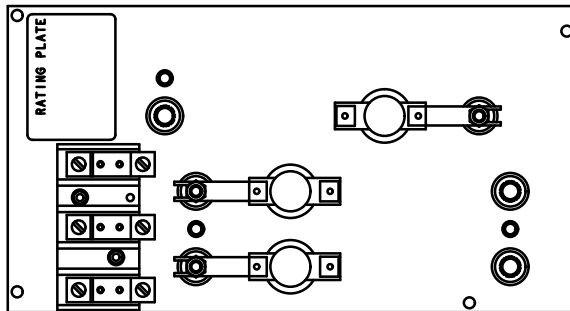
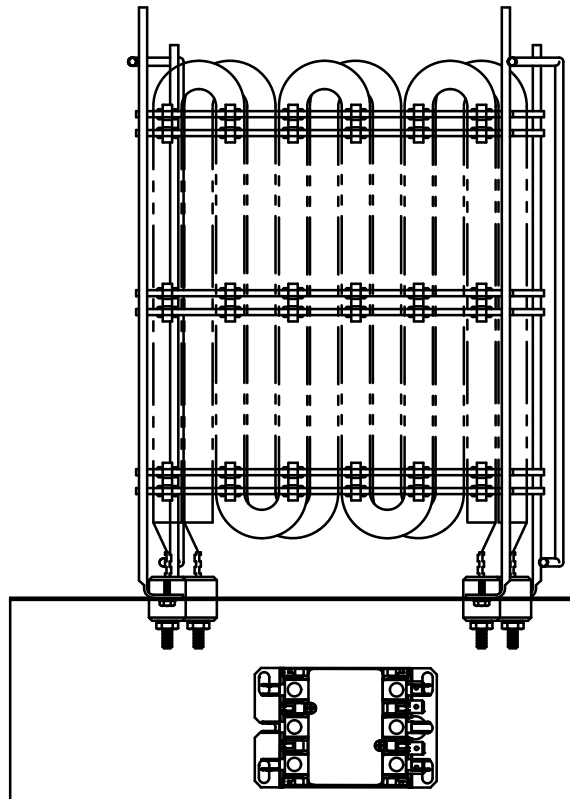


FIGURE 8

ECB29-20CB 208/230 SINGLE-PHASE  
ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

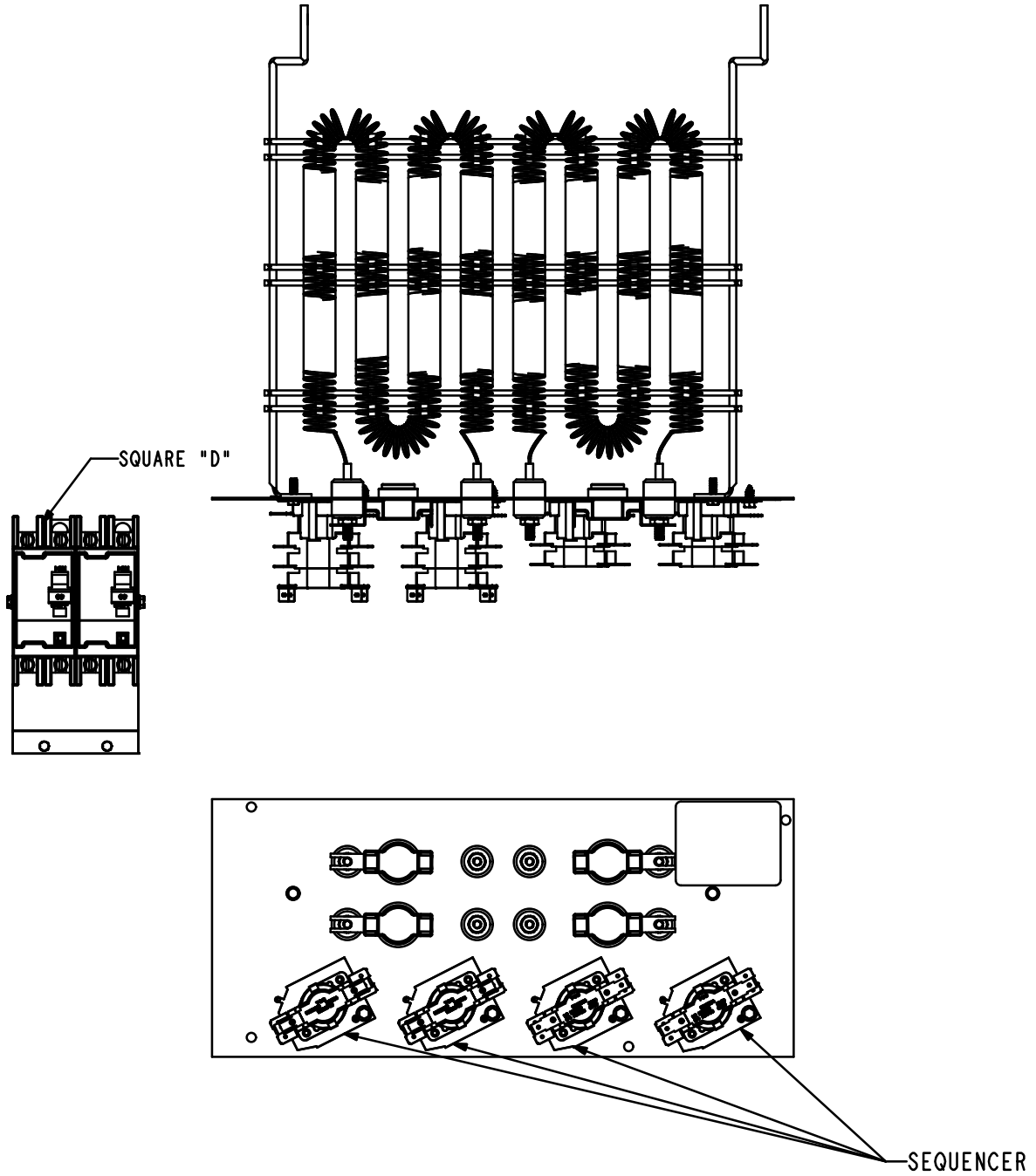
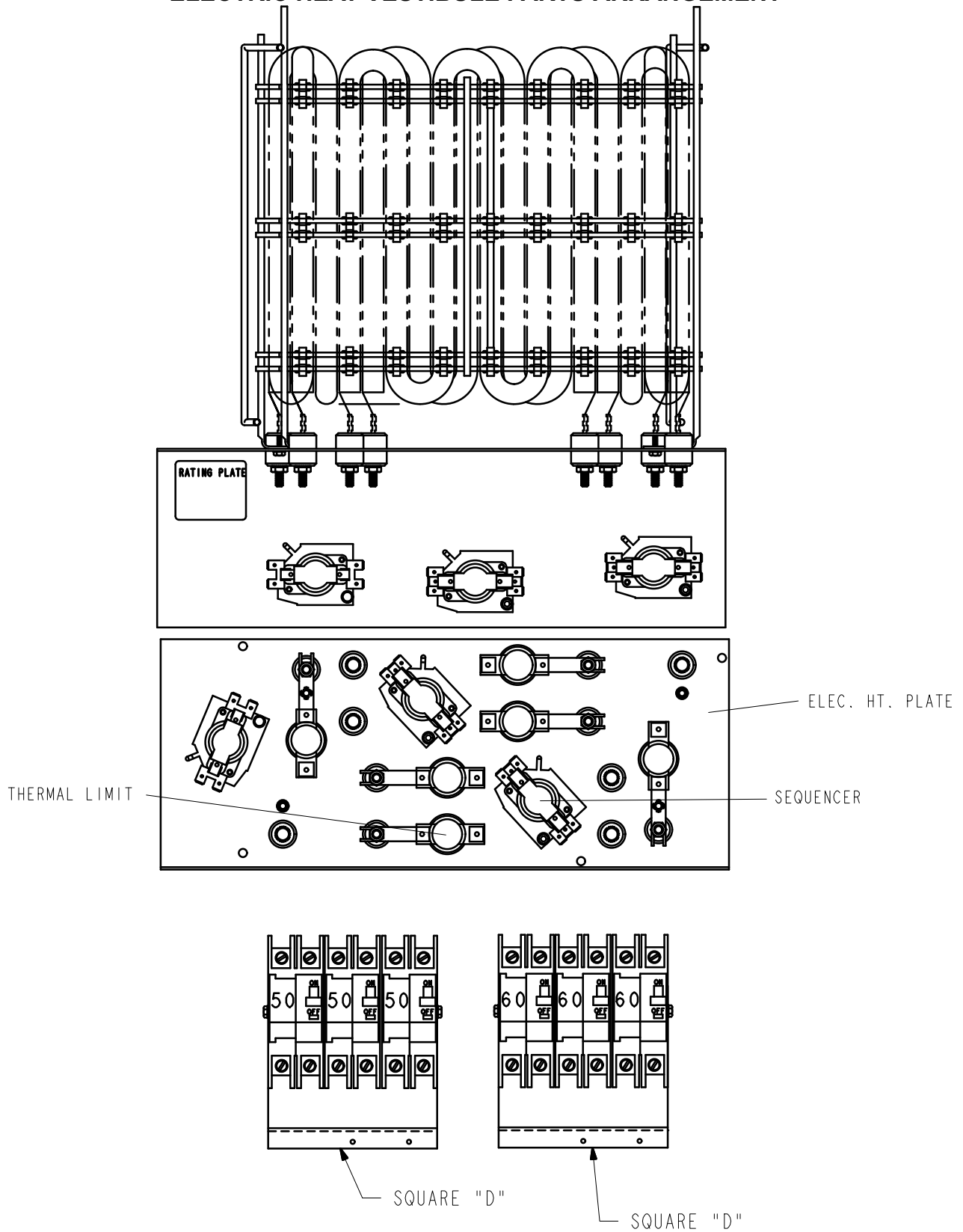


FIGURE 9

**ECB29-25CB, -30CB 208/230 SINGLE-PHASE  
ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT**



**FIGURE 10**

ECB29-20CB, -25CB 208/230 THREE-PHASE  
ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

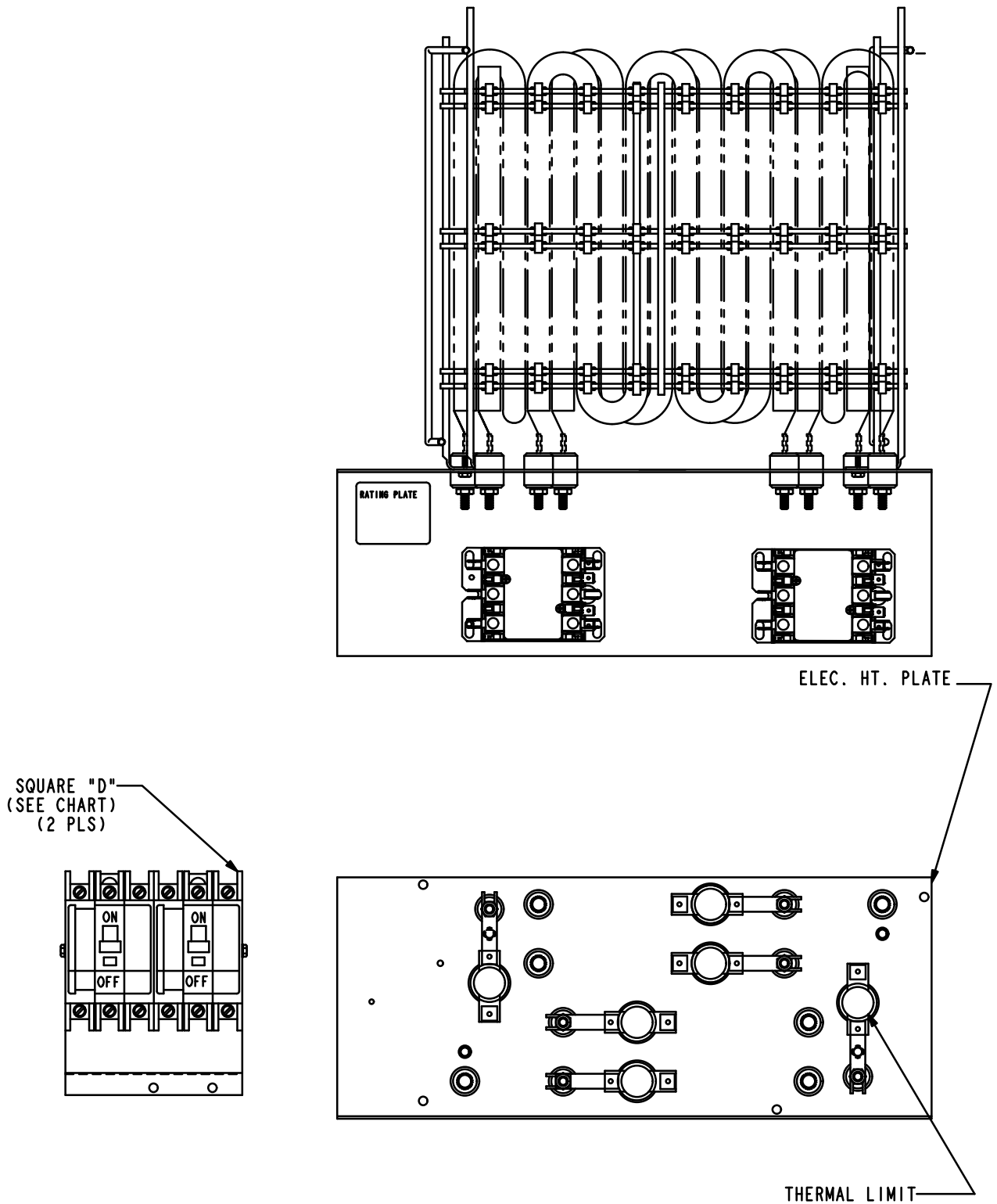


FIGURE 11



ELECTRIC HEAT DATA – CBA27UHE-018

Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection	
		Volts	kW	<sup>1</sup> Btuh				
<b>SINGLE PHASE</b>								
<b>2.5 kW</b> 4 lbs.	ECB29-2.5 ( <b>12L27</b> ) Terminal Block	1	208	1.9	6,400	4.1	16	20
			220	2.1	7,200	4.1	18	20
			230	2.3	7,800	4.1	18	20
			240	2.5	8,500	4.1	18	20
<b>4 kW</b> 4 lbs.	ECB29-4 ( <b>12L30</b> ) Terminal Block ECB29-4CB ( <b>12L45</b> ) 30A Circuit breaker	1	208	3.0	10,250	4.1	23	<sup>4</sup> <b>25</b>
			220	3.4	11,450	4.1	26	30
			230	3.7	12,550	4.1	26	30
			240	4.0	13,650	4.1	26	30
<b>5 kW</b> 4 lbs.	ECB29-5 ( <b>12L35</b> ) Terminal Block ECB29-5CB ( <b>12L47</b> ) 30A Circuit breaker	1	208	3.8	12,800	4.1	28	30
			220	4.2	14,300	4.1	31	<sup>4</sup> <b>35</b>
			230	4.6	15,700	4.1	31	<sup>4</sup> <b>35</b>
			240	5.0	17,100	4.1	31	<sup>4</sup> <b>35</b>
<b>6 kW</b> 4 lbs.	ECB29-6 ( <b>12L44</b> ) Terminal Block ECB29-6CB ( <b>12L49</b> ) 35A Circuit breaker	1	208	4.5	15,400	4.1	32	35
			220	5.0	17,100	4.1	36	<sup>4</sup> <b>40</b>
			230	5.5	18,800	4.1	36	<sup>4</sup> <b>40</b>
			240	6.0	20,500	4.1	36	<sup>4</sup> <b>40</b>
<b>8 kW</b> 5 lbs.	ECB29-8 ( <b>12L50</b> ) Terminal Block ECB29-8CB ( <b>12L52</b> ) 45A Circuit breaker	1	208	6.0	20,500	4.1	41	45
			220	6.7	22,900	4.1	47	<sup>4</sup> <b>50</b>
			230	7.3	25,100	4.1	47	<sup>4</sup> <b>50</b>
			240	8.0	27,300	4.1	47	<sup>4</sup> <b>50</b>
<b>9 kW</b> 5 lbs.	ECB29-9CB ( <b>13T79</b> ) 60A Circuit breaker	2	208	6.8	23,100	4.1	46	<sup>4</sup> <b>50</b>
			220	7.6	25,800	4.1	52	60
			230	8.3	28,200	4.1	52	60
			240	9.0	30,700	4.1	52	60
<b>10 kW</b> 6 lbs.	ECB29-10 ( <b>13T83</b> ) Terminal Block ECB29-10CB ( <b>13T87</b> ) 60A Circuit breaker	2	208	7.5	25,600	4.1	50	<sup>4</sup> <b>50</b>
			220	8.4	28,700	4.1	57	60
			230	9.2	31,400	4.1	57	60
			240	10.0	34,100	4.1	57	60

