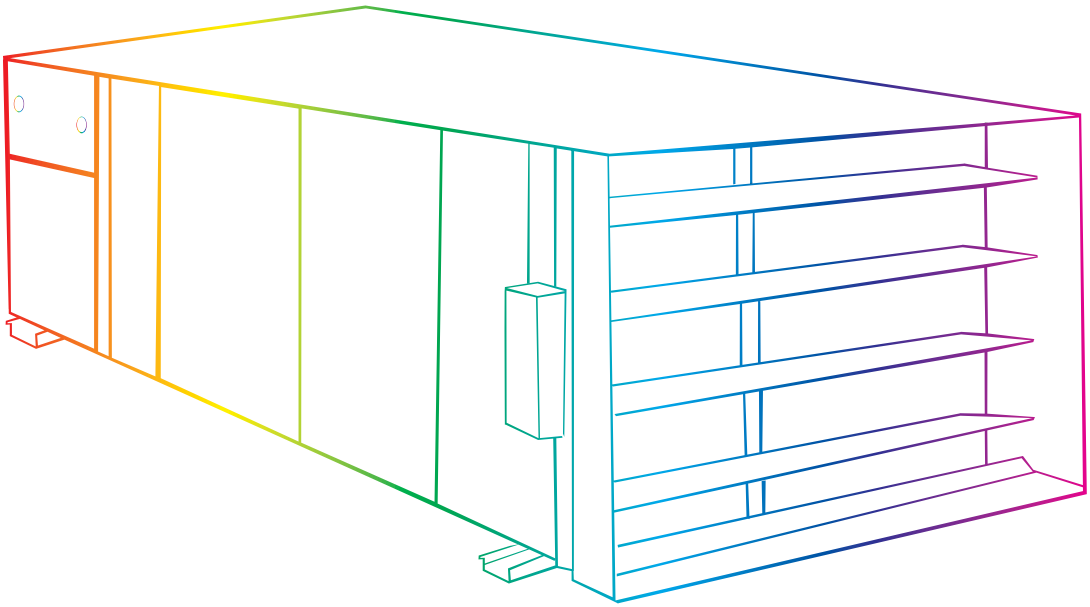
Mammoth®



Product Catalog

Water Source Heat Pumps

100 Percent Outdoor Air
6-32 Tons

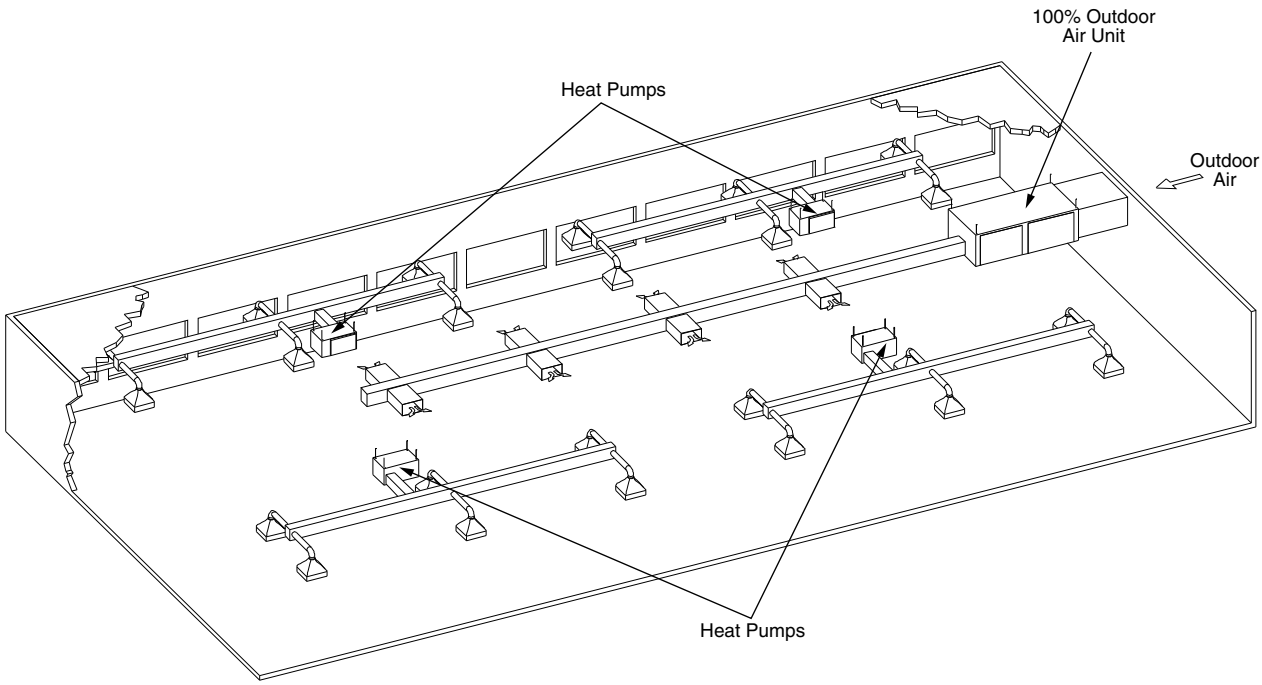
Contents

Mammoth 100% Outdoor Air water source heat pump units apply heat pump technology to the TOTAL heat pump job……..a simple and energy-efficient indoor air quality solution.

- Eight unit sizes from 6 to 32 ton
- Allows the engineer to meet building minimum fresh air requirements
- Water-cooled, reverse cycle heat pump units
- Supplies 100% outdoor air to a water source heat pump system; uses the same water loop
- Cools, heat and reheats the outside air for improved comfort; also filter and preheats
- Horizontal configuration for ceiling-hung or floor/slab mounting
- Units are designed for indoor applications

Concept

- Supplies 100% outdoor air to the return air path of the water source heat pump units
- Mixed air is conditioned by the water source heat pumps to the occupied space
- Treats the outside air to desired temperature levels
- Supplies “neutral” air to the other heat pumps



Standard Rating Data

Unit Size	CFM	GPM	COOLING			HEATING	
			Btu/hr.		EER	Btu/hr	COP
			Total	Sensible			
071	1,200	18.0	72,250	42,000	14.0	48,200	4.7
111	1,800	28.0	111,000	64,400	14.1	74,000	4.7
141	2,400	36.0	148,000	84,700	13.1	98,000	4.5
181	3,000	44.0	183,000	105,000	13.8	132,000	4.5
221	3,700	56.0	226,000	129,000	13.3	150,000	4.2
271	4,500	68.0	270,000	157,000	13.6	178,000	4.3
321	5,400	80.0	330,000	193,000	14.4	215,000	4.7
381	6,300	96.0	381,000	229,000	14.2	248,000	4.9

