

CTT Series



Thermobank

Hot Gas Defrost – 12 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 100 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 1200 L 44 - E
I II III IV V VI

I - Series Designator
CTT - Thermobank

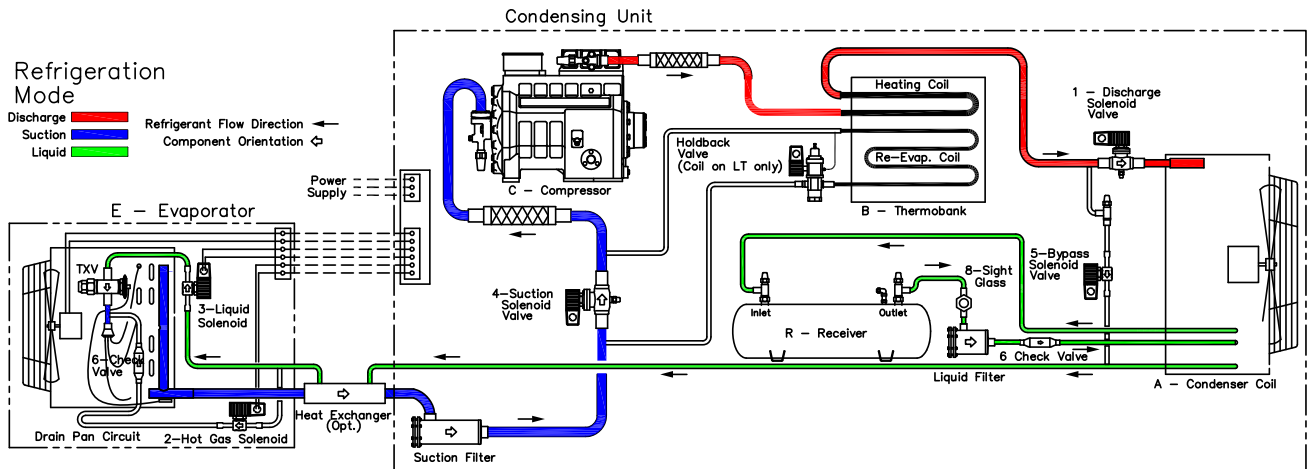
II - Compressor Code
2 - Copeland Discus
4 - Bitzer

III - Nominal HP
EX: 1200 - 12HP

IV - Temperature range
L - Low
M - Medium

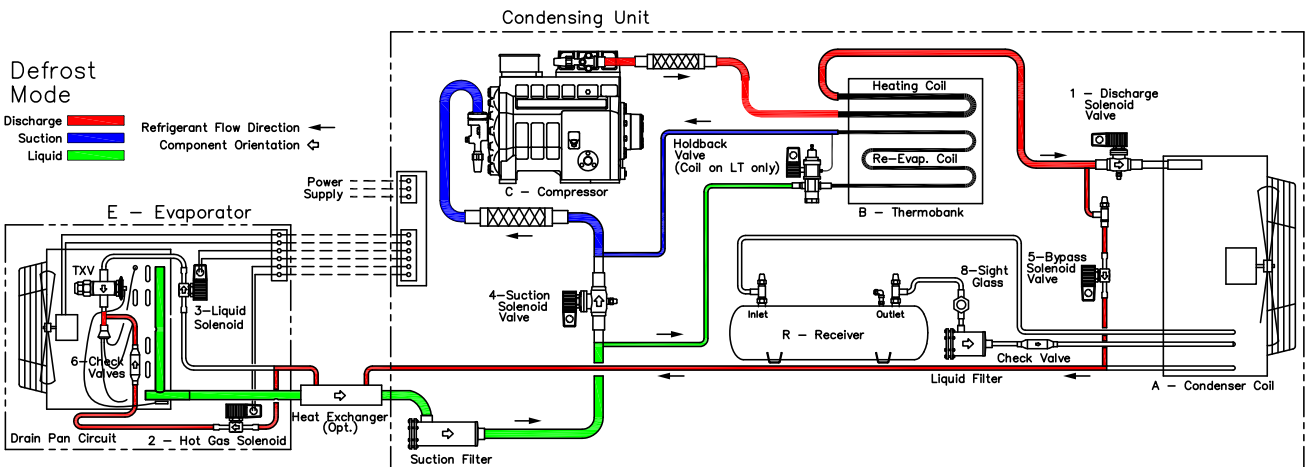
V - Refrigerant Type
44 - R 404A or R507
47 - R407C