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE-024

Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection
		Volts	kW	<sup>1</sup> Btuh			
<b>SINGLE PHASE</b>							
4 kW 4 lbs. ECB29-4 (12L30) Terminal Block ECB29-4CB (12L45) 30A Circuit breaker	1	208	3.0	10,250	4.1	23	<sup>4</sup> 25
		220	3.4	11,450	4.1	26	30
		230	3.7	12,550	4.1	26	30
		240	4.0	13,650	4.1	26	30
5 kW 4 lbs. ECB29-5 (12L35) Terminal Block ECB29-5CB (12L47) 30A Circuit breaker	1	208	3.8	12,800	4.1	28	30
		220	4.2	14,300	4.1	31	<sup>4</sup> 35
		230	4.6	15,700	4.1	31	<sup>4</sup> 35
		240	5.0	17,100	4.1	31	<sup>4</sup> 35
6 kW 4 lbs. ECB29-6 (12L44) Terminal Block ECB29-6CB (12L49) 35A Circuit breaker	1	208	4.5	15,400	4.1	32	35
		220	5.0	17,100	4.1	36	<sup>4</sup> 40
		230	5.5	18,800	4.1	36	<sup>4</sup> 40
		240	6.0	20,500	4.1	36	<sup>4</sup> 40
8 kW 5 lbs. ECB29-8 (12L50) Terminal Block ECB29-8CB (12L52) 45A Circuit breaker	1	208	6.0	20,500	4.1	41	45
		220	6.7	22,900	4.1	47	<sup>4</sup> 50
		230	7.3	25,100	4.1	47	<sup>4</sup> 50
		240	8.0	27,300	4.1	47	<sup>4</sup> 50
9 kW 5 lbs. ECB29-9CB (13T79) 60A Circuit breaker	2	208	6.8	23,100	4.1	46	<sup>4</sup> 50
		220	7.6	25,800	4.1	52	60
		230	8.3	28,200	4.1	52	60
		240	9.0	30,700	4.1	52	60
10 kW 6 lbs. ECB29-10 (13T83) Terminal Block ECB29-10CB (13T87) 60A Circuit breaker	2	208	7.5	25,600	4.1	50	<sup>4</sup> 50
		220	8.4	28,700	4.1	57	60
		230	9.2	31,400	4.1	57	60
		240	10.0	34,100	4.1	57	60

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size noted. See table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE–030

Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity		<sup>5</sup> Maximum Overcurrent Protection		Single Point Power Source		
		Volts	kW	<sup>1</sup> Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection	
<b>SINGLE PHASE</b>												
<b>4 kW</b> 4 lbs.	ECB29-4 ( <b>12L30</b> ) Terminal Block ECB29-4CB ( <b>12L45</b> ) 30A Circuit breaker	1	208	3.0	10,250	4.1	23	---	<sup>4</sup> <b>25</b>	---	---	---
			220	3.4	11,450	4.1	26	---	30	---	---	---
			230	3.7	12,550	4.1	26	---	30	---	---	---
			240	4.0	13,650	4.1	26	---	30	---	---	---
<b>5 kW</b> 4 lbs.	ECB29-5 ( <b>12L35</b> ) Terminal Block ECB29-5CB ( <b>12L47</b> ) 30A Circuit breaker	1	208	3.8	12,800	4.1	28	---	30	---	---	---
			220	4.2	14,300	4.1	31	---	<sup>4</sup> <b>35</b>	---	---	---
			230	4.6	15,700	4.1	31	---	<sup>4</sup> <b>35</b>	---	---	---
			240	5.0	17,100	4.1	31	---	<sup>4</sup> <b>35</b>	---	---	---
<b>6 kW</b> 4 lbs.	ECB29-6 ( <b>12L44</b> ) Terminal Block ECB29-6CB ( <b>12L49</b> ) 35A Circuit breaker	1	208	4.5	15,400	4.1	32	---	35	---	---	---
			220	5.0	17,100	4.1	36	---	<sup>4</sup> <b>40</b>	---	---	---
			230	5.5	18,800	4.1	36	---	<sup>4</sup> <b>40</b>	---	---	---
			240	6.0	20,500	4.1	36	---	<sup>4</sup> <b>40</b>	---	---	---
<b>8 kW</b> 5 lbs.	ECB29-8 ( <b>12L50</b> ) Terminal Block ECB29-8CB ( <b>12L52</b> ) 45A Circuit breaker	1	208	6.0	20,500	4.1	41	---	45	---	---	---
			220	6.7	22,900	4.1	47	---	<sup>4</sup> <b>50</b>	---	---	---
			230	7.3	25,100	4.1	47	---	<sup>4</sup> <b>50</b>	---	---	---
			240	8.0	27,300	4.1	47	---	<sup>4</sup> <b>50</b>	---	---	---
<b>9 kW</b> 5 lbs.	ECB29-9CB ( <b>13T79</b> ) 60A Circuit breaker 60A Circuit breaker	2	208	6.8	23,100	4.1	46	---	<sup>4</sup> <b>50</b>	---	---	---
			220	7.6	25,800	4.1	52	---	60	---	---	---
			230	8.3	28,200	4.1	52	---	60	---	---	---
			240	9.0	30,700	4.1	52	---	60	---	---	---
<b>10 kW</b> 6 lbs.	ECB29-10 ( <b>13T83</b> ) Terminal Block ECB29-10CB ( <b>13T87</b> ) 60A Circuit breaker	2	208	7.5	25,600	4.1	50	---	<sup>4</sup> <b>50</b>	---	---	---
			220	8.4	28,700	4.1	57	---	60	---	---	---
			230	9.2	31,400	4.1	57	---	60	---	---	---
			240	10.0	34,100	4.1	57	---	60	---	---	---
<b>12.5 kW</b> 10 lbs.	ECB29-12.5CB ( <b>13T88</b> ) (1) 25A Circuit breaker & (1) 50A Circuit breaker	2	208	9.4	32,000	4.1	24	38	25	<sup>4</sup> <b>40</b>	62	70
			220	10.5	35,800	4.1	27	43	<sup>4</sup> <b>30</b>	<sup>4</sup> <b>45</b>	70	70
			230	11.5	39,200	4.1	27	43	<sup>4</sup> <b>30</b>	<sup>4</sup> <b>45</b>	70	70
			240	12.5	42,600	4.1	27	43	<sup>4</sup> <b>30</b>	<sup>4</sup> <b>45</b>	70	70
<b>15 kW</b> 12 lbs.	ECB29-15CB ( <b>13T91</b> ) (1) 30A Circuit breaker & (1) 60A Circuit Breaker	2	208	11.3	38,400	4.1	28	45	30	<sup>4</sup> <b>45</b>	73	80
			220	12.6	43,000	4.1	31	52	<sup>4</sup> <b>35</b>	60	83	90
			230	13.8	47,000	4.1	31	52	<sup>4</sup> <b>35</b>	60	83	90
			240	15.0	51,200	4.1	31	52	<sup>4</sup> <b>35</b>	60	83	90
<b>THREE PHASE</b>												
<b>8 kW</b> 5 lbs.	ECB29-8 ( <b>12L61</b> ) Terminal Block	1	208	6.0	20,500	4.1	26	---	30	---	---	---
			220	6.7	22,900	4.1	29	---	30	---	---	---
			230	7.3	25,100	4.1	29	---	30	---	---	---
			240	8.0	27,300	4.1	29	---	30	---	---	---
<b>10 kW</b> 6 lbs.	ECB29-10 ( <b>12L62</b> ) Terminal Block	1	208	7.5	25,600	4.1	31	---	35	---	---	---
			220	8.4	28,700	4.1	35	---	35	---	---	---
			230	9.2	31,400	4.1	35	---	35	---	---	---
			240	10.0	34,100	4.1	35	---	35	---	---	---
<b>15 kW</b> 12 lbs.	ECB29-15CB ( <b>12L63</b> ) (1) 50A Circuit breaker	1	208	11.3	38,400	4.1	44	---	45	---	---	---
			220	12.6	43,000	4.1	50	---	50	---	---	---
			230	13.5	47,000	4.1	50	---	50	---	---	---
			240	15.0	51,200	4.1	50	---	50	---	---	---

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE–036

Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity		<sup>5</sup> Maximum Overcurrent Protection		Single Point Power Source		
		Volts	kW	<sup>1</sup> Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection	
<b>SINGLE PHASE</b>												
<b>4 kW</b> 4 lbs.	ECB29-4 <b>(2L30)</b> Terminal Block ECB29-4CB <b>(2L45)</b> 30A Circuit breaker	1	208	3.0	10,250	4.1	23	---	<sup>4</sup> <b>25</b>	---	---	---
			220	3.4	11,450	4.1	26	---	30	---	---	---
			230	3.7	12,550	4.1	26	---	30	---	---	---
			240	4.0	13,650	4.1	26	---	30	---	---	---
<b>5 kW</b> 4 lbs.	ECB29-5 <b>(2L35)</b> Terminal Block ECB29-5CB <b>(2L47)</b> 30A Circuit breaker	1	208	3.8	12,800	4.1	28	---	30	---	---	---
			220	4.2	14,300	4.1	31	---	<sup>4</sup> <b>35</b>	---	---	---
			230	4.6	15,700	4.1	31	---	<sup>4</sup> <b>35</b>	---	---	---
			240	5.0	17,100	4.1	31	---	<sup>4</sup> <b>35</b>	---	---	---
<b>6 kW</b> 4 lbs.	ECB29-6 <b>(2L44)</b> Terminal Block ECB29-6CB <b>(2L49)</b> 35A Circuit breaker	1	208	4.5	15,400	4.1	32	---	35	---	---	---
			220	5.0	17,100	4.1	36	---	<sup>4</sup> <b>40</b>	---	---	---
			230	5.5	18,800	4.1	36	---	<sup>4</sup> <b>40</b>	---	---	---
			240	6.0	20,500	4.1	36	---	<sup>4</sup> <b>40</b>	---	---	---
<b>8 kW</b> 5 lbs.	ECB29-8 <b>(2L50)</b> Terminal Block ECB29-8CB <b>(2L52)</b> 45A Circuit breaker	1	208	6.0	20,500	4.1	41	---	45	---	---	---
			220	6.7	22,900	4.1	47	---	<sup>4</sup> <b>50</b>	---	---	---
			230	7.3	25,100	4.1	47	---	<sup>4</sup> <b>50</b>	---	---	---
			240	8.0	27,300	4.1	47	---	<sup>4</sup> <b>50</b>	---	---	---
<b>9 kW</b> 5 lbs.	ECB29-9CB <b>(3T79)</b> 60A Circuit breaker	2	208	6.8	23,100	4.1	46	---	<sup>4</sup> <b>50</b>	---	---	---
			220	7.6	25,800	4.1	52	---	<b>60</b>	---	---	---
			230	8.3	28,200	4.1	52	---	<b>60</b>	---	---	---
			240	9.0	30,700	4.1	52	---	<b>60</b>	---	---	---
<b>10 kW</b> 6 lbs.	ECB29-10 <b>(3T83)</b> Terminal Block ECB29-10CB <b>(3T87)</b> 60A Circuit breaker	2	208	7.5	25,600	4.1	50	---	<sup>4</sup> <b>50</b>	---	---	---
			220	8.4	28,700	4.1	57	---	<b>60</b>	---	---	---
			230	9.2	31,400	4.1	57	---	<b>60</b>	---	---	---
			240	10.0	34,100	4.1	57	---	<b>60</b>	---	---	---
<b>12.5 kW</b> 10 lbs.	ECB29-12.5CB <b>(3T88)</b> (1) 25A Circuit breaker and (1) 50A Circuit breaker	2	208	9.4	32,000	4.1	24	38	25	<sup>4</sup> <b>40</b>	62	70
			220	10.5	35,800	4.1	27	43	<sup>4</sup> <b>30</b>	<sup>4</sup> <b>45</b>	70	70
			230	11.5	39,200	4.1	27	43	<sup>4</sup> <b>30</b>	<sup>4</sup> <b>45</b>	70	70
			240	12.5	42,600	4.1	27	43	<sup>4</sup> <b>30</b>	<sup>4</sup> <b>45</b>	70	70
<b>15 kW</b> 12 lbs.	ECB29-15CB <b>(3T91)</b> (1) 30A Circuit breaker and (1) 60A Circuit Breaker	2	208	11.3	38,400	4.1	28	45	30	<sup>4</sup> <b>45</b>	73	80
			220	12.6	43,000	4.1	31	52	<sup>4</sup> <b>35</b>	60	83	90
			230	13.8	47,000	4.1	31	52	<sup>4</sup> <b>35</b>	60	83	90
			240	15.0	51,200	4.1	31	52	<sup>4</sup> <b>35</b>	60	83	90
<b>20 kW</b> 19 lbs.	ECB29-20CB <b>(3T92)</b> (1) 50A Circuit breaker and (1) 60A Circuit Breaker	2	208	15.0	51,200	4.1	46	50	50	<sup>4</sup> <b>50</b>	96	100
			220	16.8	57,300	4.1	52	57	<sup>4</sup> <b>60</b>	60	109	125
			230	18.4	62,700	4.1	52	57	<sup>4</sup> <b>60</b>	60	109	125
			240	20.0	68,200	4.1	52	57	<sup>4</sup> <b>60</b>	60	109	125

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE–036

Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity		<sup>5</sup> Maximum Overcurrent Protection		Single Point Power Source		
		Volts	kW	<sup>1</sup> Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection	
<b>THREE PHASE</b>												
<b>8 kW</b> 5 lbs.	ECB29–8 <b>(12L61)</b> Terminal Block	1	208	6.0	20,500	4.1	26	---	30	---	---	---
			220	6.7	22,900	4.1	29	---	30	---	---	---
			230	7.3	25,100	4.1	29	---	30	---	---	---
			240	8.0	27,300	4.1	29	---	30	---	---	---
<b>10 kW</b> 6 lbs.	ECB29–10 <b>(12L62)</b> Terminal Block	1	208	7.5	25,600	4.1	31	---	35	---	---	---
			220	8.4	28,700	4.1	35	---	35	---	---	---
			230	9.2	31,400	4.1	35	---	35	---	---	---
			240	10.0	34,100	4.1	35	---	35	---	---	---
	ECB29–10 <b>(28K47)</b> (3) 20A Fuses	1	440	8.4	28,700	2.1	16	---	20	---	---	---
			460	9.2	31,400	2.1	17	---	20	---	---	---
			480	10.0	34,100	2.1	17	---	20	---	---	---
<b>15 kW</b> 12 lbs.	ECB29–15CB <b>(12L63)</b> (1) 50A Circuit breaker	1	208	11.3	38,400	4.1	44	---	<sup>4</sup> <b>45</b>	---	---	---
			220	12.6	43,000	4.1	50	---	50	---	---	---
			230	13.5	47,000	4.1	50	---	50	---	---	---
			240	15.0	51,200	4.1	50	---	50	---	---	---
	ECB29–15 <b>(28K48)</b> (3) 25A Fuses	1	440	12.6	43,000	2.1	23	---	25	---	---	---
			460	13.5	47,000	2.1	24	---	25	---	---	---
			480	15.0	51,200	2.1	25	---	30	---	---	---
<b>20 kW</b> 19 lbs.	ECB29–20CB <b>(12L64)</b> (2) 35A Circuit breaker	2	208	15.0	51,200	4.1	31	26	35	<sup>4</sup> <b>30</b>	57	60
			220	16.8	57,300	4.1	35	30	35	<sup>4</sup> <b>30</b>	65	70
			230	18.4	62,700	4.1	35	30	35	<sup>4</sup> <b>30</b>	65	70
			240	20.0	68,200	4.1	35	30	35	<sup>4</sup> <b>30</b>	65	70

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See Table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE-042