Cooling capacity is based on 95°F db, 78°F wb entering air temperature, and 85°F entering water temperature
GPM is based on 85°F entering water temperature and 95°F leaving water temperature.

Heating capacity is based on 50°F entering air temperature and 70°F entering water temperature.
Heating capacity is based on one circuit

EER= Energy Efficiency Ratio, But/hr. per watt.

Model Nomenclature

G — Voltage
F = 208-230/60/3
G = 460/60/3
K = 575/60/3

-270- — Unit Size
Btu/hr. cooling
071 = 72,250
111 = 111,000
141 = 148,000
221 = 226,000
271 = 270,000
321 = 330,000
381 = 381,000

M — Configuration
M = Make-up Air

H — Temperature Range
H = Standard Range
L = Low Temperature

C — Design Series

Unit Description

The Mammoth 100% outdoor air water source heat pump units is designed to allow the introduction of outdoor air to a heat pump system. The unit tempers the outdoor air to reduce the cooling and heating loads on the space conditioning heat pump units, while maintaining the ability to tie the make-up air units in the existing boiler/tower water circuit of the heat pump system.

The make-up air model is a single packaged, self-contained unit capable of cooling the outdoor air to remove moisture before introducing the fresh air to the space. In the cooling mode, the unit can reheat the air with hot refrigerant gas to provide a more “neutral” air temperature to the space and to prevent the possibility of excessive sweating of the supply duct. In the heating mode, the unit heats the outdoor air with hot water, steam, or electric preheat coil, plus the capability of additional heating with compressor heating.