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		
Denver	50	MINNESOTA	41	PENNSYLVANIA	49	PROVINCE-CITY	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	
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	
FLORIDA	71	St. Louis	56	SOUTH CAROLINA	63	Brandon	35
Gainesville	68	MONTANA	433	Charleston	65	Winnipeg	36
Jacksonville	68	Billings	47	Greer	60	NEW BRUNSWICK	
Miami	75	Glasgow	42	SOUTH DAKOTA	46	Saint John	42
Orlando	72	Great Falls	45	Huron	45	NEWFOUNDLAND	
Tampa	72	Helena	44	TENNESSEE	58	Gander	43
W. Palm Beach	74	NEBRASKA	49	Bristol	55	St. John's	44
GEORGIA	64	North Platte	48	Knoxville	57	NOVA SCOTIA	
Atlanta	61	Omaha	50	Memphis	62	Halifax	46
Macon	64	Scottsbluff	48	TEXAS	65	ONTARIO	
Savannah	66	Valentine	47	Amarillo	57	Ottawa	42
HAWAII	76	NEVADA	50	Dallas	65	Sault Ste. Marie	40
Honolulu	77	Las Vegas	67	El Paso	63	Thunder Bay	37
IDAHO	45	Reno	51	Houston	68	Toronto	47
Boise	51	NEW HAMPSHIRE	44	Lubbock	60	Windsor	49
ILLINOIS	52	Concord	45	San Antonio	68	QUEBEC	
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	
Fort Wayne	50	NEW MEXICO	54	VERMONT	43	Regina	35
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
Models 0400L thru 1000L are no longer available.								
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 CORRECTION 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		
Models 0400L thru 1000L are no longer available.											
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	UNIT	MCA‡	COMPRESSOR		COND	UNIT	MCA‡	COMPRESSOR		COND	UNIT	MCA‡
	RLA	LRA	FLA	AMPS		RLA	LRA	FLA	AMPS		RLA	LRA	FLA	AMPS	
Models 0400L thru 1000L are no longer available.															
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-407C				AMBIENT CORRECTION FACTOR				
	SUCTION TEMPERATURE				SUCTION TEMPERATURE				AMB.	404A	407C		
	+25°F	+20°F	+15°F	+10°F	+25°F	+20°F	+15°F	+10°F					
Models 0500M thru 1200M are no longer available.													
1500M**	144,300	130,700	119,100	108,000	No longer available with R-22	129,100	115,500	103,900	93,000				
2500M**	201,000	183,200	167,700	151,200		179,700	161,800	146,300	130,200	80°F	1.15	1.10	
3000M**	228,100	207,700	188,400	170,100		204,000	183,400	164,300	146,500	85°F	1.10	1.07	
3500M**	298,900	272,000	246,700	222,900		267,300	240,200	215,200	192,000	90°F	1.05	1.03	
4000M**	339,400	310,000	282,000	255,400		303,500	273,800	246,000	219,900	95°F	1.00	1.00	
5000M**	384,800	350,400	317,300	285,900		344,100	309,500	276,700	246,200	100°F	0.95	0.96	
6000M**	455,400	384,800	376,300	339,800		407,200	339,800	328,200	292,600	105°F	0.90	0.92	
7000M**	584,100	455,400	485,700	440,300	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.
	QTY	MODEL NO.	QTY	DIA	HP	R407C		R-404A & R-507		R407C		R-404A & R-507			
						SUC OD	LIQ OD	SUC OD	LIQ OD	UNIT ²	RECV ¹	UNIT ²	RECV ¹		
Models 0500M thru 1200M are no longer available.															
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				
	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			
Models 0500M thru 1200M are no longer available.															
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.

