TCA 15 through 25 ton

The TCA180S, 180H, 210S, 210H, 240S, 240H and 300S are available in one cabinet size with cooling capacities from 180,000 to 286,000 Btuh (45.7 to 83.8 kW).

Optional electric heat is field-installed in TCA units. Electric heat operates in single or multiple stages depending on the kW input size. 15kW to 60 kW heat sections are available for the TCA180S, 180H and 15 kW to 90 kW heat sections are available for the TCA210S, 240S, 210H, 240H and 300S. TCA180, 210S and 240S units utilize three compressors and TCA210H, 240H and 300S units utilize four.

All units are designed to accept any of several different energy management thermostat control systems with minimum field wiring.

Information contained in this manual is intended for use by qualified 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.

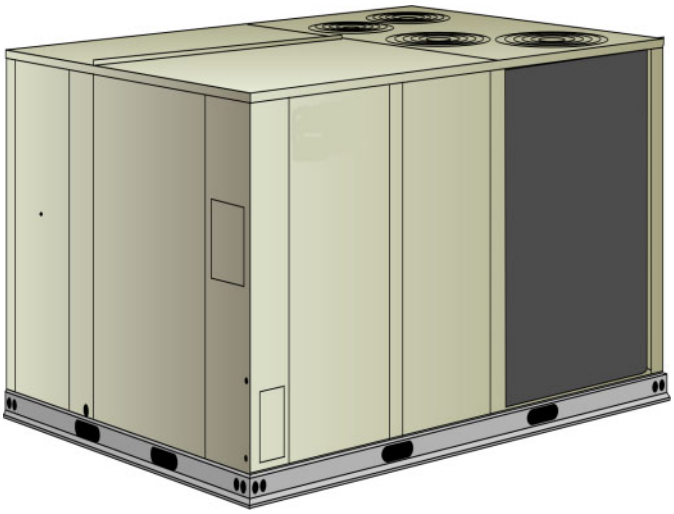
If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional installer or service agency.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.



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.

Table of Contents

Phone: (803) 738-4000

SPECIFICATIONS — 15 - 17.5 TON

General Data	Nominal Tonnage		15 Ton		17.5 Ton	
	Model No.		TCA180S2B	TCA180H2B	TCA210S2B	TCA210H2B
	Efficiency Type		Standard	High	Standard	High
Cooling Performance	Gross Cooling Capacity - Btuh (kW)		186,000 (54.5)	186,000 (54.5)	218,000 (63.8)	219,000 (64.1)
	[1] Net Cooling Capacity - Btuh (kW)		180,000 (52.7)	180,000 (52.7)	210,000 (61.5)	210,000 (61.5)
	ARI Rated Air Flow - cfm (L/s)		6000 (2830)	6000 (2830)	6700 (3160)	7000 (3305)
	Total Unit Power - kW		18.6	16.7	21.6	19.4
	[1] EER (Btuh/Watt)		9.7	10.8	9.7	10.8
	[2] Integrated Part Load Value (Btuh/Watt)		10.1	11.2	10.1	11.2
	Refrigerant Type		R-22	R-22	R-22	R-22
	Refrigerant Charge Furnished	Circuit 1	9 lbs. 0 oz. (4.08 kg)	11 lbs. 8 oz. (5.22 kg)	8 lbs. 0 oz. (3.63 kg)	11 lbs. 0 oz. (4.99 kg)
		Circuit 2	9 lbs. 0 oz. (4.08 kg)	11 lbs. 8 oz. (5.22 kg)	8 lbs. 0 oz. (3.63 kg)	11 lbs. 0 oz. (4.99 kg)
		Circuit 3	9 lbs. 0 oz. (4.08 kg)	11 lbs. 8 oz. (5.22 kg)	8 lbs. 0 oz. (3.63 kg)	11 lbs. 0 oz. (4.99 kg)
		Circuit 4	- - -	- - -	- - -	11 lbs. 0 oz. (4.99 kg)
Electric Heat Available			15, 30, 45 or 60 kW		15, 30, 45, 60 or 90 kW	
Compressor Type (no.)			Scroll (3)	Scroll (3)	Scroll (3)	Scroll (4)
Outdoor Coils	Net face area - sq. ft. (m^2) total		56.0 (5.2)	56.0 (5.2)	56.0 (5.2)	56.0 (5.2)
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)
	Number of rows		1	2	1	2
	Fins per inch (m)		20 (787)	20 (787)	20 (787)	20 (787)
Outdoor Coil Fans	Motor horsepower (W)		(4) 1/3 (249)	(4) 1/3 (249)	(4) 1/2 (373)	(4) 1/3 (249)
	Motor rpm		1075	1075	1075	1075
	Total Motor watts		1370	1395	1800	1395
	Diameter - in. (mm) - No. of blades		(4) 24 (610) - 3	(4) 24 (610) - 3	(4) 24 (610) - 3	(4) 24 (610) - 3
	Total Air volume - cfm (L/s)		15,850 (7480)	15,450 (7290)	16,000 (7550)	15,450 (7290)
Indoor Coils	Net face area - sq. ft. (m^2) total		22.3 (2.07)	22.3 (2.07)	22.3 (2.07)	22.3 (2.07)
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)	3/8 (9.5)	3/8 (9.5)
	No. of rows		3	3	3	4
	Fins per inch (m)		14 (551)	14 (551)	14 (551)	14 (551)
	Drain connection - number and size		(1) 1 in. NPT coupling			
	Expansion device type		Balanced Port Thermostatic Expansion Valve, removeable power head			
[3, 4] Indoor Blower and Drive Selection	Nominal motor HP	Low Static	3 hp (2.2 kW)	3 hp (2.2 kW)	5 hp (3.7 kW)	5 hp (3.7 kW)
		Standard Static	3 hp (2.2 kW)	3 hp (2.2 kW)	5 hp (3.7 kW)	5 hp (3.7 kW)
		High Static	5 hp (3.7 kW)	5 hp (3.7 kW)	7.5 hp (5.6 kW)	7.5 hp (5.6 kW)
	Max. usable motor output (US Only)	Low Static	3.45 hp (2.6 kW)	3.45 hp (2.6 kW)	5.75 hp (4.3 kW)	5.75 hp (4.3 kW)
		Standard Static	3.45 hp (2.6 kW)	3.45 hp (2.6 kW)	5.75 hp (4.3 kW)	5.75 hp (4.3 kW)
		High Static	5.75 hp (4.3 kW)	5.75 hp (4.3 kW)	8.63 hp (6.4 kW)	8.63 hp (6.4 kW)
	Drive Kit	Low Static	#A - 535-725 rpm	#A - 535-725 rpm	#2 - 685-865 rpm	#2 - 685-865 rpm
		Standard Static	#1 - 710-965 rpm	#1 - 710-965 rpm	#3 - 850-1045 rpm	#3 - 850-1045 rpm
		High Static	#4 - 945-1185 rpm	#4 - 945-1185 rpm	#6 - 1045-1285 rpm	#6 - 1045-1285 rpm
	Field Installed Drive Kits	Standard to Low Static	#A - 535-725 rpm	#A - 535-725 rpm	#2 - 685-865 rpm	#2 - 685-865 rpm
		High to Standard Static	#3 - 850-1045 rpm	#3 - 850-1045 rpm	#7 - 850-1045 rpm	#7 - 850-1045 rpm
Blower wheel nominal diameter x width			(2) 15 x 15 in. (381 x 381 mm)			
Filters	Type of filter		Disposable, pleated MERV 7			
	No. and size - in. (mm)		(6) 24 x 24 x 2 (610 x 610 x 51)			
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase			

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] Certified in accordance with the ULE certification program, which is based on ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

[2] Integrated Part Load Value tested at 80°F (27°C) outdoor air temperature.

[3] Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

[4] Stocked models are available with standard static drives. High static drives are factory installed (configure to order). Low static drive can be factory installed (configure to order) or standard static drives can be converted to low static with field installed kit. High static models can be converted to standard static with field installed kit.

SPECIFICATIONS — 20 - 25 TON

General Data			20 Ton		25 Ton
	Nominal Tonnage		20 Ton		25 Ton
	Model No.		TCA240S2B	TCA240H2B	TCA300S2B
	Efficiency Type		Standard	High	Standard
Cooling Performance	Gross Cooling Capacity - Btuh (kW)		243,000 (71.2)	251,000 (73.5)	302,000 (88.4)
	Net Cooling Capacity - Btuh (kW)		234,000 (68.5)	240,000 (70.3)	286,000 (83.7)
	ARI Rated Air Flow - cfm (L/s)		8000 (3775)	7500 (3540)	9000 (4245)
	Total Unit Power - kW		24.1	22.2	30.1
	[1] EER (Btuh/Watt)		9.7	10.8	9.5
	[3] Integrated Part Load Value (Btuh/Watt)		10.1	11.2	9.7
	Refrigerant Type		R-22	R-22	R-22
	Refrigerant Charge Furnished	Circuit 1	11 lbs. 8 oz. (5.22 kg)	11 lbs. 8 oz. (5.22 kg)	11 lbs. 0 oz. (4.99 kg)
		Circuit 2	11 lbs. 8 oz. (5.22 kg)	11 lbs. 8 oz. (5.22 kg)	11 lbs. 0 oz. (4.99 kg)
		Circuit 3	11 lbs. 8 oz. (5.22 kg)	11 lbs. 8 oz. (5.22 kg)	11 lbs. 0 oz. (4.99 kg)
		Circuit 4	- - -	11 lbs. 8 oz. (5.22 kg)	11 lbs. 0 oz. (4.99 kg)
Compressor Type (no.)			Scroll (3)	Scroll (4)	Scroll (4)
Electric Heat Available - See page 18 for capacities			15, 30, 45, 60 or 90 kW		
Outdoor Coils	Net face area - sq. ft. (m^2) total		56.0 (5.2)	56.0 (5.2)	56.0 (5.2)
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)	3/8 (9.5)
	Number of rows		2	2	2
	Fins per inch (m)		20 (787)	20 (787)	20 (787)
Outdoor Coil Fans	Motor horsepower (W)		(4) 1/3 (249)	(4) 1/3 (249)	(4) 1/2 (373)
	Motor rpm		1075	1075	1075
	Total Motor watts		1395	1395	1800
	Diameter - in. (mm) - No. of blades		(4) 24 (610) - 3	(4) 24 (610) - 3	(4) 24 (610) - 3
	Total Air volume - cfm (L/s)		15,450 (7290)	15,450 (7290)	16,000 (7550)
Indoor Coils	Net face area - sq. ft. (m^2) total		22.3 (2.07)	22.3 (2.07)	22.3 (2.07)
	Tube diameter - in. (mm)		3/8 (9.5)	3/8 (9.5)	3/8 (9.5)
	No. of rows		3	4	4
	Fins per inch (m)		14 (551)	14 (551)	14 (551)
	Drain connection - number & size		(1) 1 in. NPT coupling	(1) 1 in. NPT coupling	(1) 1 in. NPT coupling
	Expansion device type		Balanced Port Thermostatic Expansion Valve, removeable power head		
[4, 5] **Indoor Blower and Drive Selection**	Nominal motor HP	Low Static	5 hp (3.7 kW)	5 hp (3.7 kW)	7.5 hp (5.6 kW)
		Standard Static	7.5 hp (5.6 kW)	7.5 hp (5.6 kW)	10 hp (7.5 kW)
		High Static	10 hp (7.5 kW)	10 hp (7.5 kW)	N/A
	Max. usable motor output (US Only)	Low Static	5.75 hp (4.3 kW)	5.75 hp (4.3 kW)	8.63 hp (6.4 kW)
		Standard Static	8.63 hp (6.4 kW)	8.63 hp (6.4 kW)	11.5 hp (8.6 kW)
		High Static	11.5 hp (8.6 kW)	11.5 hp (8.6 kW)	N/A
	Drive Kit	Low Static	#2 - 685- 865 rpm	#2 - 685-865 rpm	#7 - 850-1045 rpm
		Standard Static	#7 - 850-1045 rpm	#7 - 850-1045 rpm	#6 - 1045-1285 rpm
		High Static	#6 - 1045-1285 rpm	#6 - 1045-1285 rpm	N/A
	Field Installed Low Static Drive Kit		#9 - 685-865 rpm	#9 - 685-865 rpm	#7 - 850-1045 rpm
Blower wheel nominal diameter x width			(2) 15 x 15 in. (381 x 381 mm)		
Filters	Type of filter		Disposable, pleated MERV 7		
	No. and size - in. (mm)		(6) 24 x 24 x 2 (610 x 610 x 51)		
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase		

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] Certified in accordance with the ULE certification program, which is based on ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

[2] Tested at conditions included in with ARI Standard 340/360; 95°F (35°C) outdoor air temperature and 80°F (27°C) db/67°F (19°C) wb entering evaporator air; minimum external duct static pressure.

[3] Integrated Part Load Value tested at 80°F (27°C) outdoor air temperature.

[4] Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

[5] Stocked models are available with standard static drives. High static drives are factory installed (configure to order). Low static drive can be factory installed (configure to order) or standard static drives can be converted to low static with field installed kit.

BLOWER DATA — 15 TON

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT WITH WET INDOOR COIL & AIR FILTERS IN PLACE.
FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (electric heat, economizer, etc.). See table below
2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.). See page 17

Then determine from table the blower motor output and drive required.

0.40 to 1.50 in. w.g. — **TCA180**

Air Volume cfm	External Static (in. w.g.)																					
	0.40		0.50		0.60		0.70		0.80		0.90		1.00		1.10		1.20		1.30		1.40		1.50	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Low Static – 3 HP, Drive Kit A								Standard Static – 3 HP, Drive Kit 1															
4800	577	1.13	620	1.31	662	1.48	702	1.66	742	1.83	777	2.01	811	2.18	842	2.36	872	2.54	902	2.72	932	2.89	960	3.07
5000	585	1.25	628	1.43	670	1.60	710	1.78	750	1.95	783	2.13	815	2.30	848	2.50	880	2.70	910	2.88	940	3.05	968	3.23
5500	605	1.45	648	1.65	690	1.85	728	2.05	765	2.25	800	2.45	835	2.65	865	2.85	895	3.05	925	3.25	955	3.45	983	3.65
6000	630	1.75	670	1.95	710	2.15	748	2.38	785	2.60	818	2.83	850	3.05	880	3.25	910	3.45	**940**	**3.68**	970	3.90	998	4.13
6500	650	2.05	690	2.28	730	2.50	768	2.75	805	3.00	838	3.23	870	3.45	**900**	**3.70**	**930**	**3.95**	**958**	**4.18**	985	4.40	1013	4.63
7000	675	2.35	715	2.63	755	2.90	790	3.15	825	3.40	**858**	**3.68**	**890**	**3.95**	**920**	**4.20**	**950**	**4.45**	978	4.70	1005	4.95	1030	5.18
7200	687	2.55	725	2.81	763	3.06	798	3.33	**833**	**3.60**	**866**	**3.86**	**898**	**4.11**	**926**	**4.36**	**954**	**4.61**	984	4.90	1013	5.19	1038	5.44

NOTE - **Bold** - To operate in this range, unit must be ordered with High Static Drive and drive kit #3 must be ordered separately for field installation.

1.60 to 2.60 in. w.g. — **TCA180**

Air Volume cfm	External Static (in. w.g.)																					
	1.60		1.70		1.80		1.90		2.00		2.10		2.20		2.30		2.40		2.50		2.60	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	High Static – 5 HP, Drive Kit 4																		Field Furnished Drive			
4800	987	3.24	1014	3.42	1041	3.60	1064	3.78	1087	3.95	1112	4.13	1136	4.30	1159	4.50	1181	4.70	1204	4.88	1226	5.06
5000	995	3.40	1020	3.60	1045	3.80	1070	3.98	1095	4.15	1118	4.33	1140	4.50	1163	4.70	1185	4.90	1208	5.10	1230	5.30
5500	1010	3.85	1035	4.05	1060	4.25	1085	4.48	1110	4.70	1133	4.90	1155	5.10	1178	5.30	1200	5.50	1220	5.70	1240	5.90
6000	1025	4.35	1050	4.58	1075	4.80	1098	5.00	1120	5.20	1145	5.43	1170	5.65	1193	5.88	1215	6.10	1235	6.33	1255	6.55
6500	1040	4.85	1065	5.10	1090	5.35	1115	5.60	***1140***	***5.85***	***1163***	***6.08***	***1185***	***6.30***	1205	6.53	1225	6.75	1248	7.00	1270	7.25
7000	1055	5.40	1080	5.68	***1105***	***5.95***	***1130***	***6.20***	***1155***	***6.45***	***1178***	***6.70***	1200	6.95	1220	7.20	1240	7.45	1263	7.73	1285	8.00
7200	1063	5.68	***1088***	***5.94***	***1113***	***6.19***	***1136***	***6.44***	***1159***	***6.69***	***1182***	***6.96***	1204	7.23	1226	7.50	1248	7.77	1269	8.03	1289	8.28

NOTE - ***Bold, italics*** - drive is capable of the values noted but will exceed motor horsepower.

AIR RESISTANCE (in. w.g.) - Factory or Field Installed Options

Air Volume - cfm	Electric Heat	Economizer	Horizontal Roof Curb	MERV 11 Filter
4800	- - -	- - -	.08	.01
5000	- - -	- - -	.08	.01
5500	- - -	- - -	.10	.02
6000	.01	- - -	.11	.02
6500	.01	.02	.13	.02
7000	.01	.04	.15	.03
7200	.01	.05	.16	.03

BLOWER DATA 17.5 TON

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT WITH WET INDOOR COIL & AIR FILTERS IN PLACE.
FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (electric heat, economizer, etc.). See table below
2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.). See page 17

Then determine from table the blower motor output and drive required.

0.30 to 1.30 in. w.g. **TCA210**

Air Volume cfm	External Static (in. w.g.) Covered By Drive At Nominal Air With Economizer, Standard Filters And Wet Indoor Coil																					
	0.30		0.40		0.50		0.60		0.70		0.80		0.90		1.00		1.10		1.20		1.30	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field Furnished				Low Static – 5 HP, Drive Kit 2										Standard Static – 5 HP, Drive Kit 3							
5600	609	1.51	652	1.71	694	1.91	732	2.12	769	2.33	803	2.53	837	2.73	868	2.93	899	3.13	928	3.33	957	3.53
6000	630	1.75	670	1.95	710	2.15	748	2.38	785	2.60	818	2.83	850	3.05	880	3.25	910	3.45	940	3.68	970	3.90
6500	650	2.05	690	2.28	730	2.50	768	2.75	805	3.00	838	3.23	870	3.45	900	3.70	930	3.95	958	4.18	985	4.40
7000	675	2.35	715	2.63	755	2.90	790	3.15	825	3.40	858	3.68	890	3.95	920	4.20	950	4.45	978	4.70	1005	4.95
7500	700	2.75	738	3.03	775	3.30	810	3.58	845	3.85	878	4.15	910	4.45	938	4.70	965	4.95	993	5.23	1020	5.50
8000	725	3.20	763	3.50	800	3.80	833	4.08	865	4.35	898	4.65	930	4.95	958	5.23	985	5.50	**1013**	**5.80**	**1040**	**6.10**
8400	746	3.55	783	3.87	819	4.18	853	4.49	886	4.80	916	5.12	946	5.43	974	5.73	**1001**	**6.03**	**1029**	**6.35**	1056	6.66

NOTE - **Bold** - To operate in this range, unit must be ordered with High Static Drive and drive kit #7 must be ordered separately for field installation.

1.40 to 2.50 in. w.g. **TCA210**

Air Volume cfm	External Static (in. w.g.) Covered By Drive At Nominal Air With Economizer, Standard Filters And Wet Indoor Coil																					
	1.40		1.50		1.60		1.70		1.80		1.90		2.00		2.10		2.20		2.30		2.40		2.50	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static – 5 HP, Drive Kit 3								High Static – 7.5 HP, Drive Kit 6													
5600	985	3.74	1012	3.95	1037	4.15	1062	4.35	1087	4.58	1112	4.80	1135	5.00	1157	5.20	1180	5.41	1202	5.62	1223	5.83	1244	6.04
6000	998	4.13	1025	4.35	1050	4.58	1075	4.80	1098	5.00	1120	5.20	1145	5.43	1170	5.65	1193	5.88	1215	6.10	1235	6.33	1255	6.55
6500	1013	4.63	1040	4.85	1065	5.10	1090	5.35	1115	5.60	1140	5.85	1163	6.08	1185	6.30	1205	6.53	1225	6.75	1248	7.00	1270	7.25
7000	1030	5.18	1055	5.40	1080	5.68	1105	5.95	1130	6.20	1155	6.45	1178	6.70	1200	6.95	1220	7.20	1240	7.45	1263	7.73	1285	8.00
7500	1048	5.78	1075	6.05	1100	6.33	1125	6.60	1148	6.88	1170	7.15	1193	7.40	1215	7.65	1238	7.95	1260	8.25	1280	8.50	*1300*	*8.75*
8000	1065	6.40	1090	6.70	1115	6.98	1140	7.25	1163	7.55	1185	7.85	1208	8.13	1230	8.40	***1253***	***8.70***	***1275***	***9.00***	*1295*	*9.30*	*1315*	*9.60*
8400	1081	6.96	1106	7.26	1131	7.58	1156	7.89	1179	8.19	1201	8.49	***1224***	***8.79***	***1246***	***9.09***	***1266***	***9.38***	*1286*	*9.67*	*1307*	*9.98*	*1328*	*10.29*

NOTE - ***Bold, italics*** - drive is capable of the values noted but will exceed motor horsepower.
Italics - field furnished drive

AIR RESISTANCE (in. w.g.) - Factory Installed Options

Air Volume - cfm	Electric Heat	Economizer	Horizontal Roof Curb	MERV 11 Filter
5600	- - -	- - -	.10	.02
6000	.01	- - -	.11	.02
6500	.01	.02	.13	.02
7000	.01	.04	.15	.03
7500	.01	.06	.17	.03
8000	.02	.09	.19	.04
8400	.02	.11	.21	.04

BLOWER DATA — 20 TON

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT WITH WET INDOOR COIL & AIR FILTERS IN PLACE.
FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (electric heat, economizer, etc.). See table below
2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.). See page 17

Then determine from table the blower motor output and drive required.

0.30 to 1.30 in. w.g. — **TCA240**

Air Volume cfm	External Static (in. w.g.) Covered By Drive At Nominal Air With Economizer, Standard Filters And Wet Indoor Coil																					
	0.30		0.40		0.50		0.60		0.70		0.80		0.90		1.00		1.10		1.20		1.30	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
			Low Static – 5 HP, Drive Kit 2										Standard Static – 7.5 HP, Drive Kit 7									
6400	648	1.99	688	2.22	727	2.46	764	2.69	801	2.92	834	3.15	866	3.39	896	3.62	926	3.85	954	4.08	981	4.30
7000	675	2.35	715	2.63	755	2.90	790	3.15	825	3.40	858	3.68	890	3.95	920	4.20	950	4.45	978	4.70	1005	4.95
7500	700	2.75	738	3.03	775	3.30	810	3.58	845	3.85	878	4.15	910	4.45	938	4.70	965	4.95	993	5.23	1020	5.50
8000	725	3.20	763	3.50	800	3.80	833	4.08	865	4.35	898	4.65	930	4.95	958	5.23	985	5.50	1013	5.80	1040	6.10
8500	750	3.65	788	3.98	825	4.30	858	4.60	890	4.90	920	5.23	950	5.55	978	5.85	1005	6.15	1033	6.48	1060	6.80
9000	780	4.20	815	4.53	850	4.85	880	5.18	910	5.50	940	5.83	970	6.15	998	6.48	1025	6.80	1053	7.15	1080	7.50
9600	811	4.87	845	5.22	879	5.57	910	5.94	941	6.31	970	6.67	999	7.02	1027	7.38	1054	7.74	1079	8.08	1104	8.41

1.40 to 2.50 in. w.g. — **TCA240**

Air Volume cfm	External Static (in. w.g.) Covered By Drive At Nominal Air With Economizer, Standard Filters And Wet Indoor Coil																					
	1.40		1.50		1.60		1.70		1.80		1.90		2.00		2.10		2.20		2.30		2.40		2.50	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static				High Static – 10 HP, Drive Kit 6																			
6400	1008	4.53	1035	4.75	1060	4.98	1085	5.22	1110	5.45	1135	5.68	1157	5.91	1180	6.15	1202	6.40	1225	6.65	1246	6.88	1268	7.11
7000	1030	5.18	1055	5.40	1080	5.68	1105	5.95	1130	6.20	1155	6.45	1178	6.70	1200	6.95	1220	7.20	1240	7.45	1263	7.73	1285	8.00
7500	1048	5.78	1075	6.05	1100	6.33	1125	6.60	1148	6.88	1170	7.15	1193	7.40	1215	7.65	1238	7.95	1260	8.25	1280	8.50	*1300*	*8.75*
8000	1065	6.40	1090	6.70	1115	6.98	1140	7.25	1163	7.55	1185	7.85	1208	8.13	1230	8.40	1253	8.70	1275	9.00	*1295*	*9.30*	*1315*	*9.60*
8500	1085	7.10	1110	7.40	1135	7.73	1160	8.05	1183	8.35	1205	8.65	1228	8.95	1250	9.25	1270	9.55	*1290*	*9.85*	*1310*	*10.15*	*1330*	*10.45*
9000	1105	7.83	1130	8.15	1153	8.45	1175	8.75	1198	9.08	1220	9.40	1243	9.75	1265	10.10	*1288*	*10.45*	*1310*	*10.80*	*1330*	*11.10*	*1350*	*11.40*
9600	1129	8.77	1154	9.13	1177	9.46	1199	9.78	1222	10.14	1244	10.50	1267	10.87	*1289*	*11.23*	- - -		- - -		- - -		- - -	

NOTE - *italics* - field furnished drive.

AIR RESISTANCE (in. w.g.) - Factory Installed Options

Air Volume - cfm	Electric Heat	Economizer	Horizontal Roof Curb	MERV 11 Filter
6400	.01	.02	.13	.02
7000	.01	.04	.15	.03
7500	.01	.06	.17	.03
8000	.02	.09	.19	.04
8500	.02	.11	.21	.04
9000	.04	.14	.24	.04
9600	.05	.16	.26	.05

BLOWER DATA — 25 TON

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT WITH WET INDOOR COIL & AIR FILTERS IN PLACE.
FOR ALL UNITS ADD:

1 - Any factory installed options air resistance (electric heat, economizer, etc.). See table below
2 - Any field installed accessories air resistance (duct resistance, diffuser, etc.). See page 17

Then determine from table the blower motor output and drive required.

0.0 to 1.10 in. w.g. — **TCA300S**

Air Volume cfm	External Static (in. w.g.) Covered By Drive At Nominal Air With Economizer, Standard Filters And Wet Indoor Coil																					
	0.0		0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80		0.90		1.00		1.10	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field Furnished Drive								Low Static – 7.5 HP, Drive Kit 7														Standard Static	
8000	725	3.20	763	3.50	800	3.80	833	4.08	865	4.35	898	4.65	930	4.95	958	5.23	985	5.50	1013	5.80	1040	6310	1065	6.40
8500	750	3.65	788	3.98	825	4.30	858	4.60	890	4.90	920	5.23	950	5.55	978	5.85	1005	6.15	1033	6.48	1060	6.80	1085	7.10
9250	790	4.45	825	4.80	860	5.15	893	5.50	925	5.85	955	6.20	985	6.55	1013	6.88	1040	7.20	1065	7.53	1090	7.85	1115	8.20
10000	835	5.40	868	5.78	900	6.15	930	6.50	960	6.85	988	7.23	1015	7.60	1043	7.98	1070	8.35	1095	8.70	1120	9.05	1145	9.43
10750	875	6.40	908	6.83	940	7.25	970	7.65	1000	8.05	1028	8.45	1055	8.85	1080	9.25	1105	9.65	1130	10.05	1155	10.45	1178	10.83
11500	915	7.40	948	7.88	980	8.35	**1010**	**8.80**	**1040**	**9.25**	1068	9.68	1095	10.10	1118	10.53	1140	10.95	1165	11.40	***1190***	***11.85***	***1210***	***12.23***
12000	935	7.95	963	8.35	**990**	**8.75**	**1020**	**9.23**	1050	9.70	1075	10.15	1100	10.60	1125	10.98	1150	11.35	***1173***	***11.80***	***1195***	***12.25***		

NOTE - ***Bold, italics*** - drive is capable of the values noted but will exceed motor horsepower.
Bold - To operate in this range, unit must be ordered with Standard Static Drive and drive kit #7 must be ordered separately for field installation.