For example, normal cooling provides a discharge air temperature of 63/61 F. Hot gas reheat increases the discharge temperature to76F. In the

Design Features

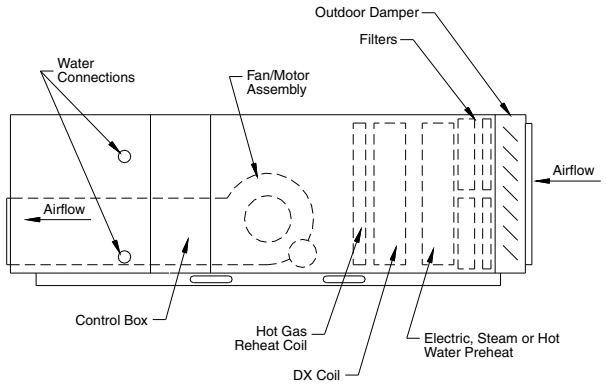
The unit casing is G-60 galvanized steel and is fully insulated with 1/2" thick (sizes 071–181) or 1"thick (sizes 221–381), non-fiberglass polymer foam reinforced with an aluminized mylar face. The unit base is constructed of heavy gauge galvanized steel with multiple supporting rails extending the length of the unit. The unit includes additional cross rails to be used as hanger brackets for ceiling suspended applications.

Multiple removable panels provide access to all sections of the unit requiring service. Filter ac-

Unit Configuration

The unit is a horizontal type for ceiling or slab mounting. The components in the direction of airflow are:

1.Outside air damper
2.Filter section
3.Preheat coil — hot water, steam, or electric
4.Air coil
5.Hot gas reheat coil
6.Fan section with belt drive assembly



The outside air damper is designed for low leakage. In the “off” mode, the damper is closed to prevent infiltration since the building is not occupied. A damper actuator closes the position of the damper.

The filter section includes 2-inch thick, 35%efficient pleated filters that slide into a steel frame. The filters can be removed from either side.

The preheat section has provisions for hot water, steam, or an electric coil to heat the entering air. The hot water and steam coils are constructed of aluminum fins bonded to seamless copper tubes. The 2-row electric heater is a two-stage, U.L. listed heater complete with a thermal fused disconnect switch. The heater requires a separate power source. The heating elements are constructed of nichrome wire. A control box on the outside of the unit houses all the electrical devices to control the heater.

The evaporator coil is constructed of aluminum fins bonded to seamless copper tubes and is 4rows deep. The coil has dual circuits in an inter-laced pattern.

The hot gas reheat coil is constructed of aluminum fins bonded to seamless copper tubes. A hot gas reheat valve allows hot refrigerant to enter the coil in the cooling mode to increase the air temperature after being cooled and dehumidified by the 4-row cooling coil. The hot gas reheat coil operates off of the #2compressor circuit.

The fan section includes a single forward-curved, belt-driven fan assembly with a three-phase, heavy-duty fan motor with overload protection. The fan assembly includes an adjustable pitch motor sheave to allow the fan speed to be set and balanced to deliver the proper airflow based on the external static pressure. Multiple fan motor horsepower options are available on each unit size to account for various sized duct systems.

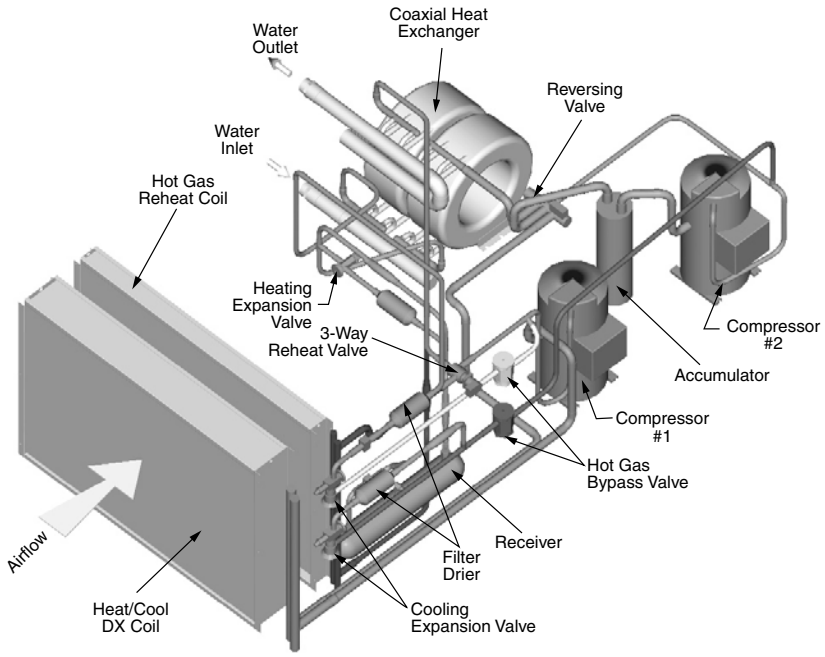
Refrigeration Circuit

The refrigeration system of the Mammoth make-up air unit is designed to handle a wide variety of entering air temperatures in the cooling and heating modes. To accomplish this, the system must incorporate the proper refrigeration components and design.