SINGLE PHASE

kW lbs.	Model Number	No. of Stages	Volts Input	kW Input	1 Btuh Input	2 Blower Motor Full Load Amps	3 Minimum Circuit Ampacity			5 Maximum Overcurrent Protection			Single Point Power Source		
							Ckt 1	Ckt 2	Ckt 3	Ckt 1	Ckt 2	Ckt 3	3 Minimum Circuit Ampacity	5 Maximum Overcurrent Protection	
4 kW 4 lbs.	ECB29-4 (1 <b>2L30</b> ) Terminal Block ECB29-4CB (1 <b>2L45</b> ) 30A Circuit breaker	1	208	3.0	10,250	7.6	28	---	---	---	30	---	---	---	---
			220	3.4	11,450	7.6	30	---	---	---	30	---	---	---	---
			230	3.7	12,550	7.6	30	---	---	---	30	---	---	---	---
			240	4.0	13,650	7.6	30	---	---	---	30	---	---	---	---
5 kW 4 lbs.	ECB29-5 (1 <b>2L35</b> ) Terminal Block ECB29-5CB (1 <b>2L47</b> ) 30A Circuit breaker	1	208	3.8	12,800	7.6	32	---	---	---	<b>4 35</b>	---	---	---	---
			220	4.2	14,300	7.6	36	---	---	---	<b>4 40</b>	---	---	---	---
			230	4.6	15,700	7.6	36	---	---	---	<b>4 40</b>	---	---	---	---
			240	5.0	17,100	7.6	36	---	---	---	<b>4 40</b>	---	---	---	---
6 kW 4 lbs.	ECB29-6 (1 <b>2L44</b> ) Terminal Block ECB29-6CB (1 <b>2L49</b> ) 35A Circuit breaker	1	208	4.5	15,400	7.6	37	---	---	---	<b>4 40</b>	---	---	---	---
			220	5.0	17,100	7.6	41	---	---	---	<b>4 45</b>	---	---	---	---
			230	5.5	18,800	7.6	41	---	---	---	<b>4 45</b>	---	---	---	---
			240	6.0	20,500	7.6	41	---	---	---	<b>4 45</b>	---	---	---	---
8 kW 5 lbs.	ECB29-8 (1 <b>2L50</b> ) Terminal Block ECB29-8CB (1 <b>2L52</b> ) 45A Circuit breaker	1	208	6.0	20,500	7.6	46	---	---	---	<b>4 50</b>	---	---	---	---
			220	6.7	22,900	7.6	51	---	---	---	<b>4 60</b>	---	---	---	---
			230	7.3	25,100	7.6	51	---	---	---	<b>4 60</b>	---	---	---	---
			240	8.0	27,300	7.6	51	---	---	---	<b>4 60</b>	---	---	---	---
9 kW 5 lbs.	ECB29-9CB (1 <b>3T79</b> ) 60A Circuit breaker 60A Circuit breaker	2	208	6.8	23,100	7.6	50	---	---	---	<b>4 50</b>	---	---	---	---
			220	7.6	25,800	7.6	56	---	---	---	60	---	---	---	---
			230	8.3	28,200	7.6	56	---	---	---	60	---	---	---	---
			240	9.0	30,700	7.6	56	---	---	---	60	---	---	---	---
12.5 kW 10 lbs.	ECB29-12.5CB (1 <b>3T88</b> ) (1) 25A Circuit breaker and (1) 50A Circuit breaker	2	208	9.4	32,000	7.6	28	38	---	---	<b>4 30</b>	<b>4 40</b>	---	66	80
			220	10.5	35,800	7.6	31	43	---	---	<b>4 35</b>	<b>4 45</b>	---	75	80
			230	11.5	39,200	7.6	31	43	---	---	<b>4 35</b>	<b>4 45</b>	---	75	80
			240	12.5	42,600	7.6	31	43	---	---	<b>4 35</b>	<b>4 45</b>	---	75	80
15 kW 12 lbs.	ECB29-15CB (1 <b>3T91</b> ) (1) 30A Circuit breaker and (1) 60A Circuit breaker	2	208	11.3	38,400	7.6	32	45	---	---	<b>4 35</b>	<b>4 45</b>	---	77	80
			220	12.6	43,000	7.6	36	52	---	---	<b>4 40</b>	60	---	88	90
			230	13.5	47,000	7.6	36	52	---	---	<b>4 40</b>	60	---	88	90
			240	15.0	51,200	7.6	36	52	---	---	<b>4 40</b>	60	---	88	90
20 kW 19 lbs.	ECB29-20CB (1 <b>3T92</b> ) (1) 50A Circuit breaker and (1) 60A Circuit breaker	2	208	15.0	51,200	7.6	50	50	---	---	50	<b>4 50</b>	---	100	125
			220	16.8	57,300	7.6	56	57	---	---	<b>4 60</b>	60	---	114	125
			230	18.4	62,700	7.6	56	57	---	---	<b>4 60</b>	60	---	114	125
			240	20.0	68,200	7.6	56	57	---	---	<b>4 60</b>	60	---	114	125
25 kW 19 lbs.	ECB29-25CB (1 <b>2L59</b> ) (3) 50A Circuit breakers	3	208	18.8	64,100	7.6	47	38	38	50	<b>4 40</b>	<b>4 40</b>	---	123	125
			220	21.0	71,700	7.6	53	43	43	<b>4 60</b>	<b>4 45</b>	<b>4 45</b>	---	140	150
			230	23.0	78,300	7.6	53	43	43	<b>4 60</b>	<b>4 45</b>	<b>4 45</b>	---	140	150
			240	25.0	85,300	7.6	53	43	43	<b>4 60</b>	<b>4 45</b>	<b>4 45</b>	---	140	150

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size noted. See Table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE-042

THREE PHASE

	Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity		<sup>5</sup> Maximum Overcurrent Protection		Single Point Power Source	
			Volts	kW	<sup>1</sup> Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection
<b>8 kW</b> 5 lbs.	ECB29-8 <b>(12L61)</b> Terminal block	1	208	6.0	20,500	7.6	30	---	30	---	---	---
			220	6.7	22,900	7.6	33	---	35	---	---	---
			230	7.3	25,100	7.6	33	---	35	---	---	---
			240	8.0	27,300	7.6	33	---	35	---	---	---
<b>10 kW</b> 6 lbs.	ECB29-10 <b>(12L62)</b> Terminal Block	1	208	7.5	25,600	7.6	36	---	40	---	---	---
			220	8.4	28,700	7.6	40	---	40	---	---	---
			230	9.2	31,400	7.6	40	---	40	---	---	---
			240	10.0	34,100	7.6	40	---	40	---	---	---
	ECB29-10 <b>(28K47)</b> (3) 20A Fuses	1	440	8.4	28,700	---	---	---	---	---	---	---
			460	9.2	31,400	---	---	---	---	---	---	---
			480	10.0	34,100	---	---	---	---	---	---	---
	<b>15 kW</b> 12 lbs.	ECB29-15CB <b>(12L63)</b> 50A Circuit breaker	1	208	11.3	38,400	7.6	49	---	50	---	---
220				12.6	43,000	7.6	55	---	<sup>4</sup> <b>60</b>	---	---	---
230				13.5	47,000	7.6	55	---	<sup>4</sup> <b>60</b>	---	---	---
240				15.0	51,200	7.6	55	---	<sup>4</sup> <b>60</b>	---	---	---
ECB29-15 <b>(28K48)</b> (3) 25A Fuses		1	440	12.6	43,000	---	---	---	---	---	---	---
			460	13.5	47,000	---	---	---	---	---	---	---
<b>20 kW</b> 19 lbs.	ECB29-20CB <b>(12L64)</b> (2) 35A Circuit breaker	2	208	15.0	51,200	7.6	36	26	<sup>4</sup> <b>40</b>	<sup>4</sup> <b>30</b>	62	70
			220	16.8	57,300	7.6	40	30	<sup>4</sup> <b>40</b>	<sup>4</sup> <b>30</b>	70	70
			230	18.4	62,700	7.6	40	30	<sup>4</sup> <b>40</b>	<sup>4</sup> <b>30</b>	70	70
			240	20.0	68,200	7.6	40	30	<sup>4</sup> <b>40</b>	<sup>4</sup> <b>30</b>	70	70
	ECB29-20 <b>(28K49)</b> (3) 35A Fuses	1	440	16.8	57,300	---	---	---	---	---	---	---
			460	18.4	62,700	---	---	---	---	---	---	---
			480	20.0	68,200	---	---	---	---	---	---	---
	<sup>6</sup> ECB29-20 <b>(28K51)</b> (3) 25A Fuses	1	550	16.8	57,300	---	---	---	---	---	---	---
			575	18.4	62,700	---	---	---	---	---	---	---
			600	20.0	68,200	---	---	---	---	---	---	---
<b>25 kW</b> 19 lbs.	ECB29-25CB <b>(12L65)</b> (2) 45A Circuit breaker	2	208	18.8	64,100	7.6	42	33	<sup>4</sup> <b>50</b>	<sup>4</sup> <b>35</b>	62	70
			220	21.0	71,700	7.6	47	38	<sup>4</sup> <b>50</b>	<sup>4</sup> <b>40</b>	85	90
			230	23.0	78,300	7.6	47	38	<sup>4</sup> <b>50</b>	<sup>4</sup> <b>40</b>	85	90
			240	25.0	85,300	7.6	47	38	<sup>4</sup> <b>50</b>	<sup>4</sup> <b>40</b>	85	90
	ECB29-25 <b>(28K50)</b> (3) 40A Fuses	1	440	21.0	71,700	---	---	---	---	---	---	---
			460	23.0	78,300	---	---	---	---	---	---	---
			480	25.0	85,300	---	---	---	---	---	---	---
	<sup>6</sup> ECB29-25 <b>(28K52)</b> (3) 35A Fuses	1	550	21.0	71,700	---	---	---	---	---	---	---
575			23.0	78,300	---	---	---	---	---	---	---	
			600	25.0	85,300	---	---	---	---	---	---	

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size noted. See table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE–048

SINGLE PHASE

Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity			<sup>5</sup> Maximum Overcurrent Protection			Single Point Power Source	
		Volts	kW	<sup>1</sup> Btuh		Ckt 1	Ckt 2	Ckt 3	Ckt 1	Ckt 2	Ckt 3	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection
4 kW 4 lbs. ECB29-4 (2L30) Terminal Block ECB29-4CB (2L45) 30A Circuit breaker	1	208	3.0	10,250	7.6	28	---	---	30	---	---	---	---
		220	3.4	11,450	7.6	30	---	---	30	---	---	---	---
		230	3.7	12,550	7.6	30	---	---	30	---	---	---	---
		240	4.0	13,650	7.6	30	---	---	30	---	---	---	---
5 kW 4 lbs. ECB29-5 (2L35) Terminal Block ECB29-5CB (2L47) 30A Circuit breaker	1	208	3.8	12,800	7.6	32	---	---	<sup>4</sup> 35	---	---	---	---
		220	4.2	14,300	7.6	36	---	---	<sup>4</sup> 40	---	---	---	---
		230	4.6	15,700	7.6	36	---	---	<sup>4</sup> 40	---	---	---	---
		240	5.0	17,100	7.6	36	---	---	<sup>4</sup> 40	---	---	---	---
6 kW 4 lbs. ECB29-6 (2L44) Terminal Block ECB29-6CB (2L49) 35A Circuit breaker	1	208	4.5	15,400	7.6	37	---	---	<sup>4</sup> 40	---	---	---	---
		220	5.0	17,100	7.6	41	---	---	<sup>4</sup> 45	---	---	---	---
		230	5.5	18,800	7.6	41	---	---	<sup>4</sup> 45	---	---	---	---
		240	6.0	20,500	7.6	41	---	---	<sup>4</sup> 45	---	---	---	---
8 kW 5 lbs. ECB29-8 (2L50) Terminal Block ECB29-8CB (2L52) 45A Circuit breaker	1	208	6.0	20,500	7.6	46	---	---	<sup>4</sup> 50	---	---	---	---
		220	6.7	22,900	7.6	51	---	---	<sup>4</sup> 60	---	---	---	---
		230	7.3	25,100	7.6	51	---	---	<sup>4</sup> 60	---	---	---	---
		240	8.0	27,300	7.6	51	---	---	<sup>4</sup> 60	---	---	---	---
9 kW 5 lbs. ECB29-9CB (3T79) 60A Circuit breaker	2	208	6.8	23,100	7.6	50	---	---	<sup>4</sup> 50	---	---	---	---
		220	7.6	25,800	7.6	56	---	---	60	---	---	---	---
		230	8.3	28,200	7.6	56	---	---	60	---	---	---	---
		240	9.0	30,700	7.6	56	---	---	60	---	---	---	---
12.5 kW 10 lbs. ECB29-12.5CB (3T88) (1) 25A Circuit breaker & (1) 50A Circuit breaker	2	208	9.4	32,000	7.6	28	38	---	<sup>4</sup> 30	<sup>4</sup> 40	---	66	80
		220	10.5	35,800	7.6	31	43	---	<sup>4</sup> 35	<sup>4</sup> 45	---	75	80
		230	11.5	39,200	7.6	31	43	---	<sup>4</sup> 35	<sup>4</sup> 45	---	75	80
		240	12.5	42,600	7.6	31	43	---	<sup>4</sup> 35	<sup>4</sup> 45	---	75	80
15 kW 12 lbs. ECB29-15CB (3T91) (1) 30A Circuit breaker & (1) 60A Circuit breaker	2	208	11.3	38,400	7.6	32	45	---	<sup>4</sup> 35	<sup>4</sup> 45	---	77	80
		220	12.6	43,000	7.6	36	52	---	<sup>4</sup> 40	60	---	88	90
		230	13.5	47,000	7.6	36	52	---	<sup>4</sup> 40	60	---	88	90
		240	15.0	51,200	7.6	36	52	---	<sup>4</sup> 40	60	---	88	90
20 kW 19 lbs. ECB29-20CB (3T92) (1) 50A Circuit breaker & (1) 60A Circuit breaker	2	208	15.0	51,200	7.6	50	50	---	50	<sup>4</sup> 50	---	100	125
		220	16.8	57,300	7.6	56	57	---	<sup>4</sup> 60	60	---	114	125
		230	18.4	62,700	7.6	56	57	---	<sup>4</sup> 60	60	---	114	125
		240	20.0	68,200	7.6	56	57	---	<sup>4</sup> 60	60	---	114	125
25 kW 19 lbs. ECB29-25CB (2L59) (3) 50A Circuit breakers	3	208	18.8	64,100	7.6	47	38	38	50	<sup>4</sup> 40	<sup>4</sup> 40	123	125
		220	21.0	71,700	7.6	53	43	43	<sup>4</sup> 60	<sup>4</sup> 45	<sup>4</sup> 45	140	150
		230	23.0	78,300	7.6	53	43	43	<sup>4</sup> 60	<sup>4</sup> 45	<sup>4</sup> 45	140	150
		240	25.0	85,300	7.6	53	43	43	<sup>4</sup> 60	<sup>4</sup> 45	<sup>4</sup> 45	140	150

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.



ELECTRIC HEAT DATA – CBA27UHE-048

THREE PHASE

	Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity		<sup>5</sup> Maximum Overcurrent Protection		Single Point Power Source		
			Volts	kW	<sup>1</sup> Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection	
8 kW 5 lbs.	ECB29-8 (12L61) Terminal block	1	208	6.0	20,500	7.6	30	---	30	---	---	---	
			220	6.7	22,900	7.6	33	---	35	---	---	---	
			230	7.3	25,100	7.6	33	---	35	---	---	---	
			240	8.0	27,300	7.6	33	---	35	---	---	---	
10 kW 6 lbs.	ECB29-10 (12L62) Terminal Block	1	208	7.5	25,600	7.6	36	---	40	---	---	---	
			220	8.4	28,700	7.6	40	---	40	---	---	---	
			230	9.2	31,400	7.6	40	---	40	---	---	---	
			240	10.0	34,100	7.6	40	---	40	---	---	---	
	ECB29-10 (28K47) (3) 20A Fuses	1	440	8.4	28,700	4.0	18	---	20	---	---	---	
			460	9.2	31,400	4.0	19	---	20	---	---	---	
			480	10.0	34,100	4.0	20	---	25	---	---	---	
	15 kW 12 lbs.	ECB29-15CB (12L63) 50A Circuit breaker	1	208	11.3	38,400	7.6	49	---	50	---	---	---
220				12.6	43,000	7.6	55	---	<sup>4</sup> 60	---	---	---	
230				13.5	47,000	7.6	55	---	<sup>4</sup> 60	---	---	---	
240				15.0	51,200	7.6	55	---	<sup>4</sup> 60	---	---	---	
ECB29-15 (28K48) (3) 25A Fuses		1	440	12.6	43,000	4.0	25	---	30	---	---	---	
			460	13.5	47,000	4.0	26	---	30	---	---	---	
			480	15.0	51,200	4.0	27	---	30	---	---	---	
20 kW 19 lbs.		ECB29-20CB (12L64) (2) 35A Circuit breaker	2	208	15.0	51,200	7.6	36	26	<sup>4</sup> 40	<sup>4</sup> 30	62	70
	220			16.8	57,300	7.6	40	30	<sup>4</sup> 40	<sup>4</sup> 30	70	70	
	230			18.4	62,700	7.6	40	30	<sup>4</sup> 40	<sup>4</sup> 30	70	70	
	240			20.0	68,200	7.6	40	30	<sup>4</sup> 40	<sup>4</sup> 30	70	70	
	ECB29-20 (28K49) (3) 35A Fuses	1	440	16.8	57,300	4.0	33	---	35	---	---	---	
			460	18.4	62,700	4.0	34	---	35	---	---	---	
			480	20.0	68,200	4.0	35	---	40	---	---	---	
	<sup>6</sup> ECB29-20 (28K51) (3) 25A Fuses	1	550	16.8	57,300	4.0	27	---	30	---	---	---	
			575	18.4	62,700	4.0	28	---	30	---	---	---	
			600	20.0	68,200	4.0	29	---	30	---	---	---	
	25 kW 19 lbs.	ECB29-25CB (12L65) (2) 45A Circuit breaker	2	208	18.8	64,100	7.6	42	33	<sup>4</sup> 50	<sup>4</sup> 35	75	80
				220	21.0	71,700	7.6	47	38	<sup>4</sup> 50	<sup>4</sup> 40	85	90
230				23.0	78,300	7.6	47	38	<sup>4</sup> 50	<sup>4</sup> 40	85	90	
240				25.0	85,300	7.6	47	38	<sup>4</sup> 50	<sup>4</sup> 40	85	90	
ECB29-25 (28K50) (3) 40A Fuses		1	440	21.0	71,700	4.0	39	---	40	---	---	---	
			460	23.0	78,300	4.0	41	---	45	---	---	---	
			480	25.0	85,300	4.0	42	---	45	---	---	---	
<sup>6</sup> ECB29-25 (28K52) (3) 35A Fuses		1	550	21.0	71,700	4.0	32	---	35	---	---	---	
			575	23.0	78,300	4.0	34	---	35	---	---	---	
			600	25.0	85,300	4.0	35	---	40	---	---	---	

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on “CB” circuit breaker models must be replaced with size noted. See table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE-060