1.20 to 2.20 in. w.g. — **TCA300S**

Air Volume cfm	External Static (in. w.g.) Covered By Drive At Nominal Air With Economizer, Standard Filters And Wet Indoor Coil																			
	1.20		1.30		1.40		1.50		1.60		1.70		1.80		1.90		2.00		2.10		2.20	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static – 10 HP, Drive Kit 6																		Field Furnished Drive			
8000	1090	6.70	1115	6.98	1140	7.25	1163	7.55	1185	7.85	1208	8.13	1230	8.40	1253	8.70	1275	9.00	1295	9.30	1315	9.60
8500	1110	7.40	1135	7.73	1160	8.05	1183	8.35	1205	8.65	1228	8.95	1250	9.25	1270	9.25	1290	9.85	1310	10.15	1330	10.45
9250	1140	8.55	1163	8.88	1185	9.20	1208	9.53	1230	9.85	1253	10.20	1275	10.55	1295	10.55	1315	11.20	- - -		- - -	
10000	1170	9.80	1193	10.15	1215	10.50	1238	10.88	1260	11.25	1283	11.62	- - -		- - -		- - -		- - -		- - -	
10750	1200	11.20	1222	11.57	- - -		- - -		- - -		- - -		- - -		- - -		- - -		- - -		- - -	
11500	***1230***	***12.60***	- - -		- - -		- - -		- - -		- - -		- - -		- - -		- - -		- - -		- - -	

AIR RESISTANCE (in. w.g.) - Factory Installed Options

Air Volume - cfm	Electric Heat	Economizer	Horizontal Roof Curb	MERV 11 Filter
8000	.02	.09	.13	.04
8500	.02	.11	.15	.04
9250	.04	.15	.18	.05
10,000	.06	.19	.21	.06
10,750	.10	.23	.25	.06
11,000	.11	.25	.27	.07

BLOWER DATA

CEILING DIFFUSER AIR RESISTANCE

Air Volume		Step-Down Diffuser												Flush Diffuser			
		RTD11-185						RTD11-275						FD11-185		FD11-275	
		2 Ends Open		1 Side/2 Ends Open		All Ends & Sides Open		2 Ends Open		1 Side/2 Ends Open		All Ends & Sides Open					
cfm	L/s	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa	in. w.g.	Pa
5000	2360	.51	127	.44	109	.39	97	- - -	- - -	- - -	- - -	- - -	- - -	.27	67	- - -	- - -
5200	2455	.56	139	.48	119	.42	104	- - -	- - -	- - -	- - -	- - -	- - -	.30	75	- - -	- - -
5400	2550	.61	152	.52	129	.45	112	- - -	- - -	- - -	- - -	- - -	- - -	.33	82	- - -	- - -
5600	2645	.66	164	.56	139	.48	119	- - -	- - -	- - -	- - -	- - -	- - -	.36	90	- - -	- - -
5800	2735	.71	177	.59	147	.51	127	- - -	- - -	- - -	- - -	- - -	- - -	.39	97	- - -	- - -
6000	2830	.76	189	.63	157	.55	137	.36	90	.31	77	.27	67	.42	104	.29	72
6200	2925	.80	199	.68	169	.59	147	- - -	- - -	- - -	- - -	- - -	- - -	.46	114	- - -	- - -
6400	3020	.86	214	.72	179	.63	157	- - -	- - -	- - -	- - -	- - -	- - -	.50	124	- - -	- - -
6500	3065	- - -	- - -	- - -	- - -	- - -	- - -	.42	104	.36	90	.31	77	- - -	- - -	.34	85
6600	3115	.92	229	.77	191	.67	167	- - -	- - -	- - -	- - -	- - -	- - -	.54	134	- - -	- - -
6800	3210	.99	246	.83	206	.72	174	- - -	- - -	- - -	- - -	- - -	- - -	.58	144	- - -	- - -
7000	3305	1.03	256	.87	216	.76	189	.49	122	.41	102	.36	90	.62	154	.40	99
7200	3400	1.09	271	.92	229	.80	199	- - -	- - -	- - -	- - -	- - -	- - -	.66	164	- - -	- - -
7400	3490	1.15	286	.97	241	.84	209	- - -	- - -	- - -	- - -	- - -	- - -	.70	174	- - -	- - -
7500	3540	- - -	- - -	- - -	- - -	- - -	- - -	.51	127	.46	114	.41	102	- - -	- - -	.45	112
7600	3585	1.20	301	1.02	254	.88	219	- - -	- - -	- - -	- - -	- - -	- - -	.74	184	- - -	- - -
8000	3775	- - -	- - -	- - -	- - -	- - -	- - -	.59	147	.49	122	.43	107	- - -	- - -	.50	124
8500	4010	- - -	- - -	- - -	- - -	- - -	- - -	.69	172	.58	144	.50	124	- - -	- - -	.57	142
9000	4245	- - -	- - -	- - -	- - -	- - -	- - -	.79	196	.67	167	.58	144	- - -	- - -	.66	164
9500	4485	- - -	- - -	- - -	- - -	- - -	- - -	.89	221	.75	186	.65	162	- - -	- - -	.74	184
10,000	4720	- - -	- - -	- - -	- - -	- - -	- - -	1.00	249	.84	209	.73	182	- - -	- - -	.81	201
10,500	4955	- - -	- - -	- - -	- - -	- - -	- - -	1.10	273	.92	229	.80	199	- - -	- - -	.89	221
11,000	5190	- - -	- - -	- - -	- - -	- - -	- - -	1.21	301	1.01	251	.88	219	- - -	- - -	.96	239

POWER EXHAUST FANS

Return Duct Negative Static Pressure		Air Volume Exhausted	
in. w.g.	Pa	cfm	L/s
0	0	8630	4070
0.05	12	8210	3875
0.10	25	7725	3645
0.15	37	7110	3355
0.20	50	6470	3055
0.25	62	5790	2730
0.30	75	5060	2390
0.35	87	4300	2030
0.40	100	3510	1655
0.45	112	2690	1270
0.50	125	1840	870

BLOWER DATA

CEILING DIFFUSER AIR THROW DATA

Model No.	Air Volume		[1] Effective Throw Range			
			Step-Down		Flush	
	cfm	L/s	ft.	m	ft.	m
	Diffuser Model		RTD11-185		FD11-185	
180 Models	5600	2645	39 - 49	12 - 15	28 - 37	9 - 11
	5800	2740	42 - 51	13 - 16	29 - 38	9 - 12
	6000	2830	44 - 54	13 - 17	40 - 50	12 - 15
	6200	2925	45 - 55	14 - 17	42 - 51	13 - 16
	6400	3020	46 - 55	14 - 17	53 - 52	13 - 16
	6600	3115	57 - 56	14 - 17	45 - 56	14 - 17

Model No.	Air Volume		[1] Effective Throw Range			
			Step-Down		Flush	
	cfm	L/s	ft.	m	ft.	m
	Diffuser Model		RTD11-275		FD11-275	
210, 240, 300S Models	7200	3400	33 - 38	10 - 12	26 - 35	8 - 11
	7400	3490	35 - 40	11 - 12	28 - 37	9 - 11
	7600	3585	36 - 41	11 - 13	29 - 38	9 - 12
	7800	3680	38 - 43	11 - 13	40 - 50	12 - 15
	8000	3775	39 - 44	12 - 13	42 - 51	13 - 16
	8200	3870	41 - 46	12 - 14	43 - 52	13 - 16
	8400	3965	43 - 49	13 - 15	44 - 54	13 - 17
	8600	4060	44 - 50	13 - 15	46 - 57	14 - 17
	8800	4155	47 - 55	14 - 17	48 - 59	15 - 18

[1] Throw is the horizontal or vertical distance an airstream travels on leaving the outlet or diffuser before the maximum velocity is reduced to 50 ft. (15 m) per minute. Four sides open.

DRIVE KIT SPECIFICATIONS

Blower Motor Outputs				RPM Range							
Nominal hp	Maximum hp	Nominal kW	Maximum kW	Drive A	Drive 1	Drive 2	Drive 3	Drive 4	Drive 6	Drive 7	Drive 9
3	3.45	2.2	2.6	535-725	710-965	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
5	5.75	3.7	4.3	- - - -	- - - -	685-865	850-1045	945-1185	- - - -	- - - -	- - - -
7.5	8.63	5.6	6.4	- - - -	- - - -	- - - -	- - - -	- - - -	1045-1285	850-1045	685-865
10	11.5	7.5	8.6	- - - -	- - - -	- - - -	- - - -	- - - -	1045-1285	- - - -	- - - -

*Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished by manufacturer are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

MANUFACTURER'S NUMBERS

		DRIVE COMPONENTS									
		RPM		ADJUSTABLE SHEAVE		FIXED SHEAVE		BELTS		SPLIT BUSHING	
Drive No.	H.P.	Min	Max	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.
A	2 & 3	535	725	1VP40x7/8	79J0301	BK95 x 1-7/16	80K1601	BX59	59A5001	N/A	N/A
1	3	710	965	1VP40x7/8	79J0301	BK72 x 1-7/16	100244-13	BX56	100245-11	N/A	N/A
2	3 & 5 High	685	865	1VP50x1-1/8	P-8-1977	BK100 x 1-7/16	39L1301	BX62	57A7701	N/A	N/A
3	5	850	1045	1VP65x1-1/8	100239-03	BK110H	100788-06	BX66	97J5901	H-1-7/16	49M6201
4	5	945	1185	1VP60x1-1/8	41C1301	BK90H x 1-7/16	100788-04	BX62	57A7701	H-1-7/16	49M6201
5	7.5	945	1185	1VP60x1-3/8	78L5501	BK90H x 1-7/16	100788-04	BX63	97J5501	H-1-7/16	49M6201
6	7.5	1045	1285	1VP65x1-3/8	78M7101	BK90H x 1-7/16	100788-04	BX64	97J5801	H-1-7/16	49M6201
6	10	1045	1285	1VP65x1-3/8	78M7101	1B5V86	78M8301	5VX760	100245-21	B-1-7/16	100246-01
7	7.5	850	1045	1VP65x1-3/8	78M7101	BK110H	100788-06	BX66	97J5901	H-1-7/16	49M6201
8	10	1135	1365	1VP65x1-3/8	78M7101	1B5V80	100240-05	5VX660	100245-20	B-1-7/16	100246-01

ELECTRIC HEAT CAPACITIES

Volts Input	15 kW			30 kW			45 kW			60 kW			90 kW		
	kW Input	Btuh Output	No. of Steps	kW Input	Btuh Output	No. of Steps	kW Input	Btuh Output	No. of Steps	kW Input	Btuh Output	No. of Steps	kW Input	Btuh Output	No. of Steps
208	11.3	38,600	1	22.5	76,800	1	33.8	115,300	2	45.0	153,600	2	67.6	230,700	2
220	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
230	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
240	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2
440	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
460	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
480	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2
550	12.6	43,000	1	25.2	86,000	1	37.8	129,000	2	50.4	172,000	2	75.6	258,000	2
575	13.8	47,100	1	27.5	93,900	1	41.3	141,000	2	55.1	188,000	2	82.7	282,200	2
600	15.0	51,200	1	30.0	102,400	1	45.0	153,600	2	60.0	204,800	2	90.0	307,100	2

ELECTRICAL/ELECTRIC HEAT DATA — TCA180S

Voltage - 60hz - 3 phase			208/230V			460V			575V		
Compressors (3)	Rated Load Amps each (total)		15.6 (46.8)			7.5 (22.5)			6 (18)		
	Locked Rotor Amps each (total)		124 (372)			59.6 (178.8)			49.4 (148.2)		
Outdoor Fan Motors (4)	Full Load Amps each (total)		2.4 (9.6)			1.3 (5.2)			1.0 (4.0)		
	Locked Rotor Amps each (total)		4.7 (18.8)			2.4 (9.6)			1.9 (7.6)		
Power Exhaust Fans (2)	Horsepower		1/3 (249)			1/3 (249)			1/3 (249)		
	Full Load Amps each (total)		4.8 (9.6)			2.6 (5.2)			2.0 (4.0)		
	Locked Rotor Amps each (total)		9.4 (18.8)			4.8 (9.6)			3.8 (7.2)		
Service Outlet 115V GFI			15 Amps			15 Amps			15 Amps		
Indoor Blower Motor	Horsepower		**3**	**5**	**7.5**	**3**	**5**	**7.5**	**3**	**5**	**7.5**
	Rated Load Amps		10.6	16.7	24.2	4.8	7.6	11	3.9	6.1	9
	Locked Rotor Amps		66	105	152	26.8	45.6	66	23.4	36.6	54
[1] **Minimum Circuit Ampacity**	with power exhaust	**0 kW**	76	82	90	37	40	44	30	32	35
		15 kW	76	82	90	37	40	44	30	32	35
		30 kW	110	118	127	55	58	63	44	47	50
		45 kW	155	163	172	77	81	85	62	65	68
		60 kW	164	172	181	82	85	90	66	68	72
	without power exhaust		71	77	85	35	38	41	28	30	33
[2] **Maximum Overcurrent Protection**	with power exhaust	**0 kW**	90	90	110	40	45	50	35	35	40
		15 kW	90	90	110	40	45	50	35	35	40
		30 kW	110	125	150	60	60	70	45	50	50
		45 kW	175	175	175	80	90	90	70	70	70
		60 kW	175	175	[3] 200	90	90	90	70	70	80
	without power exhaust		80	90	110	40	40	50	30	35	40
[4] **Unit Fuse Block**	with power exhaust		LAFB90A6		LAFB 110A8-2	LAFB 40A8	LAFB 45A8	LAFB 50A8	LAFB35A8		LAFB 40A8
	without power exhaust		LAFB 80A6	LAFB 90A6	LAFB 110A8-2	LAFB40A8		LAFB 50A8	LAFB 30A10	LAFB 35A8	LAFB 40A8
Disconnect		**0-30 kW**	T1DISC150-1			T1DISC080-1			T1DISC080-1		
		45 kW	T1DISC150-1		T1DISC250-1	T1DISC080-1			T1DISC080-1		
		60 kW	T1DISC250-1			T1DISC150-1			T1DISC080-1		
[4] **Electric Heat Control Kit**			T1EHKT01C-1Y			T1EHKT01C-1G			T1EHKT01C-1J		

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

1 HACR type breaker or fuse.

2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

3 Circuit breaker must be field provided.

4 Only used with electric heat.

ELECTRICAL/ELECTRIC HEAT DATA — TCA180H

Voltage - 60hz - 3 phase		208/230V			460V			575V		
Compressors (3)	Rated Load Amps each (total)	15.4 (46.2)			7.4 (22.2)			5.9 (17.7)		
	Locked Rotor Amps each (total)	124 (372)			59.6 (178.8)			49.4 (148.2)		
Outdoor Fan Motors (4)	Full Load Amps each (total)	2.4 (9.6)			1.3 (5.2)			1.0 (4.0)		
	Locked Rotor Amps each (total)	4.7 (18.8)			2.4 (9.6)			1.9 (7.6)		
Power Exhaust Fans (2)	Horsepower	1/3 (249)			1/3 (249)			1/3 (249)		
	Full Load Amps each (total)	4.8 (9.6)			2.6 (5.2)			2.0 (4.0)		
	Locked Rotor Amps each (total)	9.4 (18.8)			4.8 (9.6)			3.8 (7.2)		
Service Outlet 115V GFI		15 Amps			15 Amps			15 Amps		
Indoor Blower Motor	Horsepower	**3**	**5**	**7.5**	**3**	**5**	**7.5**	**3**	**5**	**7.5**
	Rated Load Amps	10.6	16.7	24.2	4.8	7.6	11	3.9	6.1	9
	Locked Rotor Amps	66	105	152	26.8	45.6	66	23.4	36.6	54
[1] **Minimum Circuit Ampacity**	with power exhaust **0 kW**	76	82	89	37	40	43	30	32	35
	15 kW	76	82	89	37	40	43	30	32	35
	30 kW	110	118	127	55	58	63	44	47	50
	45 kW	155	163	172	77	81	85	62	65	68
	60 kW	164	172	181	82	85	90	66	68	72
	without power exhaust	71	77	84	35	37	41	28	30	33
[2] **Maximum Overcurrent Protection**	with power exhaust **0 kW**	90	90	110	40	45	50	35	35	40
	15 kW	90	90	110	40	45	50	35	35	40
	30 kW	110	125	150	60	60	70	45	50	50
	45 kW	175	175	175	80	90	90	70	70	70
	60 kW	175	175	[3] 200	90	90	90	70	70	80
	without power exhaust	80	90	110	40	40	50	30	35	40
[4] **Unit Fuse Block**	with power exhaust	LAFB90A6		LAFB 110A8-2	LAFB 40A8	LAFB 45A8	LAFB 50A8	LAFB35A8		LAFB 40A8
	without power exhaust	LAFB 80A6	LAFB 90A6	LAFB 110A8-2	LAFB40A8		LAFB 50A8	LAFB 30A10	LAFB 35A8	LAFB 40A8
Disconnect	**0-30 kW**	T1DISC150-1			T1DISC080-1			T1DISC080-1		
	45 kW	T1DISC150-1		T1DISC250-1	T1DISC080-1			T1DISC080-1		
	60 kW	T1DISC250-1			T1DISC150-1			T1DISC080-1		
[4] **Electric Heat Control Kit**		T1EHKT01C-1Y			T1EHKT01C-1G			T1EHKT01C-1J		

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

1 HACR type breaker or fuse.

2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

3 Circuit breaker must be field provided.

4 Only used with electric heat.

ELECTRICAL/ELECTRIC HEAT DATA — TCA210S

Voltage - 60hz - 3 phase		208/230V			460V			575V		
Compressors (3)	Rated Load Amps each (total)	20.2 (60.6)			9.7 (29.1)			8 (24)		
	Locked Rotor Amps each (total)	156 (468)			75 (225)			54 (162)		
Outdoor Fan Motors (4)	Full Load Amps each (total)	3 (12)			1.5 (6)			1.2 (4.8)		
	Locked Rotor Amps each (total)	6 (24)			3 (12)			2.9 (11.6)		
Power Exhaust Fans (2)	Horsepower	1/3 (249)			1/3 (249)			1/3 (249)		
	Full Load Amps each (total)	4.8 (9.6)			2.6 (5.2)			2.0 (4.0)		
	Locked Rotor Amps each (total)	9.4 (18.8)			4.8 (9.6)			3.8 (7.2)		
Service Outlet 115V GFI		15 Amps			15 Amps			15 Amps		
Indoor Blower Motor	Horsepower	**3**	**5**	**7.5**	**3**	**5**	**7.5**	**3**	**5**	**7.5**
	Rated Load Amps	10.6	16.7	24.2	4.8	7.6	11	3.9	6.1	9
	Locked Rotor Amps	66	105	152	26.8	45.6	66	23.4	36.6	54
[4] **Unit Fuse Block**	with power exhaust	LAFB110A8-2		LAFB125A8-2	LAFB50A8		LAFB 60A9	LAFB 40A8	LAFB 45A8	LAFB 50A8
	without power exhaust	LAFB 100A6	LAFB 110A8-2	LAFB125A8-2	LAFB50A8			LAFB40A8		LAFB 45A8
[1] **Minimum Circuit Ampacity**	with power exhaust **0 kW**	94	100	107	45	48	52	37	39	42
	with power exhaust **15 kW**	94	100	107	45	48	52	37	39	42
	with power exhaust **30 kW**	110	118	127	55	58	63	44	47	50
	with power exhaust **45 kW**	155	163	172	77	81	85	62	65	68
	with power exhaust **60 kW**	164	172	181	82	85	90	66	68	72
	with power exhaust **90 kW**	236	244	253	118	122	126	94	97	101
	without power exhaust	89	95	102	43	46	49	35	37	40
[2] **Maximum Overcurrent Protection**	with power exhaust **0 kW**	110	110	125	50	50	60	40	45	50
	with power exhaust **15 kW**	110	110	125	50	50	60	40	45	50
	with power exhaust **30 kW**	110	125	150	60	60	70	45	50	50
	with power exhaust **45 kW**	175	175	175	80	90	90	70	70	70
	with power exhaust **60 kW**	175	175	[3] 200	90	90	90	70	70	80
	with power exhaust **90 kW**	[3] 250	[3] 250	[3] 300	125	125	150	100	100	110
	without power exhaust	100	110	125	50	50	50	40	40	45
Disconnect	**0-30 kW**	T1DISC150-1			T1DISC080-1			T1DISC080-1		
	45 kW	T1DISC150-1		T1DISC250-1	T1DISC080-1			T1DISC080-1		
	60 kW	T1DISC250-1			T1DISC150-1			T1DISC080-1		
	90 kW	N/A			T1DISC150-1			T1DISC150-1		
[4] **Electric Heat Control Kit**		T1EHKT01C-1Y			T1EHKT01C-1G			T1EHKT01C-1J		

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

1 HACR type breaker or fuse.

2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

3 Circuit breaker must be field provided.

4 Only used with electric heat.

ELECTRICAL/ELECTRIC HEAT DATA — TCA210H

Voltage - 60hz - 3 phase		208/230V			460V			575V		
Compressors (4)	Rated Load Amps each (total)	14.7 (58.8)			7.1 (28.4)			5.1 (20.4)		
	Locked Rotor Amps each (total)	91 (364)			50 (200)			37 (148)		
Outdoor Fan Motors (4)	Full Load Amps each (total)	2.4 (9.6)			1.3 (5.2)			1.0 (4.0)		
	Locked Rotor Amps each (total)	4.7 (18.8)			2.4 (9.6)			1.9 (7.6)		
Power Exhaust Fans (2)	Horsepower	1/3 (249)			1/3 (249)			1/3 (249)		
	Full Load Amps each (total)	4.8 (9.6)			2.6 (5.2)			2.0 (4.0)		
	Locked Rotor Amps each (total)	9.4 (18.8)			4.8 (9.6)			3.8 (7.2)		
Service Outlet 115V GFI		15 Amps			15 Amps			15 Amps		
Indoor Blower Motor	Horsepower	**3**	**5**	**7.5**	**3**	**5**	**7.5**	**3**	**5**	**7.5**
	Rated Load Amps	10.6	16.7	24.2	4.8	7.6	11	3.9	6.1	9
	Locked Rotor Amps	66	105	152	26.8	45.6	66	23.4	36.6	54
[1] Minimum Circuit Ampacity	with power exhaust **0 kW**	88	94	102	43	46	49	32	34	37
	15 kW	88	94	102	43	46	49	32	34	37
	30 kW	110	118	127	55	58	63	44	47	50
	45 kW	155	163	172	77	81	85	62	65	68
	60 kW	164	172	181	82	85	90	66	68	72
	90 kW	236	244	253	118	122	126	94	97	101
	without power exhaust	83	89	97	41	43	47	30	32	35
[2] Maximum Overcurrent Protection	with power exhaust **0 kW**	100	110	125	45	50	60	35	40	45
	15 kW	100	110	125	45	50	60	35	40	45
	30 kW	110	125	150	60	60	70	45	50	50
	45 kW	175	175	175	80	90	90	70	70	70
	60 kW	175	175	[3] 200	90	90	90	70	70	80
	90 kW	[3] 250	[3] 250	[3] 300	125	125	150	100	100	110
	without power exhaust	90	110	110	45	50	50	30	35	40
[4] Unit Fuse Block	with power exhaust	LAFB 100A6	LAFB 110A8-2	LAFB 125A8-2	LAFB 45A8	LAFB 50A8	LAFB 60A9	LAFB 35A8	LAFB 40A8	LAFB 45A8
	without power exhaust	LAFB 100A6	LAFB110A8-2		LAFB 45A8	LAFB50A8		LAFB 30A10	LAFB 35A8	LAFB 40A8
Disconnect	**0-30 kW**	T1DISC150-1			T1DISC080-1			T1DISC080-1		
	45 kW	T1DISC150-1	T1DISC250-1		T1DISC080-1			T1DISC080-1		
	60 kW	T1DISC250-1			T1DISC150-1			T1DISC080-1		
	90 kW	N/A			T1DISC150-1			T1DISC150-1		
[4] Electric Heat Control Kit		T1EHKT01C-1Y			T1EHKT01C-1G			T1EHKT01C-1J		

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

1 HACR type breaker or fuse.

2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

3 Circuit breaker must be field provided.

4 Only used with electric heat.

ELECTRICAL/ELECTRIC HEAT DATA — TCA240S

Voltage - 60hz - 3 phase			208/230V			460V			575V		
Compressors (3)	Rated Load Amps each (total)		22.4 (67.2)			10.9 (32.7)			8.3 (24.9)		
	Locked Rotor Amps each (total)		164 (492)			100 (300)			78 (234)		
Outdoor Fan Motors (4)	Full Load Amps each (total)		2.4 (9.6)			1.3 (5.2)			1 (4)		
	Locked Rotor Amps each (total)		4.7 (18.8)			2.4 (9.6)			7.9 (7.6)		
Power Exhaust Fans (2)	Horsepower		1/3 (249)			1/3 (249)			1/3 (249)		
	Full Load Amps each (total)		4.8 (9.6)			2.6 (5.2)			2.0 (4.0)		
	Locked Rotor Amps each (total)		9.4 (18.8)			4.8 (9.6)			3.8 (7.2)		
Service Outlet 115V GFI			15 Amps			15 Amps			15 Amps		
Indoor Blower Motor	Horsepower		**5**	**7.5**	**10**	**5**	**7.5**	**10**	**5**	**7.5**	**10**
	Rated Load Amps		16.7	24.2	30.8	7.6	11	14	6.1	9	11
	Locked Rotor Amps		105	152	193	45.6	66	84	36.6	54	66
[1] **Minimum Circuit Ampacity**	with power exhaust	**0 kW**	104	112	118	51	55	58	40	42	44
		15 kW	104	112	118	51	55	58	40	42	44
		30 kW	117	127	135	58	63	66	47	50	53
		45 kW	163	172	180	81	85	89	65	68	71
		60 kW	172	181	189	85	90	93	68	72	74
		90 kW	244	253	261	122	126	130	97	101	103
	without power exhaust		100	107	114	49	52	55	38	40	42
[2] **Maximum Overcurrent Protection**	with power exhaust	**0 kW**	125	125	150	60	60	70	45	50	50
		15 kW	125	125	150	60	60	70	45	50	50
		30 kW	125	150	150	60	70	70	50	50	60
		45 kW	175	175	[3] 200	90	90	90	70	70	80
		60 kW	175	[3] 200	[3] 200	90	90	100	70	80	80
		90 kW	[3] 250	[3] 300	[3] 300	125	150	150	100	110	110
	without power exhaust		110	125	125	50	60	60	45	45	50
[4] **Unit Fuse Block**	with power exhaust		LAFB125A8-2		LAFB 150A8-2	LAFB60A9		LAFB70A8	LAFB 45A8	LAFB50A8	
	without power exhaust		LAFB110A8	LAFB125A8-2		LAFB 50A8	LAFB60A9		LAFB45A8	LAFB50A8	
Disconnect		**0-30 kW**	T1DISC150-1			T1DISC080-1			T1DISC080-1		
		45 kW	T1DISC150-1	T1DISC250-1		T1DISC080-1	T1DISC150-1		T1DISC080-1		
		60 kW	T1DISC250-1			T1DISC150-1			T1DISC080-1	T1DISC150-1	
		90 kW	N/A			T1DISC150-1			T1DISC150-1		
[4] **Electric Heat Control Kit**			T1EHKT01C-1Y			T1EHKT01C-1G			T1EHKT01C-1J		