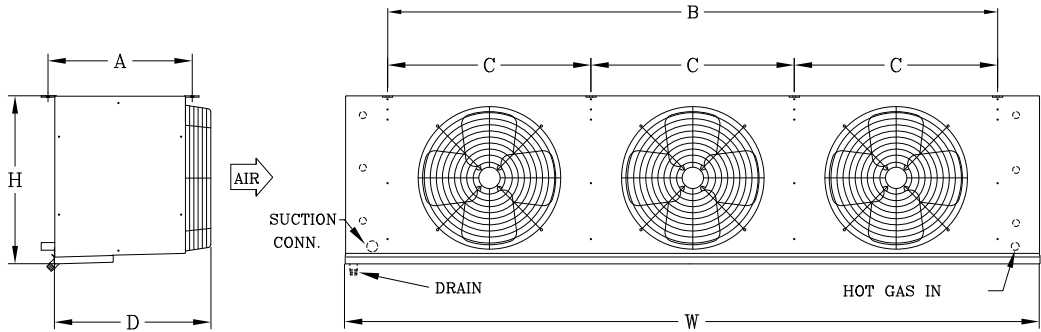
4 FPI EVAPORATORS WITH HOT GAS DRAIN PAN

EVAP MODEL	BTUH @ 10°TD		FAN MOTORS						CFM	DIMENSIONS (inches)								APPX NET LBS.
	+10°F SST	-20°F SST	QTY	HP	TOTAL AMPS			OVERALL			MOUNTING							
					230 V	460 V	575 V	H		W	D	A	B	C	E			
CONTACT FACTORY IF LOW PROFILE EVAPORATORS ARE REQUIRED																		
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		

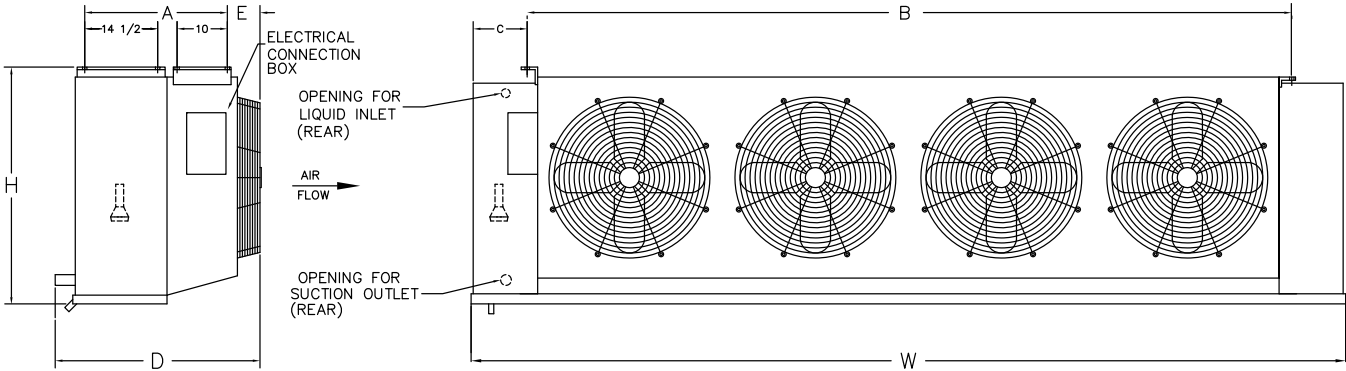
6 FPI EVAPORATORS WITH HOT GAS DRAIN PAN

EVAP MODEL	BTUH @ 10°TD		FAN MOTORS						CFM	DIMENSIONS (inches)								APPX NET LBS.
	+10°F SST	-20°F SST	QTY	HP	TOTAL AMPS			OVERALL			MOUNTING							
					230 V	460 V	575 V	H		W	D	A	B	C	E			
CONTACT FACTORY IF LOW PROFILE EVAPORATORS ARE REQUIRED																		
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	158,200	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		