First, the dual, independent refrigerant circuits are uniquely arranged to provide neutral air temperatures without over-cooling or over heating.

Circuit #1: Provides cooling. Lead circuit in the cooling mode. Includes hot gas bypass. Provides hot gas reheat and hot gas by-

Circuit #2: Provides heating and cooling. Lead circuit in the heating mode. Lag circuit in the cooling mode. Includes cooling



The unit provides cooling from both circuits, hot gas reheat from one circuit, and heating from one circuit and an optional preheat section. This arrangement provides ample hot gas reheat and ample heating capacities.

Each unit has dual scroll compressors for efficiency and reliability. Each compressor is mounted on a heavy steel base and is isolated with neoprene grommets supplied by the compressor manufacturer. The compressors have built-in overload protection.

Refrigerant circuit #1 has a thermal expansion valve. Refrigerant circuit #2 has two separate thermal expansion valves: one for cooling and one for heating. This arrangement allows for the proper flow of refrigerant throughout the operating range of the cooling and heating modes.

Hot gas bypass control is provided on both cooling circuits to allow proper suction temperature control during low load conditions.

Hot gas reheat is provided on the lead cooling circuit. A hot gas reheat valve bypasses a portion of the hot gas from the compressor discharge to the hot gas reheat coil when the control system calls for reheat. The hot gas reheat coil is sized to heat the discharge air about 15 degrees F and is designed to not over-heat the air.

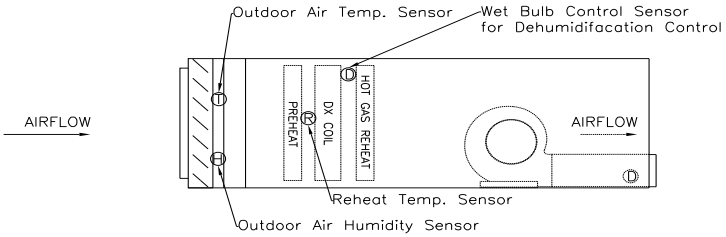
The cooling and heating refrigerant circuit #2includes an accumulator and a receiver. These devices assure that the proper form of refrigerant, liquid or gas, is being introduced into the next refrigerant device. This prevents damage to components and extends the life of the equipment. The receiver includes a pressure relief valve and is U.L. listed. The accumulator is also U.L. listed. Each refrigerant circuit includes a filter/drier.

The water-to-refrigerant coils are coaxial type and have copper inner tubes and steel outer tubes. Each coaxial coil is U.L. listed and rated for 400 psig on the water side and 450 psig on the refrigerant side.

Refrigerant safety controls include high and low refrigerant pressure switches to protect the components from excessive operating conditions. A low leaving water temperature switch is included to prevent operation at low water temperatures. A condensate float switch is also included to discontinue compressor operation if the condensate drain pan were to overflow. A separate control box houses all the electrical components. The box includes compressor contactors, fan motor contactor, hot gas reheat control relay, 24 volt transformers, compressor time delay relay, reversing valve control relay, and a lockout relay for each refrigerant circuit. The lockout relay stops compressor operation if any of the refrigerant circuit safety switches trip. The unit can be reset from the main power disconnect switch.

Temperature Control

The Mammoth 100% Outdoor Air heat pump unit offers two choices of temperature control:
1. Temperature control by others which includes a 24-volt terminal strip for connection of a controller to operate the compressors, fan motor, reversing valve and reheat valve.
2. A Mammoth DDC control system for complete unit control



Mammoth DDC Controls

The Mammoth DDC control system is an independent, stand-alone control system which includes:

- Outdoor air temperature sensor
- Leaving evaporator temperature sensor for dehumidification control
- Outdoor air humidity sensor
- Discharge air temperature sensor
- Cooling control from outdoor air and humidity sensors
- Heating control from discharge air sensor
- Reheat control for discharge air
- Neutral discharge air temperature
- Fan operation from damper end switch
- Adjustable temperature/humidity set points
- Adjustable differential for heating, cooling
- Spring return outdoor damper actuator with end switch
- Air proving switch
- Optional modulating hot gas reheat

The Mammoth DDC controls provide a tested and proven method of handling 100% outdoor air. The system has ample processing power to easily handle a wide range of entering air conditions as well as customization of the set points and some of the control logic.