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

1 HACR type breaker or fuse.

2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

3 Circuit breaker must be field provided.

4 Only used with electric heat.

ELECTRICAL/ELECTRIC HEAT DATA — TCA240H

Voltage - 60hz - 3 phase			208/230V			460V			575V		
Compressors (4)	Rated Load Amps each (total)		17.3 (69.2)			9 (36)			7.1 (28.4)		
	Locked Rotor Amps each (total)		123 (492)			62 (248)			50 (200)		
Outdoor Fan Motors (4)	Full Load Amps each (total)		2.4 (9.6)			1.3 (5.2)			1 (4)		
	Locked Rotor Amps each (total)		4.7 (18.8)			2.4 (9.6)			1.9 (7.6)		
Power Exhaust Fans (2)	Horsepower		1/3 (249)			1/3 (249)			1/3 (249)		
	Full Load Amps each (total)		4.8 (9.6)			2.6 (5.2)			2.0 (4.0)		
	Locked Rotor Amps each (total)		9.4 (18.8)			4.8 (9.6)			3.8 (7.2)		
Service Outlet 115V GFI			15 Amps			15 Amps			15 Amps		
Indoor Blower Motor	Horsepower		**5**	**7.5**	**10**	**5**	**7.5**	**10**	**5**	**7.5**	**10**
	Rated Load Amps		16.7	24.2	30.8	7.6	11	14	6.1	9	11
	Locked Rotor Amps		105	152	193	45.6	66	84	36.6	54	66
[1] **Minimum Circuit Ampacity**	with power exhaust	**0 kW**	105	113	119	54	58	61	43	46	48
		15 kW	105	113	119	54	58	61	43	46	48
		30 kW	117	127	135	58	63	66	47	50	53
		45 kW	163	172	180	81	85	89	65	68	71
		60 kW	172	181	189	85	90	93	68	72	74
		90 kW	244	253	261	122	126	130	97	101	103
	without power exhaust		100	108	114	52	55	58	41	44	46
[2] **Maximum Overcurrent Protection**	with power exhaust	**0 kW**	110	125	150	60	60	70	45	50	50
		15 kW	110	125	150	60	60	70	45	50	50
		30 kW	125	150	150	60	70	70	50	50	60
		45 kW	175	175	[3] 200	90	90	90	70	70	80
		60 kW	175	[3] 200	[3] 200	90	90	100	70	80	80
		90 kW	[3] 250	[3] 300	[3] 300	125	150	150	100	110	110
	without power exhaust		110	125	125	60	60	70	45	50	50
[4] **Unit Fuse Block**	with power exhaust		LAFB110A8-2	LAFB 125A8-2	LAFB 150A8-2	LAFB60A9		LAFB70A8	LAFB 45A8	LAFB50A8	
	without power exhaust		LAFB110A8-2	LAFB125A8-2		LAFB60A9		LAFB70A8	LAFB 45A8	LAFB50A8	
Disconnect		**0-30 kW**	T1DISC150-1			T1DISC080-1			T1DISC080-1		
		45 kW	T1DISC150-1	T1DISC250-1		T1DISC080-1	T1DISC150-1		T1DISC080-1		
		60 kW	T1DISC250-1			T1DISC150-1			T1DISC080-1	T1DISC150-1	
		90 kW	N/A			T1DISC150-1			T1DISC150-1		
[4] **Electric Heat Control Kit**			T1EHKT01C-1Y			T1EHKT01C-1G			T1EHKT01C-1J		

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

1 HACR type breaker or fuse.

2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

3 Circuit breaker must be field provided.

4 Only used with electric heat.

ELECTRICAL/ELECTRIC HEAT DATA — TCA300

Voltage - 60hz - 3 phase			208/230V			460V			575V		
Compressors (4)	Rated Load Amps each (total)		18.6 (74.4)			9.6 (38.4)			7.8 (31.2)		
	Locked Rotor Amps each (total)		156 (624)			75 (300)			54 (216)		
Outdoor Fan Motors (4)	Full Load Amps each (total)		3 (12)			1.5 (6)			1.2 (4.8)		
	Locked Rotor Amps each (total)		6 (24)			3 (12)			2.9 (11.6)		
Power Exhaust Fans (2)	Horsepower		1/3 (249)			1/3 (249)			1/3 (249)		
	Full Load Amps each (total)		4.8 (9.6)			2.6 (5.2)			2.0 (4.0)		
	Locked Rotor Amps each (total)		9.4 (18.8)			4.8 (9.6)			3.8 (7.2)		
Service Outlet 115V GFI			15 Amps			15 Amps			15 Amps		
Indoor Blower Motor	Horsepower		**5**	**7.5**	**10**	**5**	**7.5**	**10**	**5**	**7.5**	**10**
	Rated Load Amps		16.7	24.2	30.8	7.6	11	14	6.1	9	11
	Locked Rotor Amps		105	152	193	45.6	66	84	36.6	54	66
[1] **Minimum Circuit Ampacity**	with power exhaust	**0 kW**	113	121	132	57	61	64	47	49	51
		15 kW	118	126	132	57	61	64	47	49	51
		30 kW	118	127	135	58	63	66	47	50	53
		45 kW	163	172	180	81	85	89	65	68	71
		60 kW	172	181	189	85	90	93	68	72	74
		90 kW	244	253	261	122	126	130	97	101	103
	without power exhaust		108	116	127	55	58	61	45	47	49
[2] **Maximum Overcurrent Protection**	with power exhaust	**0 kW**	125	150	150	60	70	70	50	50	60
		15 kW	125	150	150	60	70	70	50	50	60
		30 kW	125	150	150	60	70	70	50	50	60
		45 kW	175	175	[3] 200	90	90	90	70	70	80
		60 kW	175	[3] 200	[3] 200	90	90	100	70	80	80
		90 kW	[3] 250	[3] 300	[3] 300	125	150	150	100	110	110
	without power exhaust		125	125	150	60	60	70	50	50	60
[4] **Unit Fuse Block**	with power exhaust		LAFB 125A8-2	LAFB150A8-2		LAFB 60A9	LAFB70A8		LAFB50A8		LAFB60A9
	without power exhaust		LAFB125A8-2		LAFB 150A8-2	LAFB60A9		LAFB70A8	LAFB50A8		LAFB60A9
Disconnect		**0-30 kW**	T1DISC150-1			T1DISC080-1			T1DISC080-1		
		45 kW	T1DISC150-1	T1DISC250-1		T1DISC080-1	T1DISC150-1		T1DISC080-1		
		60 kW	T1DISC250-1			T1DISC150-1			T1DISC080-1	T1DISC150-1	
		90 kW	N/A			T1DISC150-1			T1DISC150-1		
[4] **Electric Heat Control Kit**			T1EHKT01C-1Y			T1EHKT01C-1G			T1EHKT01C-1J		

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

1 HACR type breaker or fuse.

2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

3 Circuit breaker must be field provided.

4 Only used with electric heat.

OPTIONS / ACCESSORIES

Item		180	210	240	300S
COOLING SYSTEM					
Compressor Crankcase Heater	208/230V - T1CCHT01CD1Y	x	x	x	x
	460V - T1CCHT01CD1G	x	x	x	x
	575V - T1CCHT01CD1J	x	x	x	x
Condensate Drain Trap	PVC - LTACDKP09/36	x	x	x	x
	Copper - LTACDKC09/36	x	x	x	x
Corrosion Protection		○	○	○	○
Efficiency	Standard	○	○	○	○
	High	○	○	○	
High Pressure Switch	T1SNSR11C-1	x	x	x	x
Low Ambient Kit	T1SNSR12C-1	x	x	x	x
ELECTRIC HEAT					
15 kW	EHA240-7.5 (order 1) and EHA240S-7.5 (order 1)	x	x	x	x
30 kW	EHA360-15 (order 1) and EHA360S-15 (order 1)	x	x	x	x
45 kW	EHA360-22.5 (order 2)	x	x	x	x
60 kW	EHA150-30 (order 2)	x	x	x	x
90 kW	EHA360-45 (order 2)		x	x	x
Electric Heat Control Kit	208/230V-3ph - T1EHKT01C-1Y	x	x	x	x
	460V-3ph - T1EHKT01C-1G	x	x	x	x
	575V-3ph - T1EHKT01C-1J	x	x	x	x
Unit Fuse Blocks	See Electric Heat Tables for Ordering Information				
AIR FILTERS					
MERV 11 High Efficiency	24 x 24 x 2 order 6 per unit - C1FLTR10C-1	x	x	x	x
Replaceable Media Filter Kit with Frame	24 x 24 x 2 order 6 per unit - C1FLTR30C-1	x	x	x	x
BLOWER – SUPPLY AIR – See Blower Data Tables for Specifications					
	Low Static Motor/Drive Combination	○	○	○	○
	Standard Static Motor/Drive Combination (stock unit)	○	○	○	○
	High Static Motor/Drive Combination	○	○	○	○
	[1] Standard to Low Static Conversion Kit - Drive Kit #A - C1DRKT044-1	x			
	[1] Standard to Low Static Conversion Kit - Drive Kit #2 - C1DRKT004-1		x		
	[1] Standard to Low Static Conversion Kit - Drive Kit #9 - C1DRKT045-1			x	
	[1] Standard to Low Static Conversion Kit - Drive Kit #7 - C1DRKT042-1				x
	[2] High to Standard Static Conversion Kit - Drive Kit #3 - C1DRKT038-1	x			
	[2] High to Standard Static Conversion Kit - Drive Kit #7 - C1DRKT042-1		x		
CONTROLS					
Control Systems	See Engineering Handbook	x	x	x	x
Blower Proving Switch	LTABPSK	x	x	x	x
Dirty Filter Switch	LTADFSK	x	x	x	x
Smoke Detector - Supply	LTASASDK10/36	x	x	x	x
Smoke Detector - Return	LTARASDK10/30	x	x	x	x

NOTE - The catalog and part numbers that appear here are for ordering field installed accessories only.
○ - Configure to Order (Factory Installed). Factory installed items are special order with extended lead times and must be ordered with the unit.
⊗ - Field Installed or Configure to Order (factory installed). Factory installed items are special order with extended lead times and must be ordered with the unit.
X - Field Installed.
[1] Standard static drive can be converted to low static drive with field installed kit.
[2] High static drive can be converted to standard static drive with field installed kit.

OPTIONS / ACCESSORIES

Item			180	210	240	300S
Indoor Air Quality (Co_2) Sensors						
CO_2 Sensor Duct Mounting Kit		LTIAQSDMK03/36	x	x	x	x
Sensor - white case CO_2 display		LTAIAQSWDK03/36	x	x	x	x
Sensor - white case no display		LTAIAQSWN03/36	x	x	x	x
Sensor - black case CO_2 display		LTAIAQSND03/36	x	x	x	x
Sensor - black case, no display		LTAIAQSDMBN03/36	x	x	x	x
Aspiration Box for duct mounting		LTIAQABD03/36	x	x	x	x
Handheld CO_2 Monitor		LTAIAQSHM03/36	x	x	x	x
ELECTRICAL						
Voltage		208/230V - 3 phase	○	○	○	○
60 hz		460V - 3 phase	○	○	○	○
		575V - 3 phase	○	○	○	○
HACR Circuit Breakers		T1HACR***-1 (***indicate size)	x	x	x	x
Disconnect Switch	See Electric Heat Tables for ordering information		x	x	x	x
GFI Service Outlets		LTAGFIK10/15	x	x	x	x
CABINET						
Coil Guards		C1GARD20C-1	x	x	x	x
Hail Guards		C1GARD10C-1	x	x	x	x
Horizontal Return Air Panel Kit		C1HRAP10C-1	x	x	x	x
Economizer / OUTDOOR AIR						
Economizer - Order Hood Separately		T1ECON10C-1	⊗	⊗	⊗	⊗
Economizer Controls						
Differential Enthalpy		C1SNSR07AE1-	x	x	x	x
Single Enthalpy		C1SNSR06AE1-	⊗	⊗	⊗	⊗
Sensible		TASEK03/36	x	x	x	x
Differential Sensible		TASEK03/36	[1]x	[1]x	[1]x	[1]x
Barometric Relief						
Down-Flow Barometric Relief Dampers - Order Hood Separately		LAGED18/24	⊗	⊗	⊗	⊗
Hood for Down-Flow LAGED		C1HOOD20C-1	x	x	x	x
Horizontal Barometric Relief Dampers - Hood Furnished		LAGEDH18/24	x	x	x	x
Outdoor Air Dampers / Hoods						
Damper Section (down-flow) - Automatic - Order Hood Separately		T1DAMP20C-1	⊗	⊗	⊗	⊗
Damper Section (down-flow) - Manual - Order Hood Separately		LAOAD18/24	⊗	⊗	⊗	⊗
Outdoor Air Hood (down-flow) includes 3 - 16 x 25 x 1 in. filters		C1HOOD10C-1	⊗	⊗	⊗	⊗
Power Exhaust						
Standard Static		208/230V - C1PWRE20C-1Y	x	x	x	x
		460V - C1PWRE20C-1G	x	x	x	x
		575V - C1PWRE20C-1J	x	x	x	x
ROOF CURBS						
Down-Flow - Cliplock 1000						
14 in. (356 mm) height		LARMF18/30S-14	x	x	x	x
18 in. (457 mm) height		LARMF18/30S-18	x	x	x	x
24 in. (610 mm) height		LARMF18/30S-24	x	x	x	x
Horizontal - Cliplock 1000						
26 in. (660 mm) height		LARMFH18/24S-26	x	x	x	x
37 in. (940 mm) height		LARMFH18/24S-37	x	x	x	x
Down-Flow - Standard						
14 in. (356 mm) height		LARMF18/36-14	x	x	x	x
24 in. (610 m) height		LARMF18/36-24	x	x	x	x
Horizontal - Standard						
26 in. (660 mm) height		LARMFH18/24-26	x	x	x	x
37 in. (940 mm) height		LARMFH18/24-37	x	x	x	x
Insulation Kits for Standard Horizontal Roof Curbs						
for LARMFH18/24-26		C1INSU11C-1	x	x	x	x
for LARMFH18/24-37		C1INSU13C-1	x	x	x	x
CEILING DIFFUSERS						
Step-Down		RTD11-185(S)	x			
Order one		RTD11-275(S)		x	x	x
Flush		FD11-150/180S or FD11-185	x			
Order one		FD11-275(S)		x	x	x
Transitions - (Supply and Return)		LASRT18(S)	x			
Order one		LASRT21/24(S)		x	x	x

⊗ - Field Installed or Configure to Order (factory installed). Factory installed items are special order with extended lead times and must be ordered with the unit.
X - Field Installed.
[1] - Order two each

TCA180/300 PARTS ARRANGEMENT

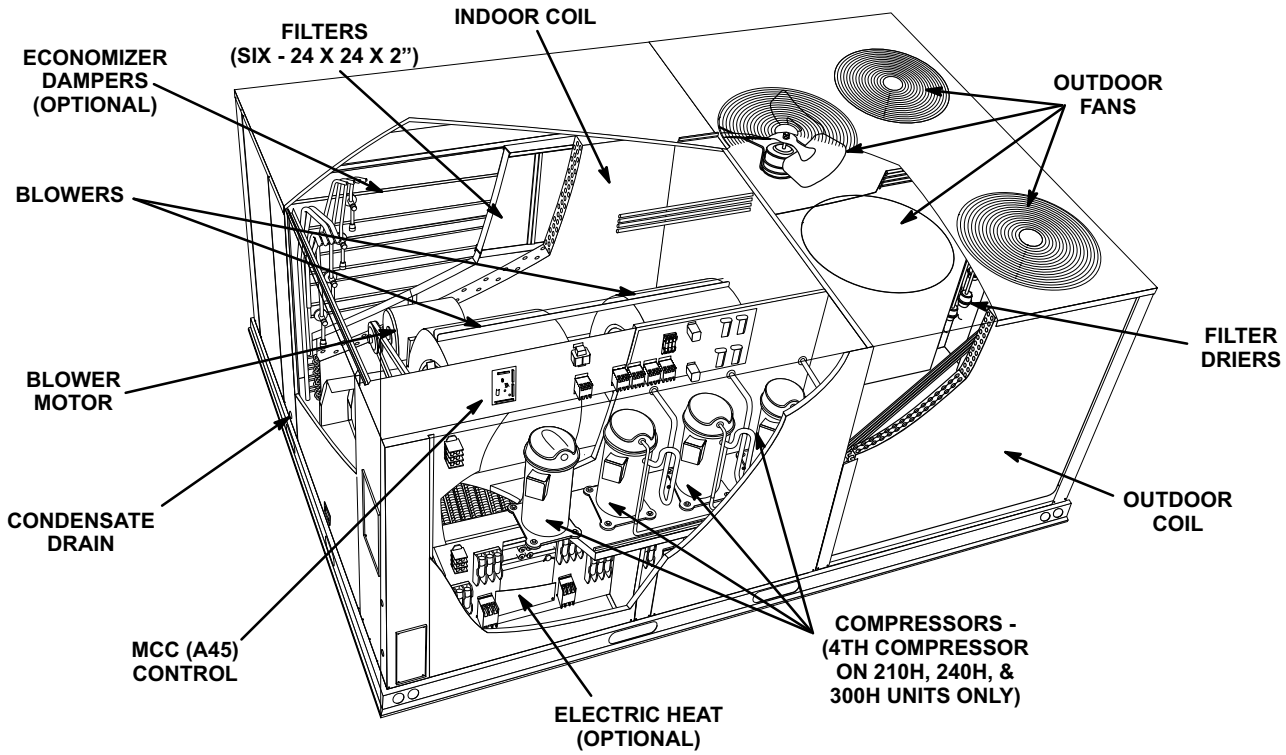


FIGURE 1

TCA CONTROL BOX

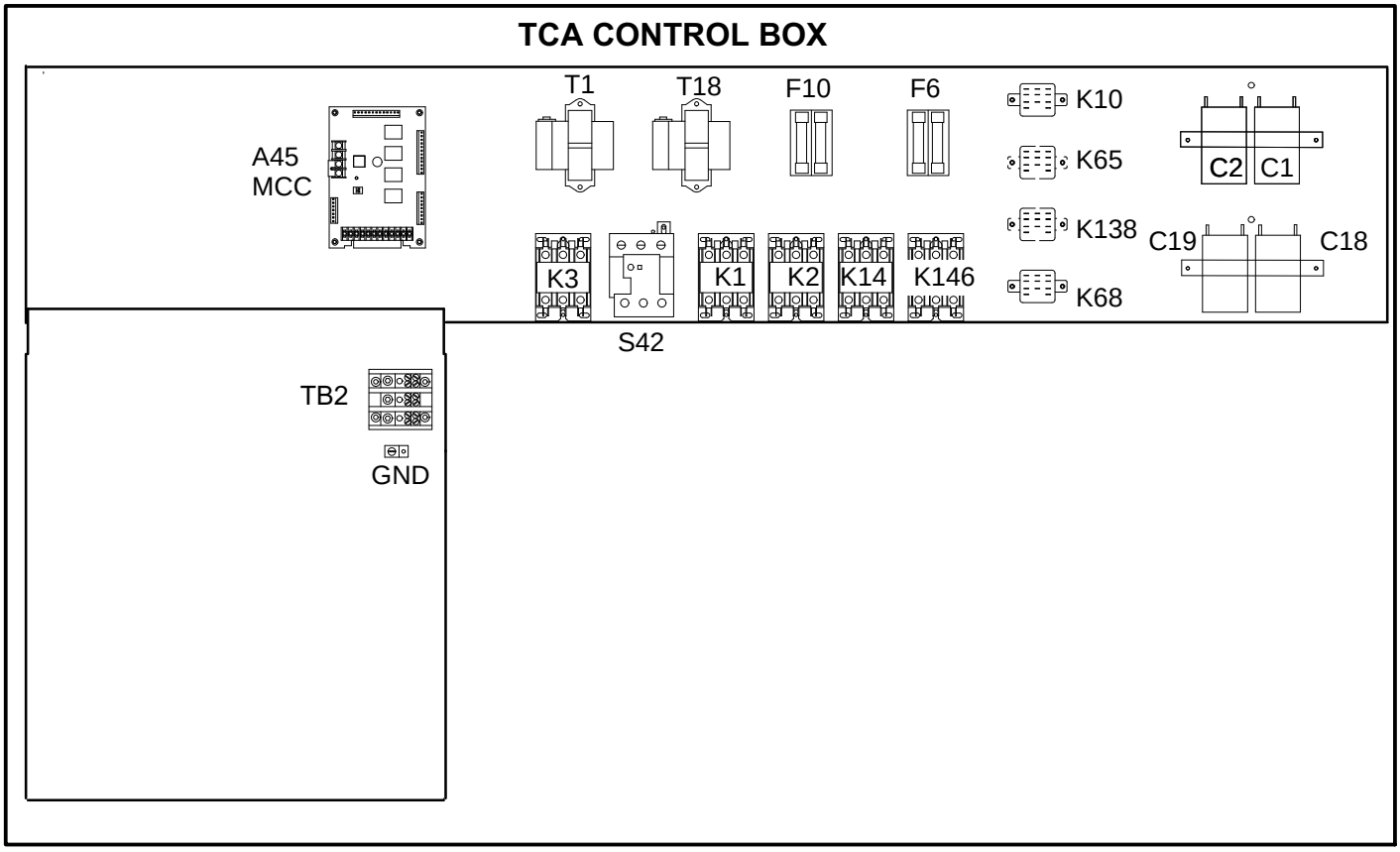


FIGURE 2

I-UNIT COMPONENTS

TCA unit components are shown in figure 1. All units come standard with removeable unit panels. All L1, L2, and L3 wiring is color coded; L1 is red, L2 is yellow, and L3 is blue.

A-Control Box Components

TCA control box components are shown in figure 2. The control box is located in the compressor compartment.

1-Disconnect Switch S48 (field installed)

All units may be equipped with an optional disconnect switch S48, or circuit breaker, CB10. S48 and CB10 can be a toggle switch or a twist style switch. Both types can be used by the service technician to disconnect power to the unit. CB10 when use, will be in the same location as S48 on the wiring diagram.

2-Terminal Strip TB2

All units are shipped with factory installed TB2. Units without S48 or CB10 will have supply power connected to TB2.

3-Control Transformer T1 (all units)

All use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8) which is located on the transformer itself. The 208/230 (Y) voltage transformers have two primary voltage taps, but only one may be used depending on supply voltage. See figure 3. 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

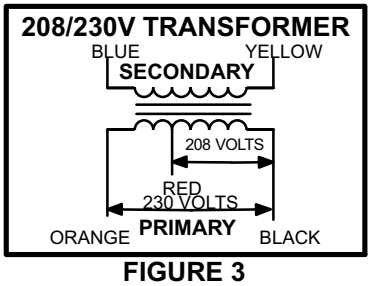


FIGURE 3

4-Contactor Transformer T18

T18 is a single line voltage to 24VAC transformer used in 4 compressor units only. Transformer T18 is protected by a 3.5 amp circuit breaker (CB18) located on the transformer itself. T18 is identical to transformer T1. The transformer supplies 24VAC power to the contactors.

5-Terminal Strip TB1

All indoor thermostat connections will be to TB1 located on MCC board A45. For thermostats with “occupied “ and “unoccupied” modes, a factory installed jumper across terminals A1 and A2 should be removed. Unit wiring is designed for a three-stage thermostat. For two-stage applications jumper between Y2 and Y3 on TB1.

6-Terminal Strip TB14

Terminal strip TB14 located on the MCC board A45 distributes 24V power from transformer T1 to the control box components. Units not equipped with smoke detectors A17 or A64, will have a factory installed jumper across terminals 24VAC and R.

7-Outdoor Fan Capacitors C1, C2, C18 & C19

Fan capacitors C1, C2, C18, C19 are 10 MFD / 370V capacitors used to assist in the start up of condenser fans B4, B5, B21, B22 respectively.

8-Outdoor Fan Relay K10 & K68

Outdoor fan relays K10 and K68 used in all units, are DPDT relays with a 24VAC coil. In all TCA units K10 energizes condenser fans B4 and B5 and K68 energizes condenser fans B21 and B22.

9-Fuses F10 and F6

Two line voltage fuses F10 provide overcurrent protection to all condenser fans in all Y voltage TCA units and rated at 30A. Fuses F6 provide overcurrent protection for optional field installed power exhaust fans and rated at 15A.

10-Compressor Contactor K1, K2 & K14 (all units) K146 (TCA 210H, 240H, 300S units only)

All compressor contactors are three-pole-double-break contactors with 24VAC coils. In all TCA180, 210S and 240S units, K1, K2 and K14 energize compressors B1, B2 and B13 in response to thermostat demand. In the TCA210H, 240H and 300S units, K1, K2, K14 and K146 energize compressors B1, B2, B13 and B20 in response to thermostat demand.

11-Blower Contactor K3

Blower contactor K3, used in all units, is a three-pole-double-break contactor with a 24VAC coil used to energize the indoor blower motor B3 in response to blower demand. K3 is energized by relay KD on the A45 MCC board.

12-Blower Motor Overload Relay S42

S42 is a manual reset overload relay, used in all TCA units equipped with 10 or more HP standard efficiency motors. The relay is connected in line with the blower motor to monitor the current flow to the motor. When the relay senses an overload condition, a set of normally closed contacts opens de-energizing the 24 volt output of T1. See figure figure 4.

13-Power Exhaust Relay K65 (PED units)

Power exhaust relay K65 is a DPDT relay with a 24VAC coil. K65 is used in Y voltage units equipped with the field installed optional power exhaust dampers. K65 is energized by the economizer enthalpy control A6, after the economizer dampers reach 50% open (adjustable) When K65 closes, exhaust fans B10 and B11 are energized.

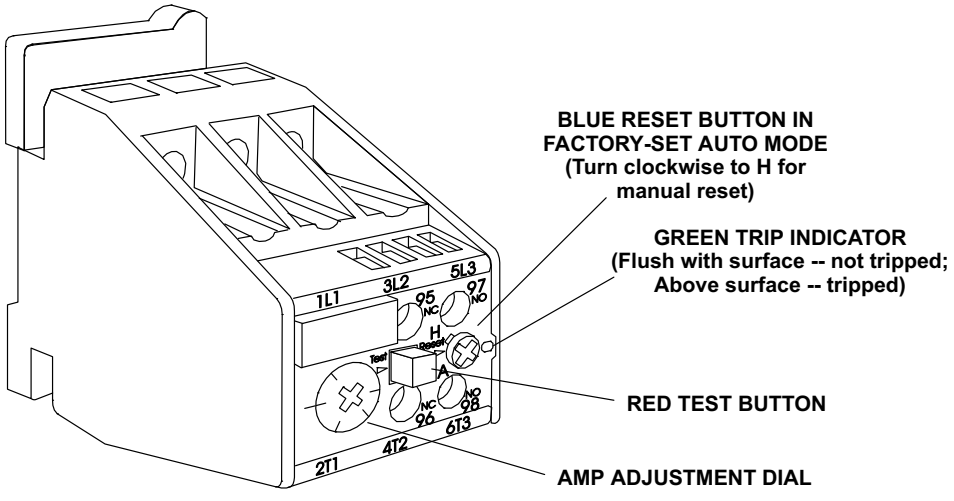
14-MCC Control A45

The main control module A45 (figure 6) controls all cooling operation and serves as a staging point for all internal inputs to the appropriate components of the TCA unit. The MCC control receives and sends out 24 volts to the components located in the TCA control box, economizer and supply/return compartments. The control communicates to compressors contactors K1, K2 , condenser fan relay K10 and indoor blower contactor K3. Thermostat hook ups (TB1) and low voltage hook ups (TB14) are located on the board. See tables 2 and 3 for terminal designations. Tables 4, 5 , 6 and 7 show pin terminal designations.

