

CTT Series

Thermobank

Hot Gas Defrost – 4 through 70 HP

Available for applications from +35°F down to -30°F, Kramer's Thermobank is the ultimate refrigeration package. Thermobank's patented hot gas defrost system provides the ultimate in ruggedness and efficiency. Known throughout the industry as the definitive refrigeration system, Thermobank delivers more refrigeration with less energy consumption, less equipment, lower installation costs and lower operating costs than conventional refrigeration packages. With its fast defrost period (typically 5 to 10 minutes), Thermobank is refrigerating while other systems are still defrosting. Superior design, superior components and superior manufacturing quality lead to Thermobank.

Standard Features:

- All Welded Thermobank
- Liquid Sub-Cooling Circuit
- Manual Pumpdown Switch
- Crankcase Heater(s)
- Liquid Line Filter-Drier
- Semi-Hermetic Compressor(s)
- Moisture Indicating Sightglass
- Electronic Room Thermostat (Loose)
- Environmentally Safe Refrigerants
- Suction Solenoid Valve
- Liquid Line Solenoid Valve (Loose)
- Floating Head Pressure
- Sub-Circuit Fusing
- Hot Gas Solenoid (Loose)
- Replaceable Core Liquid Line Filter-Drier
- Replaceable Core Suction Line Filter
- Low Noise / Energy Efficient 850 RPM Motors

- Bank Water Level Gauge
- Thermobank Drain Valve
- Adjustable Fan Cycling
- Copper Tube-Aluminum Fin Coils
- Hi-Lo Pressure Switch
- Pressure Relief Valve
- Electronic Oil Pressure Safety Control
- Weatherproof Outdoor Housing
- Manual Compressor Switch
- Receiver With Service Valves
- Evaporator(s)
- Expansion Valve(S) (Loose)
- Complete Defrost Controls
- X-Braided Pressure Control Hose
- Suction & Discharge Vibration Elim.
- Control Circuit Transformer - 460V & 575V



optional features on following page



SINCE 1914 – with over 97 years of continuous improvement in heat transfer technology, KRAMER presents models CTT refrigeration units.

Options:

- Oil Separator
- Non-Fused Disconnect
- Phase Loss Monitor
- Pressure Relief Valve
- Oversize Condenser
- Oversize Liquid Receiver
- Suction Accumulator
- Anti-Short Cycle Timer
- Single Point Alarm
- High, Low, And Oil Pressure Gauges
- Copper Fin Coil
- Coated Fin Coil

THERMOBANK is available for all commercial and industrial applications with temperatures ranging from -30°F to +35°F. This factory packaged hot gas defrost system employs a re-evaporator, ensuring a highly efficient defrost cycle, but requires no suction accumulators, reversing valves or hot gas line from condensing unit to evaporator.

THERMOBANK provides continuous energy savings as the outdoor temperature drops; BTU per Hour increases and compressor watts decrease resulting in more cooling and less energy usage for each operating hour.

Less equipment is needed with **THERMOBANK** because it does more refrigeration in 24 hours than other packaged systems. With its extremely fast defrost period (typically 5 to 10 minutes), **THERMOBANK** is refrigerating while others are still defrosting. With the lowest possible, head pressure there is a marked increase in BTU per Hour capacity.

Models CTT

Low and Medium Temperature Models

Nomenclature:

CTT 4 1000 L 44 - E

I II III IV V VI

I - Series Designator
CTT - Thermobank

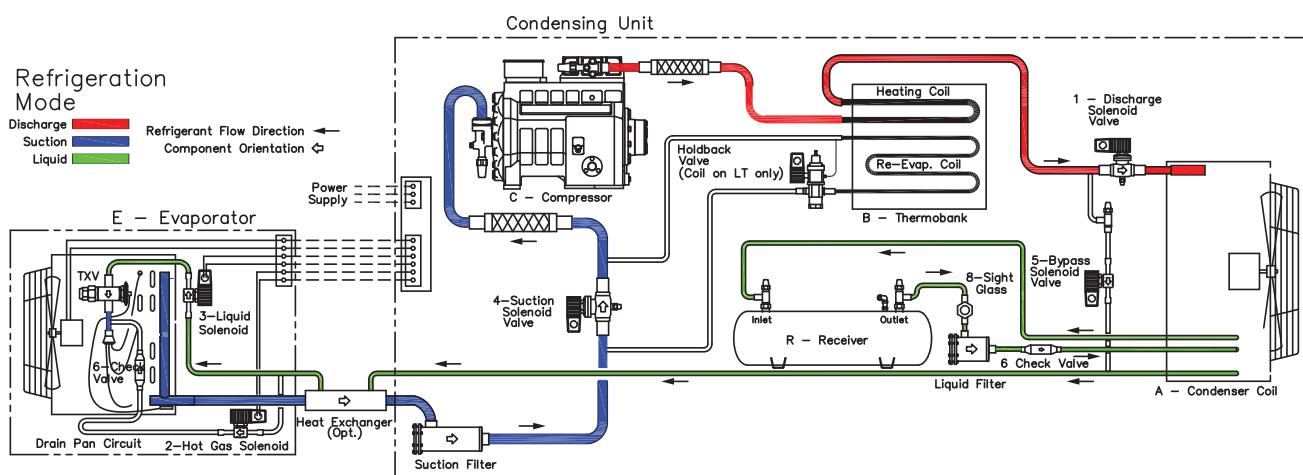
IV - Temperature range
L - Low

II - Compressor Code
2 - Copeland Discus
3 - Carlyle
4 - Bitzer

V - Refrigerant Type
44 - R 404A or R507
47 - R407C
22 - R22

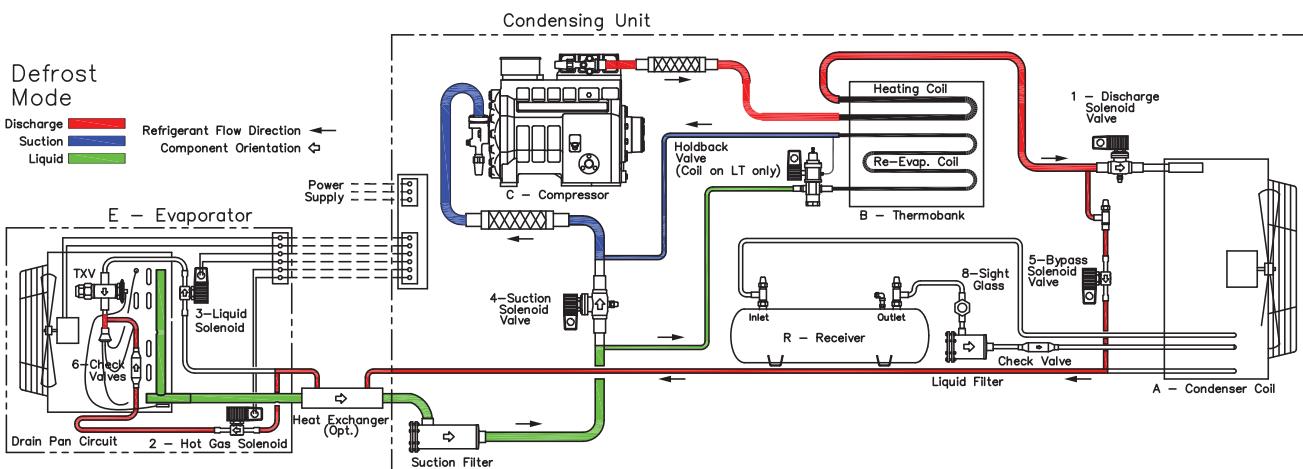
III - Nominal HP
EX: 1000 - 10HP

VI - Voltage Code
E - 208-230/3/60
G - 460/3/60
J - 575/3/60



SCHEMATIC LEGEND

A = CONDENSER	1 = DISCHARGE SOLENOID
B = THERMOBANK	2 = HOT GAS SOLENOID
C = COMPRESSOR	3 = LIQUID SOLENOID
E = EVAPORATOR	4 = SUCTION SOLENOID
R = RECEIVER	5 = BY-PASS VALVE
X = EXPANSION VALVE	6 = CHECK VALVE
	8 = SIGHT GLASS



HOW THERMOBANK WORKS

Every refrigeration system discharges the heat picked up from the evaporator and the compressor. This waste heat is normally rejected by the condenser. With Thermobank, the compressor (C) discharge passes through a heating loop that is submerged in a water filled bank (B), and then on through the condenser (A). The bank stores sufficient heat to fully re-evaporate all the liquid resulting from the defrost of the Evaporator (E).