SINGLE PHASE

Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity			<sup>5</sup> Maximum Overcurrent Protection			Single Point Power Source	
		Volts	kW	<sup>1</sup> Btuh		Ckt 1	Ckt 2	Ckt 3	Ckt 1	Ckt 2	Ckt 3	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection
4 kW 4 lbs. ECB29-4 (12L30) Terminal Block ECB29-4CB (12L45) 30A Circuit breaker	1	208	3.0	10,250	7.6	28	---	---	30	---	---	---	---
		220	3.4	11,450	7.6	30	---	---	30	---	---	---	---
		230	3.7	12,550	7.6	30	---	---	30	---	---	---	---
		240	4.0	13,650	7.6	30	---	---	30	---	---	---	---
5 kW 4 lbs. ECB29-5 (12L35) Terminal Block ECB29-5CB (12L47) 30A Circuit breaker	1	208	3.8	12,800	7.6	32	---	---	<sup>4</sup> 35	---	---	---	---
		220	4.2	14,300	7.6	36	---	---	<sup>4</sup> 40	---	---	---	---
		230	4.6	15,700	7.6	36	---	---	<sup>4</sup> 40	---	---	---	---
		240	5.0	17,100	7.6	36	---	---	<sup>4</sup> 40	---	---	---	---
6 kW 4 lbs. ECB29-6 (12L44) Terminal Block ECB29-6CB (12L49) 35A Circuit breaker	1	208	4.5	15,400	7.6	37	---	---	<sup>4</sup> 40	---	---	---	---
		220	5.0	17,100	7.6	41	---	---	<sup>4</sup> 45	---	---	---	---
		230	5.5	18,800	7.6	41	---	---	<sup>4</sup> 45	---	---	---	---
		240	6.0	20,500	7.6	41	---	---	<sup>4</sup> 45	---	---	---	---
8 kW 5 lbs. ECB29-8 (12L50) Terminal Block ECB29-8CB (12L52) 45A Circuit breaker	1	208	6.0	20,500	7.6	46	---	---	<sup>4</sup> 50	---	---	---	---
		220	6.7	22,900	7.6	51	---	---	<sup>4</sup> 60	---	---	---	---
		230	7.3	25,100	7.6	51	---	---	<sup>4</sup> 60	---	---	---	---
		240	8.0	27,300	7.6	51	---	---	<sup>4</sup> 60	---	---	---	---
9 kW 5 lbs. ECB29-9CB (13T79) 60A Circuit breaker	2	208	6.8	23,100	7.6	50	---	---	<sup>4</sup> 50	---	---	---	---
		220	7.6	25,800	7.6	56	---	---	60	---	---	---	---
		230	8.3	28,200	7.6	56	---	---	60	---	---	---	---
		240	9.0	30,700	7.6	56	---	---	60	---	---	---	---
12.5 kW 10 lbs. ECB29-12.5CB (13T88) (1) 25A Circuit Breaker and (1) 50A Circuit breaker	2	208	9.4	32,000	7.6	28	38	---	<sup>4</sup> 30	<sup>4</sup> 40	---	66	70
		220	10.5	35,800	7.6	31	43	---	<sup>4</sup> 35	<sup>4</sup> 45	---	75	80
		230	11.5	39,200	7.6	31	43	---	<sup>4</sup> 35	<sup>4</sup> 45	---	75	80
		240	12.5	42,600	7.6	31	43	---	<sup>4</sup> 35	<sup>4</sup> 45	---	75	80
15 kW 12 lbs. ECB29-15CB (13T91) (1) 30A Circuit breaker and (1) 60A Circuit breaker	2	208	11.3	38,400	7.6	32	45	---	<sup>4</sup> 35	<sup>4</sup> 45	---	77	80
		220	12.6	43,000	7.6	36	52	---	<sup>4</sup> 40	60	---	88	90
		230	13.5	47,000	7.6	36	52	---	<sup>4</sup> 40	60	---	88	90
		240	15.0	51,200	7.6	36	52	---	<sup>4</sup> 40	60	---	88	90
20 kW 19 lbs. ECB29-20CB (13T92) (1) 50A Circuit Breaker and (1) 60A Circuit breaker	2	208	15.0	51,200	7.6	50	50	---	50	<sup>4</sup> 50	---	100	125
		220	16.8	57,300	7.6	56	57	---	<sup>4</sup> 60	60	---	114	125
		230	18.4	62,700	7.6	56	57	---	<sup>4</sup> 60	60	---	114	125
		240	20.0	68,200	7.6	56	57	---	<sup>4</sup> 60	60	---	114	125
25 kW 19 lbs. ECB29-25CB (12L59) (3) 50A Circuit breakers	3	208	18.8	64,100	7.6	47	38	38	50	<sup>4</sup> 40	<sup>4</sup> 40	123	125
		220	21.0	71,700	7.6	53	43	43	<sup>4</sup> 60	<sup>4</sup> 45	<sup>4</sup> 45	140	150
		230	23.0	78,300	7.6	53	43	43	<sup>4</sup> 60	<sup>4</sup> 45	<sup>4</sup> 45	140	150
		240	25.0	85,300	7.6	53	43	43	<sup>4</sup> 60	<sup>4</sup> 45	<sup>4</sup> 45	140	150

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size noted. See table on Page9.

<sup>5</sup> HACR type circuit breaker or fuse.

ELECTRIC HEAT DATA – CBA27UHE-060

THREE PHASE

	Model Number	No. of Stages	Input			<sup>2</sup> Blower Motor Full Load Amps	<sup>3</sup> Minimum Circuit Ampacity		<sup>5</sup> Maximum Overcurrent Protection		Single Point Power Source	
			Volts	kW	<sup>1</sup> Btuh		Ckt 1	Ckt 2	Ckt 1	Ckt 2	<sup>3</sup> Minimum Circuit Ampacity	<sup>5</sup> Maximum Overcurrent Protection
<b>8 kW</b> 5 lbs.	ECB29-8 <b>(12L61)</b> Terminal block	1	208	6.0	20,500	7.6	30	---	30	---	---	---
			220	6.7	22,900	7.6	33	---	35	---	---	---
			230	7.3	25,100	7.6	33	---	35	---	---	---
			240	8.0	27,300	7.6	33	---	35	---	---	---
<b>10 kW</b> 6 lbs.	ECB29-10 <b>(12L62)</b> Terminal Block	1	208	7.5	25,600	7.6	36	---	40	---	---	---
			220	8.4	28,700	7.6	40	---	40	---	---	---
			230	9.2	31,400	7.6	40	---	40	---	---	---
			240	10.0	34,100	7.6	40	---	40	---	---	---
	ECB29-10 <b>(28K47)</b> (3) 20A Fuses	1	440	8.4	28,700	4.0	18	---	20	---	---	---
			460	9.2	31,400	4.0	19	---	20	---	---	---
			480	10.0	34,100	4.0	20	---	25	---	---	---
<b>15 kW</b> 12 lbs.	ECB29-15CB <b>(12L63)</b> 50A Circuit breaker	1	208	11.3	38,400	7.6	49	---	50	---	---	---
			220	12.6	43,000	7.6	55	---	<sup>4</sup> 60	---	---	---
			230	13.5	47,000	7.6	55	---	<sup>4</sup> 60	---	---	---
			240	15.0	51,200	7.6	55	---	<sup>4</sup> 60	---	---	---
	ECB29-15 <b>(28K48)</b> (3) 25A Fuses	1	440	12.6	43,000	4.0	25	---	30	---	---	---
			460	13.5	47,000	4.0	26	---	30	---	---	---
<b>20 kW</b> 19 lbs.	ECB29-20CB <b>(12L64)</b> (2) 35A Circuit breaker	2	208	15.0	51,200	7.6	36	26	<sup>4</sup> 40	<sup>4</sup> 30	62	70
			220	16.8	57,300	7.6	40	30	<sup>4</sup> 40	<sup>4</sup> 30	70	70
			230	18.4	62,700	7.6	40	30	<sup>4</sup> 40	<sup>4</sup> 30	70	70
			240	20.0	68,200	7.6	40	30	<sup>4</sup> 40	<sup>4</sup> 30	70	70
	ECB29-20 <b>(28K49)</b> (3) 35A Fuses	1	440	16.8	57,300	4.0	33	---	35	---	---	---
			460	18.4	62,700	4.0	34	---	35	---	---	---
			480	20.0	68,200	4.0	35	---	40	---	---	---
	<sup>6</sup> ECB29-20 <b>(28K51)</b> (3) 25A Fuses	1	550	16.8	57,300	4.0	27	---	30	---	---	---
			575	18.4	62,700	4.0	28	---	30	---	---	---
			600	20.0	68,200	4.0	29	---	30	---	---	---
<b>25 kW</b> 19 lbs.	ECB29-25CB <b>(12L65)</b> (2) 45A Circuit breaker	2	208	18.8	64,100	7.6	42	33	45	<sup>4</sup> 35	75	80
			220	21.0	71,700	7.6	47	38	<sup>4</sup> 50	<sup>4</sup> 40	85	90
			230	23.0	78,300	7.6	47	38	<sup>4</sup> 50	<sup>4</sup> 40	85	90
			240	25.0	85,300	7.6	47	38	<sup>4</sup> 50	<sup>4</sup> 40	85	90
	ECB29-25 <b>(28K50)</b> (3) 40A Fuses	1	440	21.0	71,700	4.0	39	---	40	---	---	---
			460	23.0	78,300	4.0	41	---	45	---	---	---
			480	25.0	85,300	4.0	42	---	45	---	---	---
	<sup>6</sup> ECB29-25 <b>(28K52)</b> (3) 35A Fuses	1	550	21.0	71,700	4.0	32	---	35	---	---	---
			575	23.0	78,300	4.0	34	---	35	---	---	---
			600	25.0	85,300	4.0	35	---	40	---	---	---

NOTE – Circuit 1 Minimum Circuit Ampacity includes the Blower Motor Full Load Amps.

<sup>1</sup> Electric heater capacity only – does not include additional blower motor heat capacity

<sup>2</sup> Amps shown are for blower motor only.

Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F

<sup>4</sup> Bold text indicates that the circuit breaker on "CB" circuit breaker models must be replaced with size noted. See Table on Page 9.

<sup>5</sup> HACR type circuit breaker or fuse.

## IV-START-UP - OPERATION

### A-Preliminary and Seasonal Checks

- 1- Make sure the unit is installed in accordance with the installation instructions.
- 2- Inspect electrical wiring, both field and factory installed for loose connections. Tighten as required.
- 3- Check voltage at disconnect switch. Voltage must be within range listed on the nameplate. If not, consult the power company and have voltage condition corrected before starting unit.
- 4- Check to ensure that refrigerant lines are in good condition and pipe insulation is intact.
- 5- Inspect condition of condensate drain pan and piping assembly. Disassemble and clean seasonally.

### B-Cooling Start-Up

**NOTE-** The following is a generalized procedure and does not apply to all thermostat control systems. Electronic thermostat control systems may operate differently.

- 1- Set fan switch to AUTO or ON and move the system selection switch to COOL. Adjust the thermostat to a setting far enough below room temperature to bring on the compressor. Compressor will start and cycle on demand from the thermostat.
- 2- The refrigerant circuit is charged with HFC-410A refrigerant. See outdoor unit rating plate for correct charge amount.
- 3- Refer to the correct outdoor unit service manual for more information.

### C-Heating Start-Up

- 1- Set the fan switch to AUTO or ON and move the system selection switch to HEAT. Adjust the thermostat setting above room temperature.
- 2- The indoor blower immediately starts and the electric heat will stage on based on sequencer timing.

### D-Safety or Emergency Shutdown

Turn off unit power at circuit breaker.

### E-Extended Period Shutdown

Turn off thermostat or set to "UNOCCUPIED" mode. Turn off power to unit. All access panels and covers must be in place and secured. The condensate assembly should be clean and dry for extended period shutdown.

## V-TYPICAL OPERATING CHARACTERISTICS

### A-Blower Operation and Adjustment

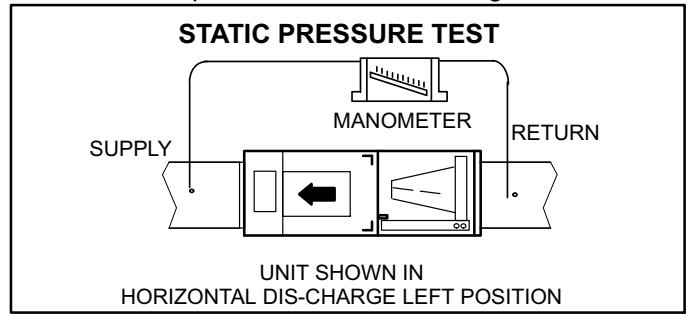
**NOTE-** The following is a generalized procedure and does not apply to all thermostat controls.

- 1- Blower operation is dependent on thermostat control system.
- 2- Generally, blower operation is set at thermostat sub-base fan switch. With fan switch in ON position, blower operates continuously. With fan switch in AUTO position, blower cycles with demand.

- 3- In all cases, blower and entire unit will be off when the system switch is in OFF position.

### B-External Static Pressure

- 1- Measure tap locations as shown in figure 12.



**FIGURE 12**

- 2- Punch a 1/4" (6mm) diameter hole in supply and return air plenums. Insert manometer hose flush with inside edge of hole or insulation. Seal around the hose with Permagum. Connect the zero end of the manometer to the discharge (supply) side of the system. On ducted systems, connect the other end of manometer to the return duct as above. For systems with non-ducted returns, leave the other end of the manometer open to the atmosphere.
- 3- With only the blower motor running and the evaporator coil dry, observe the manometer reading. Adjust blower motor speed to deliver the air desired according to the installation requirements.
- 4- External static pressure drop must not exceed 0.8" W.C.
- 5- Seal around the hole when the check is complete.

### C-Blower Speed Taps

#### Motor Speed Taps

**NOTE -** Motor is programmed for a 45-second delay off on all speed taps except TAP #1 (continuous fan speed).

**TABLE 1**

Tap	Operation	Remarks
1	Continuous or low speed fan (for 2-speed heat pumps or A/C units)	Continuous fan speed is energized (24 volt input to "G") when either "G" or "Y1" has a 24 volt signal (24 volt input from "Y1" passes through the room thermostat's "Fan Automatic contacts" to the "G" terminal).
2	Low-speed operation on high static system	CFM set at 1/2 ton less than nominal of unit (e.g. 3-ton set at 1000 CFM).
3	Cooling speed setting	CFM set at 400 cfm per nominal ton at ARI minimum static allowed, as follows: 1.5 to 2.0 ton - 0.10 2.5 to 3.5 ton - 0.15 4 to 5 ton - 0.20.
4	Heat pump with electric heat	CFM set at 400 cfm per nominal ton at .4 static. Energized when electric heat element has a call for heat.
5	High static applications	CFM set at 400 cfm per nominal ton at .8 static.

Table 2 shows the recommended factory blower speed tap selections for CBA27UHE series units.

These settings are for nominal tonnage match-ups with the CBA27UHE units. When matched with other sizes, it is recommended that the CFM be adjusted to approximately 400 CFM per ton.

To change blower motor speed tap remove the speed tap from Y2 on the terminal strip and insert the desired speed tap. See blower data on pages 4 and 5 for the desired CFM setting

**TABLE 2**

Recommended Blower Speed Tap Selection			
Operation	CBA27UHE	Outdoor unit	Tap
Cooling	ALL MODELS	Condensing unit	3
		Heat pump	3
Heating*		Condensing unit with electric heat only	4
		Heat pump with electric heat	4

\* Minimum setting for heat

**NOTE** - Motor is programmed for a 45-second delay off on all speed taps except TAP #1 (continuous fan speed).

**VI-MAINTENANCE**

<b>NOTICE !</b>
<p>Failure to follow instructions will cause damage to the unit.</p> <p>This unit is equipped with an aluminum coil. Aluminum coils may be damaged by exposure to solutions with a pH below 5 or above 9. The aluminum coil should be cleaned using potable water at a moderate pressure (less than 50psi). If the coil cannot be cleaned using water alone, Lennox recommends use of a coil cleaner with a pH in the range of 5 to 9. The coil must be rinsed thoroughly after cleaning.</p> <p>In coastal areas, the coil should be cleaned with potable water several times per year to avoid corrosive buildup (salt).</p>

<b>⚠ WARNING</b>
<p>Disconnect power before performing any maintenance.</p>

At the beginning of each heating / cooling season, the system should be checked as follows:

**A-Filters**

<b>⚠ IMPORTANT</b>
<p>Filter access panel must be in place during unit operation. Excessive warm air entering the unit may result in water blow-off problems.</p>

Filters may be duct-mounted or installed in the cabinet. A filter is installed at the factory. Note that filter access door fits over access panel. Air will leak if the access panel is placed over the filter door.

Filters should be inspected monthly and must be cleaned or replaced when dirty to assure proper air handler operation.

Units are equipped with standard throw-away type filters which should be replaced when dirty.

To remove filter, loosen the thumbscrews holding the filter panel in place. Slide filter out of the guides on either side of cabinet, insert new filter and replace panel.

**TABLE 3**

CBA27UHE Model	Filter Size - In. (mm)
-018, -024, -030, -036	20 x 20 (508 x 508)
-042, -048, -060	20 x 24 (508 x 610)

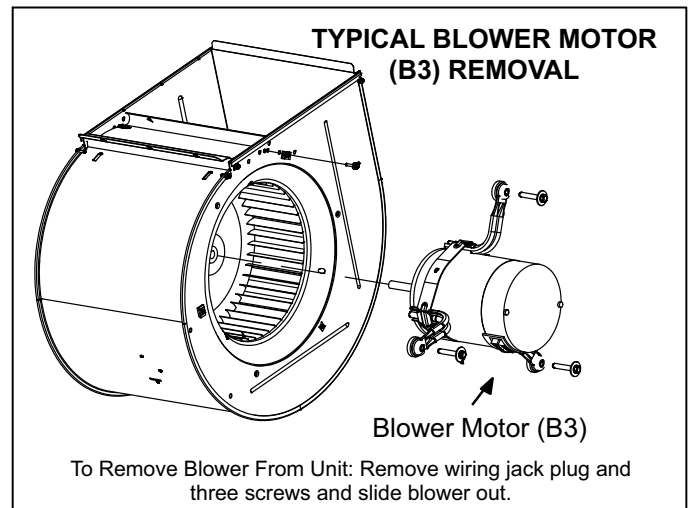
**B-Supply Air Blower**

- 1- Check and clean blower wheel.
- 2- Motors are pre-lubricated for extended life; no further lubrication is required.

**C-Electrical**

- 1- Check all wiring for loose connections.
- 2- Check circuit breaker located in unit control box.
- 3- Check for correct voltage at unit (unit operating).
- 4- Check amp-draw on blower motor.
- 5- Check to see that heat (if applicable) is operating.