Features

The MCC A45 is equipped with a green LED for board status. See table 1 for LED flash codes. While in the cooling mode the board will incorporate AUTO-STAGING. If the board receives a Y3 demand (if applicable) the board will energize Y1, Y2 and Y3 in successive order. In the same manner a Y2, will be interpreted as a Y1/Y2. The MCC control also incorporates a minimum run time of 4 minutes for up to 3 independent cooling stages. This 4 minute run time can be interrupted by pushing SW1 located on the board. If pressed for 3 seconds or more, the control goes into TEST mode disabling AUTO-STAGING. The MCC control board is used for all T class units. A dip switch, factory set, is provided to configure to unit type (TGA gas, TCA cooling/electric heat, THA heat pump) See figure 5.

SIEMENS OVERLOAD RELAY



Adjust relay amp setting according to value given on the blower motor nameplate. Proper relay amp setting equals motor nameplate FLA X service factor of 1.15 X .95.
Use small slotted screwdriver to adjust control mode from automatic reset (A) to manual reset (H). Control must be in the manual reset mode (H) to perform a test. Press the red test button. Green trip indicator should pop out. Press the blue reset screw to reset the relay.

FIGURE 4

TABLE 1

LED Status	Indicates	Action
Off	No power to board.	Check field wiring.
On	Processor error.	Press MCC pushbutton and hold for three seconds to reset processor.*
Flashes Slowly	Normal.	None.
Flashes Rapidly	Invalid unit DIP switch selected.	Make sure switches are set correctly. Refer to figure 5.
Flashes Rapidly	Simultaneous heat and cool demands.	Check thermostat and wiring.

*Press pushbutton and immediately release to override the 4-minute compressor minimum run time.

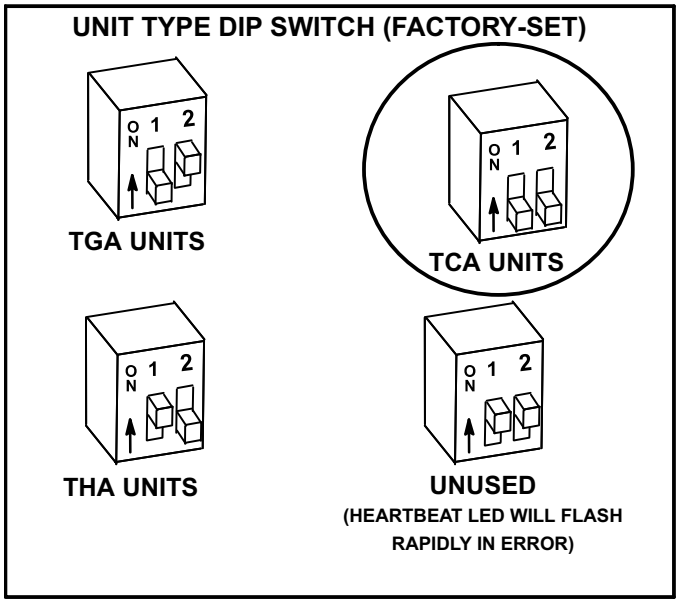


FIGURE 5

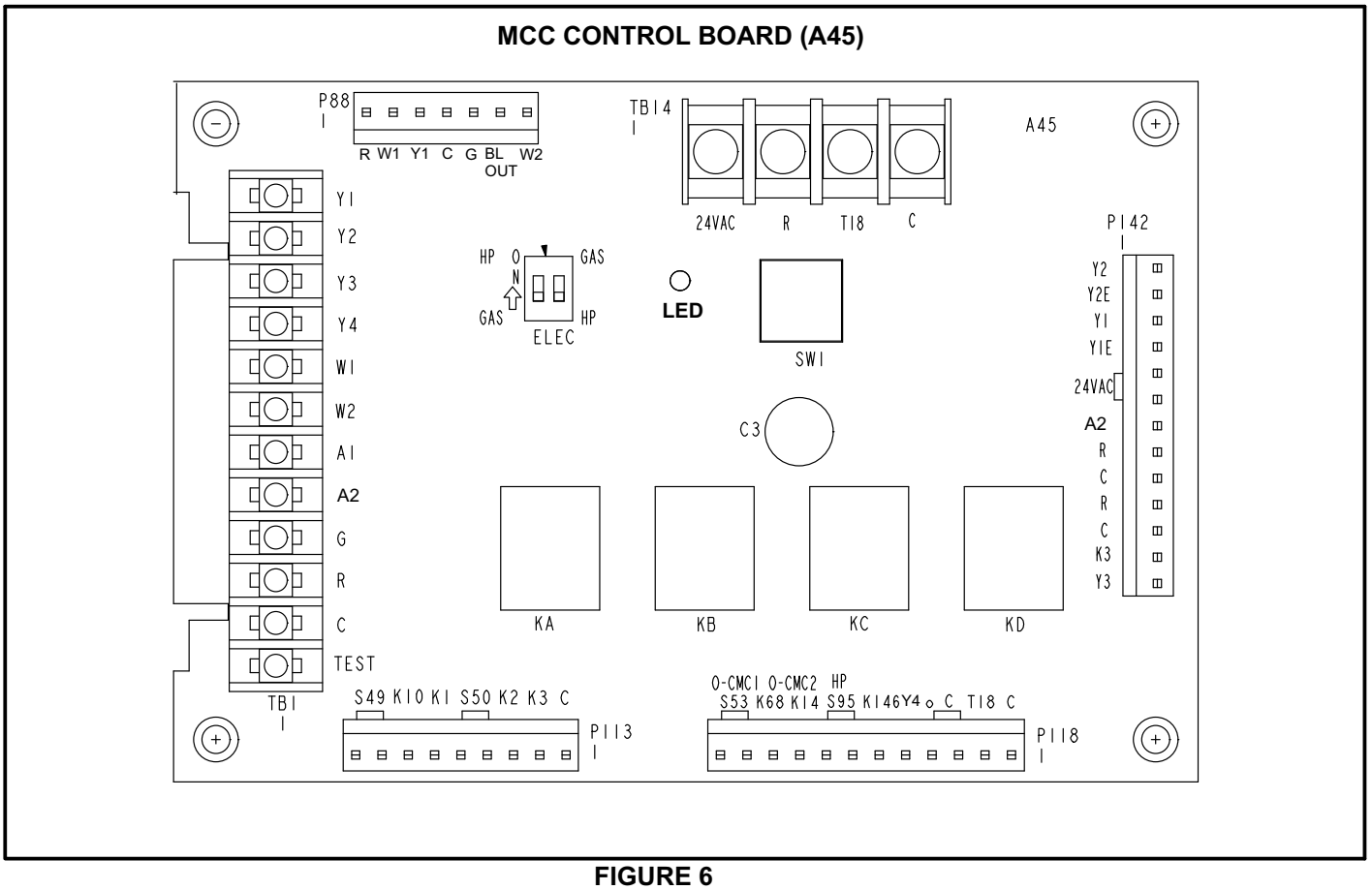


FIGURE 6

TABLE 2

TB1 TERMINAL DESIGNATIONS	
Y1	Cool Stage 1
Y2	Cool Stage 2
Y3	Cool Stage 3 (N/A)
Y4	Cool Stage 4 (N/A)
W1	Heat Stage 1
W2	Heat Stage 2
A1	Occupied Loop
A2	Occupied Loop
G	Indoor Blower
R	24V To Thermostat
C	Ground
TEST	Test Terminal (Disable Min Run Time)

TABLE 3

TB14 24VAC TERMINAL DESIGNATIONS	
24VAC	Uninterrupted 24 Volt Power
R	24 Volt Accessories (from T1 transformer)
T18	24 Volts (from T18 transformer)
C	Ground

TABLE 4

P142 TERMINAL DESIGNATIONS	
Terminal	Function
Y2	From Economizer (cool2)
Y2E	To Processor (micro chip)
Y1	From Economizer
Y1E	To Processor (micro chip)
24V	To Smoke Detector
24V	From T1 Transformer
A2	Occupied Loop from Thermostat
R	To Economizer
C	Ground to Economizer
R	From Transformer T1
C	Ground
K3	From Transformer T18
Y3	To Processor (micro chip)

TABLE 5

P113 TERMINAL DESIGNATIONS	
Terminal	Function
S49	Relay KA To Freeze Stat
S49	From Freeze Stat
K10	Relay KA To Outdoor Fan Relay
K1	Freeze Stat to Compressor Contactor
S50	Relay KB To Freeze Stat
S50	From Freeze Stat
K2	Freeze Stat To Compressor Contactor
K3	KD To Fan Relay
C	Ground To Cooling Component

TABLE 6

P88 TERMINAL DESIGNATIONS	
Terminal	**Function**
R	24V To A3
W1	Heat Stage 1 to A3
Y1	Cooling Stage to A3
C	Ground to A3
G	Blower Demand to A3
BL OUT	Blower Out from A3
W2	Heat Stage 2 to A3

TABLE 7

P118 TERMINAL DESIGNATIONS	
Terminal	**Function**
S53	Relay KC to Freezestat
S53	From Freezestat
K68	Relay KD to Outdoor Fan Relay
K14	Freezestat to Compressor Contactor
S95	Relay KC to Freezestat
S95	From Freezestat
K146	Freezestat to Compressor Contactor
Y4	Cool Stage 4 from TB1
C	Ground
C	Ground
T18	24V from T18
C	Ground

B-Cooling Components

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See figures 7 and 8. Four draw-through type condenser fans are used in TCA180/300 units. All units are equipped with belt-drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by an optional field-installed economizer. The evaporators are slab type and are stacked. Each evaporator uses a thermostatic expansion valve as the primary expansion device. Each evaporator is also equipped with enhanced fins and rifled tubing. In all units each compressor is protected by a freezestat (on each evaporator). Optional field installed low ambient switches and optional field installed high pressure switches are availabe for additional compresor protection.

1-Compressors B1, B2 & B13 (all units) B20 (TCA210H/240H/300S only)

All TCA180/300 units use scroll compressors. TCA180, 210S and 240S units use 3 compressors and TCA210H, 240H and 300S use four compressors. All compressors are equipped with independent cooling circuits. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

Electrical shock hazard. Compressor must be grounded. Do not operate without protective cover over terminals. Disconnect power before removing protective cover. Discharge capacitors before servicing unit. Failure to follow these precautions could cause electrical shock resulting in injury or death.

Each compressor is energized by a corresponding compressor contactor.

NOTE-Refer to the wiring diagram section for specific unit operation.

2-High Pressure Switches (optional) S4, S7 & S28 (all units) S96 (TCA210H, 240H, 300S only)

The high pressure switches is a manual reset SPST N.C. switch which opens on a pressure rise.

S4 (first circuit), S7 (second circuit), S28 (third circuit), and S96 (fourth circuit) are wired in series with the respective compressor contactor coils.

When discharge pressure rises to 450 ± 10 psig (3103 ± 69 kPa) (indicating a problem in the system) the switch opens and the respective compressor is de-energized (the economizer can continue to operate).

3-Low Ambient Switches (optional) S11, S84 & S85 (all units) S94 (210H, 240H, 300S only)

The low ambient switch is an optional field installed auto-reset N.O. pressure switch which allows for mechanical cooling operation at low outdoor temperatures. The switch is located in each liquid line prior to the indoor coil in the blower compartment.

In three compressor units, S11 (compressor 1) is wired in series with outdoor fan relay K10 coil. S84 (compressor 2) and S85 (compressor 3) are wired in parallel with the outdoor fan relay K68 coil.

In four compressor units, S11 (compressor 1) and S84 (compressor 2) are wired in parallel with outdoor fan relay K10. S85 (compressor 3) and S94 (compressor 4) are wired parallel with outdoor fan relay K68.

When liquid pressure rises to 275 ± 10 psig (1896 ± 69 kPa), that switch closes. When discharge pressure in one refrigerant circuit drops to 150 ± 10 psig (1034 ± 69 kPa), that switch opens. The pair of condenser fans are energized when one switch in parallel with the outdoor fan relay closes. To de-energize the outdoor fan relay, both switches in parallel must open before the fans are de-energized. This intermittent fan operation results in higher evaporating temperature allowing the system to operate without icing the evaporator coil and losing capacity.

4-Filter Drier (all units)

TCA units have a filter drier located in the liquid line of each refrigerant circuit at the exit of each condenser coil. The drier removes contaminants and moisture from the system.

5-Freezestats S49, S50 & S53 (all units) S59 (TCA210H/240H/300S only)

Each unit is equipped with a low temperature switch (freezestat) located on a return bend of each evaporator coil. S49 (first circuit), S50 (second circuit) and S53 (third circuit) are located on the corresponding evaporator coils. On the 210H, 240H and 300S models, S95 is located on the fourth circuit.

Each freezestat is wired in series with the corresponding compressor contactor. Each freezestat is a SPST N.C. auto-reset switch which opens at 29°F $\pm$ 3°F (-1.7°C $\pm$ 1.7°C) on a temperature drop and closes at 58°F $\pm$ 4°F (14.4°C $\pm$ 2.2°C) on a temperature rise. To prevent coil icing, freezestats open during compressor operation to temporarily disable the respective compressor until the coil temperature rises.

6-Condenser Fans B4, B5, B21 & B22

See SPECIFICATIONS tables at the front of this manual for specifications of condenser fans used in all units. All condenser fans used have single-phase motors. The fan assembly may be removed for servicing and cleaning.

TCA180H, 180S, 210S & 240S PLUMBING, COMPRESSOR AND REFRIGERANT CIRCUITS DETAIL

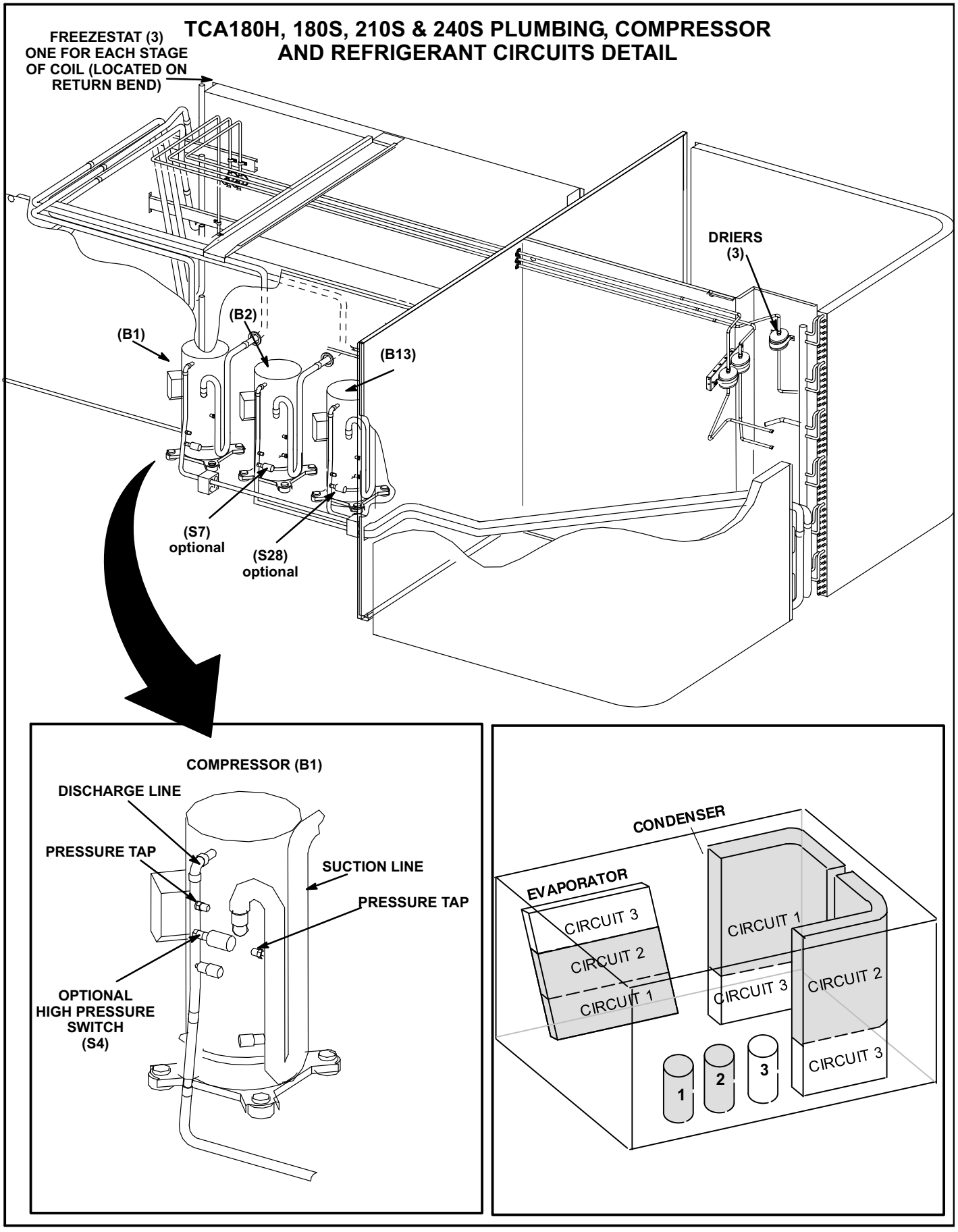
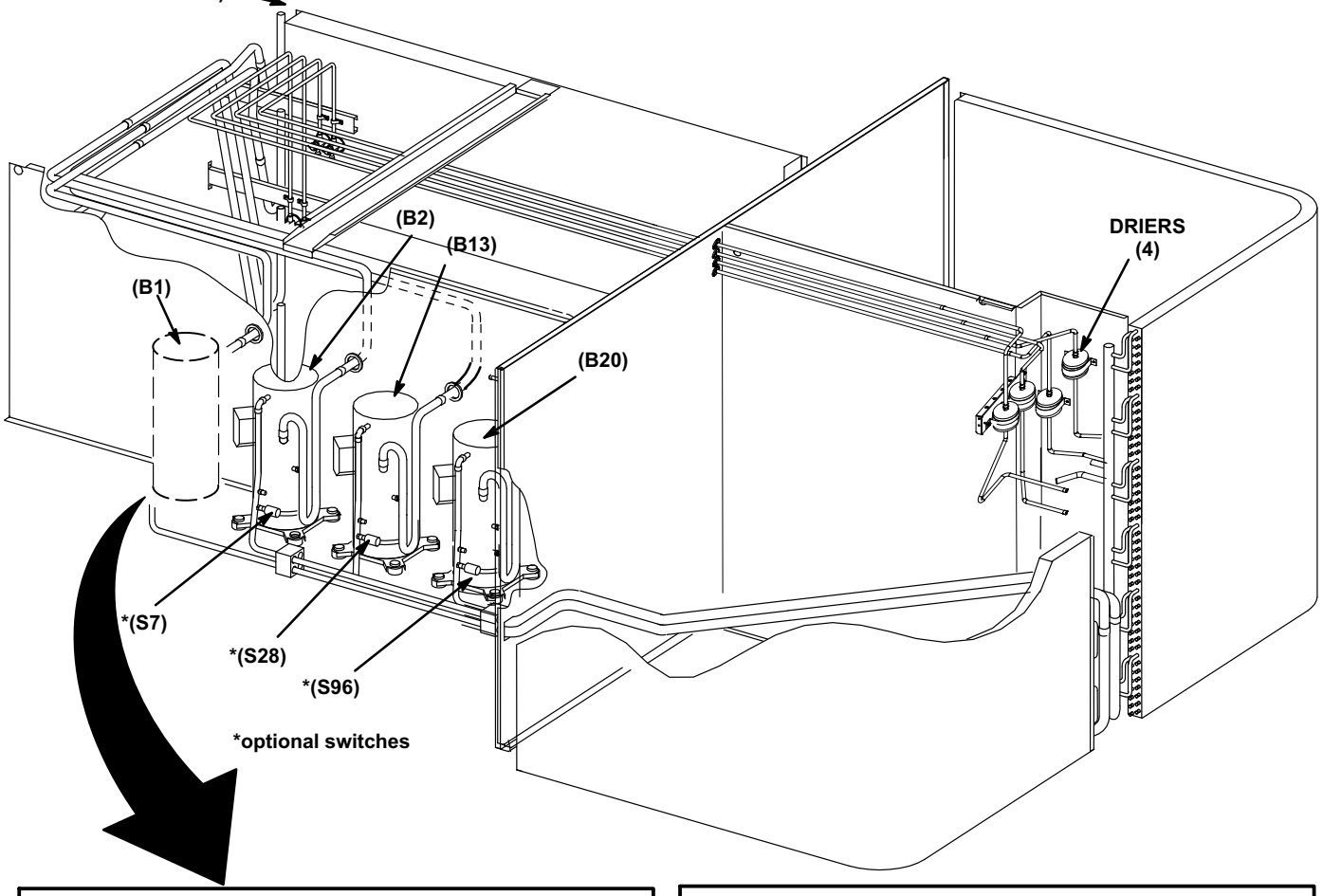
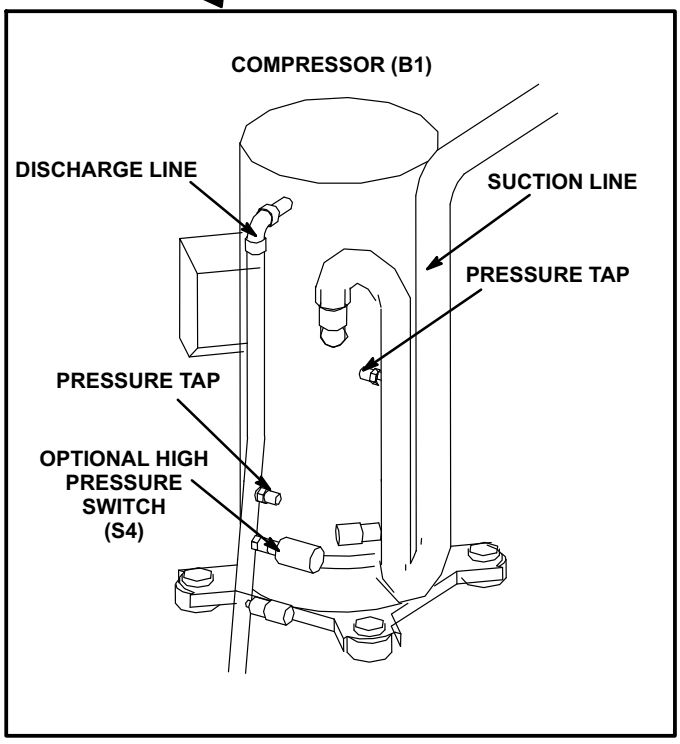


FIGURE 7

TCA210H, 240H, 300S PLUMBING, COMPRESSOR AND REFRIGERANT CIRCUITS DETAIL





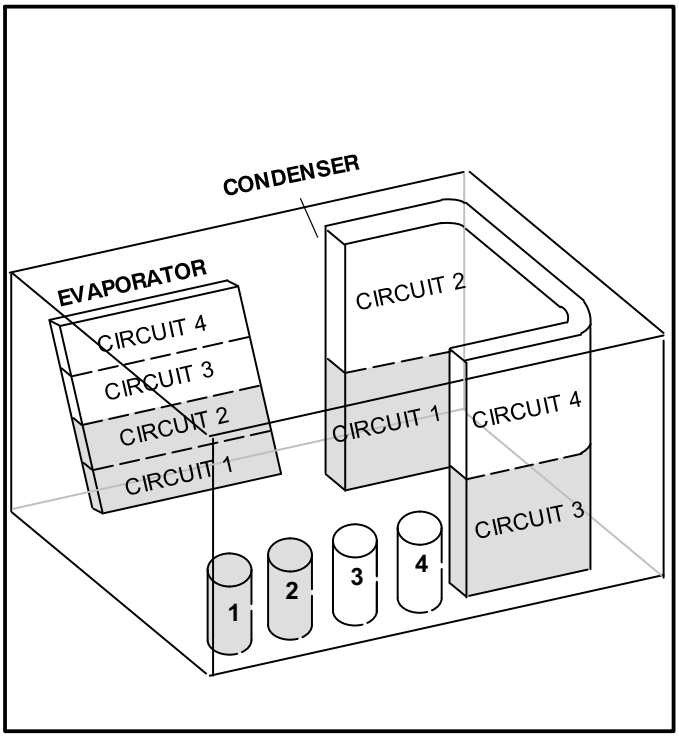


FIGURE 8

C-Blower Compartment

The blower compartment in TCA180/300 units is located between the evaporator coil and the compressor / control section on the opposite side of the condenser coil. The blower assembly is accessed by removing the screws on either side of the sliding base. The base pulls out as shown in figure 11.

1-Blower Wheels

All TCA180/300 units have two 15 in. x 15 in. (381 mm x 381 mm) blower wheels. Both wheels are driven by one motor mounted on a single shaft. Shaft bearings are equipped with grease ports for service.

2-Indoor Blower Motor B3

All units use three-phase single-speed blower motors. CFM adjustments are made by adjusting the motor pulley (sheave). Motors are equipped with sealed ball bearings. All motor specifications are listed in the SPECIFICATIONS (table of contents) in the front of this manual. Units may be equipped with motors manufactured by various manufacturers, therefore electrical FLA and LRA specifications will vary. See unit rating plate for information specific to your unit.

OPERATION / ADJUSTMENT

Blower Operation

Initiate blower demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat.

1- Blower operation is manually set at the thermostat subbase fan switch. With fan switch in **ON** position, blowers will operate continuously.

2- With fan switch in **AUTO** position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in **OFF** position.

Blower Access

The blower assembly is secured to a sliding base which allows the entire assembly to be pulled out of the unit. See figure 11.

1- Remove the clamp which secures the blower wiring to the blower motor base.

2- Remove and retain screws on either side of sliding base. Pull base toward outside of unit. When pulling the base out further than 12" (305mm), disconnect wiring to K3 blower contactor T1, T2, and T3. Pull wiring toward blower to allow enough slack to slide the base out further.

3- Slide base back into original position when finished servicing. Replace the clamp and blower wiring in the previous location on the blower motor base. Reconnect wiring to K3 if it was disconnected.

4- Replace retained screws on either side of the sliding base.

Determining Unit Air Volume

1- The following measurements must be made with a dry indoor coil. Run blower without cooling demand. Air filters must be in place when measurements are taken.

2- With all access panels in place, measure static pressure external to unit (from supply to return).

3- Measure the indoor blower wheel RPM.

4- Refer to blower tables in BLOWER DATA (table of contents) in the front of this manual. Use static pressure and RPM readings to determine unit air volume.

5- The RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase RPM. Turn counterclockwise to decrease RPM. Seefigure 11 for TCA180/300 units.

Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat grooves. Make sure blower and motor pulley are aligned as shown in figure 9.

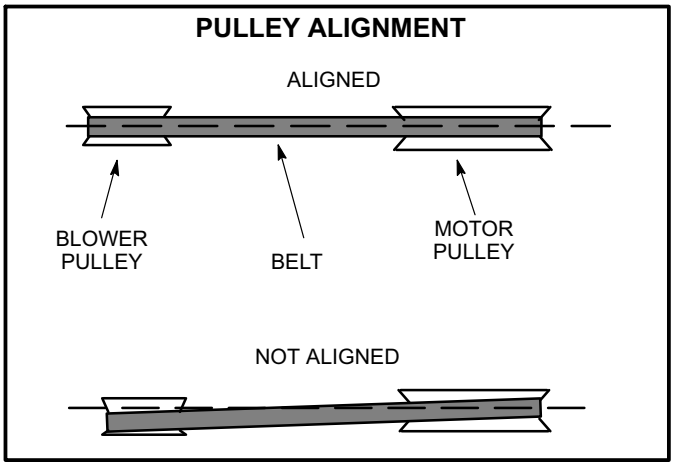


FIGURE 9

1- Loosen four bolts securing motor base to mounting frame. See figure 11.

2- *To relieve belt tension -*
Turn adjusting bolt to the right, or clockwise, to move the motor upward and loosen the belt. This decreases the distance between the blower motor pulley and the blower housing pulley.