THE REFRIGERATION CYCLE

The compressor discharge refrigerant, after heating the bank water, flows to the air cooled condenser and then to the receiver (R). From the receiver the liquid refrigerant flows through a sub-cooling circuit in the condenser and on to the expansion valve (X), and the evaporator (E). The refrigerant returns to the compressor as in any standard system.

To prevent excessive super-heating of the refrigerant vapor returning to the compressor and to maintain the water temperature in the bank, the refrigerant flow bypasses the bank through the suction line solenoid (4) during the refrigeration cycle. This normally closed suction line solenoid is generously sized for minimum pressure drop, providing an extra margin of safety. On low temperature systems, an electronically operated holdback valve (H) ensures that no refrigerant flows through the bank during the refrigeration cycle.

THE DEFROST CYCLE

A time clock automatically puts the Thermobank system into a defrost cycle and initiates the following: discharge solenoid Valve (1) closes; the evaporator (E) fans stop; hot gas solenoid valve (2) opens; liquid solenoid valve (3) closes; Suction solenoid valve (4) closes.

The compressor discharge gas goes directly into the liquid line because by-pass solenoid valve (5) is open when discharge solenoid (1) is closed. All the warm liquid refrigerant in the liquid line flows through the evaporator. This liquid refrigerant insures a rapid defrost and charges the defrost circuit. Additional hot gas condenses in the evaporator providing an unusually rapid defrost at all ambient conditions.

With the suction solenoid (4) closed, the liquid refrigerant flows through the holdback valve (H) which controls the rate of refrigerant flow and the pressure in the bank. The bank becomes an evaporator and absorbs the stored heat. The Thermobank system utilizes a high pressure safety control which functions to momentarily open the discharge line solenoid (1) if discharge pressures rise to a high level.

The defrost cycle is terminated by a pressure switch that senses evaporator pressures and starts the post-defrost period. During post-defrost the discharge solenoid (1) is open; by-pass solenoid valve (5) is closed and hot gas solenoid (2) is closed. Suction solenoid (4) and liquid solenoid (3) remain closed. At the end of the pressure terminated post-defrost period, both suction solenoid (4) and liquid solenoid (3) open and the evaporator fan motors start. During defrost, the hot gas by-passes the receiver so after defrost the receiver contains ample liquid refrigerant to begin refrigerating immediately and prevent compressor short cycling. The system then returns to the normal refrigeration cycle.

FASTEST DEFROST

THERMOBANK has a typical defrost cycle duration of 5 to 10 minutes. The defrost is uniform throughout the coil, and minimizes the heat and vapor added to the room during defrost. The defrosting evaporator receives the full heat of rejection of the refrigerant. This is the sum of the compressor heat while operating at maximum suction pressure during the defrost cycle and the heat extracted from the bank. There is always an adequate supply of refrigerant for defrosting.

EXTRA COMPRESSOR PROTECTION

Many factors are incorporated in **THERMOBANK** to protect the compressor and insure long life. All units utilize a pump-down cycle to prevent refrigerant migration to the compressor during the off-cycle. During the defrost cycle the bank is protected against flood-back. The holdback valve protects against overloading the compressor motor by regulating the inlet pressure to the compressor. The reduced refrigerant charge is additional protection for the compressor.

BANK DESIGN

The bank has a welded hermetic design to insure a long, leak free life. The heavy gauge steel shell has a bulls-eye water level gauge. Checking the water level is quick and easy. The shell is insulated with closed cell foam to maintain proper water temperature at any ambient condition and provide optimum system performance. The internal heat transfer loops are die formed from extra heavy wall, seamless copper tubing. The bank contains a thermostat controlled immersion heater for stabilizing water temperature and automatic freeze protection. The heavy duty welded design makes the bank durable, reliable, safe and service free. A drain connection is also provided for seasonal shutdown when applicable.

EXTRA LARGE CONDENSERS

Ratings for ambient temperatures to 105°F are given for all **THERMOBANK** systems. Special systems are available for ambient design temperatures above 110°F. All condensers have a maximum fin spacing of 12 FPI to help prevent coil fouling and increase the time between coil cleanings. Generous coil surface keeps head pressures lower, saves energy, and extends the life of the equipment. An integral sub-cooling circuit is standard to prevent flash gas in liquid risers and increase system efficiency. Fan cycle controls allow some adjustability to the head pressure and will minimize fan motor energy consumption in low ambient's. An optional pressure control may be provided on the header end fan to assure sufficient head pressure is available for a good cold ambient re-start.

OPERATING HOURS

The length of defrost must be taken into account when selecting equipment. Thermobank's defrost cycle is very rapid, typically 5 to 10 minutes, and for this reason the equipment can be selected on the basis of twenty hours per day operation. Other systems require thirty to forty minutes for a complete defrost and the general practice is to select this equipment on eighteen hours per day operation. For the same job, Thermobank equipment requirement is 10% less than others. Thermobank will be refrigerating while others are still defrosting.

AVERAGE OUTDOOR TEMPERATURE

The Average Outdoor Temperature is considerably less than the design outdoor temperature. The outdoor temperature may vary hourly during a twenty-four hour day. It varies day to day, month to month, and season to season. It is the average outdoor temperature that dictates the number of hours of equipment operation. As the outdoor temperature drops, the capacity of Thermobank increases. With more BTU's per hour, the equipment operates less time to handle the twenty-four hour refrigeration load. Page 7 shows the Annual Average Outdoor Temperature for locations throughout the U.S.A. and Canada. Select the location nearby or similar in temperature. The estimated annual electrical savings can be calculated from Table 1.

AVERAGE OUTDOOR TEMPERATURE

STATE-CITY	AAOT-°F	STATE-CITY	AAOT-°F	STATE-CITY	AAOT-°F	STATE-CITY	AAOT-°F
ALABAMA	63	IOWA	48	NEW YORK	46	VIRGINIA	55
Birmingham	62	Des Moines	50	Albany	47	Norfolk	59
Huntsville	60	KANSAS	55	Buffalo	48	Richmond	58
Mobile	67	Goodland	51	New York	55	Roanoke	56
ALASKA	26	Wichita	56	Syracuse	47	WASHINGTON	48
Anchorage	36	KENTUCKY	56	NORTH CAROLINA	59	Seattle	53
Fairbanks	27	Louisville	56	Asheville	55	Spokane	47
Juneau	41	LOUISIANA	66	Charlotte	60	PUERTO RICO	76
ARIZONA	60	New Orleans	68	Raleigh	59	San Juan	79
Flagstaff	46	Shreveport	65	NORTH DAKOTA	41	WEST VIRGINIA	52
Phoenix	72	MAINE	41	Bismarck	41	Beckley	51
ARKANSAS	61	Portland	45	OHIO	51	Charleston	55
Little Rock	61	MARYLAND	54	Akron	50	Elkins	49
CALIFORNIA	59	Baltimore	55	CINCINNATI	53	WISCONSIN	43
Fresno	63	MASSACHUSETTS	48	Cleveland	50	Green Bay	44
Los Angeles	65	Boston	51	Columbus	51	Milwaukee	46
Redding	62	Blue Hill Obs.	48	Youngstown	48	WYOMING	43
San Francisco	57	MICHIGAN	45	OKLAHOMA	60	Cheyenne	46
Stockton	61	Detroit	49	Oklahoma City	60	Sheridan	45
COLORADO	45	Grand Rapids	47	OREGON	49	CANADA	
Colorado Springs	49	Marquette	39	Portland	53	PROVINCE-CITY	
Denver	50	MINNESOTA	41	PENNSYLVANIA	49	AAOT-°F	
Grand Junction	53	Duluth	38	Allentown	51	ALBERTA	
CONNECTICUT	49	Minneapolis	45	Erie	49	Calgary	35
Hartford	50	MISSISSIPPI	63	Philadelphia	54	Edmonton	34
DELAWARE	55	Jackson	64	Pittsburgh	50	BRITISH COLUMBIA	51
Wilmington	54	Tupelo	62	Scranton	49	Vancouver	51
D.C.	55	MISSOURI	55	RHODE ISLAND	50	Victoria	51
Washington	57	Kansas City	54	Providence	50	MANITOBA	35
FLORIDA	71	St. Louis	56	SOUTH CAROLINA	63	Brandon	36
Gainesville	68	MONTANA	433	Charleston	65	Winnipeg	35
Jacksonville	68	Billings	47	Greer	60	NEW BRUNSWICK	42
Miami	75	Glasgow	42	SOUTH DAKOTA	46	Saint John	42
Orlando	72	Great Falls	45	Huron	45	NEWFOUNDLAND	43
Tampa	72	Helena	44	TENNESSEE	58	Gander	44
W. Palm Beach	74	NEBRASKA	49	Bristol	55	St. John's	44
GEORGIA	64	North Platte	48	Knoxville	57	NOVA SCOTIA	46
Atlanta	61	Omaha	50	Memphis	62	Halifax	46
Macon	64	Scottsbluff	48	TEXAS	65	ONTARIO	42
Savannah	66	Valentine	47	Amarillo	57	Ottawa	40
HAWAII	76	NEVADA	50	Dallas	65	Sault Ste. Marie	37
Honolulu	77	Las Vegas	67	EI Paso	63	Thunder Bay	47
IDAHO	45	Reno	51	Houston	68	Toronto	49
Boise	51	NEW HAMPSHIRE	44	Lubbock	60	Windsor	43
ILLINOIS	52	Concord	45	San Antonio	68	QUEBEC	39
Chicago	49	NEW JERSEY	63	Wichita Falls	63	Montreal	43
Peoria	51	Newark	55	UTAH	49	Quebec	39
INDIANA	52	Trenton	54	Salt Lake City	52	SASKATCHEWAN	35
Fort Wayne	50	NEW MEXICO	54	VERMONT	43	Regina	34
Indianapolis	52	Albuquerque	56	Burlington	44	Saskatoon	34