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

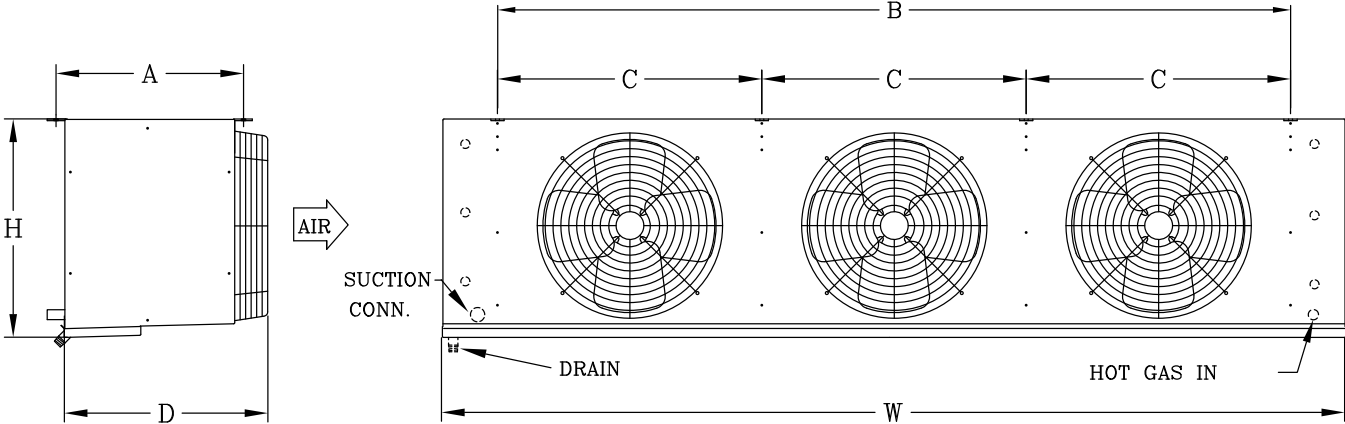
Note: Units without heated drain pans are not to be used for room temperatures below +34°F

6 FPI EVAPORATORS WITHOUT HEATED DRAIN PAN

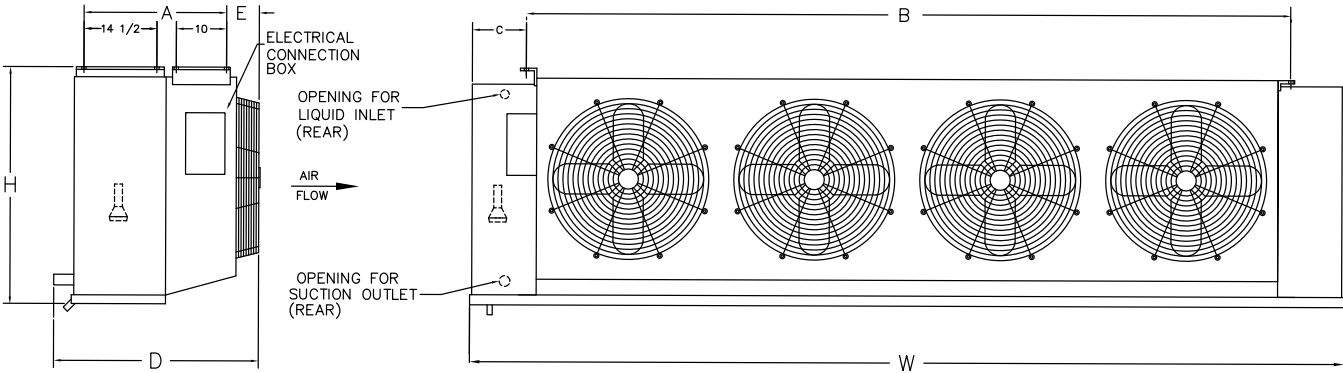
EVAP MODEL	BTUH @ 10°TD +25°F SST	FAN MOTORS					CFM	DIMENSIONS							APPX. NET LBS.
		QTY	HP	TOTAL AMPS				OVERALL			MOUNTING				
				230 V	460 V	575 V		H	W	D	A	B	C	E	
CSA370	37,000	2	1/3	6.4	2.6	1.6	5460	25	76	20	18	63	–	–	210
CSA415	41,500	3	1/3	6.4	2.6	2.4	8620	25	76	20	18	63	–	–	230
CSA490	49,000	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 - 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		
Models 0400L thru 1000L are no longer available.										
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 - 4 FPI EVAPS