**D-CONSTANT TORQUE SPEED BLOWER MOTOR (ECM) (B3)**



**FIGURE 13**

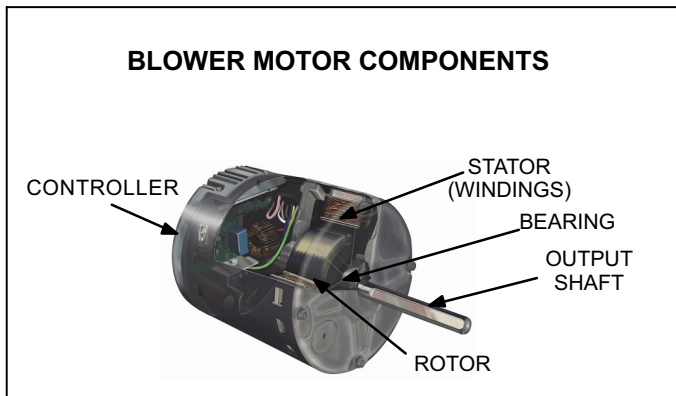
The constant torque ECM (electronically commutated motor) communicates with the air handler control via 24VAC inputs. It is programmed to provide a constant level of torque (current / power) to the motor. This is a multi-tap motor with the ability to have 1 to 5 programmed levels of torque (see table 4). Each value equals a specific amount of torque to create the proper amount of airflow for each system demand. This value is specific to model and size system.

**TABLE 4**

TAP SETTINGS					
Parameter	Tap 1	Tap 2	Tap 3	Tap 4	Tap 5
OFF-Delay	0	45	45	45	45
Torque (oz. ft) (Se)	25.73	37.96	47.38	50.51	57.73
% of full output	32.16	47.45	59.22	63.14	72.16

Each tap can have a unique amount of torque programmed for a specific purpose. For example, switching from Tap 1 to Tap 2 may increase the airflow, but not necessarily at a specific interval like changing from low to medium low speed on a PSC motor.

Internal components are shown in figure 14. The stator windings are split into three poles which are electrically connected to the controller. This arrangement allows motor windings to turn on and off in sequence by the controller.



**FIGURE 14.**

The controller uses sensing devices to sense what position the rotor is in at any given time. By sensing the position of the rotor and then switching the motor windings on and off in sequence, the rotor shaft turns the blower.

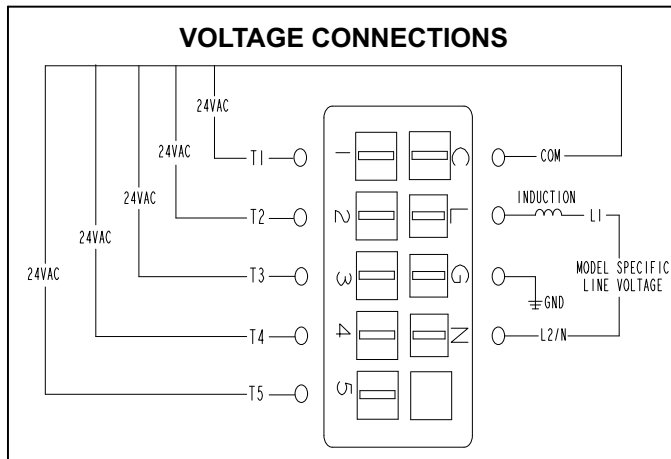
**Operation**

The 230VAC voltage connections to the motor are labeled **L**, **G** and **N**.

- 230VAC **L** = L1 115VAC, **G** = Ground, **N** = L2 115VAC

The 230VAC is connected to the motor at all times. This voltage operates the internal electronics and drives the motor. In addition, the motor requires a low voltage to operate. The low voltage to the motor is delivered to taps 1-5 and the

(C) terminal from the control relay. The motor accepts a communication signal of 24VAC on these taps. Instead of energizing a motor speed (winding) on a PSC motor for each demand (heat cool, constant fan); the communication voltage directs the motor to operate at the torque value stored for each tap.



**FIGURE 15.**

During each demand, the fan motor will maintain the selected torque during changes in the systems external static pressure (ESP) (constant torque). If ESP increases the motor will use more power (current) to maintain torque. The motor has a programmed limit of operation to protect itself from damage, due to the energy it must use to maintain torque at high external static pressures. If the systems maximum total ESP is exceeded, torque will not be maintained, however the motor will deliver as much torque as possible, without causing damage to itself.

Constant torque allows the fan motor to maintain the torque (current) delivered to the motor when ESP is higher than recommended and/or changes during system operation. ESP (the resistance to the movement of air) is increased when duct work is undersized, poorly constructed and/or full or dirt or debris. ESP can increase during system operation when dirt builds up on the air distribution systems components, especially the filter, and when customers close or block grilles and registers. When torque is maintained, airflow does not decrease as fast as it would on a PSC motor system. This decreases the effect ESP has on loss of airflow, providing better system performance and efficiency within the limits of the motor design.

The fan motor has no programmable (On) delays but multiple (Off) delays (see table 4) are programmed into the motor. The off delay is programmed into the motor and can not be adjusted.

**Installation**

It is recommended that the electrical connections on the ECM be facing down or between the 4 and 8 O'clock position, and a drip loop formed out of the wiring harness leaving the motor. This is to prevent any moisture or water that may get into the motor area from running into the connectors where it could cause damage to the control.

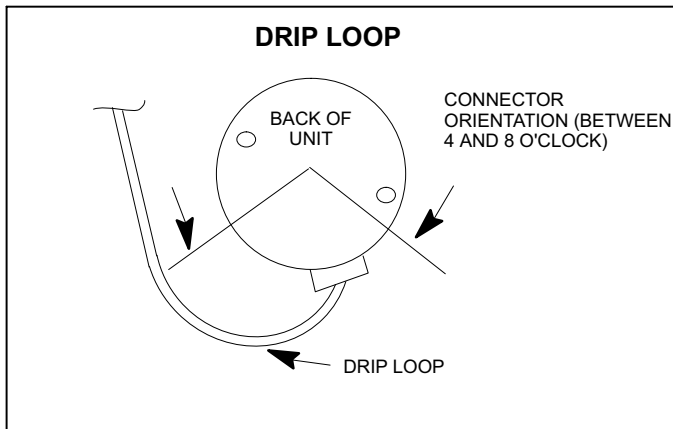


FIGURE 16

**⚠ DANGER**

Disconnect power from unit and wait at least five minutes to allow capacitors to discharge before attempting to service motor. Failure to wait may cause personal injury or death.

**INDOOR BLOWER MOTOR (B3) CONTROL TROUBLESHOOTING (REGAL-BELOIT)**

Before troubleshooting any HVAC system, it is a good practice to become familiar with the components and wiring diagram. On fan motor systems it is a good practice to check the tap selections and delay settings.

*If the motor is running* but the system is noisy, shutting down on its limits or safeties or the evaporator coil is freezing, there is a good chance the motor is good. The problem is most likely external to the motor.

- Check the tap selections using the HVAC OEM guide
- Check the air distribution system components for dirt load and closed dampers, registers and grilles.
- Measure the total external static pressure. Make repair(s) if above the recommended maximum level and confirm airflow at the new total ESP with the air flow tables (beginning on page 4). Aftermarket filter sizing is a common issue.

*If the motor is not running*, the following checks will diagnose whether it is operational. **Always disconnect the power to the HVAC system before disconnecting or reconnecting any connectors to these motors.** There are two inputs needed to operate this motor, a high voltage constant power source, and the low voltage communication that selects the torque value in each tap per demand.

**Checking 230VAC Voltage Input**

First check the high voltage to terminals (L) and (N). There should be 230VAC on these two terminals whenever there is power to the system, regardless of a demand call. Applying incorrect high voltage to the motor may cause the motor to not operate, or even damage the motor.

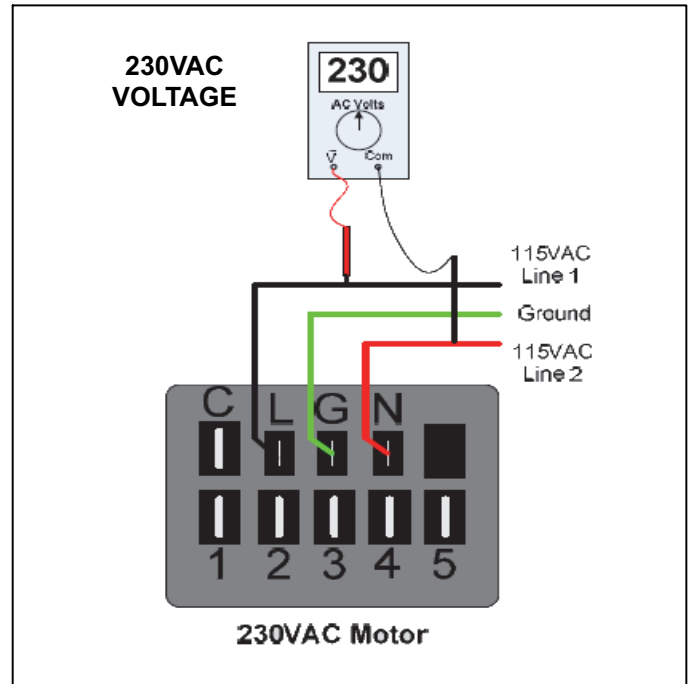


FIGURE 17

**Checking the Low-Voltage Communication Input**

If no low voltage communication (typically 24VAC) is measured at the motor on taps 1-5, check the HVAC system wiring, controls and demand call. Always check low voltage between terminals 1-5 and (C) at the motor, never ground. Once the problem is corrected, confirm that the low voltage communication is applied to a programmed tap. If proper low voltage communication is present at a programmed tap, with proper high voltage to the motor and it still does not operate, the motor is failed.

- 1- Initiate a demand from the thermostat and check the voltage between the common and the appropriate motor terminal 1- 5. Confirm the meter is set to the 24VAC.
- 2- If the low voltage communication is not present, check the demand from the thermostat. Also check the output terminal and wires from the K20 blower relay.
- 3- If the motor has proper high voltage as identified in the previous section, and proper low voltage to a programmed terminal, and motor is not operating, the motor has failed. Replace motor.

# VII-WIRING DIAGRAMS AND SEQUENCE OF OPERATIONS

## A- CBA27UHE Units 208/230V/460V SINGLE PHASE - SEQUENCE OF OPERATION

- 1- Line voltage is routed to transformer T1 and blower motor B3.
- 2- T1 supplies 24VAC to terminal strip TB1, which supplies 24VAC to the indoor thermostat and electric heat, if used.

### HEATING

- 3- When there is a call for heat, W1 of the thermostat energizes the electric heat relay K32 (covered in the electric heat section).
- 4- Blower motor B3 is energized on heating speed after K20-1 closes.
- 5- Economizer (if used) is energized.

### SINGLE-STAGE COOLING (Y1 to Y2 jumper in place)

- 6- When there is a call for cooling, Y2 of the thermostat energizes blower on cooling speed.

### TWO-STAGE THERMOSTAT

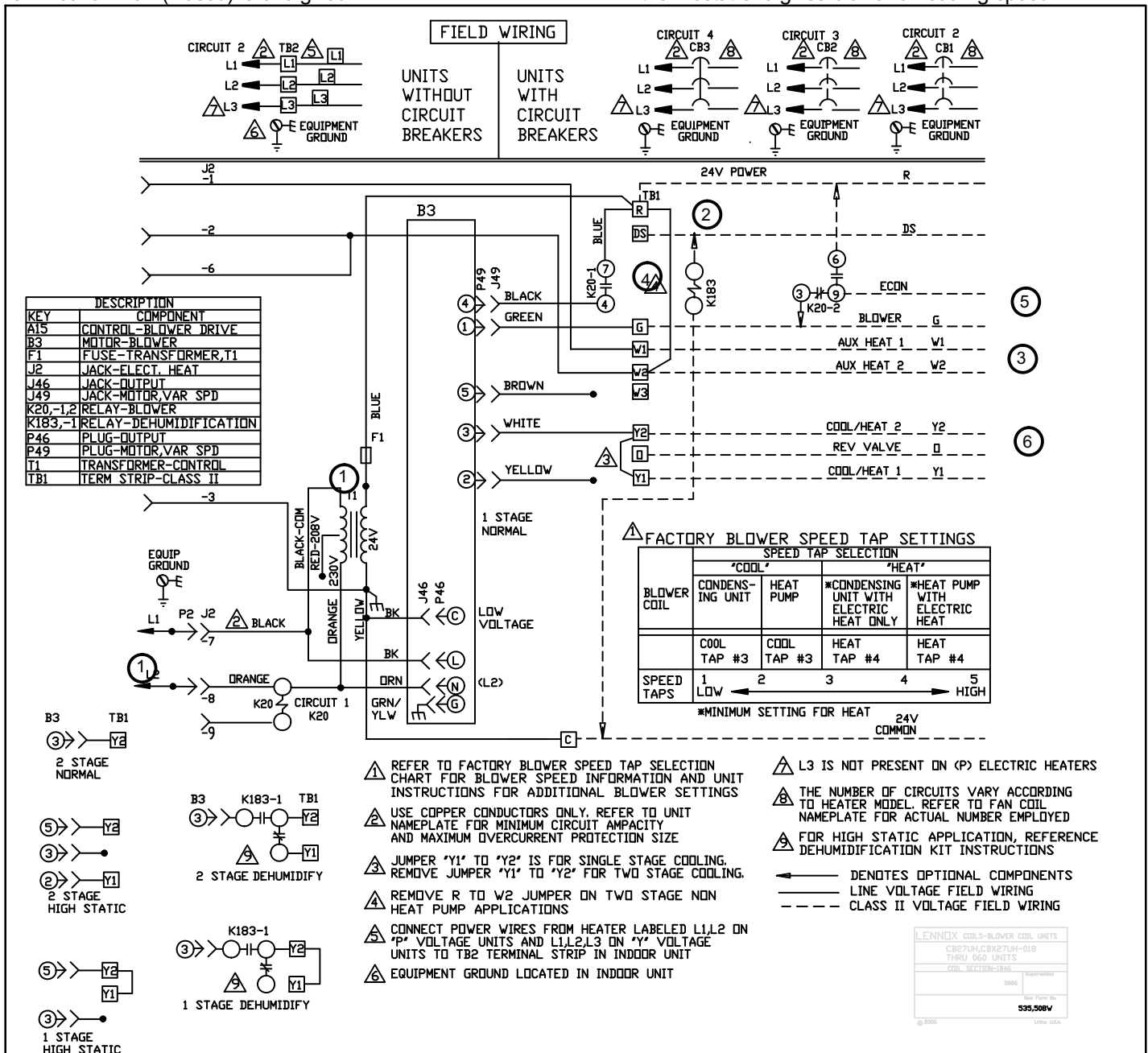
(remove jumper between Y1 and Y2)

### FIRST-STAGE COOLING

- 7- When there is a call for cooling, Y1 sends power through the room thermostat to G to energizes blower on first stage cooling speed.

### SECOND-STAGE COOLING

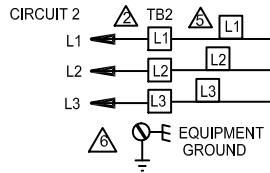
- 8- When there is a call for second stage cooling, Y2 of the thermostat energizes blower on cooling speed.