Calculate Your Savings

ANNUAL AVERAGE OUTDOOR TEMPERATURE	75°F	70°F	65°F	60°F	55°F	50°F	45°F	40°F
ESTIMATED ANNUAL ELECTRICAL SAVINGS	5%	10%	15%	20%	25%	30%	35%	40%
FACTOR TO COST CONVENTIONAL SYSTEM	0.95	0.90	0.85	0.80	0.75	0.70	0.65	0.60

Conventional System Operating Cost x Factor = Thermobank Operating Cost. For temperature between those shown, interpolate to obtain savings.

LOW TEMP (0°F to -40°Fst) PERFORMANCE DATA

MODEL CTT	SUCTION TEMPERATURE							
	0°F	-5°F	-10°F	-15°F	-20°F	-25°F	-30°F	-40°F
0400L44	32,700	29,100	25,700	22,600	19,700	17,100	14,700	10,400
0500L44	42,800	38,400	34,300	30,400	26,900	23,600	20,500	14,900
0600L44	52,500	47,100	42,000	37,200	32,800	28,700	24,900	18,500
0800L44	60,800	54,600	48,800	43,400	38,400	33,700	29,400	21,600
0900L44	78,100	69,900	62,300	55,300	48,700	42,600	37,100	27,400
1000L44	82,900	74,700	67,000	59,700	52,800	46,400	40,400	29,800
1200L44	96,100	86,000	76,800	68,400	60,700	53,400	46,500	33,200
1500L44	113,700	102,400	92,200	82,700	73,900	65,700	57,800	42,400
2200L44	132,000	119,800	109,200	98,100	87,500	77,300	67,600	49,100
2700L44	169,800	153,700	138,100	123,100	108,700	95,200	82,600	60,400
3100L44	187,300	169,600	153,900	136,300	121,700	106,400	92,700	69,350
4400L44	267,000	242,100	218,600	196,300	175,100	154,800	135,300	98,300
5400L44	340,500	307,900	279,100	248,500	219,400	192,000	166,400	121,700
6200L44	373,300	338,000	306,700	271,650	242,600	212,100	184,750	138,200

AMBIENT CORR. FACTOR	
AMB.	404A
80°F	1.15
85°F	1.10
90°F	1.05
95°F	1.00
100°F	0.95
105°F	0.90

For design conditions other than 95°F, multiply the rating by the correction factor.

LOW TEMP PHYSICAL DATA

MODEL CTT	COMPRESSOR		COND FANS			CONNECTIONS		CHARGE LBS.		Unit Config.	APPROX NET LBS.
	QTY	MODEL NO.	QTY	DIA	HP	SUC OD	LIQ OD	UNIT ²	RECV ¹		
0400L44	1	2DF-F16KE	1	30	1	1 1/8	1/2	14	64	A	1200
0500L44	1	2DA-F23KE	1	30	1	1 3/8	1/2	18	64	A	1250
0600L44	1	3DA-F28KE	1	30	1	1 3/8	1/2	18	64	A	1300
0800L44	1	3DB-F33KE	1	30	1	1 3/8	5/8	24	91	A	1400
0900L44	1	3DF-F40KE	1	30	1	1 5/8	5/8	24	91	A	1450
1000L44	1	3DS-F46KE	1	30	1	1 5/8	5/8	28	91	A	1500
1200L44	1	4DA-F47KE	2	30	1	1 5/8	5/8	22	91	B	1300
1500L44	1	4DL-F63KE	2	30	1	1 5/8	5/8	29	91	B	2200
2200L44	1	4DT-F76KE	2	30	1	2 1/8	7/8	39	124	B	2500
2700L44	1	6DL-F93KE	2	30	1	2 1/8	7/8	49	157	B	3100
3100L44	1	6DT-F11ME	3	30	1	2 1/8	7/8	58	189	C	3600
4400L44	2†	4DT-F76KE	4	30	1	3 1/8	1 1/8	58	189	D	5000
5400L44	2†	6DL-F93KE	4	30	1	3 1/8	1 1/8	101	358	D	5500
6200L44	2†	6DT-F11ME	6	30	1	3 1/8	1 1/8	83	270	E	7000

† Compressors piped in parallel. ¹ Receiver at 90% full. ² Estimated refrigerant charge is for a condensing unit only. It does not include evaporators, interconnecting piping or other accessories.

See back cover for unit configuration.

LOW TEMP ELECTRICAL DATA

MODEL CTT	230/3/60					460/3/60					575/3/60				
	COMPRESSOR		COND FLA	UNIT AMPS	MCA‡	COMPRESSOR		COND FLA	UNIT AMPS	MCA‡	COMPRESSOR		COND FLA	UNIT AMPS	MCA‡
	RLA	LRA				RLA	LRA				RLA	LRA			
0400L44	16.8	102	4.0	21.8	25	8.1	52	2.0	10.6	13	6.7	41	2.1	9.3	11
0500L44	28.8	161	4.0	33.8	40	10.2	60	2.0	12.7	15	9.1	49	2.1	11.7	14
0600L44	30.3	150	4.0	34.3	42	13.7	77	2.0	16.2	20	10.5	62	2.1	13.1	16
0800L44	31.5	161	4.0	36.5	44	16.1	83	2.0	18.6	23	11.0	67	2.1	13.6	16
0900L44	39.0	215	4.0	44.0	53	16.9	106	2.0	19.4	24	16.4	84	2.1	19.0	23
1000L44	42.0	215	4.0	47.0	57	18.6	106	2.0	21.1	26	16.8	84	2.1	19.4	24
1200L44	45.2	220	8.0	54.2	65	22.6	110	4.0	27.1	33	17.5	106	4.2	22.2	27
1500L44	42.6	278	8.0	51.6	62	26.3	139	4.0	30.8	37	20.9	113	4.2	25.6	31
2200L44	66.0	374	8.0	75.0	91	33.0	187	4.0	37.5	46	24.1	135	4.2	28.8	35
2700L44	80.8	450	8.0	89.8	109	40.4	225	4.0	44.9	55	32.5	172	4.2	37.2	45
3100L44	95.6	470	12.0	108.6	132	47.8	235	6.0	54.3	66	39.6	200	6.3	46.4	56
4400L44	122.0	748	16.0	139.0	169	66.0	374	8.0	74.5	91	48.2	270	8.4	57.1	69
5400L44	161.6	900	16.0	178.6	218	80.8	450	8.0	89.3	109	65.0	344	8.4	73.9	90
6200L44	191.2	940	16.0	208.2	255	95.6	470	8.0	104.1	128	79.2	400	8.4	88.1	108

‡ MCA does not include evaporator motors.