MODEL CTT	MBH @ +10° SST			EVAP FOR +20°F ROOM			MBH @ +20° SST			EVAP FOR +30°F ROOM		
	M44	M47		LPG-T	MSG-T	TV	M44	M47		LPG-T	MSG-T	TV
Models 0500M thru 1200M are no longer available												
1500M	108.0	93.0	R-22	—	(2) 510	1100, (2) 550	130.7	115.5	R-22	—	—	1200, (2) 550
2500M	151.2	130.2		—	—	1400, (2) 750	183.2	161.8		—	—	1600, (2) 750
3000M	170.1	146.5	Not	—	—	1600, (2) 750	207.7	183.4	Not	—	—	1900, (2) 950
3500M	222.9	192.0		—	—	1900, (2) 950	272.0	240.2		—	—	(2) 1200
4000M	255.4	219.9	Avail.	—	—	(2) 1100	310.0	273.8	Avail.	—	—	(2) 1400
5000M	285.9	246.5		—	—	(2) 1400	350.4	309.5		—	—	(2) 1600
6000M	339.8	292.6		—	—	(2) 1600	384.8	339.8		—	—	(2) 1900
7000M	440.3	379.1	—	—	(2) 1900	455.4	402.2	—	—	(2) 1900		

MODEL CTT	MBH @ +25°F SST			EVAP FOR +35°F ROOM	
	M44	M47		MSA (4 FPI)	CM (4 FPI)
Models 0500M thru 1200M are no longer available					
1500M	144.3	129.1	R-22	—	1350, 1600, (2) 850
2500M	201.0	179.7		—	1800, 2100, (2) 1100
3000M	228.1	204.0		—	2100, (2) 1100
3500M	298.9	267.3	Not	—	(2) 1600
4000M	339.4	303.5		—	(2) 1600
5000M	384.8	344.1	Available	—	(2) 1800
6000M	455.4	407.2		—	(2) 2100
7000M	584.1	522.2		—	(3) 1800

LOW TEMP THERMOBANK - 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
Models 0400L thru 1000L are no longer available.								
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 - 6 FPI EVAPS

MODEL CTT	MBH @ +10° SST			EVAP FOR +20°F ROOM			MBH @ +20° SST			EVAP FOR +30°F ROOM		
	M44	M47		LPG-T	CSG-T	CTV	M44	M47		LPG-T	CSG-T	CTV
Models 0500M thru 1200M are no longer available												
1500M	108.0	93.0	R-22	—	(2) 520	1070	130.7	115.5	R-22	—	—	1220, (2) 620
2500M	151.2	130.2		—	—	1360, 1580	183.2	161.8		—	—	1800, (2) 850
3000M	170.1	146.5	Not	—	—	1580, (2) 850	207.7	183.4	Not	—	—	2100, (2) 1070
3500M	222.9	192.0		—	—	2100, (2) 1070	272.0	240.2		—	—	(2) 1360
4000M	255.4	219.9	Avail.	—	—	(2) 1220	310.0	273.8	Avail.	—	—	(2) 1580
5000M	285.9	246.5		—	—	(2) 1360	350.4	309.5		—	—	(2) 1800
6000M	339.8	292.6		—	—	(2) 1580	384.8	339.8		—	—	(2) 2100
7000M	440.3	379.1		—	—	(2) 2100	455.4	402.2		—	—	(2) 2100

MODEL CTT	MBH @ +25° SST			EVAP FOR +35°F ROOM						
	M44	M47		MSA (6 FPI)	CM (6 FPI)					
0500M	Models 0500M thru 1200M are no longer available									
0700M										
0800M										
1000M										
1200M	Models 0500M thru 1200M are no longer available									
1500M						144.3	129.1	R-22	(2) 620	1390, (2) 710
2500M						201.0	179.7		—	1810, 2060, (2) 970
3000M						228.1	204.0		Not	—
3500M	298.9	267.3	—	2400, (2) 1390						
4000M	339.4	303.5	Available	—	(2) 620					
5000M	384.8	344.1		—	(2) 620					
6000M	455.4	407.2		—	(2) 620					
7000M	584.1	522.2	—	—	(2) 620					