MDDC - Sequence of Operation

On a call for unit operation, the outdoor air damper will open. When the damper is fully open, the fan will run continuously. The controller will first examine the mixed air temperature. If the outdoor air is below the set point of the outdoor air sensor, the preheat sensor will be energized to increase the air temperature.

After the need for preheat is examined, the controller then looks at the need for compressor operation. If the discharge air is above the first stage cooling set point, then the first stage of compressor cooling will be energized. If the humidity at the discharge is above the set point, the controller will energize stage one cooling operation. On a further increase in the discharge air temperature, the second stage cooling compressor will be energized.

If the discharge air temperature is below the set point (55 F and adjustable), the hot gas reheat valve will be activated to provide hot refrigerant gas to the reheat coil to increase the discharge air temperature. If the discharge air temperature rises above the discharge air temperature set point, the hot gas reheat valve will be de-activated. The optional modulating hot gas reheat control will modulate the hot gas valves in order to maintain a 70 F and 50%humidity at the discharge of the unit.

If the discharge air temperature falls below the second stage cooling control set point, the second stage cooling will be de-activated. The first stage of cooling will remain on until the discharge air temperature is below the first stage cooling set point. The first stage cooling will also remain on until the humidity is below the discharge air humidity set point. The first stage cooling will be de-activated only when both the air temperature and the air humidity

Factory-mounted Options

Electric Preheat
The Mammoth 100% Outdoor Air unit provides electric heat to preheat the outdoor air to a point where efficient compressor heating can take place.

The preheat section is located after the outside air damper section and the filter section. The electric heater is a pre-assembled package designed to be installed packaged units. The elements are constructed of nichrome wire and include thermal limits, duct high limit, air proving switch, and non-fused disconnect switch. The heater has two-stage control which receives its signals from the temperature control system. The heater is controlled from the mixed air controller to maintain a minimum 40°F entering air temperature to the air coil to allow operation of the mechanical refrigeration for heating.

The heater includes its own control boxed mounted on the outside of the unit casing, which houses all the heater control components and safety devices. The heater is U.L. listed. A separate power source from the unit is required.

Hot Water or Steam Preheat
The Mammoth 100% Outdoor Air unit provides hot water heat or steam to preheat cold outdoor air to a point where efficient compressor heating can take place.

The preheat section is located after the outside air damper section and the filter section. The coil has two rows and is constructed of aluminum fins bonded to seamless copper tubes.

Units with the optional temperature control system include a two-way, two-position, spring return valve actuator. The valve actuator is controlled from the mixed air controller to maintain a minimum 40°F entering air temperature to the air coil to allow operation of the mechanical refrigeration for heating. A freezestat closes the outdoor air dampers and stops the fan and compressor if mixed air is below 33°F.

Steam valves are not provided with the steam preheat option.
Modulating hot water valve control is available to provide more accurate control of the hot water coil with overshooting the leaving air temperature.

Low Temperature Operation
For ground-coupled and geothermal applications, Mammoth -WEBCO offers modifications to allow operation at lower fluid temperatures down to 25°F. The coaxial heat exchangers, water piping, and refrigerant piping are insulated to prevent sweating.

High Efficiency Filters
The standard filter can be upgraded to include 4" thick, 85% efficient panel type filters. Included with these filters2" thick throwaway prefilters to extend the life of the high efficient filters.

The filters are located after the outdoor air dampers in its own section accessible from removable panels. Galvanized steel filter racks accommodate the 2" thick standard filters and the 4" thick panel filters.

Dual Compressor Heating
For additional heating capacity, the unit is available with both refrigerant circuits to provide compressor heating operation. The following components are added to the refrigerant circuit: heating expansion valve, suction line accumulator, receiver with fusible plug and outlet valve.

Bottom Drain Connection
The side drain connection can be relocated to the bottom of the unit to allow for complete draining of the condensate. The connection is 7/8” OD copper.

Cupronickel Heat Exchangers
The standard copper inner tube of the refrigerant-to-water coaxial heat exchangers can be replaced with those made of 90/10 cupronickel. The result is increased protection against scale build-up associated with well water, groundwater, and brackish water applications.

Field-installed Accessories

Stainless steel braided hoses are available with threaded NPT water connections to the piping system. Flexible hoses isolate the unit from the system piping and allow for easy connection. Each hose is constructed of stainless braid with steel fittings and is rated at 200 psig working pressure. Hoses are available in 24- and 36-inch lengths.