3- Tighten four bolts securing motor base to mounting frame.

IMPORTANT - Align top edges of blower motor base and mounting frame base parallel before tightening two bolts on the other side of base. Motor shaft and blower shaft must be parallel.

Check Belt Tension

Overtensioning belts shortens belt and bearing life. Check belt tension as follows:

1- Measure span length X. See figure 10.

2- Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 1.5mm per 100mm of span length.

Example: Deflection distance of a 40" span would be 40/64" or 5/8".

Example: Deflection distance of a 400mm span would be 6mm.

3- Measure belt deflection force. For a used belt, the deflection force should be 5 lbs. (35kPa). A new belt deflection force should be 7 lbs. (48kPa).

A force below these values indicates an undertensioned belt. A force above these values indicates an overtensioned belt.

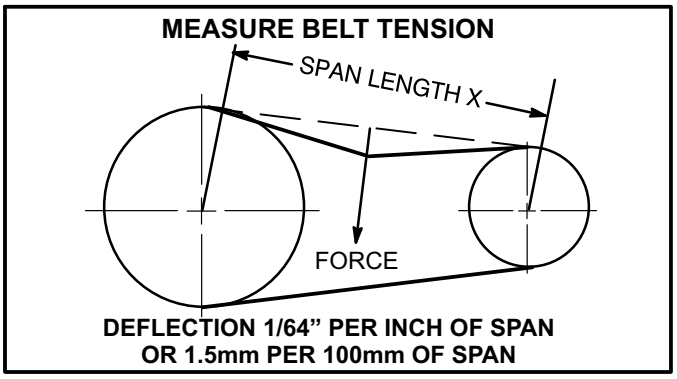


FIGURE 10

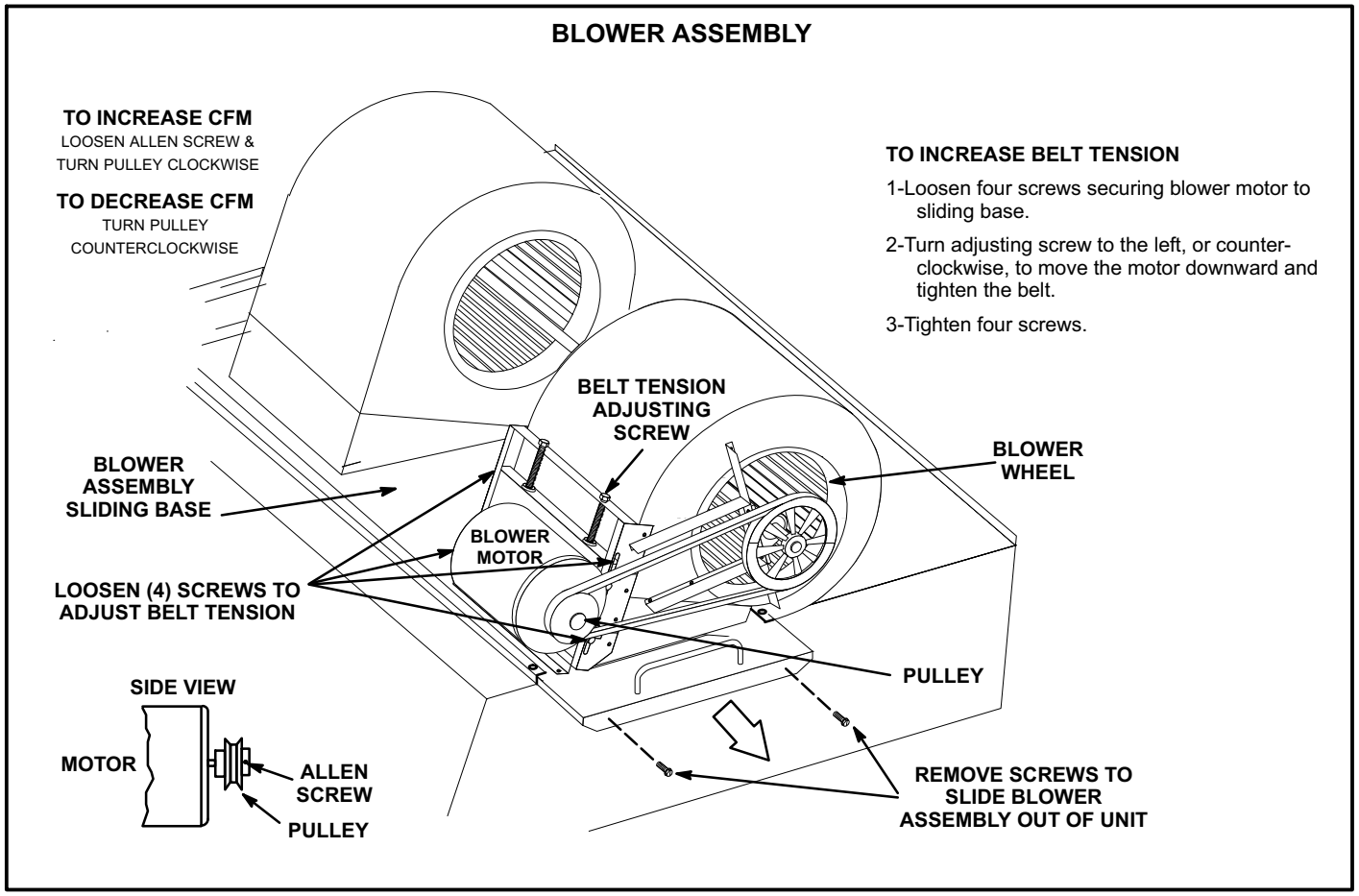


FIGURE 11

D-Optional Electric Heat Components

See ELECTRICAL / ELECTRIC HEAT (table of contents) for possible TCA to EHA matchups and electrical ratings.

All electric heat sections consist of electric heating elements exposed directly to the airstream. See figure 1. Two electric heat sections (first section and second section) are used in all 15kW through 90kW heaters used in TCA180/300 units. Multiple-stage elements are sequenced on and off in response to thermostat demand. EHA parts arrangement is shown in figures 14 and 15.

Control Box Components

The main control box (see figure 12) houses some electric heat components and the electric heat control "hat" section (figure 13).

1-Terminal Strip TB15

TB15 distributes line power to the EHA unit, fuse F4, and is used in all electric heat applications.

2-Fuse F4

Fuse F4 is used only with single point power supply. F4 gives over amperage protection to the compressor and other cooling components. F4 is located inside a sheet metal enclosure in the main control box.

Electric Heat Hat Section (Figure 13)

3-Electric Heat Relay K9

All TCA series units with electric heat use an electric heat relay K9. K9 is a N.O. DPDT pilot relay intended to electrically isolate the unit's 24V circuit from the electric heat assembly 24V circuit. K9 is energized by W1 from the main control board A45. K9-1 closes, enabling T2 to energize the electric heat.

4-Electric Heat Relay K19

All TCA series units with electric heat use an electric heat relay K19. K19 is a N.O. SPDT pilot relay intended to electrically isolate the unit's 24V circuit from the electric heat assembly 24V circuit. K19 is energized by W2 from the main control board A45 (once K9 is energized). K19-1 closes, enabling T2 to energize the remaining electric heat.

5-Time Delay DL2

DL2 is a solid state timer used in all electric heat units. DL2 staggers the energizing of the first (W1) and second (W2) stage heating elements by providing a timed interval. When the timer is de-energizing, the contacts are delayed 1 second before opening.

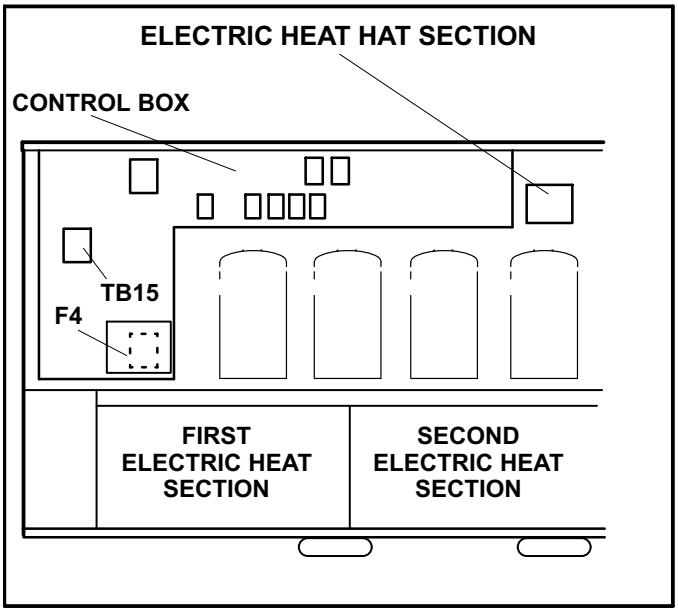


FIGURE 12

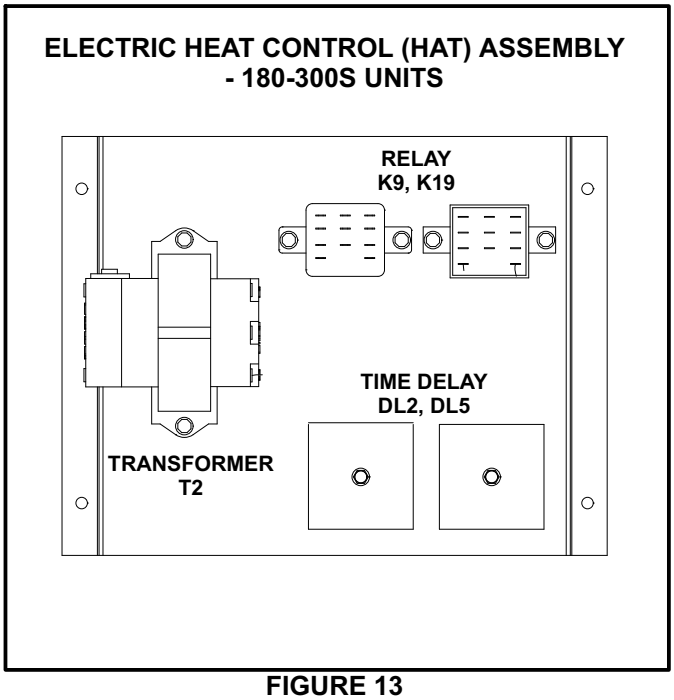


FIGURE 13

6-Time Delay DL5

Time delay DL5 is identical to DL2. DL5 further staggers the (W2) second stage heating elements by providing a timed interval between the energizing of the elements activated by DL2 and elements activated by DL5.

7-Electric Heat Transformer T2

All TCA series units with electric heat use a single line voltage to 24VAC transformer mounted in the electric heat control hat section in the control box. The transformer supplies power to all electric heat controls (contactors and coils). The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker CB13 located on the body of T2. The 208/230 (Y) voltage transformers use two primary voltage taps as shown in figure 3. Transformer T2 is identical to T1.

Electric Heat Sections

8-Contactors K15, K16, K17 and K18

Contactors K15, K16, K17 and K18 are all three-pole double-break contactors located on the electric heat vestibule. K15 and K16 are located on the first electric heat section, while K17 and K18 are located on the second electric heat section. However, in the 15 and 30kW heaters, the first section houses all contactors and fuses. All contactors are equipped with a 24VAC coil. The coils in the K15, K16, K17 and K18 contactors are energized by the main panel A45. Contactors K15 and K17 energize the first stage heating elements, while K16 and K18 energize the second stage heating elements.

9-Fuse F3

Fuse F3 are housed in a fuse block which holds three fuses. Each F3 fuse is connected in series with each leg of electric heat. Figure 15 and table 8 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1 through F3 - 8.

10-Terminal Strip TB3

Electric heat line voltage connections are made to terminal strip TB3 (or a fuse block on some models) located in the upper left corner of the electric heat vestibule.

11-High Temperature Limits S15 and S107 (Primary)

S15 and S107 are SPST N.C. auto-reset thermostats located on the back panel of the electric heat section below the heating elements. S15 is the high temperature limit for the first electric heat section, while S107 is the high temperature limit for the second electric heat section. Both thermostats are identical and are wired in series with the first stage contactor coil. When either S15 or S107 opens, indicating a problem in the system, contactor K15 is de-energized. When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. The thermostats used on EHA360-45-1 Y/G/J are factory set to open at 200°F $\pm$ 5°F (93.3°C $\pm$ 2.8°C) on a temperature rise and automatically reset at 160°F $\pm$ 6°F (71.1°C $\pm$ 3.3°C) on a temperature fall. All other electric heat section thermostats are factory set to open at 170°F $\pm$ 5°F (76.7°C $\pm$ 2.8°C) on a temperature rise and automatically reset at 130°F $\pm$ 6°F (54.4°C $\pm$ 3.3°C) on a temperature fall. The thermostats are not adjustable.

12-Heating Elements HE1 through HE14

Heating elements are composed of helix wound bare nichrome wire exposed directly to the airstream. Three elements are connected in a three-phase arrangement. The elements in 208/230V units are connected in a “Delta” arrangement. Elements in 460 and 575V units are connected in “Wye” arrangement. Each stage is energized independently by the corresponding contactors located on the electric heat vestibule panel. Once energized, heat transfer is instantaneous. High temperature protection is provided by primary and redundant high temperature limits and overcurrent protection is provided by fuses.

EHA 15, 30, 45, 60, and 90 KW
ELECTRIC HEAT SECTION PARTS ARRANGEMENT

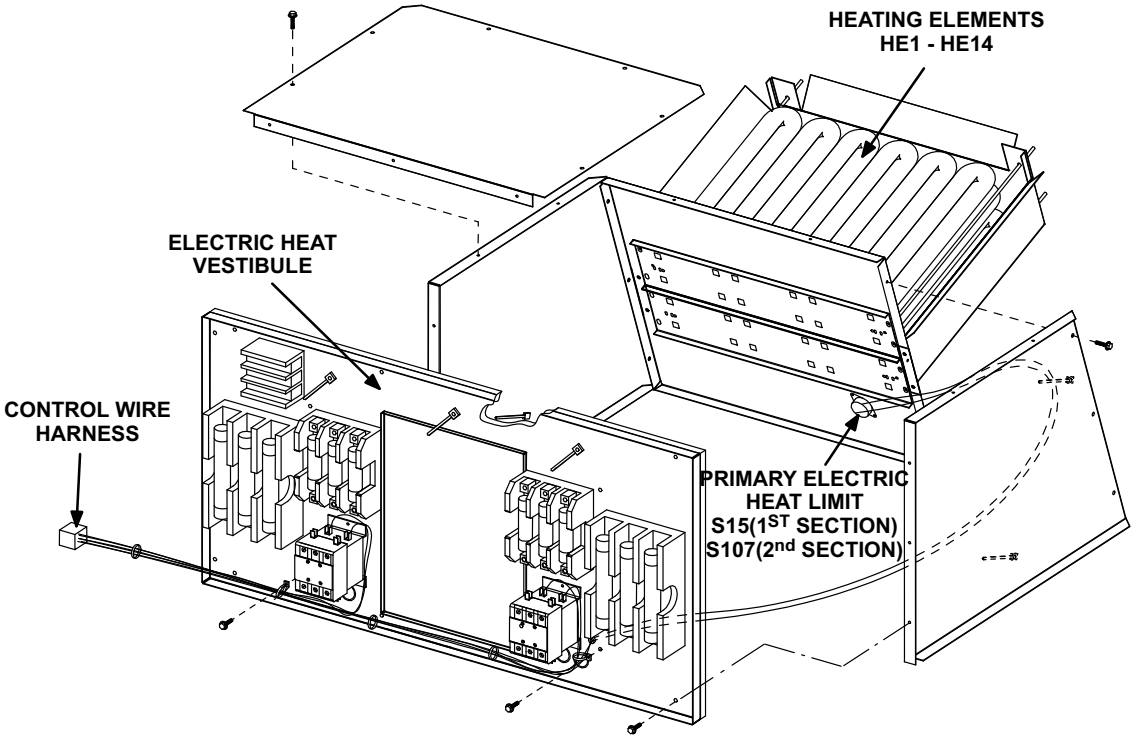


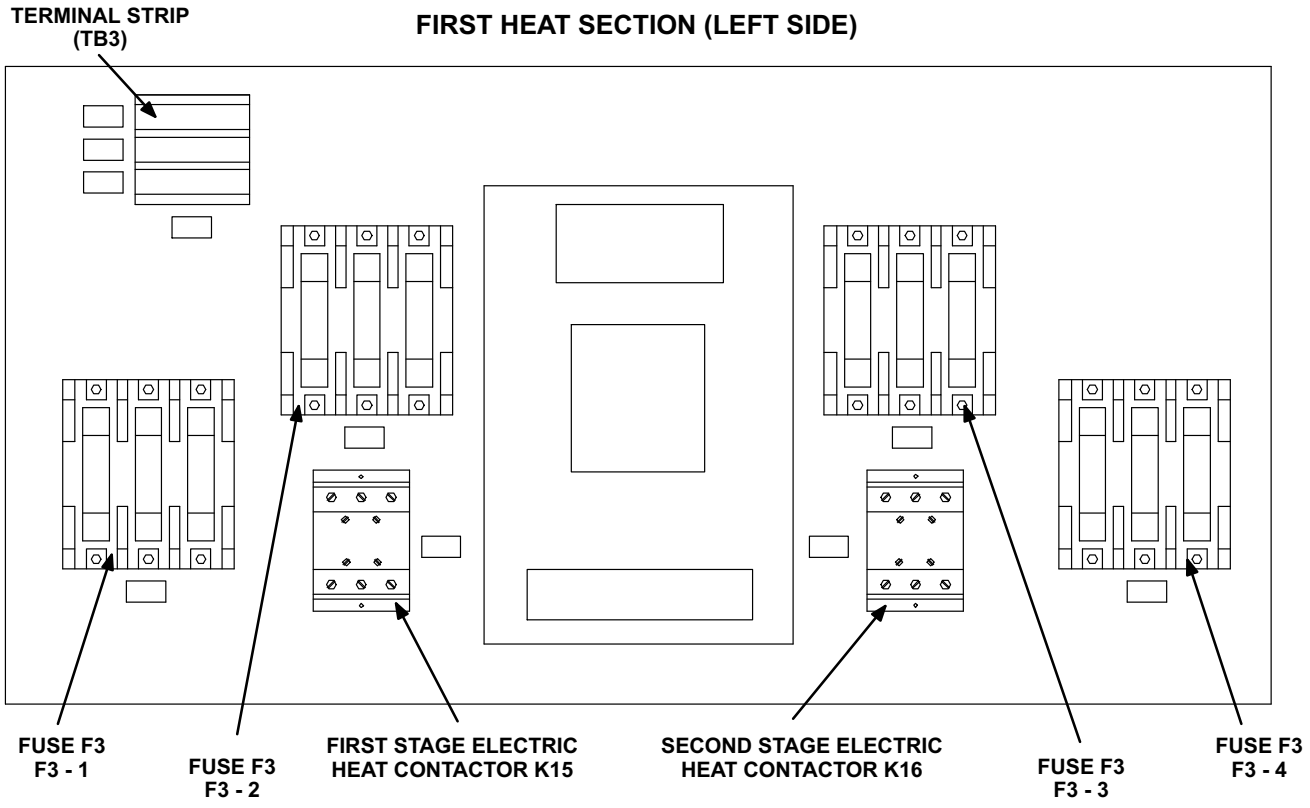
FIGURE 14

TABLE 8

TCA180/300 ELECTRIC HEAT SECTION FUSE RATING									
EHA QUANTITY & SIZE	VOLTAGES	FUSE (3 each)							
		F3 - 1	F3 - 2	F3 - 3	F3 - 4	F3 - 5	F3 - 6	F3 - 7	F3 - 8
(1) EHA240-7.5 & (1) EHA240S-7.5 (15 kW Total)	208/230V	50 Amp 250V	——	——	——	——	——	——	——
	460V	25 Amp 600V	——	——	——	——	——	——	——
	575V	20 Amp 600V	——	——	——	——	——	——	——
(1) EHA360-15 & (1) EHA360S-15 (30 kW Total) or (1) EHA156-15 & (1) EHA156S-15	208/230V	60 Amp 250V	60 Amp 250V	——	——	——	——	——	——
	460V	50 Amp 600V	——	——	——	——	——	——	——
	575V	40 Amp 600V	——	——	——	——	——	——	——
(2) EHA360-22.5 (45 kW Total) or (2) EHA156-22.5	208/230V	50 Amp 250V	——	——	25 Amp 250V	50 Amp 250V	——	——	25 Amp 250V
	460V	25 Amp 600V	——	——	15 Amp 600V	25 Amp 600V	——	——	15 Amp 600V
	575V	20 Amp 600V	——	——	10 Amp 600V	20 Amp 600V	——	——	10 Amp 600V
(2) EHA150-30 (60 kW Total) or (2) EHA156-30	208/230V	50 Amp 250V	——	——	50 Amp 250V	50 Amp 250V	——	——	50 Amp 250V
	460V	25 Amp 600V	——	——	25 Amp 600V	25 Amp 600V	——	——	25 Amp 600V
	575V	20 Amp 600V	——	——	20 Amp 600V	20 Amp 600V	——	——	20 Amp 600V
(2) EHA360-45 (90 kW Total)	208/230V	50 Amp 250V	——	60 Amp 250V	60 Amp 250V	50 Amp 250V	——	60 Amp 250V	60 Amp 250V
	460V	25 Amp 600V	——	——	50 Amp 600V	25 Amp 600V	——	——	50 Amp 600V
	575V	20 Amp 600V	——	——	40 Amp 600V	20 Amp 600V	——	——	40 Amp 600V

TCA180/300 ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

FIRST HEAT SECTION (LEFT SIDE)



SECOND HEAT SECTION (RIGHT SIDE)

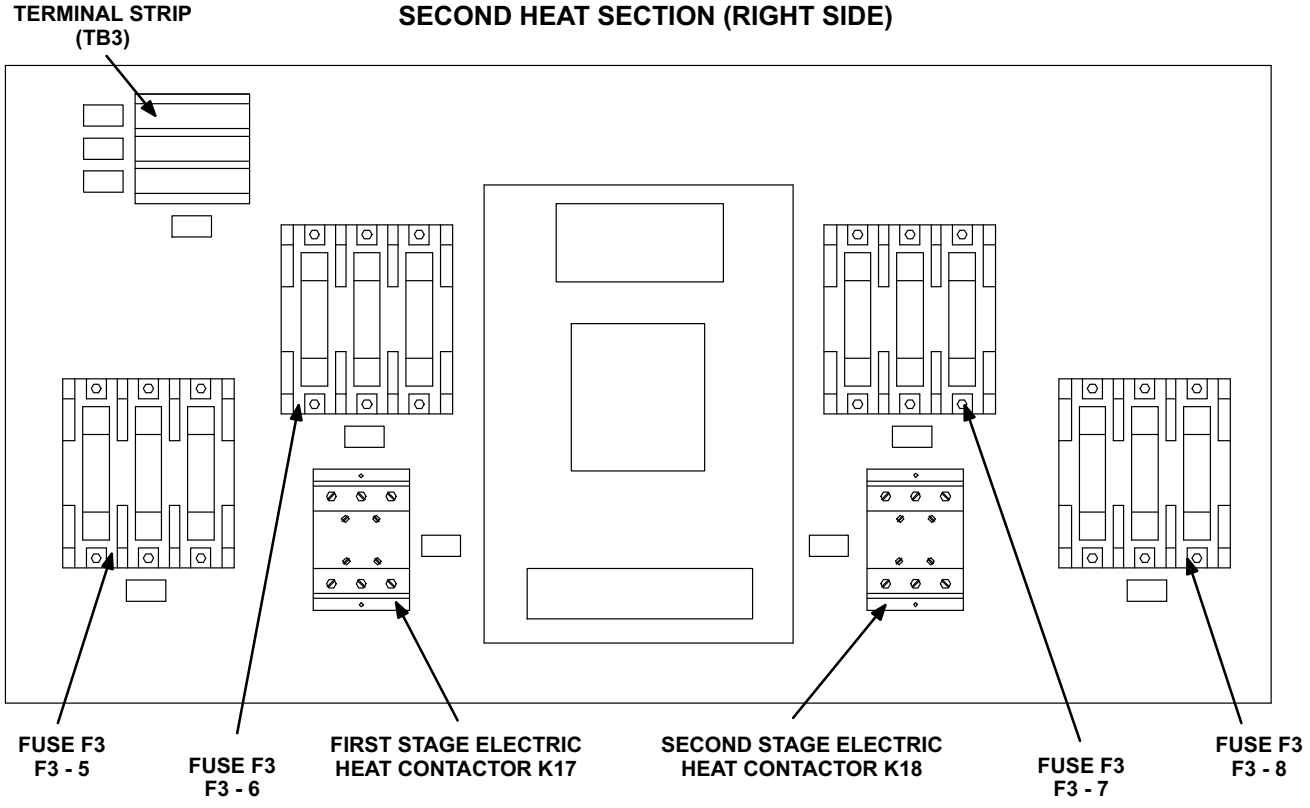


FIGURE 15

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (LARMF18/36 or LARMFH18/24).

III-STARTUP - OPERATION

Refer to startup directions and to the unit wiring diagram when servicing. See unit nameplate for minimum circuit ampacity and maximum fuse size.

A-Preliminary and Seasonal Checks

1- Make sure the unit is installed in accordance with the installation instructions and applicable codes.

2- Inspect all electrical wiring, both field and factory installed for loose connections. Tighten as required. Refer to unit diagram located on inside of unit control box cover.

3- Check to ensure that refrigerant lines are in good condition and do not rub against the cabinet or other refrigerant lines.

4- Check voltage at the disconnect switch or TB2. Voltage must be within the range listed on the nameplate. If not, consult the power company and have the voltage corrected before starting the unit.

5- Recheck voltage and amp draw with unit running. If voltage is not within range listed on unit nameplate, stop unit and consult power company. Refer to unit nameplate for maximum rated load amps.

6- Inspect and adjust blower belt (see section on Blower Compartment - Blower Belt Adjustment).

B-Cooling Startup

The thermostat specified for use on this unit has three cooling outputs.

1- Remove coil covers before starting unit.

2- Initiate first and second stage cooling demands according to instructions provided with thermostat.

3- First-stage thermostat demand will energize compressor 1. Second-stage thermostat demand will energize compressor 2. Third-stage thermostat demand will energize compressor 3 (and 4 on 4-compressor units only). On units with an economizer, when outdoor air is acceptable, a first-stage demand will energize the economizer; a second-stage demand will energize compressor 1.

4- *180S & H, 210S, 240S,-*
Units contain three refrigerant circuits or systems. Evaporator and condenser coil refrigerant circuit 1 makes up stage 1 cooling. Evaporator and condenser coil refrigerant circuit 2 makes up stage 2 cooling. Evaporator and condenser coil refrigerant circuit 3 makes up stage 3 cooling. See figure 16.

210H, 240H, 300S -
Units contain four refrigerant circuits or systems. Evaporator and condenser coil refrigerant circuit 1 makes up stage 1 cooling. Evaporator and condenser refrigerant circuit 2 makes up stage 2 cooling. Evaporator and condenser refrigerant circuit 3 and 4 makes up stage 3 cooling. See figure 17.