MEDIUM TEMP (+10°F to +25°Fst) PERFORMANCE DATA

MODEL CTT	R-404A & R-507				R-22				R-407C				AMBIENT CORRECTION FACTOR			
	SUCTION TEMPERATURE				SUCTION TEMPERATURE				SUCTION TEMPERATURE				AMB.	404A	22	407C
	+25°F	+20°F	+15°F	+10°F	+25°F	+20°F	+15°F	+10°F	+25°F	+20°F	+15°F	+10°F	80°F	1.15	1.10	1.10
0500M**	52,800	47,700	42,900	38,400	52,100	46,600	41,300	36,500	47,300	42,200	37,500	33,100				
0700M**	74,600	67,900	61,600	55,700	72,300	65,000	57,900	51,200	66,700	60,000	53,800	48,000				
0800M**	91,000	82,800	75,100	67,700	89,300	80,500	72,300	64,600	81,400	73,200	65,500	58,300				
1000M**	107,800	98,300	89,300	80,700	105,200	95,200	85,900	77,300	96,400	86,800	77,900	69,500				
1200M**	125,300	114,700	104,600	95,000	116,000	105,200	95,000	85,500	112,100	101,300	91,300	81,800				
1500M**	144,300	130,700	119,100	108,000	136,600	123,000	111,300	100,200	129,100	115,500	103,900	93,000				
2500M**	201,000	183,200	167,700	151,200	192,100	172,200	154,900	128,200	179,700	161,800	146,300	130,200				
3000M**	228,100	207,700	188,400	170,100	216,700	196,200	177,000	159,200	204,000	183,400	164,300	146,500				
3500M**	298,900	272,000	246,700	222,900	278,800	252,200	227,700	205,200	267,300	240,200	215,200	192,000				
4000M**	339,400	310,000	282,000	255,400	319,800	290,800	263,800	238,900	303,500	273,800	246,000	219,900				
5000M**	384,800	350,400	317,300	285,900	374,100	338,800	306,100	275,800	344,100	309,500	276,700	246,200				
6000M**	455,400	384,800	376,300	339,800	433,600	392,600	353,900	317,200	407,200	339,800	328,200	292,600				
7000M**	584,100	455,400	485,700	440,300	555,000	502,700	454,400	410,200	522,200	402,200	423,600	379,100				

** 44 = R-404A OR R-507, 22 = R-22, 47 = R407C.

For ambient design conditions other than 95°F, multiply the rating by the correction factor.

MEDIUM TEMP PHYSICAL DATA

MODEL CTT	COMPRESSOR		COND FANS			CONNECTIONS				CHARGE LBS.				Unit Config.	APPX NET LBS.
						R407C & R-22	R-404A & R-507	R407C & R-22	R-404A & R-507	UNIT ²	RECV ¹	UNIT ²	RECV ¹		
	QTY	MODEL NO.	QTY	DIA	HP	SUC OD	LIQ OD	SUC OD	LIQ OD	UNIT ²	RECV ¹	UNIT ²	RECV ¹		
0500M**	1	2DD-R63KE	1	30	1	1 1/8	5/8	1 1/8	5/8	20	63	18	64	A	1250
0700M**	1	2DA-R89KE	1	30	1	1 3/8	5/8	1 3/8	5/8	27	106	24	91	A	1375
0800M**	1	3DA-R10ME	1	30	1	1 3/8	5/8	1 3/8	5/8	33	106	28	91	A	1400
1000M**	1	3DB-R12ME	1	30	1	1 5/8	7/8	1 5/8	7/8	33	106	28	91	A	1500
1200M**	1	3DF-R15ME	2	30	1	1 5/8	7/8	1 5/8	7/8	29	106	25	91	B	2000
1500M**	1	3DS-R17ME	2	30	1	1 5/8	7/8	1 5/8	7/8	34	106	29	91	B	2200
2500M**	1	4DH-R22ME	2	30	1	2 1/8	7/8	2 1/8	7/8	45	144	39	124	B	3000
3000M**	1	4DJ-R28ME	3	30	1	2 1/8	1 1/8	2 1/8	1 1/8	68	219	58	189	C	3600
3500M**	1	6DH-R35ME	3	30	1	2 1/8	1 1/8	2 1/8	1 1/8	68	219	58	189	C	3800
4000M**	1	6DJ-R40ME	3	30	1	2 1/8	1 3/8	2 1/8	1 1/8	86	295	74	253	C	4300
5000M**	2‡	4DH-R22ME	4	30	1	2 5/8	1 1/8	2 5/8	1 1/8	90	295	78	253	D	5250
6000M**	2‡	4DJ-R28ME	4	30	1	2 5/8	1 5/8	2 5/8	1 3/8	118	416	101	358	D	5700
7000M**	2‡	6DH-R35ME	6	30	1	3 1/8	1 3/8	3 1/8	1 3/8	131	376	113	363	E	8000

** 44 = R-404A or R-507, 47 = R407C, 22 = R-22.

2‡ Compressors piped in parallel. ¹ Receiver at 90% full. ² Estimated refrigerant charge is for a condensing unit only. It does not include evaporators, interconnecting piping or other accessories. See back cover for unit configuration.

MEDIUM TEMP ELECTRICAL DATA

MODEL CTT	208-230/3/60				460/3/60				575/3/60				Unit Config.	APPX NET LBS.	
	COMPRESSOR		COND FLA	UNIT AMPS	MCA ³	COMPRESSOR		COND FLA	UNIT AMPS	MCA ³	COMPRESSOR		COND FLA	UNIT AMPS	MCA ³
	RLA	LRA				RLA	LRA				RLA	LRA			
0500M**	22.3	120	4.0	27.3	32	10.5	60	2.0	13.5	16	7.9	49	2.1	11.0	15
0700M**	32.0	169	4.0	37.0	44	14.1	85	2.0	17.1	20	13.3	67	2.1	16.4	19
0800M**	41.0	215	4.0	46.0	56	20.0	106	2.0	23.0	27	16.4	84	2.1	19.5	23
1000M**	43.6	215	4.0	48.6	59	20.0	106	2.0	23.0	27	16.4	84	2.1	19.5	23
1200M**	48.2	275	8.0	57.2	69	23.6	138	4.0	28.6	34	N/A	N/A	N/A	N/A	N/A
1500M**	59.6	275	8.0	68.6	83	29.0	138	4.0	34.0	41	23.6	110	4.2	28.8	34
2500M**	82.2	428	8.0	91.2	111	41.1	214	4.0	46.1	56	34.4	172	4.2	39.6	48
3000M**	94.0	470	12.0	107.0	130	47.0	235	6.0	54.0	65	39.3	200	6.3	46.6	56
3500M**	107.0	565	12.0	120.0	146	53.5	283	6.0	60.5	73	42.5	230	6.3	49.8	60
4000M**	142.0	594	12.0	155.0	190	71.0	297	6.0	78.0	95	53.5	245	6.3	60.8	74
5000M**	164.4	856	16.0	181.4	222	82.2	428	8.0	91.2	111	68.8	344	8.4	78.2	95
6000M**	188.0	940	16.0	205.0	251	94.0	470	8.0	103.0	126	78.6	400	8.4	88.0	107
7000M**	214.0	1130	24.0	239.0	292	107.0	566	12.0	120.0	146	85.0	460	12.6	98.6	119