Department of Energy Annual Walk-In Energy Factor (AWEF) Ratings

Base Model Number	AWEF	
	Outdoor Rated	Indoor Rated

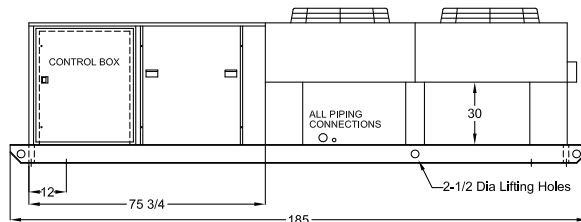
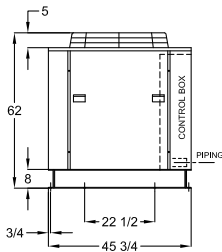
Medium Temperature Models

1500M**	8.73	—
2500M**	9.54	—

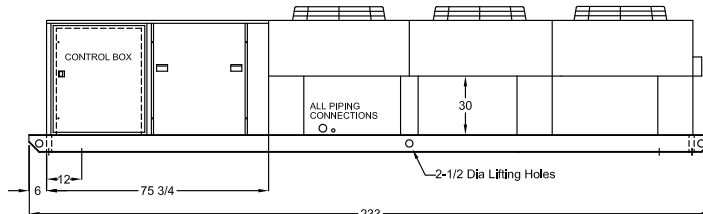
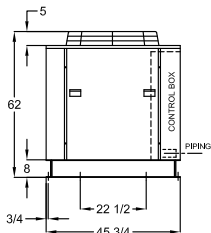
* Each asterisk represents a variable character based upon model, voltage, and vintage ordered.

Larger HP models are not intended for use in walk-in coolers less than 3,000 sq. feet thus are outside the scope of this DOE regulation.

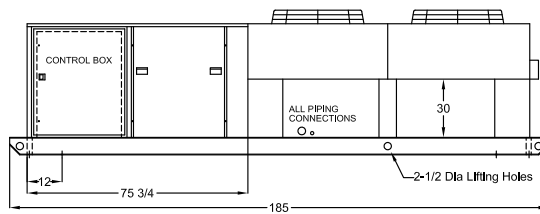
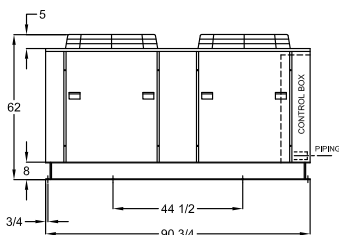
Dept. of Energy AWEF ratings for low temperature condensing models will be implemented in 2020.



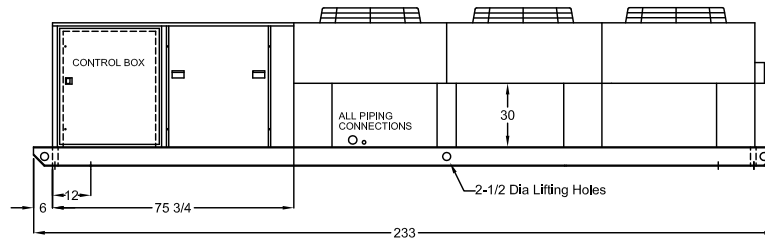
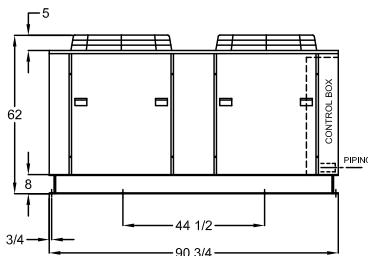
FAN CONFIGURATION "B"



FAN CONFIGURATION "C"



FAN CONFIGURATION "D"



FAN CONFIGURATION "E"

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