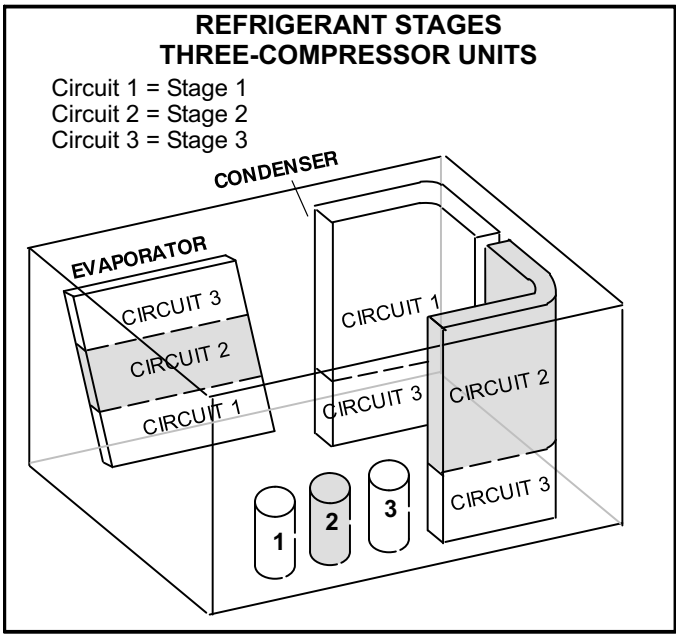


FIGURE 16

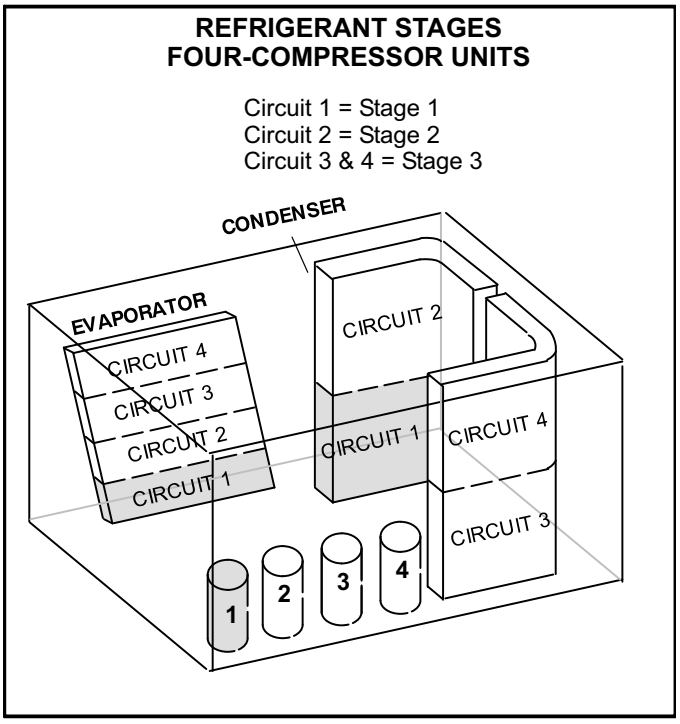


FIGURE 17

5- *180S & H, 210S, 240S,-*
First-stage thermostat demand will energize condenser fans 1 and 2. Second-stage thermostat demand will energize condenser fans 3 and 4. Fans will continue to operate with additional thermostat demands.

210H, 240H, 300S -
First-stage thermostat demand will energize condenser fans 1 and 2. See figure 18. Third-stage thermostat demand will energize condenser fans 3 and 4.

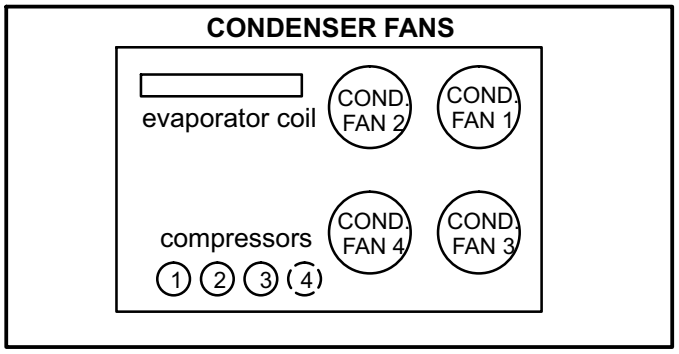


FIGURE 18

6- Each refrigerant circuit is separately charged with HCFC22 refrigerant. See unit rating plate for correct amount of charge.

7- Refer to Cooling Operation and Adjustment section for proper method to check refrigerant charge.

IV-CHARGING

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly.

Failure to follow this warning may result in personal injury or death.

WARNING-Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires charge, *reclaim the charge, evacuate the system,* and *add required nameplate charge.*

*NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C) , the charge **must** be weighed into the system.*

If weighing facilities are not available, or to check the charge, use the following procedure:

1- Attach gauge manifolds and operate unit in cooling mode until system stabilizes (approximately five minutes). Make sure outdoor air dampers are closed.

2- Check each system separately with all stages operating.

3- Use a thermometer to accurately measure the outdoor ambient temperature.

4- Apply the outdoor temperature to tables 9 through 15 to determine normal operating pressures.

5- Compare the normal operating pressures to the pressures obtained from the gauges. Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system. **Correct any system problems before proceeding.**

6- If discharge pressure is high, remove refrigerant from the system. If discharge pressure is low, add refrigerant to the system.

- Add or remove charge in increments.
- Allow the system to stabilize each time refrigerant is added or removed.

7- Use the following approach method along with the normal operating pressures to confirm readings.

TABLE 9
TCA180S NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	172	75	178	78	181	78
75°F	199	77	205	80	210	80
85°F	228	79	237	82	242	81
95°F	258	80	271	83	274	82
105°F	293	82	309	84	312	84
115°F	331	83	348	85	350	85

TABLE 10
TCA180H NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	158	72	159	74	158	74
75°F	183	76	186	79	184	78
85°F	210	78	214	81	211	79
95°F	239	79	245	83	241	81
105°F	270	81	278	84	273	82
115°F	304	82	313	86	306	84

TABLE 11
TCA210S NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	188	66	191	67	194	71
75°F	213	69	217	70	220	73
85°F	242	71	247	74	252	74
95°F	275	73	281	76	286	76
105°F	308	75	315	77	321	77
115°F	347	77	355	79	361	79

TABLE 12
TCA210H NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3		CIRCUIT 4	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	170	77	173	80	172	80	168	80
75°F	197	78	198	81	197	81	193	81
85°F	223	79	225	82	225	82	221	82
95°F	255	81	255	83	257	83	252	83
105°F	289	83	287	84	293	85	287	85
115°F	329	85	323	86	333	87	327	87

TABLE 13
TCA240S NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	185	69	182	73	183	72
75°F	212	71	209	75	210	74
85°F	236	72	233	75	234	75
95°F	267	73	265	76	264	75
105°F	297	74	301	77	300	76
115°F	335	76	340	78	338	78

TABLE 14
TCA240H NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3		CIRCUIT 4	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	179	75	181	79	174	79	176	79
75°F	207	76	208	81	203	79	204	80
85°F	239	78	238	82	233	80	234	81
95°F	272	80	270	83	266	83	266	83
105°F	307	83	303	84	301	84	300	85
115°F	351	85	342	85	343	86	342	86

TABLE 15
TCA300S NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3		CIRCUIT 4	
	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc. ±5 psig	Dis. ±10 psig	Suc ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	185	69	183	70	186	72	179	71
75°F	213	72	210	74	215	76	207	75
85°F	247	75	241	77	249	78	240	78
95°F	280	77	271	78	281	80	271	79
105°F	320	79	309	79	317	81	307	80
115°F	361	81	346	80	358	82	345	82

Charge Verification - Approach Method

1- Using the same thermometer, compare liquid temperature to outdoor ambient temperature.

Approach Temperature = Liquid temperature minus ambient temperature.

2- Approach temperatures should match values in table 16. An approach temperature greater than this value indicates an undercharge. An approach temperature less than this value indicates an overcharge.

3- Do not use the approach method if system pressures do not match pressures in tables 9 through 15. The approach method is not valid for grossly over or undercharged systems.

TABLE 16
APPROACH TEMPERATURES

Unit	Liquid Temp. Minus Ambient Temp.			
	1st Stage	2nd Stage	3rd Stage	4th Stage
180S 210S 240S 180H	7°F ± 1 (3.9°C ± 0.5)	7°F ± 1 (3.9°C ± 0.5)	7°F ± 1 (3.9°C ± 0.5)	NA
210H	9°F ± 1 (5°C ± 0.5)	7°F ± 1 (3.9°C ± 0.5)	8°F ± 1 (4.4°C ± 0.5)	8°F ± 1 (4.4°C ± 0.5)
240H	10°F ± 1 (5.6°C ± 0.5)	9°F ± 1 (5°C ± 0.5)	9°F ± 1 (5°C ± 0.5)	10°F ± 1 (5.6°C ± 0.5)
300S	14°F ± 1 (7.8°C ± 0.5)	12°F ± 1 (6.7°C ± 0.5)	12°F ± 1 (6.7°C ± 0.5)	12°F ± 1 (6.7°C ± 0.5)

V- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

TCA units are factory charged and require no further adjustment; however, charge should be checked periodically using the approach method. The approach method compares actual liquid temperature with the outdoor ambient temperature. See section IV-CHARGING.

NOTE-When unit is properly charged discharge line pressures should approximate those in tables 9 through 15.

VI-MAINTENANCE

⚠ CAUTION

Electrical shock hazard. Turn off power to unit before performing any maintenance, cleaning or service operation on the unit.

⚠ CAUTION

Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.

⚠WARNING

Product contains fiberglass wool.
Disturbing the insulation in this product during installation, maintenance, or repair will expose you to fiberglass wool. Breathing this may cause lung cancer. (Fiberglass wool is known to the State of California to cause cancer.)
Fiberglass wool may also cause respiratory, skin, and eye irritation.
To reduce exposure to this substance or for further information, consult material safety data sheets available from address shown on unit nameplate or contact your supervisor.

A-Filters

Units are equipped with six 24 X 24 X 2" filters. Filters should be checked and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters. See figure 19.

NOTE-Filters must be U.L.C. certified or equivalent for use in Canada.

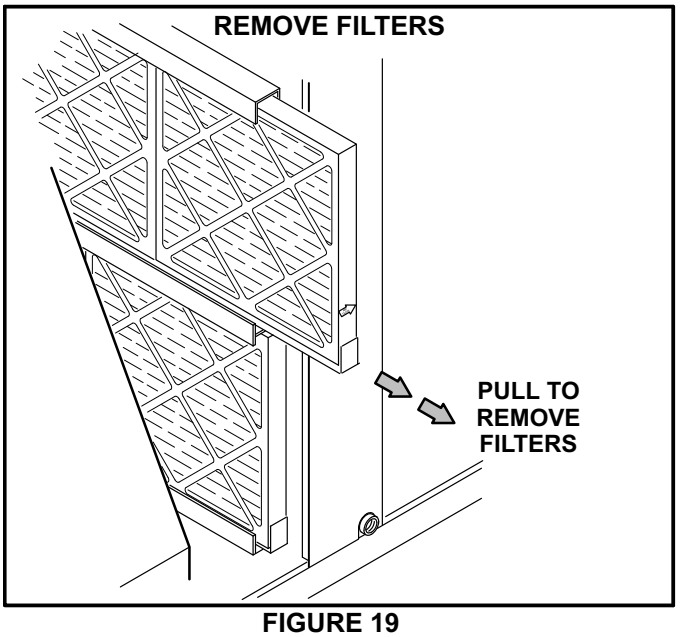


FIGURE 19

B-Lubrication

All motors used in TCA units are factory lubricated, no further lubrication is required.

Blower shaft bearings are prelubricated. For extended bearing life, relubricate at least once every two years with a lithium base grease such as Alvania 3 (Shell Oil), Chevron BRB2 (Standard OIl) or Regal AFB2 (Texas Oil). Use a hand grease gun for lubrication. Add only enough grease to purge through the bearings so that a bead of grease appears at the seal lip contacts.

C-Supply Air Blower Wheel

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

D-Evaporator Coil

Inspect and clean coil at beginning of each season. Clean using mild detergent or commercial coil cleanser. Check condensate drain pan and line, if necessary. Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet.

E-Condenser Coil

Clean condenser coil annually with detergent or commercial coil cleaner and inspect monthly during the cooling season.
Condenser coils are made of two formed slabs. Dirt and debris may become trapped between the slabs. To clean between slabs, carefully separate coil slabs and wash them thoroughly. See figure 20. Flush coils with water following cleaning.
Note - Remove all screws and gaskets prior to cleaning procedure and replace upon completion.

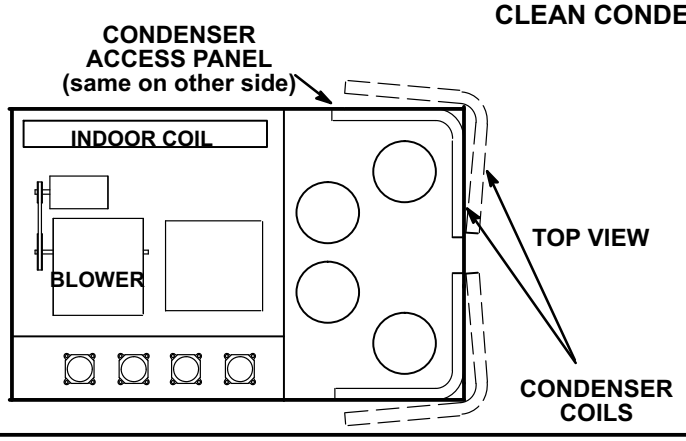
F-Electrical

1- Check all wiring for loose connections.

2- Check for correct voltage at unit (unit operating).

3- Check amp-draw on both condenser fan motor and blower motor.
Fan Motor Rating Plate ____ Actual _____
Indoor Blower Motor Rating Plate____ Actual____

CLEAN CONDENSER COIL



1- Remove unit top panel and both condenser access panels.

2- Remove screws securing coil end plates to mullions.

3- Remove clips connecting coils slabs and separate slabs 3-4" (76-102mm).

4- Clean coils with detergent or commercial coil cleaner.

5- Rinse thoroughly with water and reassemble.

FIGURE 20

VII-ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be installed to the TGA units.

A-LARMF and LARMFH Mounting Frames

When installing either the TCA units on a combustible surface for downflow discharge applications, the LARMF18/36 14-inch or 24-inch (356 mm or 610mm) height roof mounting frame is used. For horizontal discharge applications, use LARMFH18/24 26-inch or 37-inch (660mm or 940mm) height roof mounting frame. This frame converts unit from down-flow to horizontal air flow. The 37 inch (940mm) horizontal frame meets National Roofing Code requirements. The roof mounting frames are recommended in all other applications but not required. If the TCA units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16" per linear foot or 5mm per meter in any direction.

The assembled LARMF18/36 mounting frame is shown in figure 21. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in figure 22. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

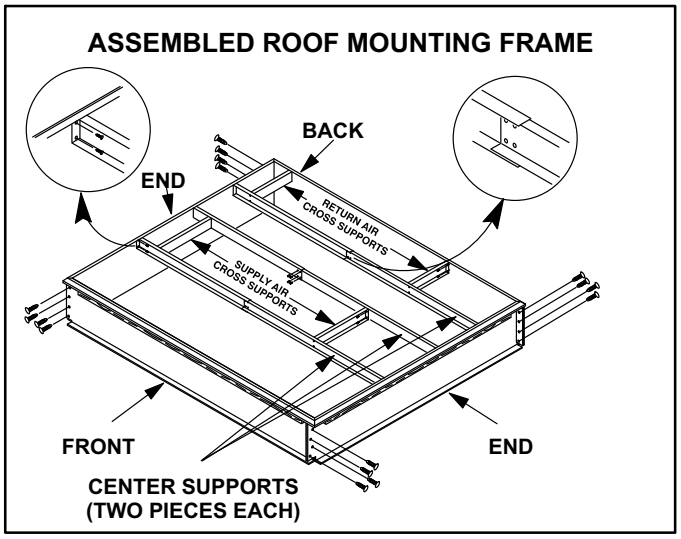


FIGURE 21

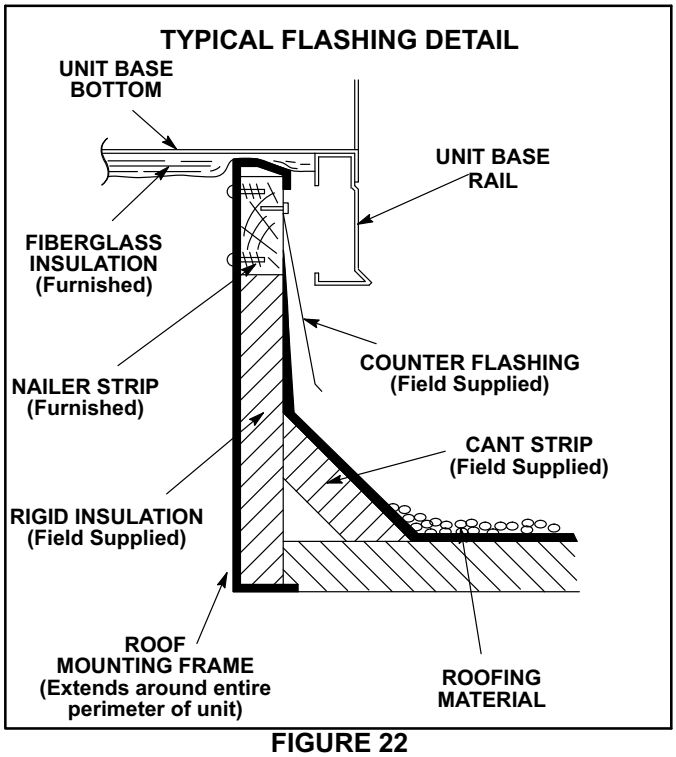


FIGURE 22

B-Transitions

Optional supply/return transitions LASRT18/24 are available for use with TCA series units utilizing optional LARMF18/36 roof mounting frame. Transition must be installed in the LARMF18/36 mounting frame before mounting the unit to the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures.

C-Supply and Return Diffusers (all units)

Optional flush mount diffuser/return FD11 and extended mount diffuser/return RTD11 are available for use with all TCA units. Refer to manufacturer's instructions included with transition for detailed installation procedures.

D-T1ECON

Unit may contain an optional modulating economizer equipped with an A6 enthalpy control and an A7 outdoor enthalpy sensor. The economizer modulates to use outdoor air for free cooling when temperature is suitable.

The A6 enthalpy control is located in the economizer access area. See figure 23. The A7 enthalpy sensor is located on the division panel between horizontal supply and return air sections.

Optional Sensors

An optional differential sensor (A62) may be used with the A7 outdoor sensor to compare outdoor air enthalpy to return air enthalpy. When the outdoor air enthalpy is below the return air enthalpy, outdoor air is used for free cooling.

A mixed air sensor (R1) is used in modulating the dampers to 55°F (13°C) blower compartment air temperature.

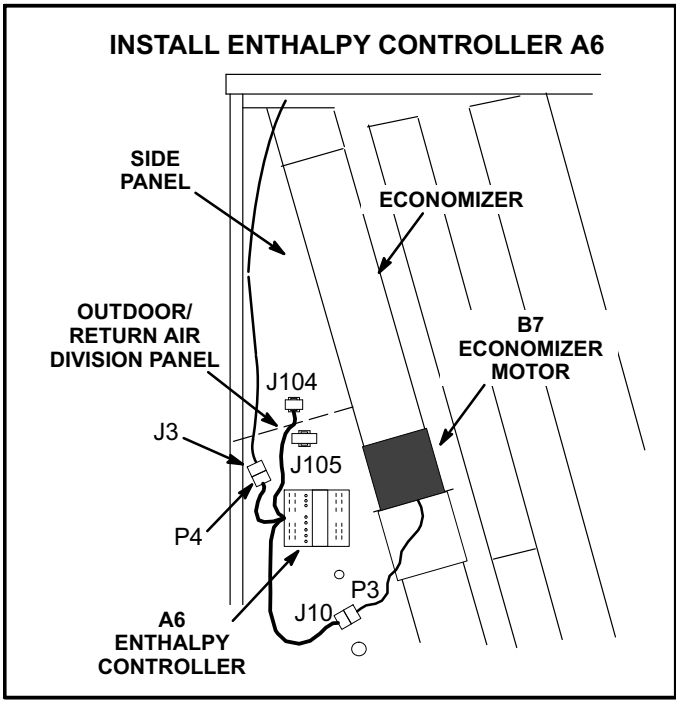


FIGURE 23

An optional IAQ sensor (A63) may be used to lower operating costs by controlling outdoor air based on CO_2 level or room occupancy (also called demand control ventilation or DCV). Damper minimum position can be set lower than traditional minimum air requirements; dampers open to traditional ventilation requirements when CO_2 level reaches DCV (IAQ) setpoint.

Refer to instructions provided with sensors for installation.

A6 Enthalpy Control LED's

A steady green Free Cool LED indicates that outdoor air is suitable for free cooling.

When an optional IAQ sensor is installed, a steady green DCV LED indicates that the IAQ reading is higher than setpoint requiring more fresh air. See figure 24.

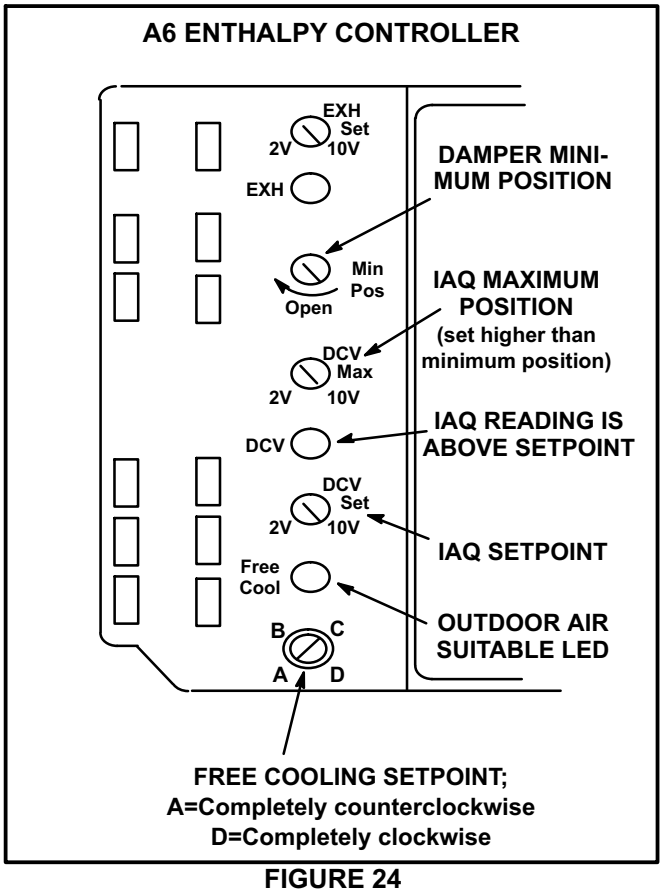


FIGURE 24

Free Cooling Setpoint

Outdoor air is considered suitable when temperature and humidity are less than the free cooling setpoints shown in table 17. Setting A is recommended. See figure 24. At setting A, free cooling will be energized when outdoor air is approximately 73°F (23°C) and 50% relative humidity. If indoor air is too warm or humid, lower the setpoint to B. At setting B, free cooling will be energized at 70°F (21°C) and 50% relative humidity.

When an optional A62 differential sensor is installed, turn A6 enthalpy control free cooling setpoint potentiometer completely clockwise to position "D".

TABLE 17
ENTHALPY CONTROL SETPOINTS

Control Setting	Free Cooling Setpoint At 50% RH
A	73° F (23° C)
B	70° F (21° C)
C	67° F (19° C)
D	63° F (17° C)

Damper Minimum Position

NOTE - A jumper is factory-installed between TB1 A1 and A2 terminals to maintain occupied status (allowing minimum fresh air). When using an electronic thermostat or energy management system with an occupied/unoccupied feature, remove jumper.

1- Set thermostat to occupied mode if the feature is available. Make sure jumper is in place between A45 control board TB1 terminals A1 and A2 if using a thermostat which does not have the feature.

2- Rotate MIN POS SET potentiometer to approximate desired fresh air percentage.

Note - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified. Dampers will open to DCV MAX setting (if CO2 is above setpoint) to meet traditional ventilation requirements.

3- Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point “A” (40°F, 4°C shown).

4- Measure return air temperature. Mark that point on the top line of chart 1 and label the point “B” (74°F, 23°C shown).

5- Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point “C” (70°F, 21°C shown).

6- Draw a straight line between points A and B.

7- Draw a vertical line through point C.

8- Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

9- If fresh air percentage is less than desired, adjust MIN POS SET potentiometer higher. If fresh air percentage is more than desired, adjust MIN POS SET potentiometer lower. Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

DCV Set and Max Settings

Adjust settings when an optional IAQ sensor is installed.

The DCV SET potentiometer is factory-set at approximately 50% of the potentiometer range. Using a standard 1-2000ppm CO_2 sensor, dampers will start to open when the IAQ sensor reads approximately 1000ppm. Adjust the DCV SET potentiometer to the approximate setting specified by the controls contractor. Refer to figure 24.

The DCV MAX potentiometer is factory-set at approximately 50% of the potentiometer range or 6VDC. Dampers will open approximately half way when CO_2 rises above setpoint. Adjust the DCV MAX potentiometer to the approximate setting specified by the controls contractor. Refer to figure 24.

Note - DCV Max must be set higher than economizer minimum position setting for proper demand control ventilation.

Economizer Operation

The occupied time period is determined by the thermostat or energy management system.

Outdoor Air Not Suitable:

During the unoccupied time period dampers are closed.

During the occupied time period a cooling demand will open dampers to minimum position and mechanical cooling functions normally. See table 18.

During the occupied time period dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability).

Outdoor Air Suitable:

See table 19 for economizer operation with a standard three-stage thermostat.

During the occupied period, dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability). DCV MAX will NOT override damper full-open position. When an R1 mixed air sensor for modulating dampers is installed, DCV MAX may override damper free cooling position when occupancy is high and outdoor air temperatures are low. If R1 senses discharge air temperature below 45°F (7°C), dampers will move to minimum position until discharge air temperature rises to 48°F (9°C).

B-Outdoor Air Dampers

T1DAMP20 used on TCA units consists of a set of dampers which may be manually or motor (M) operated to allow outside air into the system (see figure 27). Either air damper can be installed in TCA units.The motorized damper assembly opens to minimum position during the occupied time period and remains closed during the unoccupied period. Manual damper assembly is set at installation and remains in that position. See figure 25. Washable filter supplied with the outdoor air dampers can be cleaned with water and a mild detergent. It should be sprayed with Filter Handicoater when dry prior to reinstallation. Filter Handicoater is R.P. Products coating no. 418.

Optional manual and motorized outdoor air dampers provide fresh outdoor air.

Follow the steps to determine fresh air percentage

1- Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point “A” (40°F, 4°C shown).

2- Measure return air temperature. Mark that point on the top line of chart 1 and label the point “B” (74°F, 23°C shown).

3- Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point “C” (70°F, 21°C shown).

4- Draw a straight line between points A and B.

5- Draw a vertical line through point C.

6- Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

7- If fresh air percentage is less than desired, adjust thumbwheel higher. If fresh air percentage is more than desired, adjust thumbwheel lower. Repeat steps until calculation reads desired fresh air percentage. See figure 26.

Set damper minimum position in the same manner as economizer minimum position. Adjust motorized damper position using the thumbwheel on the damper motor. See figure 26. Manual damper fresh air intake percentage can be determined in the same manner.