208/230V - Single Phase

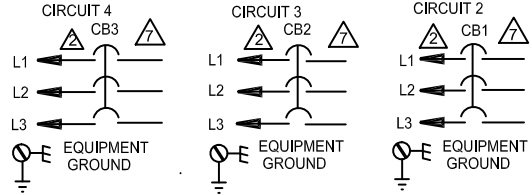


### FIELD WIRING FOR UNITS WITHOUT CIRCUIT BREAKERS

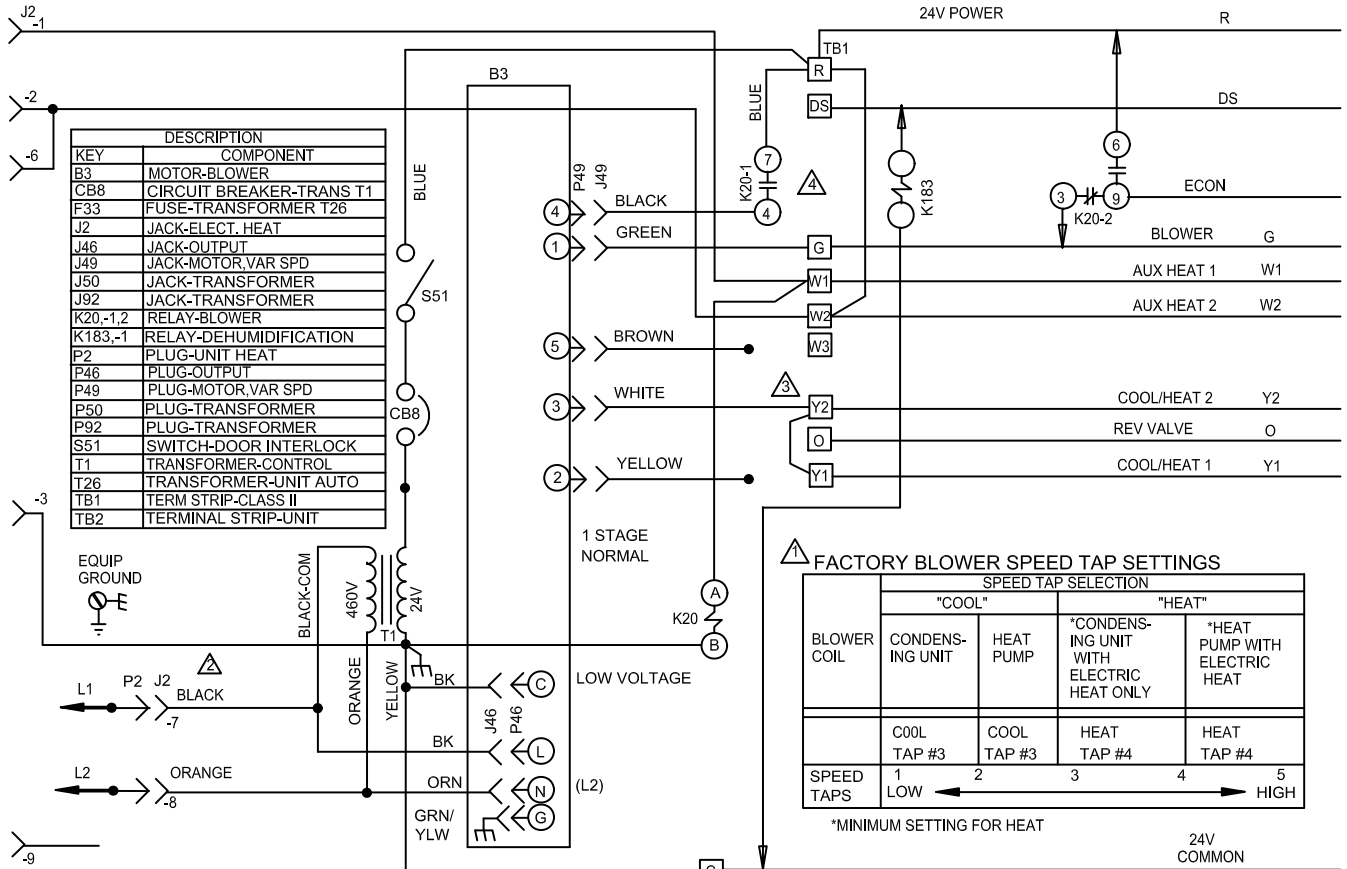


- ⚠ CONNECT POWER WIRES FROM HEATER LABELED L1, L2, L3 ON G VOLTAGE UNITS TO TB2 TERMINAL STRIP IN INDOOR UNIT
- ⚠ EQUIPMENT GROUND LOCATED IN INDOOR UNIT

### FIELD WIRING FOR UNITS WITH CIRCUIT BREAKERS



- ⚠ THE NUMBER OF CIRCUITS VARY ACCORDING TO HEATER MODEL. REFER TO FAN COIL NAMEPLATE FOR ACTUAL NUMBER EMPLOYED

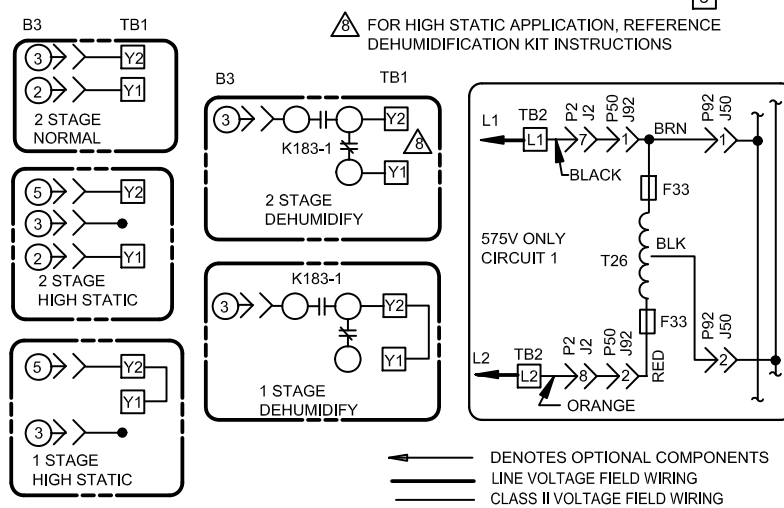


#### FACTORY BLOWER SPEED TAP SETTINGS

BLOWER COIL	SPEED TAP SELECTION			
	"COOL"		"HEAT"	
	CONDENS-ING UNIT	HEAT PUMP	*CONDENS-ING UNIT WITH ELECTRIC HEAT ONLY	*HEAT PUMP WITH ELECTRIC HEAT
	COOL TAP #3	COOL TAP #3	HEAT TAP #4	HEAT TAP #4
SPEED TAPS	1	2	3	4
	LOW			HIGH

\*MINIMUM SETTING FOR HEAT

24V COMMON



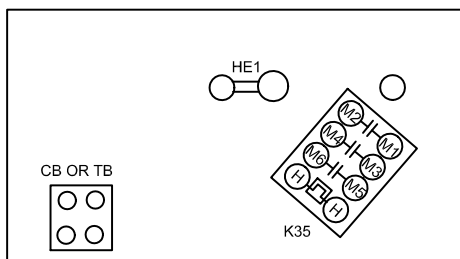
- ⚠ REFER TO FACTORY BLOWER SPEED TAP SELECTION CHART FOR BLOWER SPEED INFORMATION AND UNIT INSTRUCTIONS FOR ADDITIONAL BLOWER SETTINGS
- ⚠ USE COPPER CONDUCTORS ONLY. REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE
- ⚠ JUMPER "Y1" TO "Y2" IS FOR SINGLE STAGE COOLING. REMOVE JUMPER "Y1" TO "Y2" FOR TWO STAGE COOLING.
- ⚠ REMOVE R TO W2 JUMPER ON TWO STAGE NON HEAT PUMP APPLICATIONS

— DENOTES OPTIONAL COMPONENTS  
 — LINE VOLTAGE FIELD WIRING  
 — CLASS II VOLTAGE FIELD WIRING

## 460V - Single Phase

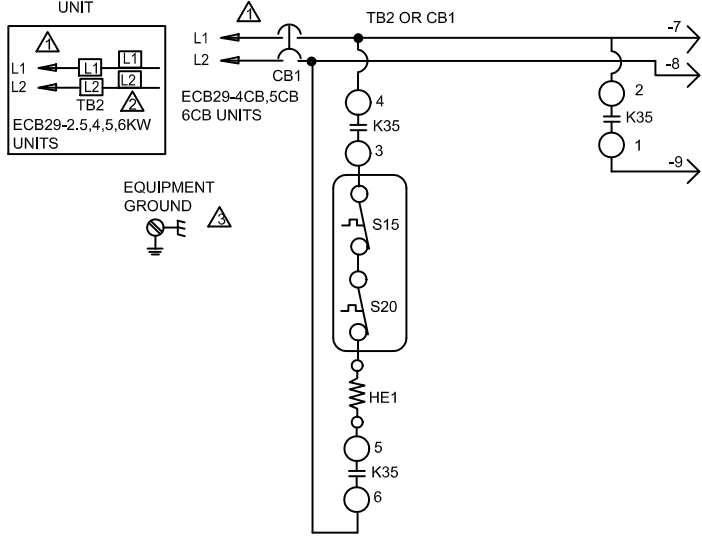
# B-ECB29-2.5, -4, -5, -6, 4CB, 5CB, 6CB - 208/230V SINGLE PHASE - SEQUENCE OF OPERATION

- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat relay K35 with 24VAC.
- 2- When K35-1 closes, the blower is energized on heating speed.
- 3- Assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE1 is energized.



KEY	DESCRIPTION	COMPONENT
CB1	CIRCUIT BREAKER-ELECT HEAT	
HE1	ELEMENT-ELECTRIC HEAT 1	
K32,-1,2	RELAY-ELECTRIC HEAT	
P2	PLUG-ELECTRIC HEAT	
S15	SWITCH-LIMIT, PRIMARY, ELECT HEAT	
S20	SWITCH-LIMIT, SECONDARY, ELECT HEAT	
TB2	TERMINAL STRIP-UNIT	

- NOTE: USE COPPER CONDUCTORS ONLY
- ⚠ REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.
  - ⚠ CONNECT POWER WIRES FROM UNIT LABELED L1 AND L2 TO TB2 TERMINAL STRIP ON HEATER PLATE
  - ⚠ EQUIPMENT GROUND IS LOCATED IN INDOOR UNIT



— LINE VOLTAGE FIELD INSTALLED

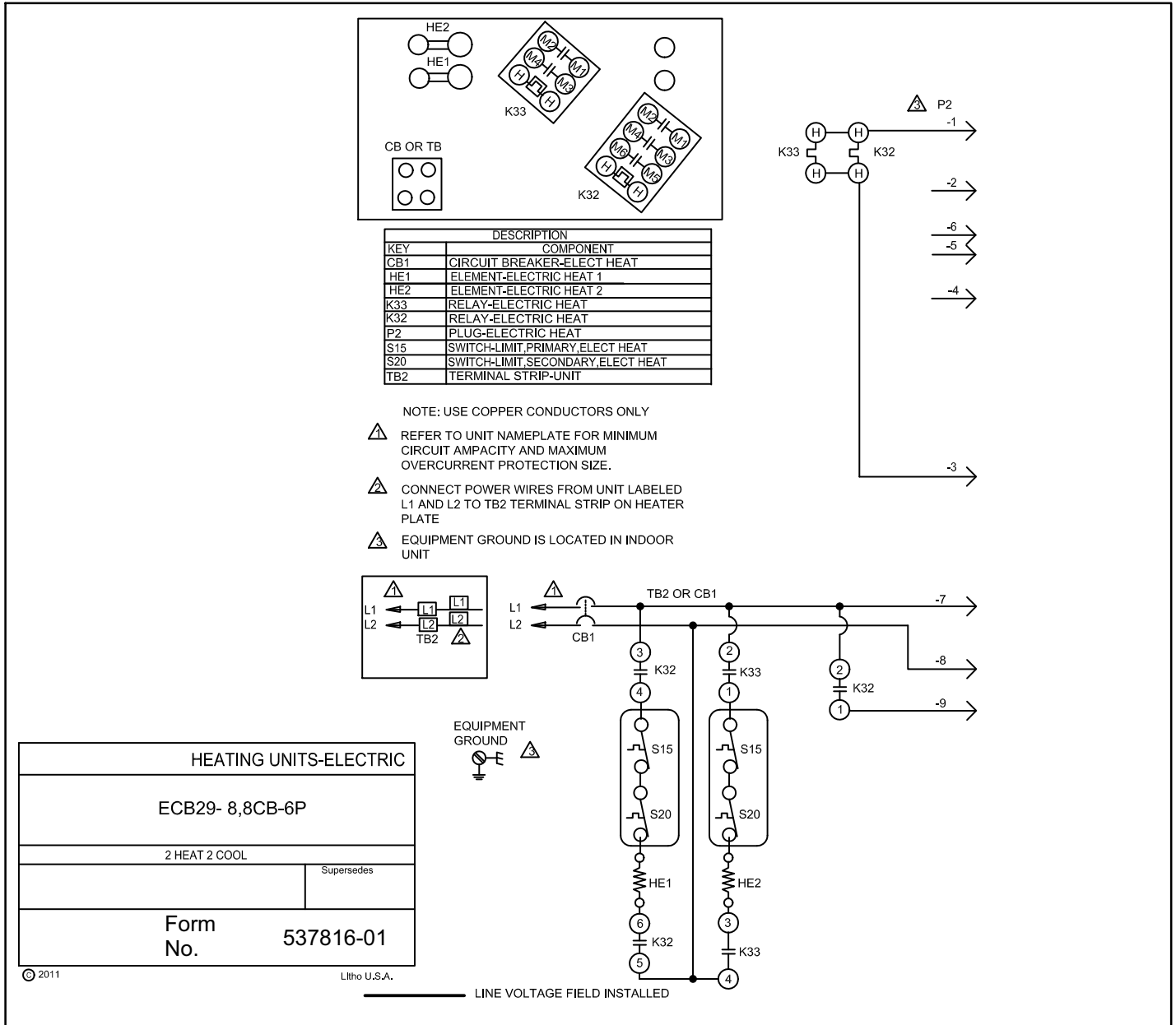
HEATING-ELECTRIC	
ECB29-2.5, 4, 5, 6, 4CB, 5CB, 6CB-6P	
Supersedes	
0714	Form No. <b>537764-01</b>

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# C-ECB29-8, 8CB 208/230V SINGLE PHASE - SEQUENCE OF OPERATION

- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat relays K32 and K33 with 24VAC.
- 2- When K32-1 closes, the blower is energized on heating speed.
- 3- When K32-2 and K32-3 close, assuming N.C. primary (S15) and the secondary (S20) limit switches are closed, electric heat element HE1 is energized.
- 4- When K33-1 and K33-2 close, assuming N.C. primary (S10) and the secondary (S20) limit switches are closed, electric heat element HE2 is energized.



# D-ECB29-9CB, 10, 10CB - 208/230V SINGLE PHASE - SEQUENCE OF OPERATION

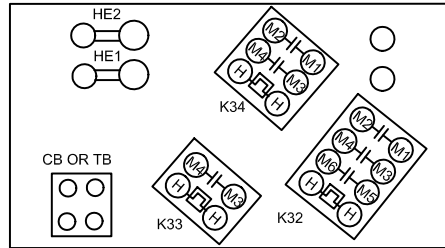
## FIRST STAGE HEAT

- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat relays K32 and K33 with 24VAC.
- 2- When K32-1 closes, the blower is energized on heating speed.
- 3- K32-2 and K32-3 close and assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE1 is energized.

## SECOND STAGE HEAT

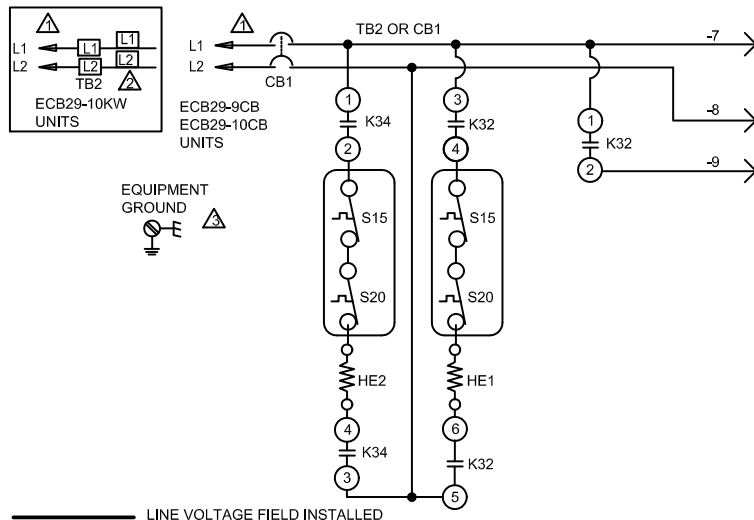
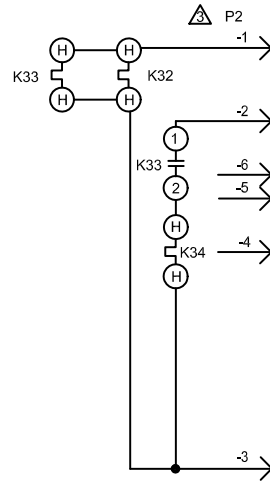
**(remove jumper between W2 and R)**

- 4- When K33-1 closes, the unit is ready for a second stage heat demand. W2 of the thermostat sends a second stage heat demand, energizing the electric heat relay K34 with 24VAC.
- 5- When K34-1 and K34-2 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE2 is energized.



KEY	DESCRIPTION
CB1	CIRCUIT BREAKER-ELECT HEAT
HE1	ELEMENT-ELECTRIC HEAT 1
HE2	ELEMENT-ELECTRIC HEAT 2
K32	RELAY-ELECTRIC HEAT
K33	RELAY-ELECTRIC HEAT
K34	RELAY-ELECTRIC HEAT
P2	PLUG-ELECTRIC HEAT
S15	SWITCH-LIMIT, PRIMARY, ELECT HEAT
S20	SWITCH-LIMIT, SECONDARY, ELECT HEAT
TB2	TERMINAL STRIP-UNIT

- NOTE: USE COPPER CONDUCTORS ONLY
- ⚠ REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.
  - ⚠ CONNECT POWER WIRES FROM UNIT LABELED L1 AND L2 TO TB2 TERMINAL STRIP ON HEATER PLATE
  - ⚠ EQUIPMENT GROUND IS LOCATED IN INDOOR UNIT



HEATING UNITS-ELECTRIC	
ECB29-9CB, 10, 10CB-7P	
2 HEAT 2 COOL	
Supersedes	
0615	Form No. 537770-02

# E-ECB29-12.5CB, -15CB - 208/230V SINGLE PHASE - SEQUENCE OF OPERATION

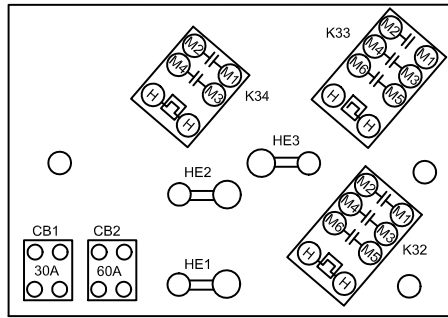
## FIRST STAGE HEAT

- 1- When there is a call for heat, W1 of the thermostat energizes electric heat relays K32 and K33 with 24VAC.
- 2- When K32-1 closes, the blower is energized on heating speed.
- 3- When K32-2 and K32-3 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE1 is energized.