** 44 = R-404A OR R-507, 47 = 407C, 22 = R-22, ³ MCA does not include evaporator motors.

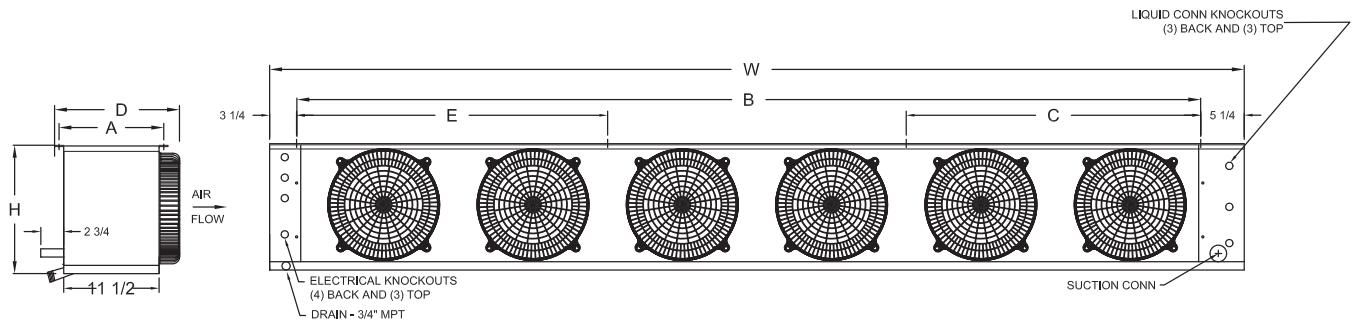
4 FPI EVAPORATORS WITH HOT GAS DRAIN PAN

EVAP MODEL	BTUH @ 10°TD		FAN MOTORS			CFM	DIMENSIONS (inches)						APPX NET LBS.			
			QTY	HP	TOTAL AMPS			OVERALL			MOUNTING					
	+10°F SST	-20°F SST			230 V	460 V	575 V	H	W	D	A	B	C			
LPG142T	15,700	14,200	4	1/20	4.0	2.0	N/A	3050	16 1/4	82	15	12 5/8	73	—	36 1/2	85
LPG182T	20,200	18,200	5	1/20	5.0	2.5	N/A	3550	16 1/4	100	15	12 5/8	91	—	54 1/2	105
LPG214T	23,600	21,400	6	1/20	6.0	3.0	N/A	4290	16 1/4	118	15	12 5/8	109	36 1/2	36 1/2	125
MSG140T	15,900	14,000	2	1/8	1.8	0.9	0.7	3620	19	55	19	17	42	—	—	110
MSG175T	19,800	17,500	3	1/8	2.7	1.4	1.1	5750	19	76	19	17	63	—	—	150
MSG230T	26,200	23,000	2	1/3	6.4	2.6	1.6	5930	25	76	20	18	63	—	—	165
MSG325T	36,800	32,500	2	1/3	6.4	2.6	1.6	5430	25	76	20	18	63	—	—	220
MSG390T	44,100	39,000	3	1/3	9.6	3.9	2.4	8890	25	106	20	18	93	31	—	275
MSG510T	57,700	51,000	3	1/3	9.6	3.9	2.4	8150	25	106	20	18	93	31	—	300
TV400D	44,000	40,000	2	1/2	3.6	1.8	N/A	8600	43	75	32	26	58	7 1/2	3 1/4	305
TV550D	60,500	55,000	2	1/2	3.6	1.8	N/A	8400	43	75	32	26	58	7 1/2	3 1/4	430
TV750D	83,000	75,000	2	3/4	7.0	3.5	N/A	13100	43	111	33	26	94	7 1/2	4	500
TV950D	104,500	95,000	2	3/4	7.0	3.5	N/A	15000	43	111	33	26	94	7 1/2	4	535
TV1100D	119,000	108,000	2	3/4	7.0	3.5	N/A	14500	44	111	36	28	94	7 1/2	5 3/4	580
TV1200D	132,000	120,000	3	3/4	10.5	5.3	N/A	20200	48	136	42	28 1/4	113 1/4	11 3/8	7 1/2	1120
TV1400D	154,000	140,000	3	3/4	10.5	5.3	N/A	19500	48	136	42	28 1/4	113 1/4	11 3/8	7 1/2	1265
TV1600D	176,000	160,000	4	3/4	14.0	7.0	N/A	26900	48	174	42	28 1/4	151 1/4	11 3/8	7 1/2	1660
TV1900D	205,000	186,000	4	3/4	14.0	7.0	N/A	26000	48	174	42	28 1/4	151 1/4	14 1/2	7 1/2	1700

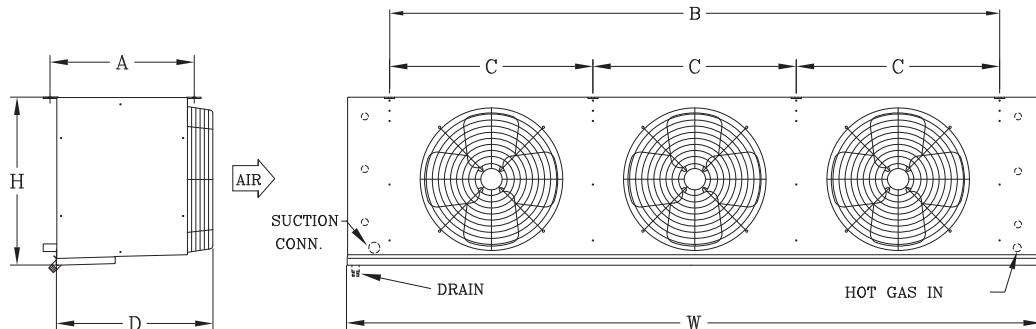
6 FPI EVAPORATORS WITH HOT GAS DRAIN PAN

EVAP MODEL	BTUH @ 10°TD		FAN MOTORS			CFM	DIMENSIONS (inches)						APPX NET LBS.			
			QTY	HP	TOTAL AMPS			OVERALL			MOUNTING					
	+10°F SST	-20°F SST			230 V	460 V	575 V	H	W	D	A	B	C			
LPG184T	20,400	18,400	4	1/20	4.0	2.0	N/A	2650	16 1/4	82	15	12 5/8	73	—	36 1/2	110
LPG220T	24,600	22,000	5	1/20	5.0	2.5	N/A	3410	16 1/4	100	15	12 5/8	91	—	54 1/2	125
LPG240T	26,700	24,000	6	1/20	6.0	3.0	N/A	4110	16 1/4	118	15	12 5/8	109	36 1/2	36 1/2	135
LPG265T	29,500	26,500	6	1/20	6.0	3.0	N/A	3980	16 1/4	118	15	12 5/8	109	36 1/2	36 1/2	145
CSG185T	21,000	18,500	3	1/8	2.7	1.4	1.1	5510	19	76	19	17	63	—	—	160
CSG270T	29,200	27,000	2	1/3	6.4	2.6	1.6	5720	25	76	20	18	63	—	—	175
CSG320T	35,600	32,000	2	1/3	6.4	2.6	1.6	5480	25	76	20	18	63	—	—	200
CSG385T	43,600	38,500	3	1/3	9.6	3.9	2.4	9130	25	106	20	18	93	31	—	270
CSG460T	52,000	46,000	3	1/3	9.6	3.9	2.4	9090	25	106	20	18	93	31	—	285
CSG520T	58,800	52,000	3	1/2	9.6	3.9	2.4	8190	25	106	20	18	93	31	—	300
CTV450	49,800	45,200	2	1/2	3.6	1.8	N/A	8400	43	75	32	26	58	7 1/2	3 1/4	305
CTV620	68,400	62,200	2	3/4	3.6	1.8	N/A	8200	43	75	32	26	58	7 1/2	3 1/4	430
CTV850	93,200	84,800	2	3/4	7.0	3.5	N/A	12800	43	111	33	26	94	7 1/2	4	500
CTV1070	118,700	107,400	2	3/4	7.0	3.5	N/A	14600	43	111	33	26	94	7 1/2	4	535
CTV1220	134,500	122,000	2	3/4	7.0	3.5	N/A	14100	44	111	36	28	94	7 1/2	5 3/4	580
CTV1360	149,200	135,600	3	3/4	10.5	5.3	N/A	19700	48	136	42	28 1/4	113 1/4	11 3/8	7 1/2	1120
CTV1580	174,900	458,200	3	3/4	10.5	5.3	N/A	19000	48	136	42	28 1/4	113 1/4	11 3/8	7 1/2	1265
CTV1800	200,700	180,800	4	3/4	14.0	7.0	N/A	21500	48	174	42	28 1/4	151 1/4	11 3/8	7 1/2	1660
CTV2100	231,700	210,270	4	3/4	14.0	7.0	N/A	21200	48	174	42	28 1/4	151 1/4	14 1/2	7 1/2	1700