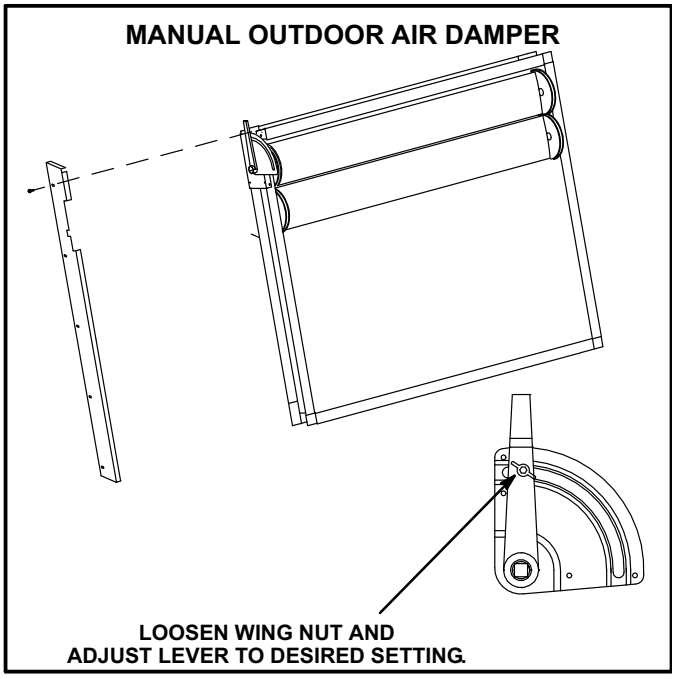


FIGURE 25

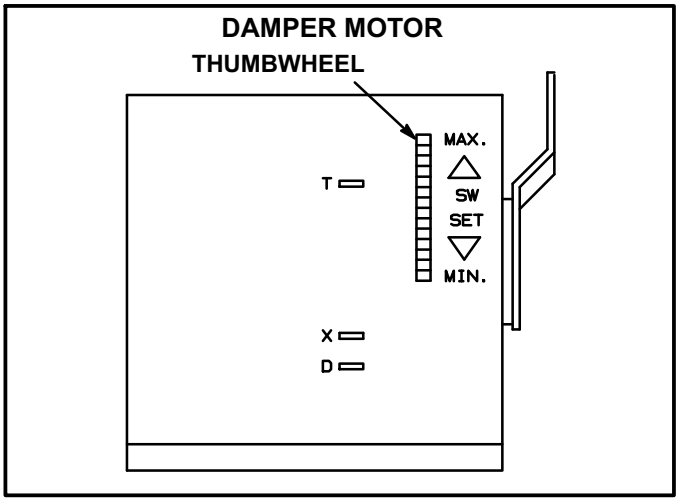


FIGURE 26

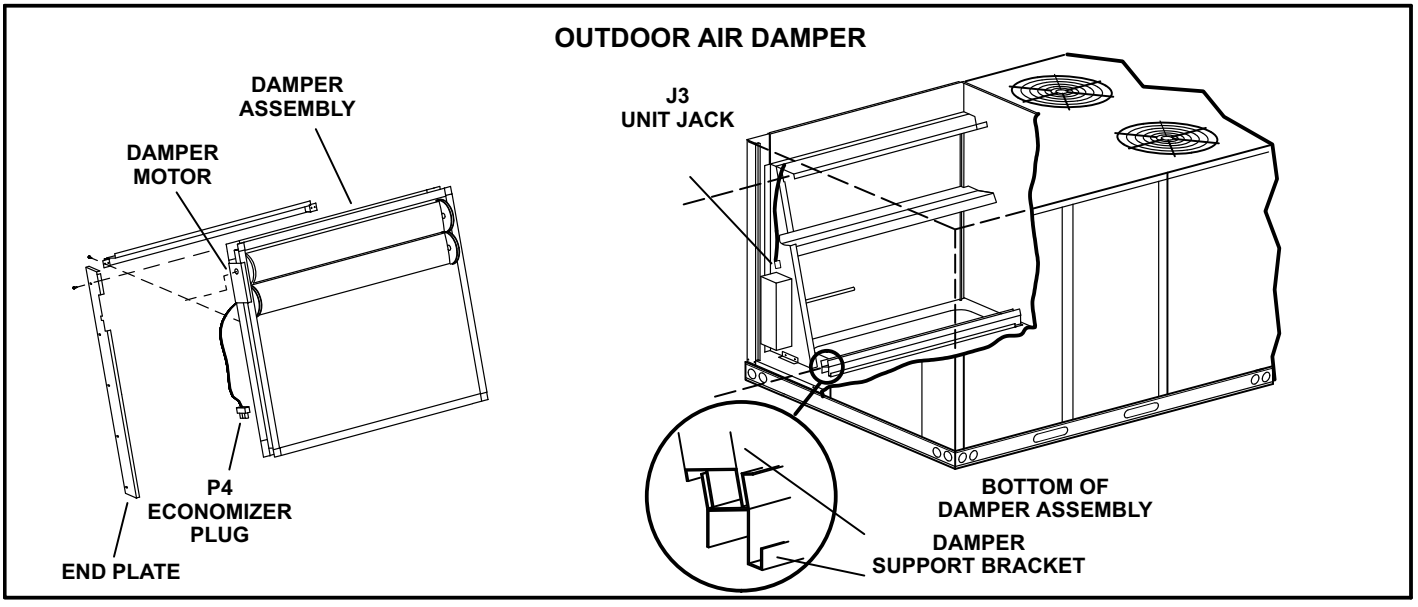


FIGURE 27

CHART 1
CALCULATE MINIMUM FRESH AIR PERCENTAGE

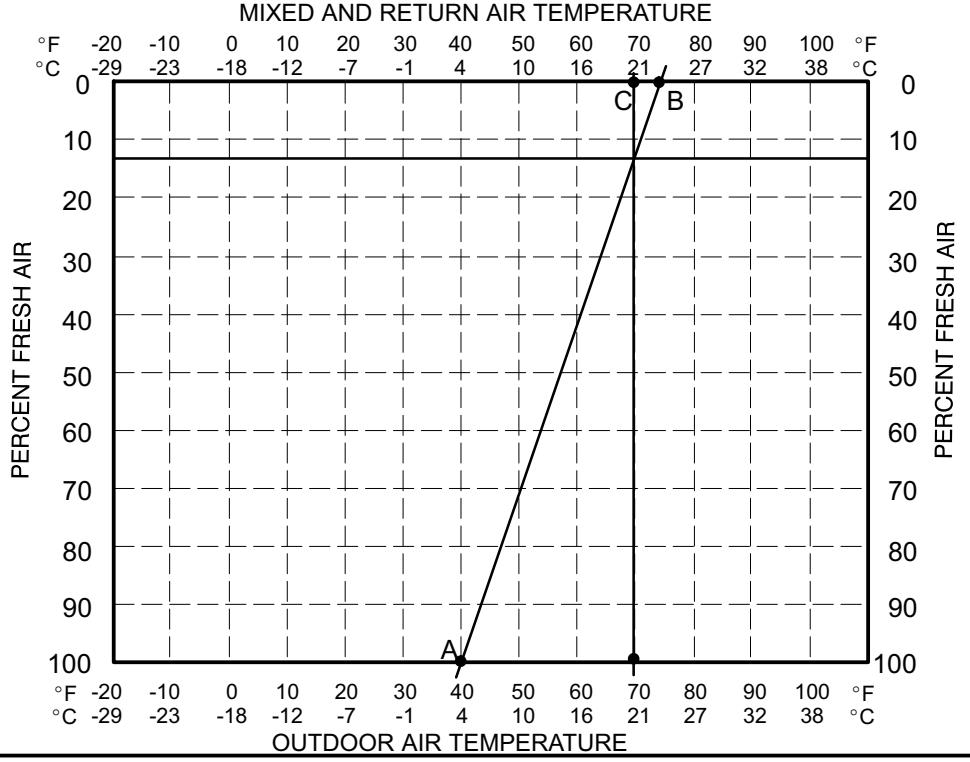


TABLE 18

ECONOMIZER OPERATION-OUTDOOR AIR IS **NOT SUITABLE** FOR FREE COOLING – FREE COOL LED "OFF"

THERMOSTAT DEMAND	DAMPER POSITION		MECHANICAL COOLING
	UNOCCUPIED	**OCCUPIED**	
Off	Closed	Closed	No
G	Closed	Minimum*	No
Y1	Closed	Minimum*	Stage 1
Y2	Closed	Minimum*	Stage 2
Y3	Closed	Minimum*	Stage 3

*IAQ sensor can open damper to DCV max.

TABLE 19

ECONOMIZER OPERATION-OUTDOOR AIR IS **SUITABLE** FOR FREE COOLING – FREE COOL LED "ON"

THERMOSTAT DEMAND	DAMPER POSITION		MECHANICAL COOLING
	UNOCCUPIED	**OCCUPIED**	
Off	Closed	Closed	No
G	Closed	Minimum	No
Y1	Modulating	Modulating	No
Y2	Modulating	Modulating	Stage 1
Y3	Modulating	Modulating	Stage 2

E-LAGED(H) Gravity Exhaust Dampers

LAGED18/24 dampers (figure 28) available for TCA180/300 units, are used in downflow and LAGED(H)18/24 are used in horizontal air discharge applications. LAGED(H) gravity exhaust dampers are installed in the return air plenum . The dampers must be used any time an economizer or power exhaust fans are applied to TCA series units.

Gravity exhaust dampers allow exhaust air to be discharged from the system when an economizer and/or power exhaust is operating. Gravity exhaust dampers also prevent outdoor air infiltration during unit off cycle. See installation instructions for more detail.

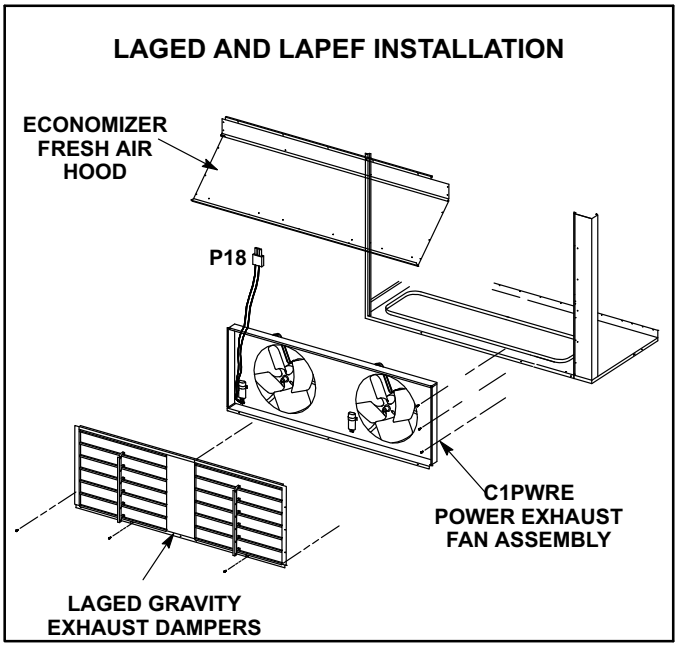


FIGURE 28

F-C1PWRE20C Power Exhaust Fans

C1PWRE20C available for TCA180/300 units are power exhaust fans used in downflow applications only. The fans require optional down-flow gravity exhaust dampers and T1ECON economizers. Power exhaust fans provide exhaust air pressure relief and also run when return air dampers are closed and supply air blowers are operating. Figure 28 shows the location of the C1PWRE. See installation instructions for more detail.

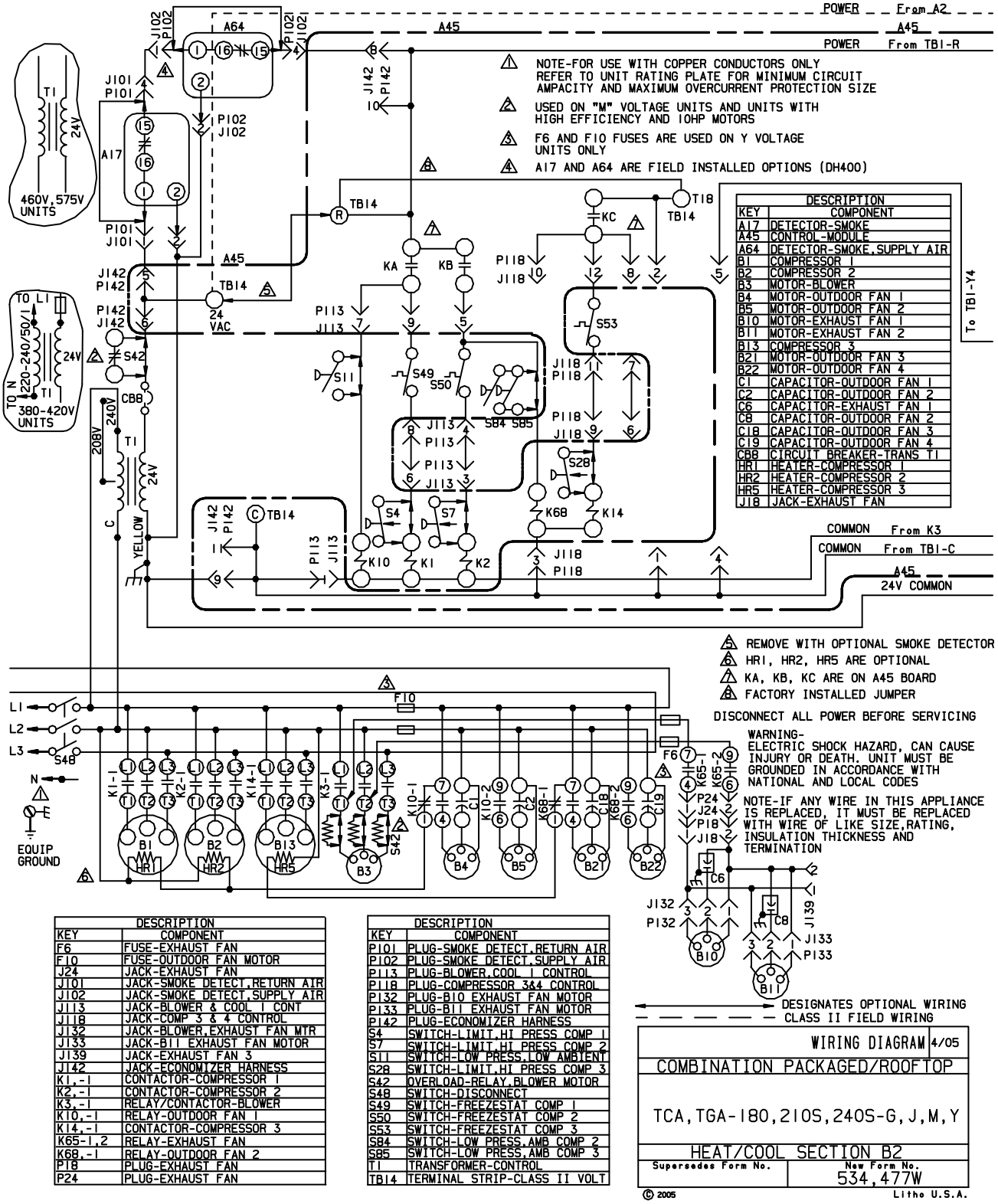
G-Dirty Filter Switch S27

The dirty filter switch senses static pressure increase indicating a dirty filter condition. The switch is N.O. and closes at 1" W.C. (248.6 Pa) The switch is mounted on the top filter channel corner.

H-Indoor Air Quality (CO_2) Sensor A63

The indoor air quality sensor monitors CO_2 levels and reports the levels to the economizer control module A6. The board adjusts the economizer dampers according to the CO_2 levels. The sensor is mounted next to the indoor thermostat or in the return air duct. Refer to the indoor air quality sensor installation instructions for proper adjustment.

TCA180S, 180H 210S, 240S UNIT DIAGRAM



DESCRIPTION	
KEY	COMPONENT
A17	DETECTOR-SMOKE
A45	CONTROL-MODULE
A64	DETECTOR-SMOKE,SUPPLY AIR
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR-BLOWER
B4	MOTOR-OUTDOOR FAN 1
B5	MOTOR-OUTDOOR FAN 2
B10	MOTOR-EXHAUST FAN 1
B11	MOTOR-EXHAUST FAN 2
B13	COMPRESSOR 3
B21	MOTOR-OUTDOOR FAN 3
B22	MOTOR-OUTDOOR FAN 4
C1	CAPACITOR-OUTDOOR FAN 1
C2	CAPACITOR-OUTDOOR FAN 2
C6	CAPACITOR-EXHAUST FAN 1
C8	CAPACITOR-OUTDOOR FAN 2
C18	CAPACITOR-OUTDOOR FAN 3
C19	CAPACITOR-OUTDOOR FAN 4
CB8	CIRCUIT BREAKER-TRANS T1
HR1	HEATER-COMPRESSOR 1
HR2	HEATER-COMPRESSOR 2
HR5	HEATER-COMPRESSOR 3
J18	JACK-EXHAUST FAN

DESCRIPTION	
KEY	COMPONENT
F6	FUSE-EXHAUST FAN
F10	FUSE-OUTDOOR FAN MOTOR
J24	JACK-EXHAUST FAN
J101	JACK-SMOKE DETECT,RETURN AIR
J102	JACK-SMOKE DETECT,SUPPLY AIR
J113	JACK-BLOWER & COOL 1 CONT
J118	JACK-COMP 3 & 4 CONTROL
J132	JACK-BLOWER,EXHAUST FAN MTR
J133	JACK-B11 EXHAUST FAN MOTOR
J139	JACK-EXHAUST FAN 3
J142	JACK-ECONOMIZER HARNESS
K1,-1	CONTACTOR-COMPRESSOR 1
K2,-1	CONTACTOR-COMPRESSOR 2
K3,-1	RELAY/CONTACTOR-BLOWER
K10,-1	RELAY-OUTDOOR FAN 1
K14,-1	CONTACTOR-COMPRESSOR 3
K65-1,2	RELAY-EXHAUST FAN
K68,-1	RELAY-OUTDOOR FAN 2
P18	PLUG-EXHAUST FAN
P24	PLUG-EXHAUST FAN

DESCRIPTION	
KEY	COMPONENT
P101	PLUG-SMOKE DETECT,RETURN AIR
P102	PLUG-SMOKE DETECT,SUPPLY AIR
P113	PLUG-BLOWER,COOL 1 CONTROL
P118	PLUG-COMPRESSOR 3&4 CONTROL
P132	PLUG-B10 EXHAUST FAN MOTOR
P133	PLUG-B11 EXHAUST FAN MOTOR
P142	PLUG-ECONOMIZER HARNESS
S4	SWITCH-LIMIT,HI PRESS COMP 1
S7	SWITCH-LIMIT,HI PRESS COMP 2
S11	SWITCH-LOW PRESS,LOW AMBIENT
S28	SWITCH-LIMIT,HI PRESS COMP 3
S42	OVERLOAD-RELAY,BLOWER MOTOR
S48	SWITCH-DISCONNECT
S49	SWITCH-FREEZESTAT COMP 1
S50	SWITCH-FREEZESTAT COMP 2
S53	SWITCH-FREEZESTAT COMP 3
S84	SWITCH-LOW PRESS,AMB COMP 2
S85	SWITCH-LOW PRESS,AMB COMP 3
T1	TRANSFORMER-CONTROL
TB14	TERMINAL STRIP-CLASS II VOLT

WIRING DIAGRAM	4/05
COMBINATION PACKAGED/ROOFTOP	
TCA,TGA-180,210S,240S-G,J,M,Y	
HEAT/COOL SECTION B2	
Supersedes Form No.	New Form No. 534,477W

TCA180S, 180H, 210S, 240S SEQUENCE OF OPERATION

Power:

1. Line voltage from unit disconnect S48 or TB2 if equipped, energizes transformer T1. T1 provides 24VAC to the unit cooling, heating and blower controls and TB1 and TB14.

Blower Operation:

2. The main control module receives a demand from thermostat terminal G. A45 energizes blower contactor K3 with 24VAC.
3. N.O. K3 closes, energizing blower B3.

Optional Power Exhaust Operation:

4. The economizer control module receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).
5. N.O. K65-1 and N.O. K65-2 both close, energizing exhaust fan motors B10 and B11.

1st Stage Cooling (compressor B1)

6. First stage cooling demand Y1 and G is energized by the thermostat. G energizes blower.
7. 24VAC is routed from P113 on module A45 through N.C. freezestat S49, optional N.C. high pressure switch S4 to energize compressor contactor K1.
8. N.O. contacts K1 close energizing compressor B1.
9. Optional N.O. low ambient switch S11 closes to energize condenser fan relay K10.
10. N.O. contacts K10-1 and K10-2 close energizing condenser fan B4 and B5.

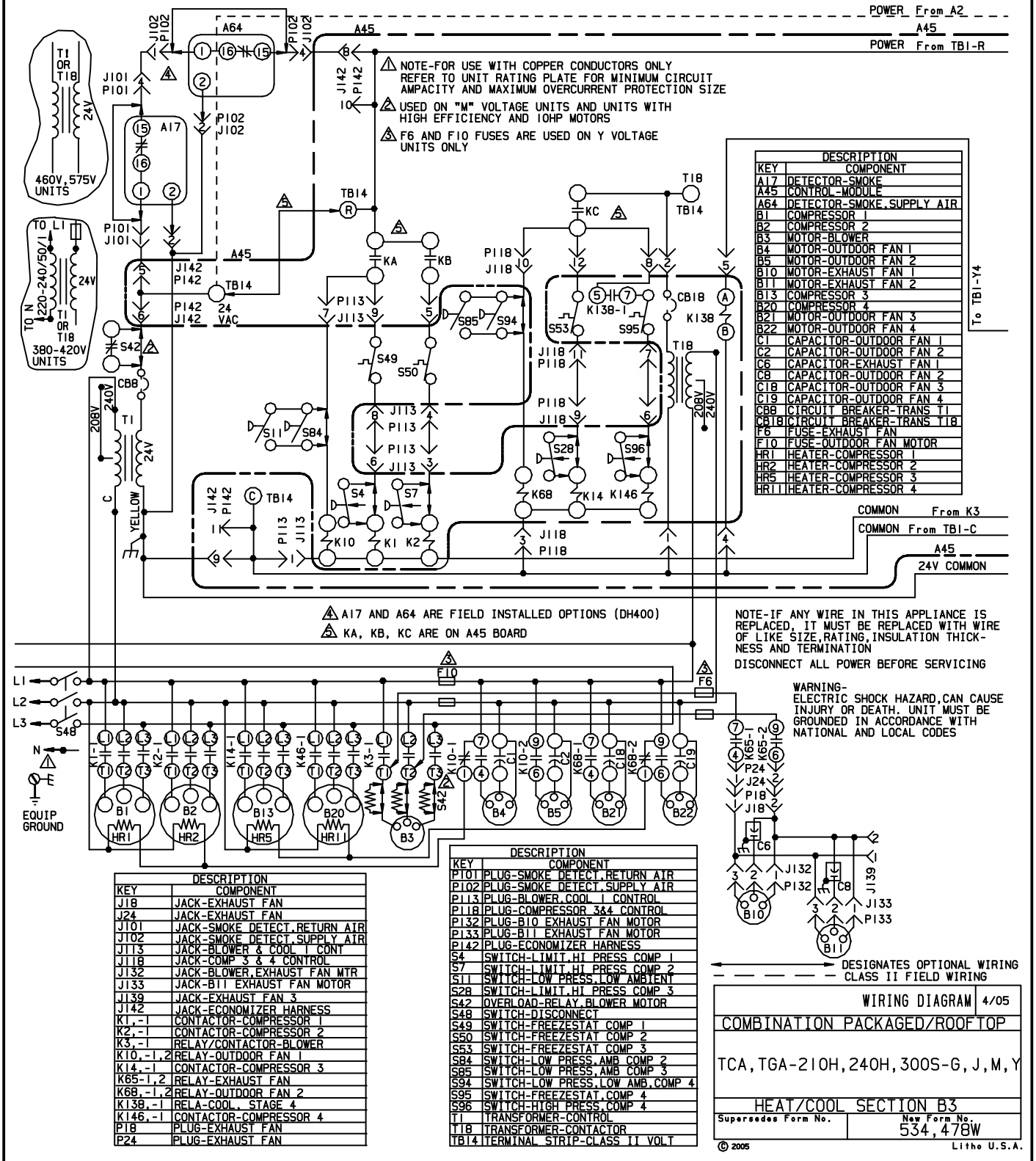
2nd Stage Cooling (compressor B2 is energized)

11. Second stage cooling demand energizes Y2.
12. 24VAC is routed from P113 on module A45 through N.C. freezestat S50, optional N.C. high pressure switch S7 to energize compressor contactor K2.
13. N.O. K2 closes energizing compressor B2.
14. Optional N.O. low ambient switch S84 closes to energize condenser fan relay K68.
15. .N.O. contacts K68-1 and K68-2 close energizing condenser fans B21 and B22.

3rd Stage Cooling (compressor B13 is energized)

16. Third stage cooling demand energizes Y3.
17. 24VAC is routed from P118 on module A45 through N.C. freezestat S53, optional N.C. high pressure switch S28 to energize compressor contactor K14.
18. N.O. K14 closes energizing compressor B13.

TCA210H, 240H, 300S UNIT DIAGRAM



DESCRIPTION	
KEY	COMPONENT
A17	DETECTOR-SMOKE
A45	CONTROL-MODULE
A64	DETECTOR-SMOKE,SUPPLY AIR
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR-BLOWER
B4	MOTOR-OUTDOOR FAN 1
B5	MOTOR-OUTDOOR FAN 2
B10	MOTOR-EXHAUST FAN 1
B11	MOTOR-EXHAUST FAN 2
B13	COMPRESSOR 3
B20	COMPRESSOR 4
B21	MOTOR-OUTDOOR FAN 3
B22	MOTOR-OUTDOOR FAN 4
C1	CAPACITOR-OUTDOOR FAN 1
C2	CAPACITOR-OUTDOOR FAN 2
C6	CAPACITOR-EXHAUST FAN 1
C8	CAPACITOR-OUTDOOR FAN 2
C18	CAPACITOR-OUTDOOR FAN 3
C19	CAPACITOR-OUTDOOR FAN 4
CB8	CIRCUIT BREAKER-TRANS T1
CB18	CIRCUIT BREAKER-TRANS T18
F6	FUSE-EXHAUST FAN
F10	FUSE-OUTDOOR FAN MOTOR
HR1	HEATER-COMPRESSOR 1
HR2	HEATER-COMPRESSOR 2
HR5	HEATER-COMPRESSOR 3
HR11	HEATER-COMPRESSOR 4

DESCRIPTION	
KEY	COMPONENT
J18	JACK-EXHAUST FAN
J24	JACK-EXHAUST FAN
J101	JACK-SMOKE DETECT.RETURN AIR
J102	JACK-SMOKE DETECT.SUPPLY AIR
J113	JACK-BLOWER & COOL 1 CONT
J118	JACK-COMP 3 & 4 CONTROL
J132	JACK-BLOWER,EXHAUST FAN MTR
J133	JACK-B11 EXHAUST FAN MOTOR
J139	JACK-EXHAUST FAN 3
J142	JACK-ECONOMIZER HARNESS
K1,-1	CONTACTOR-COMPRESSOR 1
K2,-1	CONTACTOR-COMPRESSOR 2
K3,-1	RELAY/CONTACTOR-BLOWER
K10,-1,2	RELAY-OUTDOOR FAN 1
K14,-1	CONTACTOR-COMPRESSOR 3
K65-1,2	RELAY-EXHAUST FAN
K68,-1,2	RELAY-OUTDOOR FAN 2
K138,-1	RELA-COOL, STAGE 4
K146,-1	CONTACTOR-COMPRESSOR 4
P18	PLUG-EXHAUST FAN
P24	PLUG-EXHAUST FAN

DESCRIPTION	
KEY	COMPONENT
P101	PLUG-SMOKE DETECT.RETURN AIR
P102	PLUG-SMOKE DETECT.SUPPLY AIR
P113	PLUG-BLOWER,COOL 1 CONTROL
P118	PLUG-COMPRESSOR 3&4 CONTROL
P132	PLUG-B10 EXHAUST FAN MOTOR
P133	PLUG-B11 EXHAUST FAN MOTOR
P142	PLUG-ECONOMIZER HARNESS
S4	SWITCH-LIMIT,HI PRESS COMP 1
S7	SWITCH-LIMIT,HI PRESS COMP 2
S11	SWITCH-LOW PRESS,LOW AMBIENT
S28	SWITCH-LIMIT,HI PRESS COMP 3
S42	OVERLOAD-RELAY,BLOWER MOTOR
S48	SWITCH-DISCONNECT
S49	SWITCH-FREEZESTAT COMP 1
S50	SWITCH-FREEZESTAT COMP 2
S53	SWITCH-FREEZESTAT COMP 3
S84	SWITCH-LOW PRESS,AMB COMP 2
S85	SWITCH-LOW PRESS,AMB COMP 3
S94	SWITCH-LOW PRESS,LOW AMB,COMP 4
S95	SWITCH-FREEZESTAT,COMP 4
S96	SWITCH-HIGH PRESS,COMP 4
T1	TRANSFORMER-CONTROL
T18	TRANSFORMER-CONTACTOR
TB14	TERMINAL STRIP-CLASS II VOLT

WIRING DIAGRAM	4/05
COMBINATION PACKAGED/ROOFTOP	
TCA,TGA-210H,240H,300S-G,J,M,Y	
HEAT/COOL SECTION B3	
Supersedes Form No.	New Form No. 534,478W

TCA210H, 240H, 300S SEQUENCE OF OPERATION

Power:

1. Line voltage from unit disconnect S48 or TB2 if equipped, energizes transformer T1. T1 provides 24VAC to the unit cooling, heating and blower controls and TB1 and TB14.