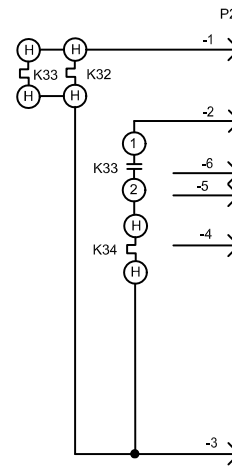
## SECOND STAGE HEAT

(remove jumper between W2 and R)

- 4- When K33-1 closes, the unit is ready for a second stage heat demand. When K33-2 and K33-3 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE2 is energized.
- 5- W2 of the thermostat sends a second stage heat demand, energizing electric heat relay K34 with 24VAC.
- 6- When K34-1 and K34-2 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, heating element HE3 is energized.

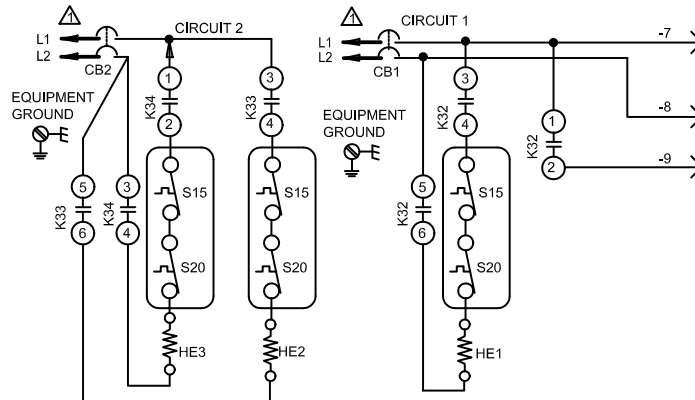


DESCRIPTION	
KEY	COMPONENT
CB1	CIRCUIT BREAKER-ELECT HEAT
CB2	CIRCUIT BREAKER-ELECT HEAT
HE1	ELEMENT-ELECTRIC HEAT 1
HE2	ELEMENT-ELECTRIC HEAT 2
HE3	ELEMENT-ELECTRIC HEAT 3
K32	RELAY-ELECTRIC HEAT
K33	RELAY-ELECTRIC HEAT
K34	RELAY-ELECTRIC HEAT
P2	PLUG-ELECTRIC HEAT
S15	SWITCH-LIMIT, PRIMARY, ELECT HEAT
S20	SWITCH-LIMIT, SECONDARY, ELECT HEAT



⚠ REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.  
 — LINE VOLTAGE FIELD INSTALLED  
 ← DENOTES OPTIONAL COMPONENTS

NOTE: USE COPPER CONDUCTORS ONLY



HEATING UNITS-ELECTRIC	
ECB29-12.5CB-7P ECB29-15CB-7P	
2 HEAT 2 COOL	
	Supersedes
Form No.	537787-02

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# F-ECB29-20CB - 208/230V SINGLE PHASE - SEQUENCE OF OPERATION

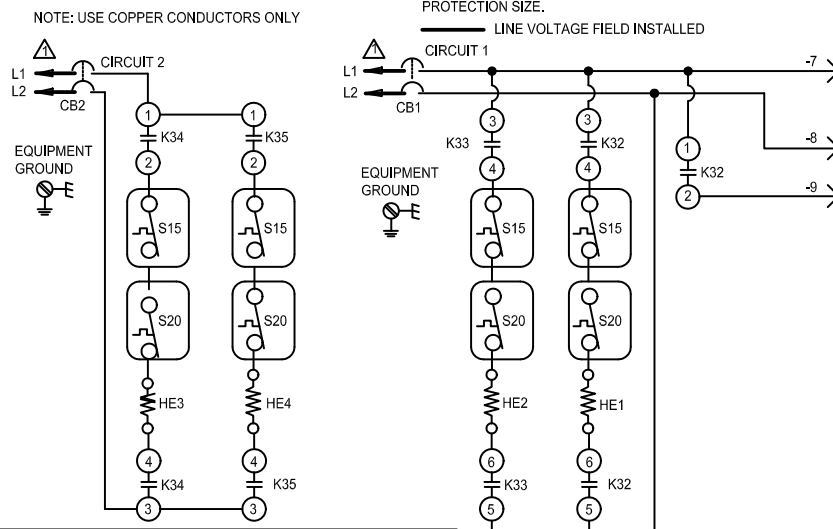
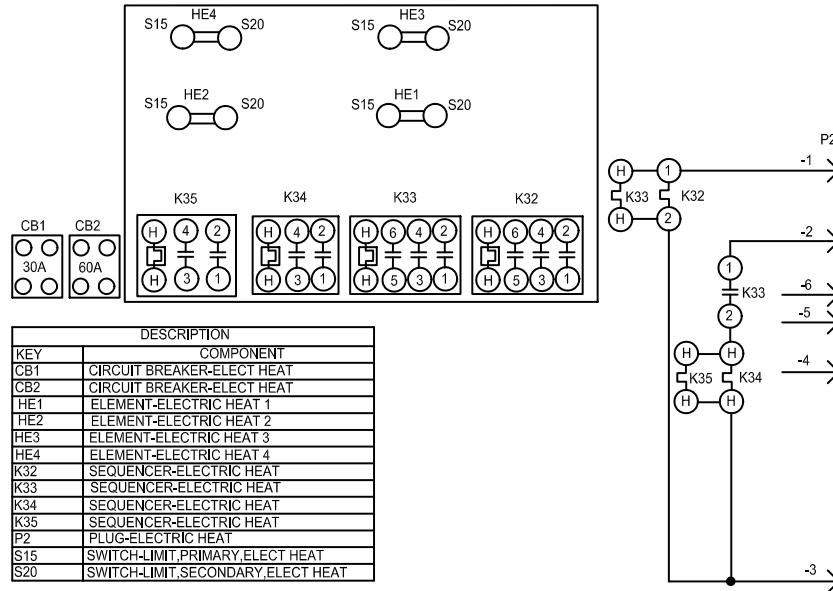
## FIRST STAGE HEAT

- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat relays.
- 2- When K32-1 closes, the blower is energized on heating speed.
- 3- When K32-2 and K32-3 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE1 is energized.
- 4- When K33-2 and K32-3 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE2 is energized.

## SECOND STAGE HEAT

(remove jumper between W2 and R)

- 5- W2 of the thermostat sends a second stage heat demand, energizing the electric heat relays K34 and K35 with 24VAC. When K34-2 and K34-3 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, heating element HE3 is energized. When K35-2 and K35-3 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE4 is energized.



HEATING UNITS-ELECTRIC	
ECB29-20CB-9P	
2 HEAT 2 COOL	
Supersedes	
Form No.	537760-02

# G-ECB29-25CB - 208/230V SINGLE PHASE - SEQUENCE OF OPERATION

## FIRST STAGE HEAT

- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat relays K32 and K34 with 24VAC.
- 2- When K32-1 closes, the blower is energized on heating speed.
- 3- When K32-2 and K32-3 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE1 is energized.
- 4- When K34-2 and K34-3 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE2 is energized.

## SECOND STAGE HEAT

(remove jumper between W2 and R)

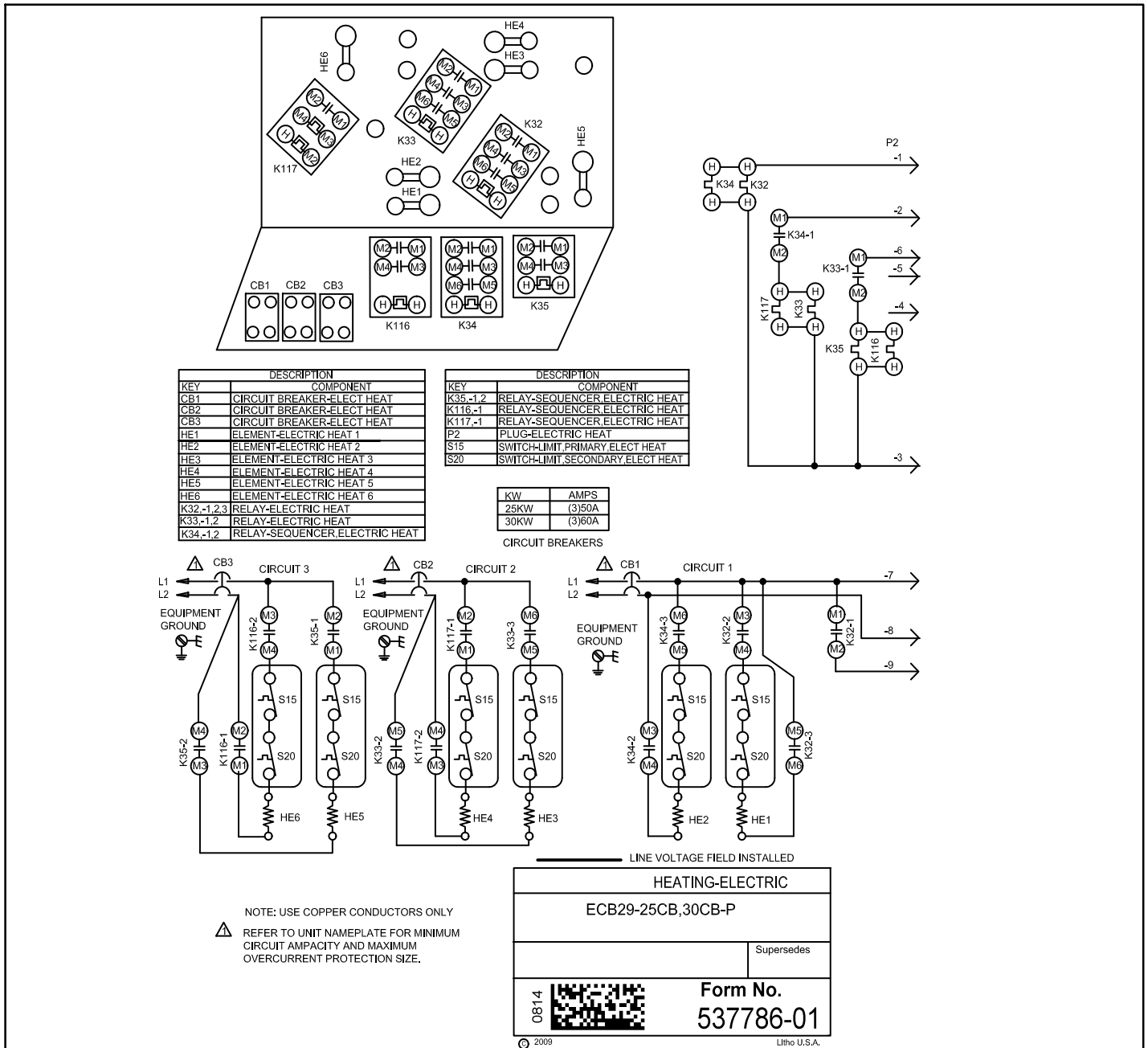
- 5- When K34-1 closes, the unit is ready for a second stage heat demand. W2 of the thermostat sends a second stage heat demand, energizing the electric heat relays K33 and K117 with 24VAC.

- 6- When K33-2, K33-3, K117-1 and K117-2 close, assuming primary (S15) and secondary (S20) limit switches are closed, electric heat elements HE3 and HE6 are energized.

## THIRD STAGE HEAT

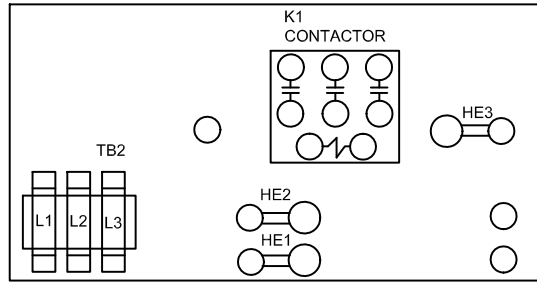
(remove jumper between W3 and R, if using third stage)

- 7- When K33-1 closes, the unit is ready for a third stage heat demand. W3, if available, of the thermostat sends a third stage heat demand, energizing the electric heat relays K35 and K116 with 24VAC.
- 8- When K35-1, K35-2, K116-1 and K116-2 close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat elements HE4 and HE5 are energized.



# H-ECB29 -8, -10 - 208/230V THREE PHASE - SEQUENCE OF OPERATION

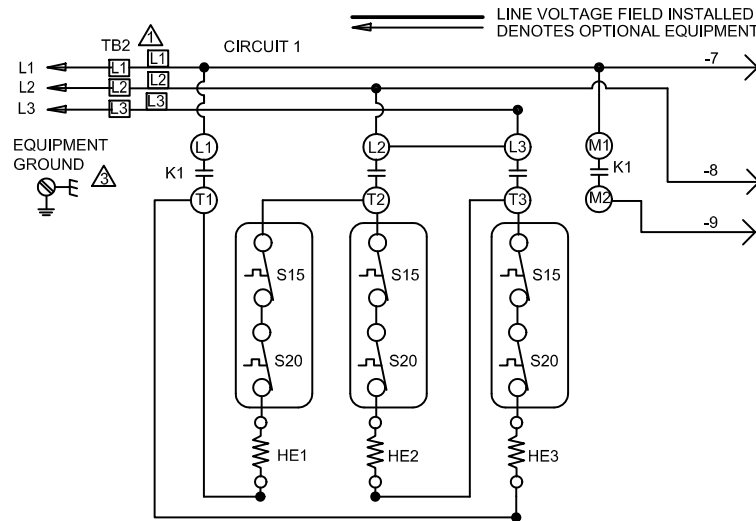
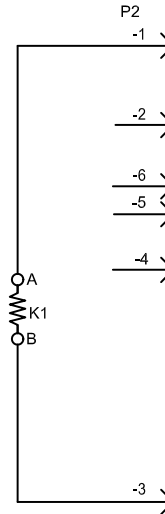
- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat contactor K1.
- 2- When K1 contacts M1 and M2 close, the blower is energized on heating speed.
- 3- When K1 contactor closes, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat elements HE1, HE2, and HE3 are energized.



DESCRIPTION	
KEY	COMPONENT
CB1	CIRCUIT BREAKER-ELECT HEAT
HE1	ELEMENT-ELECTRIC HEAT 1
HE2	ELEMENT-ELECTRIC HEAT 2
HE3	ELEMENT-ELECTRIC HEAT 3
K1	CONTACTOR
P2	PLUG-ELECTRIC HEAT
S15	SWITCH-LIMIT, PRIMARY, ELECT HEAT
S20	SWITCH-LIMIT, SECONDARY, ELECT HEAT
TB2	TERMINAL STRIP-ELECTRIC HEAT

NOTE: USE COPPER CONDUCTORS ONLY

- ⚠ CONNECT POWER WIRES FROM HEATER, LABELED L1, L2, AND L3 TO TB2 TERMINAL STRIP INSIDE INDOOR UNIT
- ⚠ REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.
- ⚠ EQUIPMENT GROUND IS LOCATED IN INDOOR UNIT



HEATING-ELECTRIC	
ECB29-8,10-4-Y	
Supersedes	
0714	Form No. 537772-01

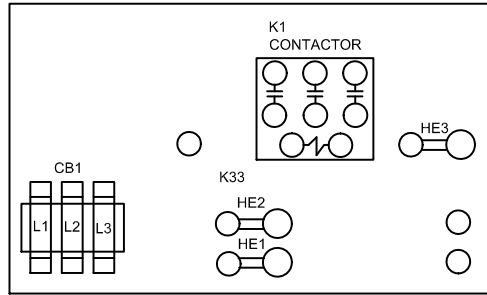
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# I-ECB29 -15CB - 208/230V THREE PHASE - SEQUENCE OF OPERATION

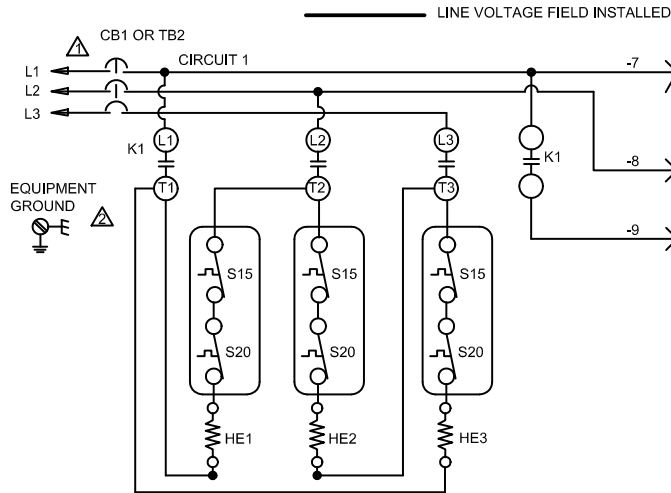
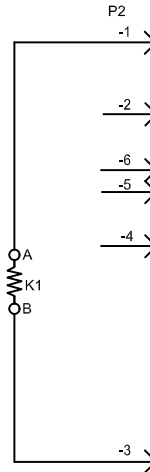
- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat contactor K1.
- 2- When K1 contacts M1 and M2 close, the blower is energized on heating speed.
- 3- When K1 contactor closes, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat elements HE1, HE2, and HE3 are energized.