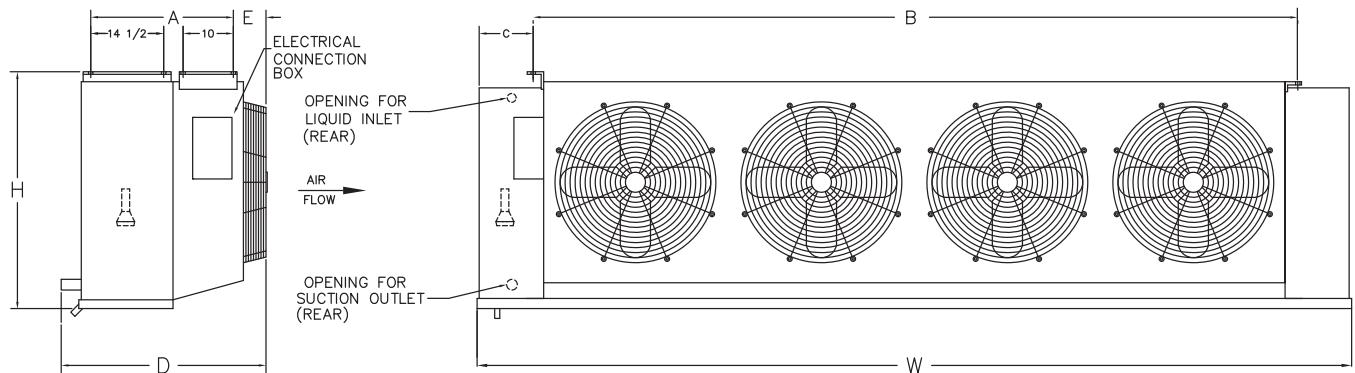
LPG MODELS



MSG & CSG MODELS



TV & CTV MODELS



NOTE: Models CM 450 - 1250 have four mounting holes (dimension A). Models CM 1350-2100 have eight mounting holes (4 per side).

4 FPI EVAPORATORS WITHOUT HEATED DRAIN PAN

EVAP MODEL	BTUH @ 10°TD +25°F SST	FAN MOTORS					CFM	DIMENSIONS							APPX. NET LBS.		
		QTY	HP	TOTAL AMPS				OVERALL			MOUNTING						
				230 V	460 V	575 V		H	W	D	A	B	C	E			
MSA340	34,000	2	1/3	6.4	2.6	1.6	5710	25	76	20	18	63	—	—	200		
MSA395	39,500	2	1/3	6.4	2.6	1.6	5430	25	76	20	18	63	—	—	215		
MSA465	46,500	3	1/3	9.6	3.9	2.4	8990	25	106	20	18	93	31	—	270		
MSA585	58,500	3	1/3	9.6	3.9	2.4	8140	25	106	20	18	93	31	—	295		
CM450	45,500	2	1/2	3.6	1.8	N/A	8600	43	75	32	26	58	7 1/2	3 1/4	300		
CM620	62,700	2	1/2	3.6	1.8	N/A	8400	43	75	32	26	58	7 1/2	3 1/4	425		
CM850	85,500	2	3/4	7.0	3.5	N/A	13100	43	111	33	26	94	7 1/2	4	495		
CM1100	107,900	2	3/4	7.0	3.5	N/A	15000	43	111	33	26	94	7 1/2	4	530		
CM1250	123,500	2	3/4	7.0	3.5	N/A	14500	44	111	36	28	94	7 1/2	5 3/4	575		
CM1350	136,600	3	3/4	10.5	5.3	N/A	20200	48	136	42	28 1/4	113 1/4	11 3/8	7 1/2	1110		
CM1600	159,900	3	3/4	10.5	5.3	N/A	19500	48	136	42	28 1/4	113 1/4	11 3/8	7 1/2	1255		
CM1800	182,200	4	3/4	14.0	7.0	N/A	25200	48	174	42	28 1/4	151 1/4	11 3/8	7 1/2	1650		
CM2100	212,500	4	3/4	14.0	7.0	N/A	24300	48	174	42	28 1/4	151 1/4	14 1/2	7 1/2	1690		

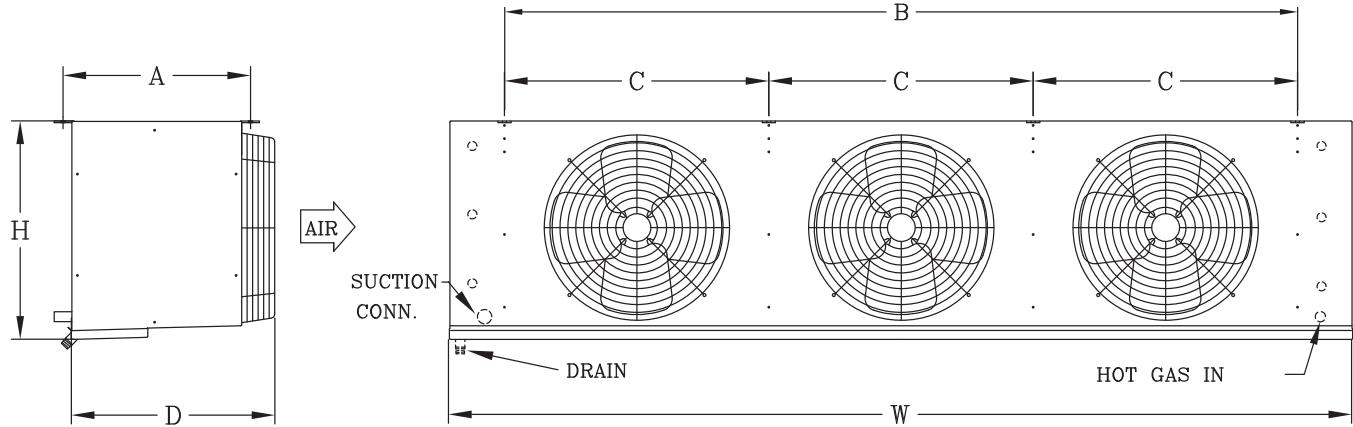
Note: Units without heated drain pans are not to be used for room temperatures below +34°F