Blower Operation:

2. The main control module receives a demand from thermostat terminal G. A45 energizes blower contactor K3 with 24VAC.
3. N.O. K3 closes, energizing blower B3.

Optional Power Exhaust Operation:

4. The economizer control module receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).
5. N.O. K65-1 and N.O. K65-2 both close, energizing exhaust fan motors B10 and B11.

1st Stage Cooling (compressor B1)

6. First stage cooling demand Y1 and G is energized by the thermostat. G energizes blower.
7. 24VAC is routed from main control module A45, P113 to N.C. freezestats S49, optional N.C. high pressure switch S4. Compressor contactor K1 is energized.
8. N.O. contacts K1 closes energizing compressor B1.
9. Optional N.O. low ambient switch S11 closes to energize condenser fan relay K10.
10. N.O. contacts K10-1 and K10-2 close energizing condenser fan B4 and B5.

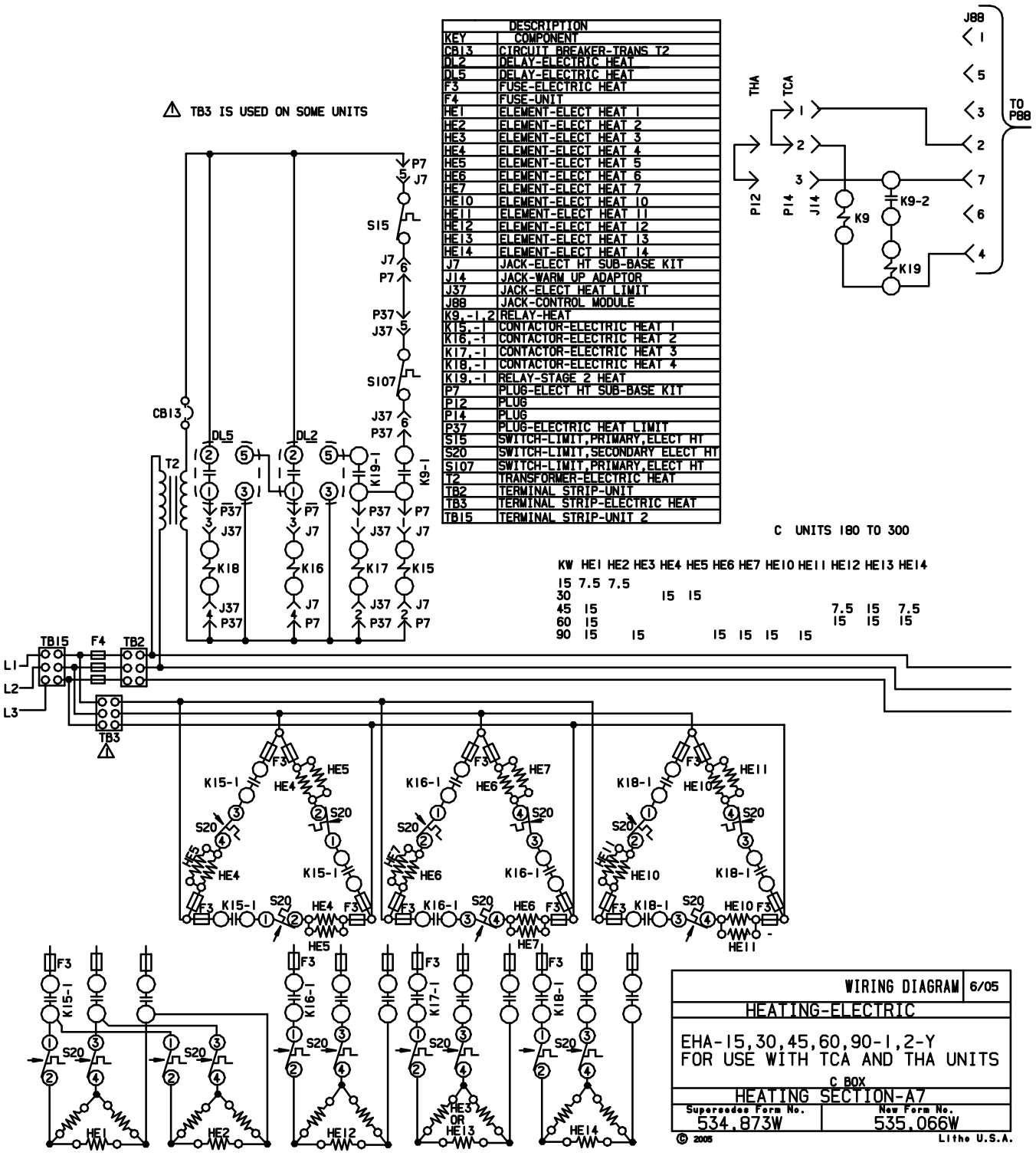
2nd Stage Cooling (compressor B2 is energized)

11. Second stage cooling demand energizes Y2.
12. 24VAC is routed from module A45 P113 to N.C. freezestat S50, optional N.C. high pressure switch S7. Compressor contactor K2 is energized.
13. N.O. K2 closes energizing compressor B2.
14. Optional N.O. low ambient switch S84 closes. (S84 and S11 are wired in parallel)

3rd Stage Cooling (compressor B13 and B20 are energized)

15. Third stage cooling demand energizes Y3.
16. 24VAC is routed from main control module A45 , P118 to N.C. freezestats S53 and S95 then continues through optional N.C. high pressure switches S28 and S96. Compressor contactors K14 and K146 are energized.
17. N.O. K14 and K146 close energizing compressors B13 and B20.
18. Optional N.O. low ambient switches S28 and S96 (wired in parallel) close to energize condenser fan relay K68
19. N.O. contacts K68-1 and K68-2 close energizing fans B21 and B22.

EHA-15, 30, 45, 60, 90kW Y VOLTAGE



DESCRIPTION	
KEY	COMPONENT
CB13	CIRCUIT BREAKER-TRANS T2
DL2	DELAY-ELECTRIC HEAT
DL5	DELAY-ELECTRIC HEAT
F3	FUSE-ELECTRIC HEAT
F4	FUSE-UNIT
HE1	ELEMENT-ELECT HEAT 1
HE2	ELEMENT-ELECT HEAT 2
HE3	ELEMENT-ELECT HEAT 3
HE4	ELEMENT-ELECT HEAT 4
HE5	ELEMENT-ELECT HEAT 5
HE6	ELEMENT-ELECT HEAT 6
HE7	ELEMENT-ELECT HEAT 7
HE10	ELEMENT-ELECT HEAT 10
HE11	ELEMENT-ELECT HEAT 11
HE12	ELEMENT-ELECT HEAT 12
HE13	ELEMENT-ELECT HEAT 13
HE14	ELEMENT-ELECT HEAT 14
J7	JACK-ELECT HT SUB-BASE KIT
J14	JACK-WARM UP ADAPTOR
J37	JACK-ELECT HEAT LIMIT
J88	JACK-CONTROL MODULE
K9,-1,2	RELAY-HEAT
K15,-1	CONTACTOR-ELECTRIC HEAT 1
K16,-1	CONTACTOR-ELECTRIC HEAT 2
K17,-1	CONTACTOR-ELECTRIC HEAT 3
K18,-1	CONTACTOR-ELECTRIC HEAT 4
K19,-1	RELAY-STAGE 2 HEAT
P7	PLUG-ELECT HT SUB-BASE KIT
P12	PLUG
P14	PLUG
P37	PLUG-ELECTRIC HEAT LIMIT
S15	SWITCH-LIMIT,PRIMARY,ELECT HT
S20	SWITCH-LIMIT,SECONDARY ELECT HT
S107	SWITCH-LIMIT,PRIMARY,ELECT HT
T2	TRANSFORMER-ELECTRIC HEAT
TB2	TERMINAL STRIP-UNIT
TB3	TERMINAL STRIP-ELECTRIC HEAT
TB15	TERMINAL STRIP-UNIT 2

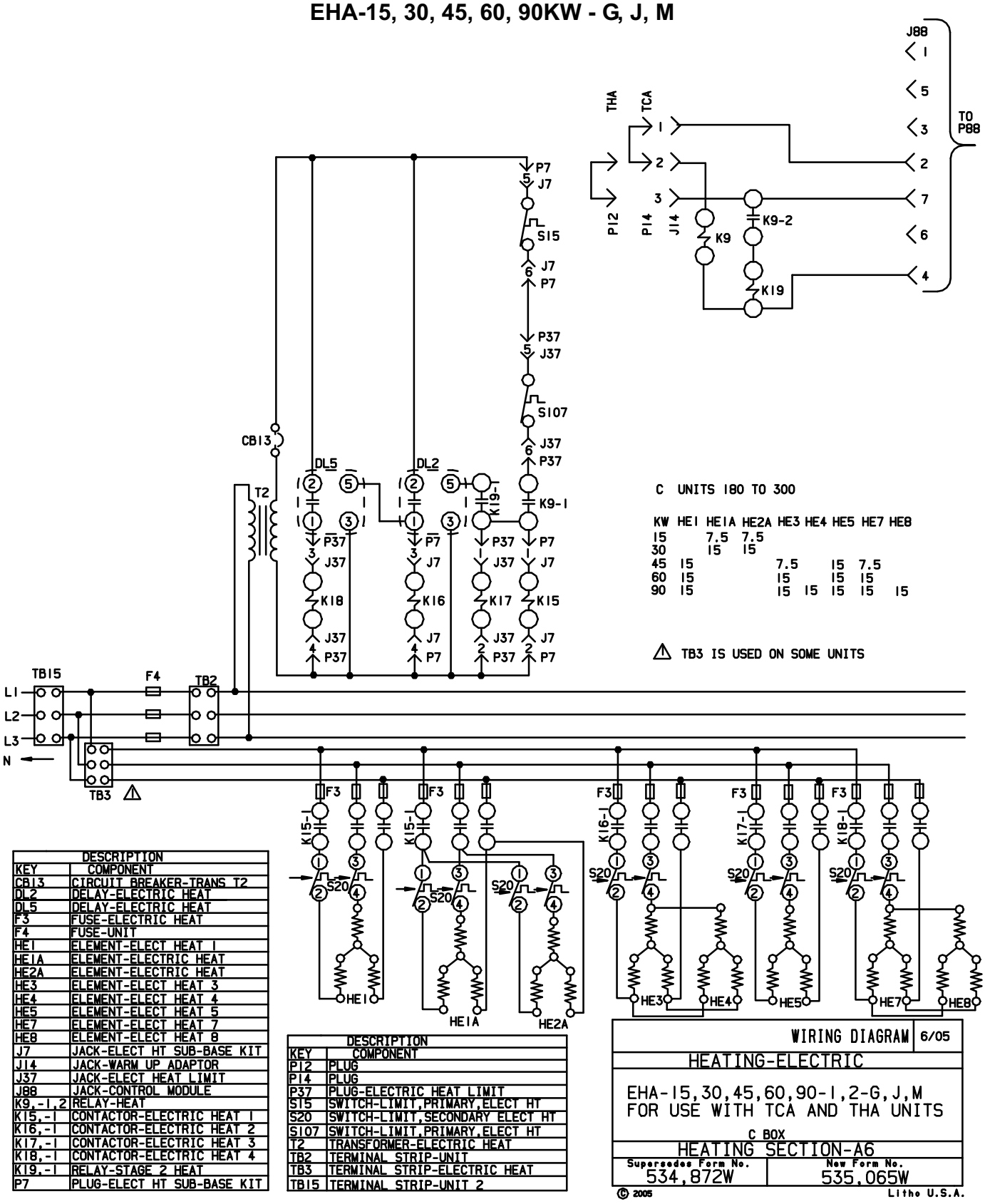
C UNITS 180 TO 300

KW	HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE10	HE11	HE12	HE13	HE14
15	7.5	7.5										
30			15	15								
45	15									7.5	15	7.5
60	15									15	15	15
90	15		15			15	15	15	15			

WIRING DIAGRAM	6/05
HEATING-ELECTRIC	
EHA-15,30,45,60,90-1,2-Y FOR USE WITH TCA AND THA UNITS	
C BOX HEATING SECTION-A7	
Supersedes Form No. 534.873W	New Form No. 535.066W

Litho U.S.A.

EHA-15, 30, 45, 60, 90KW - G, J, M



C UNITS 180 TO 300

KW	HE1	HE1A	HE2A	HE3	HE4	HE5	HE7	HE8
15		7.5	7.5					
30		15	15					
45	15			7.5		15	7.5	
60	15			15		15	15	
90	15			15	15	15	15	15

⚠ TB3 IS USED ON SOME UNITS

KEY	DESCRIPTION COMPONENT
CB13	CIRCUIT BREAKER-TRANS T2
DL2	DELAY-ELECTRIC HEAT
DL5	DELAY-ELECTRIC HEAT
F3	FUSE-ELECTRIC HEAT
F4	FUSE-UNIT
HE1	ELEMENT-ELECT HEAT 1
HE1A	ELEMENT-ELECTRIC HEAT
HE2A	ELEMENT-ELECTRIC HEAT
HE3	ELEMENT-ELECT HEAT 3
HE4	ELEMENT-ELECT HEAT 4
HE5	ELEMENT-ELECT HEAT 5
HE7	ELEMENT-ELECT HEAT 7
HE8	ELEMENT-ELECT HEAT 8
J7	JACK-ELECT HT SUB-BASE KIT
J14	JACK-WARM UP ADAPTOR
J37	JACK-ELECT HEAT LIMIT
J88	JACK-CONTROL MODULE
K9,-1,2	RELAY-HEAT
K15,-1	CONTACTOR-ELECTRIC HEAT 1
K16,-1	CONTACTOR-ELECTRIC HEAT 2
K17,-1	CONTACTOR-ELECTRIC HEAT 3
K18,-1	CONTACTOR-ELECTRIC HEAT 4
K19,-1	RELAY-STAGE 2 HEAT
P7	PLUG-ELECT HT SUB-BASE KIT

KEY	DESCRIPTION COMPONENT
P12	PLUG
P14	PLUG
P37	PLUG-ELECTRIC HEAT LIMIT
S15	SWITCH-LIMIT,PRIMARY,ELECT HT
S20	SWITCH-LIMIT,SECONDARY ELECT HT
S107	SWITCH-LIMIT,PRIMARY,ELECT HT
T2	TRANSFORMER-ELECTRIC HEAT
TB2	TERMINAL STRIP-UNIT
TB3	TERMINAL STRIP-ELECTRIC HEAT
TB15	TERMINAL STRIP-UNIT 2

WIRING DIAGRAM 6/05

HEATING-ELECTRIC

EHA-15,30,45,60,90-1,2-G,J,M
FOR USE WITH TCA AND THA UNITS

C BOX

HEATING SECTION-A6

Supersedes Form No.	New Form No.
534,872W	535,065W

Litho U.S.A.

Sequence of Operation -EHA15, 30, 45, 60, 90kW - Y and G, J, M

NOTE: This sequence of operation is for all Electric Heat kW ratings Y, G, J and M voltages.

HEATING ELEMENTS:

1- Terminal Strip TB15 supplies power to TB3. TB3 supplies line voltage to electric heat elements HE1 through HE14. Each element is protected by fuse F3.

FIRST STAGE HEAT:

Heating demand initiates at W1 in thermostat.

2 - 24VAC is routed from T2, proving N.C. primary limits S15 (first heat section) and S107 (second heat section). Voltage then energizes contactors K15 and K17. 24VAC is routed through module A45 P88 energizing relay K9. N.O. K9-1 close.

3 - N.O. contact K15-1 closes allowing the first bank of elements to be energized. N.O. K17-1 closes allowing the second bank of elements to be energized.

SECOND STAGE HEAT:

With the first stage heat operating, an additional heating demand initiates at W2 in the thermostat.

4 - Relay K19 is energized. N.O. contacts K19-1 close energizing timer DL2.

5 - After a 30 second delay, DL2 closes energizing contactor K16 and timer DL5.

6 - N.O. contacts K16-1 close allowing the third bank of elements to be energized.

7 - After a 30 second delay, DL5 closes energizing contactor K18. K18-1 closes allowing the fourth bank of elements to be energized.

END OF SECOND STAGE HEAT:

Heating demand is satisfied. Terminal W2 in the thermostat is de-energized.

8 - Electric heat contactors K16 and K18 are de-energized.

9 - The fourth and third set of elements are de-energized.

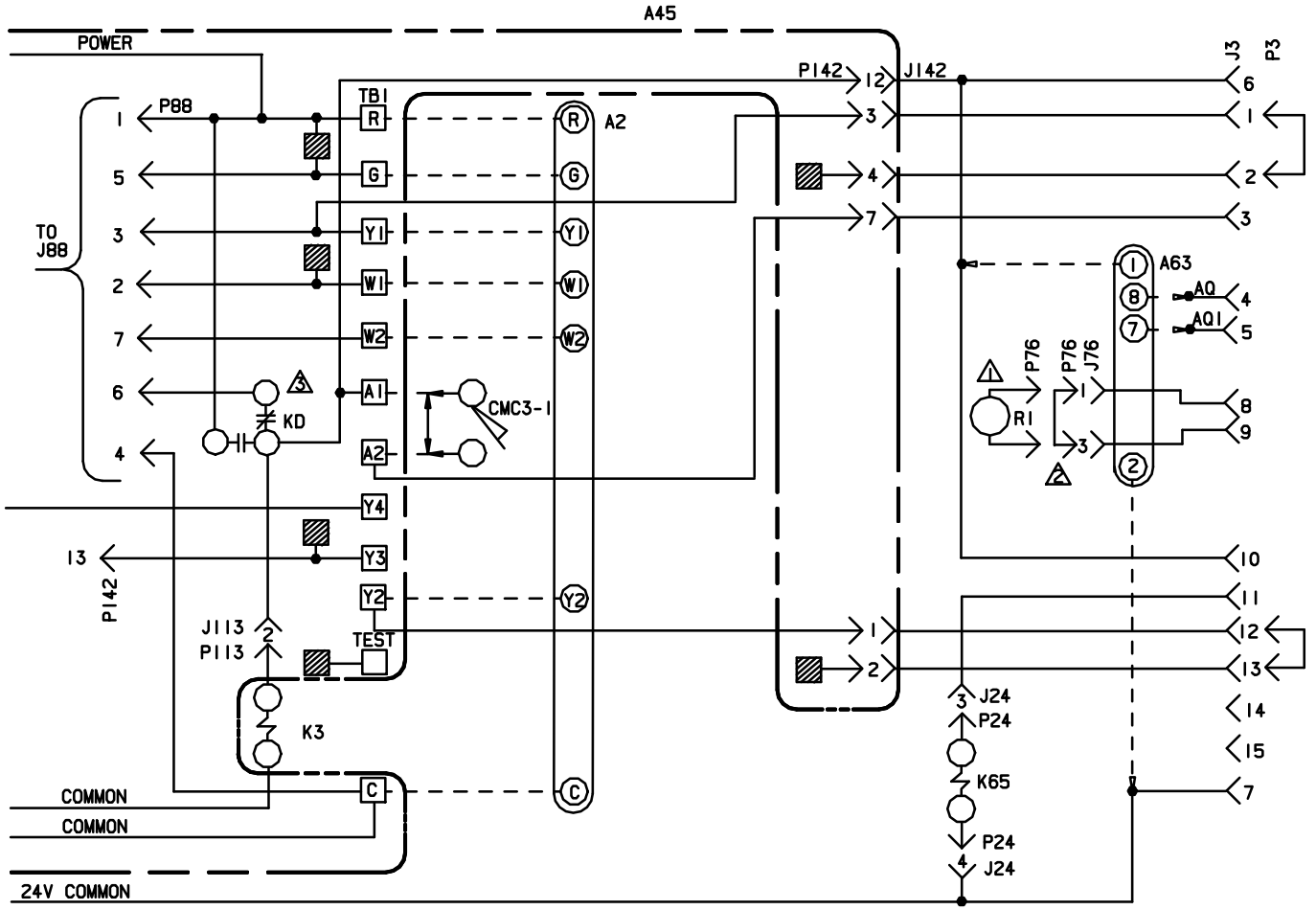
END OF FIRST STAGE HEAT:

Heating demand is satisfied. Terminal W1 in the thermostat is de-energized.

10 - Electric heat contactors K15 and K17 are de-energized.

11 - The second and first set of electric heat elements are de-energized.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



⚠1 R1 IS USED WITH OPTIONAL MODULATING ECONOMIZER FIELD KIT

⚠2 REMOVE JUMPER WHEN R1 IS USED

⚠3 KD IS ON A45 BOARD

DESCRIPTION	
KEY	COMPONENT
A2	SENSOR-ELECTRONIC
A45	CONTROL-MODULE
A63	SENSOR-CO2
CMC3-1	CLOCK-TIME
J3	JACK-UNIT, ECONOMIZER
J24	JACK-EXHAUST FAN
J76	JACK-SENSOR, ECONOMIZER
J113	JACK-BLOWER & COOL 1 CONTROL
J142	JACK-ECONOMIZER HARNESS
K3	RELAY/CONTACTOR-BLOWER
K65	RELAY-EXHAUST FAN
P3	PLUG-LESS ECONOMIZER
P24	PLUG-EXHAUST FAN
P76	PLUG-SENSOR, ECONOMIZER
P88	PLUG-HEAT CONTROL
P113	PLUG-BLOWER & COOL 1 CONTROL
P142	PLUG-ECONOMIZER HARNESS
R1	SENSOR-MIXED OR SUPPLY AIR
TB1	TERMINAL STRIP-24V CLASS II

THERMOSTAT HEAT ANTICIPATION SETTING 0.1 AMP

▨ INDICATES MICRO PROCESSER

DESIGNATES OPTIONAL WIRING

CLASS II FIELD WIRING

WIRING DIAGRAM	2/05
ACCESSORIES	
ELECTROMECHANICAL OR ELECTRONIC THERMOSTAT FOR TCA/TGA UNITS	
TEMPERATURE CONTROL SECTION C1	
Supersedes Form No.	New Form No. 534,484W

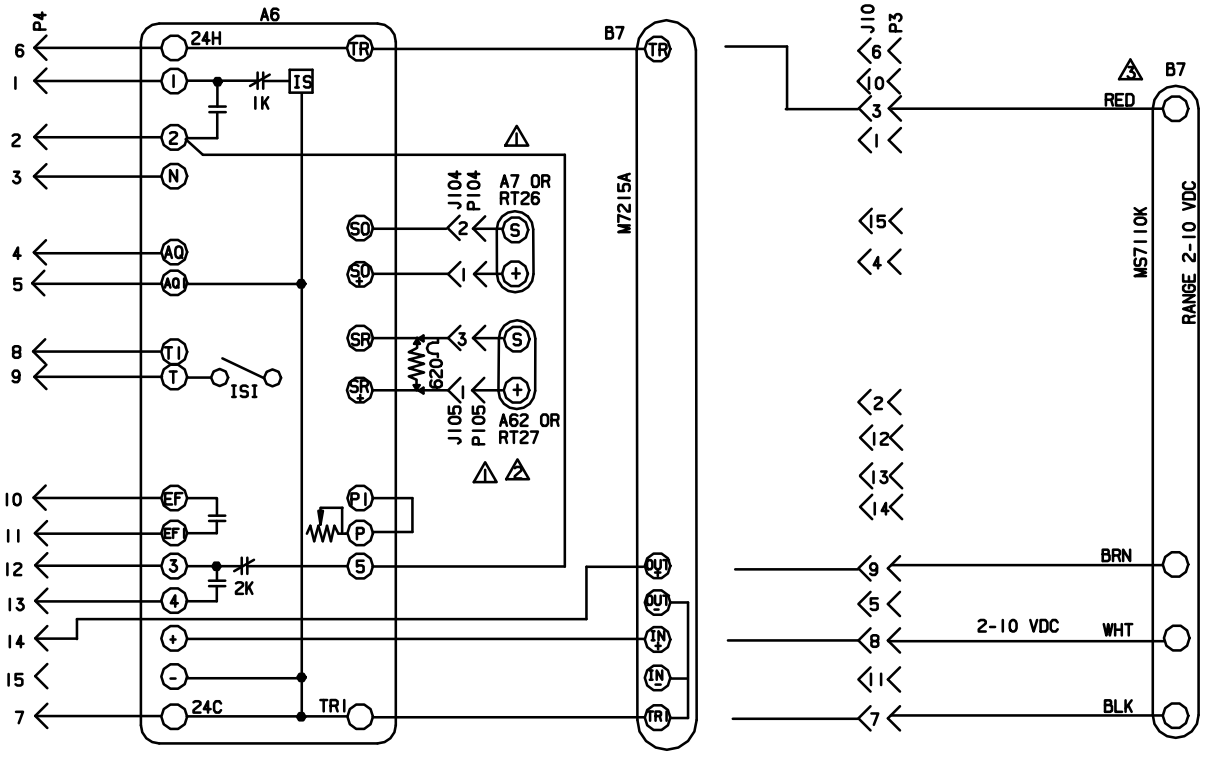
POWER:

1. Terminal strip TB1 found on the main control module A45 energize thermostat components with 24VAC.

OPERATION:

2. The main control module A45 receives data from the electronic thermostat A2 (Y1, Y2, Y3, W1, W2, G, OCP) A45 energizes the appropriate components for heat or cool demand.

"T" SERIES ECONOMIZER



KEY	DESCRIPTION COMPONENT
A6	CONTROL-SOLID STATE ENTHALPY
A7	SENSOR-SOLID STATE ENTHALPY
A62	SENSOR-ENTHALPY, INDOOR
B7	MOTOR-DAMPER, ECONOMIZER
J10	JACK-ECONOMIZER
J104	JACK-SENSOR,OUTDOOR ENTHALPY
J105	JACK-SENSOR,RETURN AIR ENTHALPY
P3	PLUG-LESS ECONOMIZER
P4	PLUG-ECONOMIZER
P104	PLUG-SENSOR,OUTDOOR ENTHALPY
P105	PLUG-SENSOR,RETURN AIR ENTHALPY
RT26	SENSOR-OUTDOOR AIR TEMP
RT27	SENSOR-INDOOR AIR TEMP

△3 USED ON C BOX UNITS

△2 A62 ENTHALPY SENSOR OR RT27 USED FOR DIFFERENTIAL SENSING

△1 RT26 AND RT27, TEMPERATURE SENSORS MAY BE USED INSTEAD OF A7 AND A62 ENTHALPY SENSORS

DESIGNATES OPTIONAL WIRING

CLASS II FIELD WIRING

WIRING DIAGRAM	12/04
ACCESSORIES	
ECONOMIZER FOR TCA/TGA UNITS	
ECONOMIZER SECTION DI	
Supersedes Form No.	New Form No. 534,965W

SEQUENCE OF OPERATION

POWER:

1. Economizer control module A6 is energized through main module A45, P142 when contactor K3 is energized.

OPERATION:

2. Enthalpy sensor A7 and A62 (if differential enthalpy is used) communicates to the economizer control module A6 when to power the damper motor B7.
3. Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.
4. The damper actuator provides 2 to 10 VDC position feedback.