KEY	DESCRIPTION	COMPONENT
CB1	CIRCUIT BREAKER-ELECT HEAT	
HE1	ELEMENT-ELECTRIC HEAT 1	
HE2	ELEMENT-ELECTRIC HEAT 2	
HE3	ELEMENT-ELECTRIC HEAT 3	
K1	CONTACTOR	
P2	PLUG-ELECTRIC HEAT	
S15	SWITCH-LIMIT, PRIMARY, ELECT HEAT	
S20	SWITCH-LIMIT, SECONDARY, ELECT HEAT	

- NOTE: USE COPPER CONDUCTORS ONLY
- ⚠ REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.
  - ⚠ EQUIPMENT GROUND IS LOCATED IN INDOOR UNIT

NOTE-USE 50 AMP CIRCUIT BREAKER



HEATING-ELECTRIC	
ECB29-15CB-4-Y	
Supersedes	
Form No.	<b>537771-01</b>

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# J-ECB29-20CB, -25CB - 208/230V THREE PHASE - SEQUENCE OF OPERATION

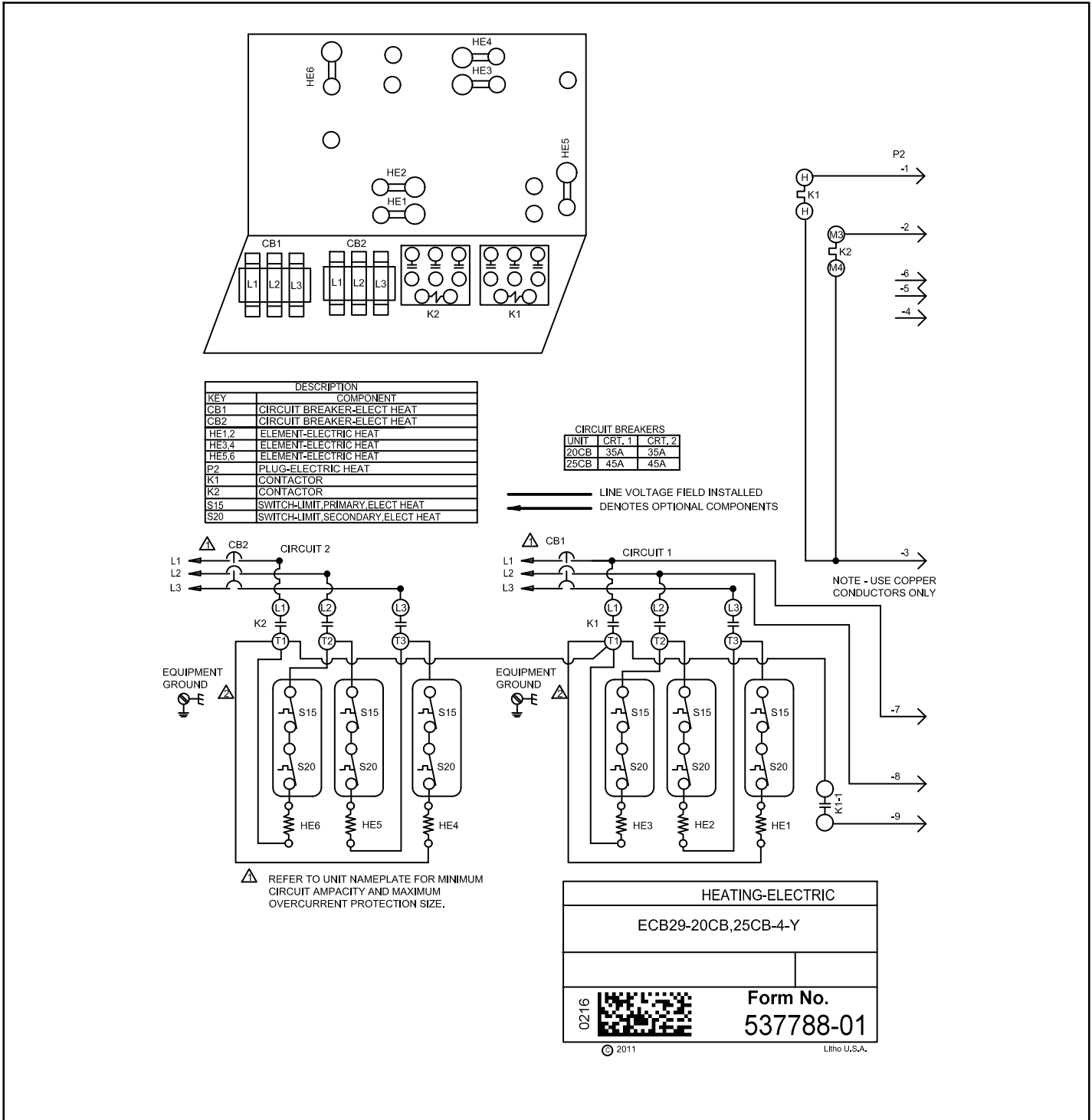
## FIRST STAGE HEAT

- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat contactor K1 with 24VAC.
- 2- When K1-1 closes, the blower is energized on heating speed.
- 3- When K1 contactor closes, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat elements HE1, HE2 and HE3 are energized.

## SECOND STAGE HEAT

(remove jumper between W2 and R)

- 4- W2 of the thermostat sends a second stage heat demand, energizing the electric heat contactor K2 with 24VAC.
- 5- When K2-1 closes, the blower (if not energized) is energized on heating speed.
- 6- When K2 contactor contacts close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat elements HE4, HE5, and HE6 are energized.



# K-ECB29-10, -15, -20 and -25CB - 460V THREE PHASE - SEQUENCE OF OPERATION

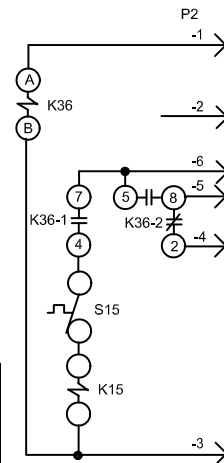
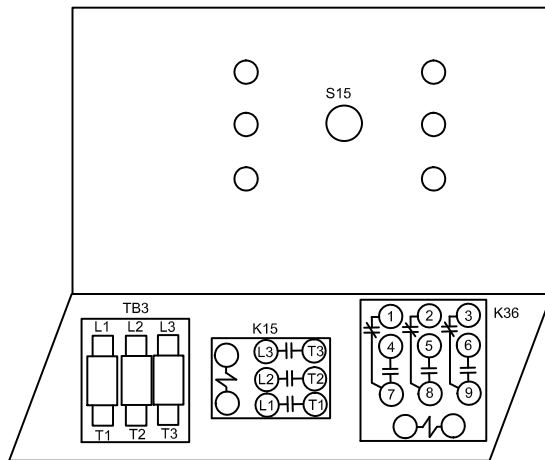
## FIRST STAGE HEAT

- 1- When there is a call for heat, W1 of the thermostat energizes the electric heat relays K32 and K34 with 24VAC.
- 2- When K32-1 closes, the blower is energized on heating speed.
- 3- When K32-1 and K32-2 closes, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat elements HE 1 and HE2 are energized.
- 4- When K34-1 closes, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat element HE3 is energized.

## SECOND STAGE HEAT

*(remove jumper between W2 and R)*

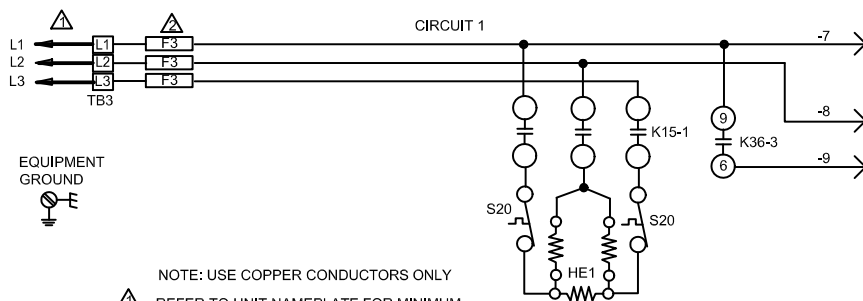
- 5- When K34-2 closes, the unit is ready for a second stage heat demand. W2 of the thermostat sends a second stage heat demand, energizing the electric heat relays K33 and K35 with 24VAC.
- 6- When K33-1 closes, the blower (if not energized) is energized on heating speed and economizer heat relay K43 is energized (see 208/230VAC CB schematic).
- 7- When K33-1, K35-1, and K35-2 contacts close, assuming the N.C. primary (S15) and secondary (S20) limit switches are closed, electric heat elements HE4, HE5, and HE6 are energized.



### FUSE SIZE CHART

UNIT	VOLTAGE	FUSE SIZE
ECB29-10	G	20A
	J	—
ECB29-15	G	25A
	J	—
ECB29-20	G	35A
	J	25A
ECB29-25	G	40A
	J	35A

KEY	DESCRIPTION	COMPONENT
F3	FUSE-ELECTRIC HEAT	
HE1	ELEMENT-ELECTRIC HEAT 1	
K15,-1	CONTACTOR-ELECTRIC HEAT	
K36,-1,2,3	RELAY-HEAT BLOWER	
P2	PLUG-ELECTRIC HEAT	
S15	SWITCH-LIMIT, PRIMARY ELECT HEAT	
S20	SWITCH-LIMIT, SECONDARY ELECT HEAT	
TB3	TERMINAL STRIP-ELECTRIC HEAT	



NOTE: USE COPPER CONDUCTORS ONLY  
REFER TO UNIT NAMEPLATE FOR MINIMUM  
CIRCUIT AMPACITY AND MAXIMUM  
OVERCURRENT PROTECTION SIZE.

LINE VOLTAGE FIELD INSTALLED	
HEATING-ELECTRIC	
ECB29-10,15,20,25-G	
ECB29-20,25-J	
AECB29-10,15,20-G	
1009	Supersedes
New Form No.	
531,708W	

## L-CBA27UHE with DEHUMIDIFICATION RELAY K183

### Operation Sequence

- 1-. If there is no dehumidification demand when 24 volts is applied to the system, the thermostat will send 24 volts to the K183 dehumidification relay coil. The normally-open relay contacts 5 and 9 will close and contacts 1 and 9 will open.
- 2-. If the total system static is higher than 0.49 in. w.g., a higher indoor blower speed may be needed to satisfy supply air requirements.
- 3-. The lower the indoor blower speed during dehumidification demands, without freezing the indoor coil, the better moisture removal will be. In Humiditrol® applications, this lower speed will increase the temperature rise on the Humiditrol® coil.
- 4-. When more than one motor tap is energized, built in logic gives the highest speed tap precedence.
- 5-. On a dehumidification call, the thermostat will remove 24 volt output from the "D" terminal; the "Y2" terminal (if available) becomes activated with 24 volts. This will de-energize K183 dehumidification relay and output 24 volts from Y2.

**NOTE - For any of the following configurations, refer to figure wiring diagram for proper system indoor blower fan speed tap selection.**

### Single Stage Systems

**Y1 cooling demand from the room thermostat with no dehumidification demand**—24 volts passes to the Y1 terminal on the coil blower. The factory jumper from Y1 and Y2 will direct the 24 volt signal through the closed set of contacts to the selected indoor blower cooling speed (factory set on Tap # 3 - white wire). Systems with total system statics between 0.50 and 0.80 in. w.g. may require a motor speed change.

**Y1 cooling demand with dehumidification demand**—K183 relay de-energizes. Contacts 5 and 9 open and isolate the cooling tap speed on the motor from the system. The room thermostat will still be calling for a Y1 demand, so 24 volts will still output from the Y1 and G terminals. The Y1 signal (factory jumpered to Y2 on the indoor unit's 24 volt terminal strip) will be isolated from the indoor blower motor by the opening of contacts 5 to 9 but the G signal will still be able to provide 24 volt power to the continuous indoor blower speed (factory set on Tap # 1 - green wire). Systems with total system statics between 0.50 and 0.80 in. w.g. may require a motor speed change.

### Two Stage Systems

**NOTE - Factory jumper wire between Y1 and Y2 on the indoor unit 24 volt terminal strip must be removed for two-stage systems.**

**Y1 cooling demand from the room thermostat with no dehumidification demand**—24 volts passes to the Y1 terminal on the coil blower. The Y1 demand will be isolated from the cooling tap speed on the indoor blower motor by removal of the jumper between Y1 and Y2 on the indoor unit's terminal strip on systems where the total system static is less than 0.50 in. w.g. The room thermostat outputs Y1 and G on a Y1 demand. The G signal from the room thermostat will still provide 24 volt power to the continuous indoor blower speed (factory set on Tap # 1 - green wire).

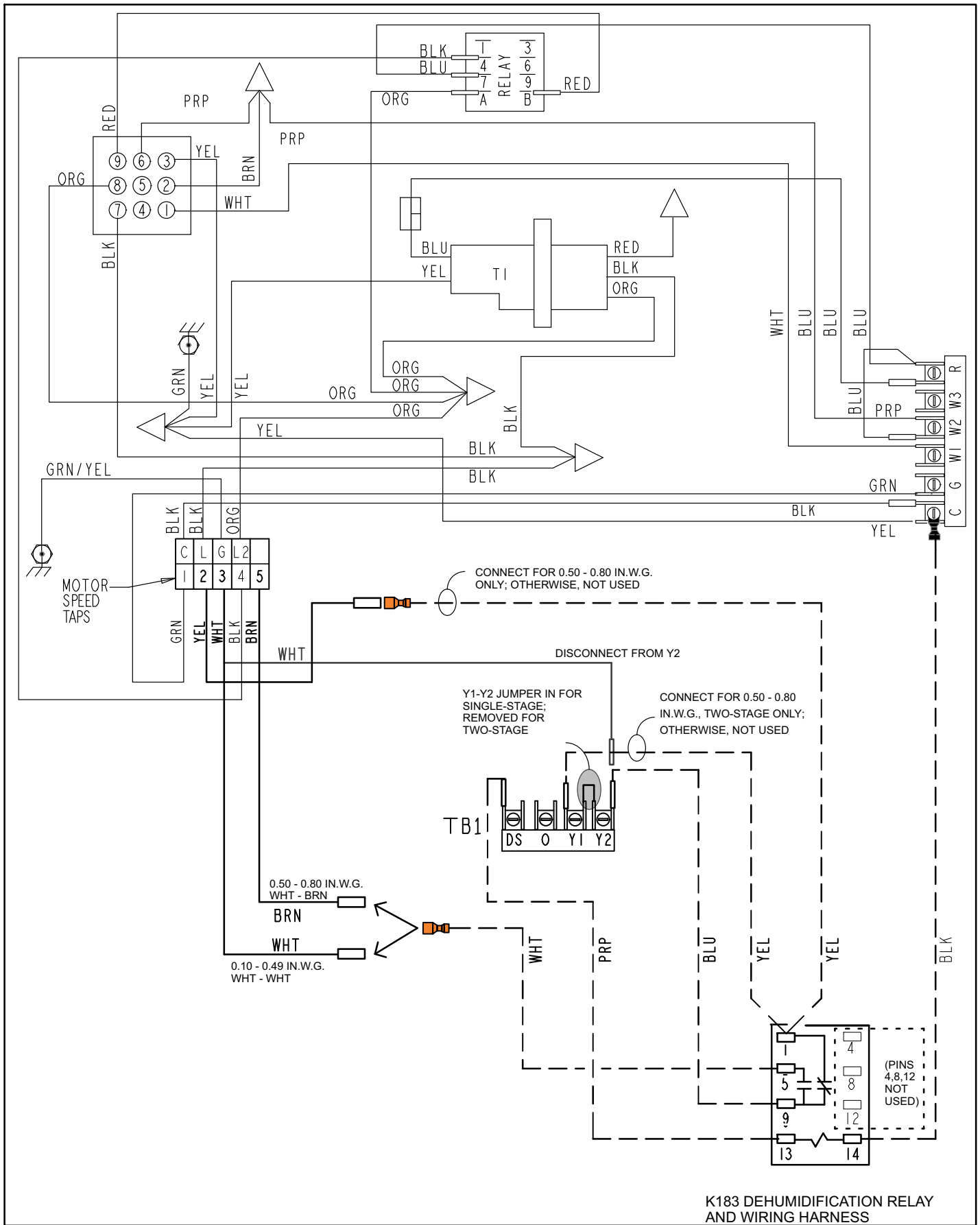
Systems with total system statics between 0.50 and 0.80 in. w.g. will require the yellow wires from the K183 relay terminal 1 to be connected to Y1 on the unit's indoor terminal strip and Tap # 2 (yellow from the indoor blower motor). The Y1 input from the indoor unit will allow the indoor blower motor to run on Tap # 2 - yellow wire.

The G signal from the room thermostat will still provide 24 volt power to the continuous indoor blower speed (factory set on Tap # 1 - green wire).

**Y2 cooling demand from the room thermostat with no dehumidification demand**—24 volts passes to the Y2 terminal on the coil blower. The Y2 demand will pass through closed relay contacts 5 and 9 to the selected indoor blower cooling speed (factory set on Tap # 3 - white wire). Systems with total system statics between 0.50 and 0.80 in. w.g. may require a motor speed change.

**Y1 or Y1/Y2 cooling demand with dehumidification demand**—K183 relay de-energizes and the room thermostat Y2 energizes. K183 relay contacts 5 and 9 will open and isolate the cooling blower speed on the motor from the system. The room thermostat will still be calling for a Y1, Y2, and G demand, so 24 volts will still be output to the terminal strip in the indoor coil blower. Y1 is not wired to the K183 relay, Y2 will send 24 volts through the K183 relay 9 to 1 closed contacts to the yellow wire that is not connected to the motor in systems where the total system static is less than 0.50 in. w.g. The G signal will still provide 24 volt power to motor Tap # 1 - Green wire. Indoor blower motor will run on Tap # 1 - Green wire. Systems with total system statics between 0.50 and 0.80 in. w.g. may require a motor speed change.

Systems with total system statics between 0.50 and 0.80 in. w.g. will require the yellow wires from the K183 relay terminal 1 to be connected to Y1 on the unit's indoor terminal strip and Tap # 2 - yellow from the indoor blower motor. The Y1 input from the indoor unit will allow the indoor blower motor to run on Tap # 2 - Yellow wire. The Y2 demand will go through K183 relay contacts 9 to 1 to indoor blower motor speed Tap # 2 - Yellow wire. The G signal will still provide 24 volt power to motor Tap # 1 - Green wire. The indoor blower motor will run on Tap # 2 - Yellow wire.



K183 DEHUMIDIFICATION RELAY AND WIRING HARNESS