6 FPI EVAPORATORS WITHOUT HEATED DRAIN PAN

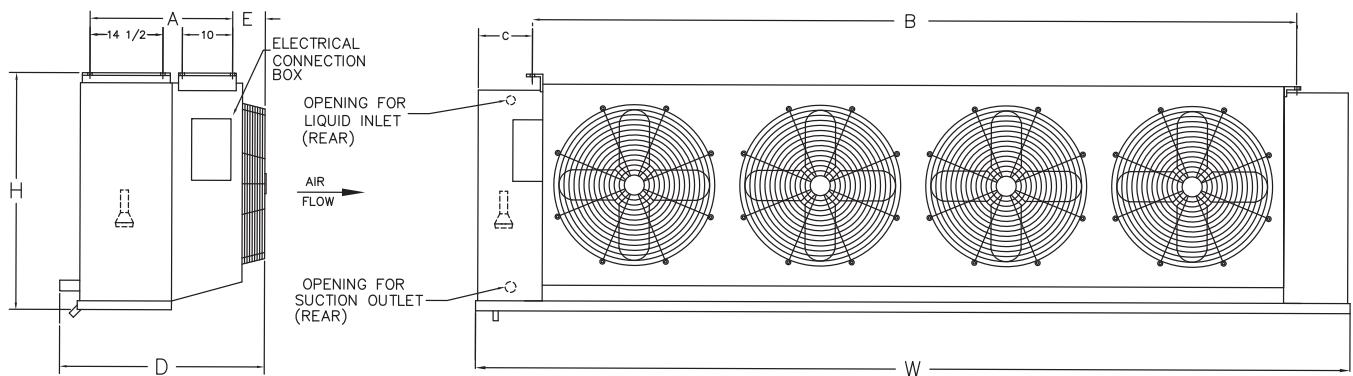
EVAP MODEL	BTUH @ 10°TD +25°F SST	FAN MOTORS					CFM	DIMENSIONS							APPX. NET LBS.		
		QTY	HP	TOTAL AMPS				OVERALL			MOUNTING						
				230 V	460 V	575 V		H	W	D	A	B	C	E			
CSA370	37,000	2	1/3	6.4	2.6	1.6	5460	25	76	20	18	63	—	—	210		
CSA415	41,500	3	1/3	6.4	2.6	2.4	8620	25	76	20	18	63	—	—	230		
CSA490	49,000	3	1/3	9.6	3.9	2.4	8580	25	106	20	18	93	31	—	275		
CSA620	62,000	3	1/3	9.6	3.9	2.4	7770	25	106	20	18	93	31	—	300		
CCM520	51,400	2	1/2	3.6	1.8	N/A	8385	43	75	32	26	58	7 1/2	3 1/4	305		
CCM710	70,825	2	1/2	3.6	1.8	N/A	8190	43	75	32	26	58	7 1/2	3 1/4	430		
CCM970	97,125	2	3/4	7.0	3.5	N/A	12800	43	111	33	26	94	7 1/2	4	510		
CCM1220	122,250	2	3/4	7.0	3.5	N/A	14600	43	111	33	26	94	7 1/2	4	540		
CCM1390	139,400	2	3/4	7.0	3.5	N/A	14100	44	111	36	28	94	7 1/2	5 3/4	590		
CCM1550	154,500	3	3/4	10.5	5.3	N/A	19700	48	136	42	28 1/4	113 1/4	11 3/8	7 1/2	1125		
CCM1810	180,450	3	3/4	10.5	5.3	N/A	19000	48	136	42	28 1/4	113 1/4	11 3/8	7 1/2	1265		
CCM2060	205,560	4	3/4	14.0	7.0	N/A	24600	48	174	42	28 1/4	151 1/4	11 3/8	7 1/2	1660		
CCM2400	239,900	4	3/4	14.0	7.0	N/A	23700	48	174	42	28 1/4	151 1/4	14 1/2	7 1/2	1700		

Note: Units without heated drain pans are not to be used for room temperatures below +34°F

MSA & CSA MODELS



CM & CCM MODELS



NOTE: Models CCM520 - 1390 have four mounting holes (dimension A).
Models CCM 1550-2400 have eight mounting holes (4 per side).

LOW TEMP THERMOBANK SYSTEMS WITH 4 FPI EVAPS

MODEL CTT	MBH @ -20° SST	EVAP FOR -10°F ROOM			MBH @ -30° SST	EVAP FOR -20°F ROOM			MBH @ -40° SST	FOR -30°F ROOM TV
		LPG-T	MSG-T	TV		LPG-T	MSG-T	TV		
0400L44	19.7	182, 214	175	—	14.7	182	175	—	10.4	—
0500L44	26.9	214	230	—	20.5	214	175, 230	—	14.9	—
0600L44	32.8	(2) 182	325	—	24.9	(2) 142	230	—	18.5	—
0800L44	38.4	(2) 214	390	400	29.4	(2) 182	325	—	21.6	—
0900L44	48.7	—	510	550	37.1	(2) 214	390, (2) 175	400	27.4	400
1000L44	52.8	—	510	550	40.4	—	390	400	29.8	400
1200L44	60.7	—	(2) 325	550	46.5	—	510, (2) 230	550	33.2	400
1500L44	73.9	—	(2) 390	750	57.8	—	510, (2) 390	550	42.4	550
2200L44	87.5	—	(2) 510	950, (2) 550	67.6	—	(2) 390	750, (2) 400	49.1	550
2700L44	108.7	—	(2) 510	1100, (2) 550	82.6	—	(2) 510	950, (2) 550	60.4	750, (2) 400
3100L44	121.7	—	—	1200, 1400	92.7	—	(2) 510	1100, (2) 550	69.4	950, (2) 550
4400L44	175.1	—	—	1900, (2) 950	135.3	—	—	1400, (2) 750	98.3	1200
5400L44	219.4	—	—	(2) 1100, (2) 1200	166.4	—	—	1900, (2) 950	121.7	1400, (2) 750
6200L44	242.6	—	—	(2) 1400	184.8	—	—	(2) 1100, (2) 1200	138.2	1900, (2) 950

MEDIUM TEMP THERMOBANK SYSTEMS WITH 4 FPI EVAPS

MODEL CTT	MBH @ +10° SST			EVAP FOR +20°F ROOM			MBH @ +20° SST			EVAP FOR +30°F ROOM		
	M44	M47	M22	LPG-T	MSG-T	TV	M44	M47	M22	LPG-T	MSG-T	TV
0500M	38.4	33.1	36.5	(2) 182, (2) 214	390	400	47.7	42.2	46.6	(2) 214	390, 510	400
0700M	55.7	48.0	51.2	(2) 214	510	400, 550	67.9	60.0	65.0	—	510, (2) 325	550
0800M	67.7	58.3	64.6	—	510, (2) 325	550	82.8	73.2	80.5	—	(2) 390	750, (2) 400
1000M	80.7	69.5	77.3	—	(2) 390	750, (2) 400	98.3	86.8	95.2	—	(2) 390	950, (2) 400
1200M	95.0	81.8	85.5	—	(2) 390	950, (2) 400	114.7	101.3	105.2	—	(2) 510	1100, (2) 550
1500M	108.0	93.0	100.2	—	(2) 510	1100, (2) 550	130.7	115.5	123.0	—	—	1200, (2) 550
2500M	151.2	130.2	128.2	—	—	1400, (2) 750	183.2	161.8	172.2	—	—	1600, (2) 750
3000M	170.1	146.5	159.2	—	—	1600, (2) 750	207.7	183.4	196.2	—	—	1900, (2) 950
3500M	222.9	192.0	205.2	—	—	1900, (2) 950	272.0	240.2	252.2	—	—	(2) 1200
4000M	255.4	219.9	238.9	—	—	(2) 1100	310.0	273.8	290.8	—	—	(2) 1400
5000M	285.9	246.5	275.8	—	—	(2) 1400	350.4	309.5	338.8	—	—	(2) 1600
6000M	339.8	292.6	317.2	—	—	(2) 1600	384.8	339.8	392.6	—	—	(2) 1900
7000M	440.3	379.1	410.2	—	—	(2) 1900	455.4	402.2	502.7	—	—	(2) 1900

MODEL CTT	MBH @ +25°F SST			EVAP FOR +35°F ROOM	
	M44	M47	M22	MSA (4 FPI)	CM (4 FPI)
0500M	52.8	47.3	52.1	465, 585	450
0700M	74.6	66.7	72.3	585, (2) 340	620
0800M	91.0	81.4	89.3	(2) 465	850, (2) 450
1000M	107.8	96.4	105.2	(2) 585	1100, (2) 450
1200M	125.3	112.1	116.0	(2) 585	1250, (2) 620
1500M	144.3	129.1	136.6	—	1350, 1600, (2) 850
2000M	157.9	141.2	152.5	—	1600, (2) 850
2500M	201.0	179.7	192.1	—	1800, 2100, (2) 1100
3000M	228.1	204.0	216.7	—	2100, (2) 1100
3500M	298.9	267.3	278.8	—	(2) 1600
4000M	339.4	303.5	319.8	—	(2) 1600
5000M	384.8	344.1	374.1	—	(2) 1800
6000M	455.4	407.2	433.6	—	(2) 2100
7000M	584.1	522.2	555.0	—	(3) 1800

LOW TEMP THERMOBANK SYSTEMS WITH 6 FPI EVAPS

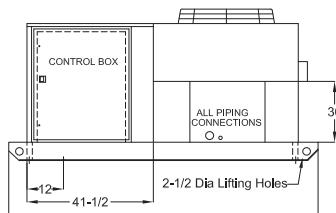
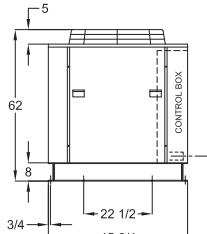
MODEL CTT	MBH @ -20° SST	EVAP FOR -10°F ROOM			MBH @ -30° SST	EVAP FOR -20°F ROOM		
		LPG-T	CSG-T	CTV		LPG-T	CSG-T	CTV
0400L44	19.7	220	185	—	14.7	184	185	—
0500L44	26.9	240, 265	270	—	20.5	220, 240	270	—
0600L44	32.8	(2) 184	320	—	24.9	265	270	—
0800L44	38.4	(2) 210	385	450	29.4	(2) 184	320	—
0900L44	48.7	(2) 240	460	620	37.1	(2) 220	385	—
1000L44	52.8	(2) 265	520	620	40.4	(2) 240	460	450
1200L44	60.7	—	(2) 320	620	46.5	(2) 265	520	450
1500L44	73.9	—	(2) 385	850	57.8	—	(2) 320	620
2200L44	87.5	—	(2) 460	850, (2) 450	67.6	—	(2) 385	620
2700L44	108.7	—	(2) 520	1070, (2) 620	82.6	—	(2) 460	850, (2) 450
3100L44	121.7	—	—	1220, 1360	92.7	—	(2) 520	1070, (2) 620
4400L44	175.1	—	—	1800, (2) 850	135.3	—	—	1360, (2) 620
5400L44	219.4	—	—	2100, (2) 1220	166.4	—	—	1800, (2) 850
6200L44	242.6	—	—	(2) 1360, (2) 1580	184.8	—	—	2100, (2) 1070

MEDIUM TEMP THERMOBANK SYSTEMS WITH 6 FPI EVAPS

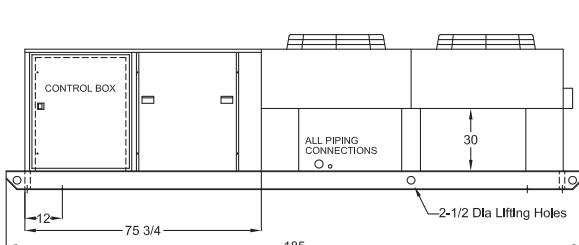
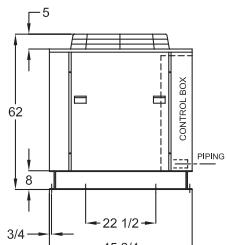
MODEL CTT	MBH @ +10° SST			EVAP FOR +20°F ROOM			MBH @ +20° SST			EVAP FOR +30°F ROOM		
	M44	M47	M22	LPG-T	CSG-T	CTV	M44	M47	M22	LPG-T	CSG-T	CTV
0500M	38.4	33.1	36.5	(2) 184, (2) 220	385	450	47.7	42.2	46.6	(2) 240	460	450
0700M	55.7	48.0	51.2	(2) 240, (2) 265	520	450, 620	67.9	60.0	65.0	(2) 265	520, (2) 320	620
0800M	67.7	58.3	64.6	(2) 265	520, (2) 320	620	82.8	73.2	80.5	—	(2) 385	850
1000M	80.7	69.5	77.3	—	(2) 385	850	98.3	86.8	95.2	—	(2) 460	1070, (2) 450
1200M	95.0	81.8	85.5	—	(2) 460	850, (2) 450	114.7	101.3	105.2	—	(2) 520	1070
1500M	108.0	93.0	100.2	—	(2) 520	1070	130.7	115.5	123.0	—	—	1220, (2) 620
2500M	151.2	130.2	128.2	—	—	1360, 1580	183.2	161.8	172.2	—	—	1800, (2) 850
3000M	170.1	146.5	159.2	—	—	1580, (2) 850	207.7	183.4	196.2	—	—	2100, (2) 1070
3500M	222.9	192.0	205.2	—	—	2100, (2) 1070	272.0	240.2	252.2	—	—	(2) 1360
4000M	255.4	219.9	238.9	—	—	(2) 1220	310.0	273.8	290.8	—	—	(2) 1580
5000M	285.9	246.5	275.8	—	—	(2) 1360	350.4	309.5	338.8	—	—	(2) 1800
6000M	339.8	292.6	317.2	—	—	(2) 1580	384.8	339.8	392.6	—	—	(2) 2100
7000M	440.3	379.1	410.2	—	—	(2) 2100	455.4	402.2	502.7	—	—	(2) 2100

MODEL CTT	MBH @ +25°F SST			EVAP FOR +35°F ROOM		
	M44	M47	M22	MSA (6 FPI)	CM (6 FPI)	
0500M	52.8	47.3	52.1	490, 620	520	
0700M	74.6	66.7	72.3	490, (2) 370	710	
0800M	91.0	81.4	89.3	(2) 415	970	
1000M	107.8	96.4	105.2	(2) 490	970, (2) 520	
1200M	125.3	112.1	116.0	(2) 620	1220, (2) 520	
1500M	144.3	129.1	136.6	(2) 620	1390, (2) 710	
2500M	201.0	179.7	192.1	—	1810, 2060, (2) 970	
3000M	228.1	204.0	216.7	—	2060, 2400, (2) 1220	
3500M	298.9	267.3	278.8	—	2400, (2) 1390	
4000M	339.4	303.5	319.8	—	(2) 620	
5000M	384.8	344.1	374.1	—	(2) 620	
6000M	455.4	407.2	433.6	—	(2) 620	
7000M	584.1	522.2	555.0	—	(2) 620	

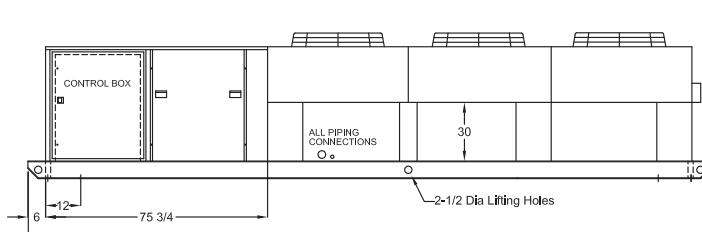
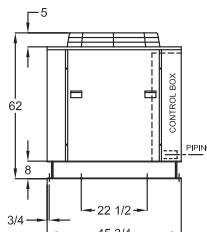
Condensing Unit Configuration



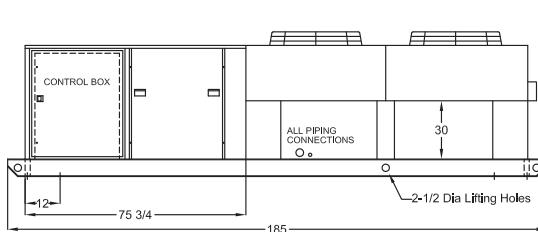
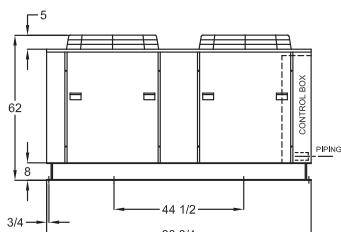
CONFIGURATION "A"



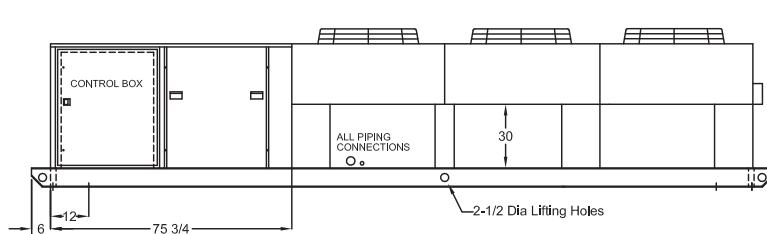
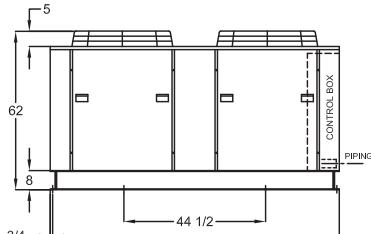
FAN CONFIGURATION "B"



FAN CONFIGURATION "C"



FAN CONFIGURATION "D"



FAN CONFIGURATION "E"

Due to ongoing product improvement, specifications are subject to change without notice.