Ball valves are available in female NPT sizes to allow isolation of the unit from the piping system. They can also be used to adjust and balance the flow through the unit. Each valve has a brass body and stainless steel core and is rated for 400 psig.

Performance Data

Capacity Data for Unit Size 071 at 1,200 CFM

Water Flow GPM	Water P.D. Ft. Water (psi)	COOLING Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr.	Sensible Capacity Btu/hr.	Heat Rejection Btu/hr.	Power Input KW	Leaving Water °F	HEATING Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr	Heat Absorp. Btu/hr.	Power Input KW	Water Flow GPM
13.5	4.9 (2.1)	40	90/76	79,527	41,497	92,131	3.693	53.6	40	40	34,317	25,800	2.496	13.5
			95/78	82,156	45,531	94,805	3.706	54.0		50	33,744	24,673	2.658	
			100/80	84,855	49,561	97,553	3.720	54.5		60	33,330	23,629	2.842	
18	7.3 (3.2)	40	90/76	80,474	41,752	92,696	3.581	50.3	40	40	35,277	26,345	2.617	18
			95/78	83,134	45,811	95,399	3.594	50.6		50	34,659	25,157	2.784	
			100/80	85,866	49,865	98,178	3.608	50.9		60	34,170	24,023	2.973	
13.5	4.9 (2.1)	50	90/76	78,790	40,775	92,435	3.998	63.7	50	40	38,759	29,888	2.599	13.5
			95/78	81,395	44,739	95,088	4.012	64.1		50	38,062	28,655	2.756	
			100/80	84,069	48,698	97,815	4.028	64.5		60	37,639	27,700	2.912	
18	7.3 (3.2)	50	90/76	78,596	41,089	91,792	3.866	60.2	50	40	39,925	30,603	2.731	18
			95/78	81,194	45,083	94,436	3.880	60.5		50	39,167	29,411	2.859	
			100/80	83,862	49,073	97,156	3.895	60.8		60	38,666	28,250	3.052	
13.5	4.9 (2.1)	70	90/76	72,757	39,208	88,709	4.674	83.1	60	40	43,202	33,978	2.703	13.5
			95/78	75,162	43,019	91,169	4.690	83.5		50	42,380	32,637	2.855	
			100/80	77,632	46,827	93,701	4.708	83.9		60	41,950	31,771	2.982	
18	7.3 (3.2)	70	90/76	73,778	39,506	89,245	4.532	79.9	60	40	44,575	34,862	2.846	18
			95/78	76,217	43,346	91,739	4.548	80.2		50	43,677	33,665	2.933	
			100/80	78,722	47,183	94,303	4.565	80.5		60	43,164	32,478	3.131	
13.5	4.9 (2.1)	85	90/76	69,063	38,009	87,082	5.279	97.9	70	40	47,644	38,067	2.806	13.5
			95/78	71,346	41,704	89,428	5.298	98.2		50	46,698	36,619	2.953	
			100/80	73,690	45,395	91,843	5.319	98.6		60	46,259	35,842	3.052	
18	7.3 (3.2)	85	90/76	69,938	38,268	87,454	5.132	94.7	70	40	49,223	39,120	2.960	18
			95/78	72,250	41,988	89,827	5.150	95.0		50	48,185	37,919	3.008	
			100/80	74,624	45,704	92,269	5.170	95.3		60	47,660	36,704	3.210	
13.5	4.9 (2.1)	90	90/76	67,783	37,620	86,566	5.503	102.8						
			95/78	70,023	41,277	88,872	5.523	103.2						
			100/80	72,324	44,930	91,246	5.544	103.5						
18	7.3 (3.2)	90	90/76	68,649	37,876	86,902	5.348	99.7						
			95/78	70,918	41,558	89,235	5.367	99.9						
			100/80	73,248	45,235	91,636	5.388	100.2						
13.5	4.9 (2.1)	100	90/76	65,163	36,829	85,644	6.001	112.7						
			95/78	67,318	40,409	87,870	6.022	113.0						
			100/80	69,529	43,985	90,162	6.045	113.4						
18	7.3 (3.2)	100	90/76	66,010	37,079	85,906	5.830	109.5						
			95/78	68,192	40,683	88,158	5.850	109.8						
			100/80	70,433	44,284	90,476	5.873	110.1						
18	7.3 (3.2)	110	90/76	63,671	36,307	85,478	6.389	119.5						
			95/78	65,775	39,837	87,659	6.412	119.7						
			100/80	67,937	43,362	89,905	6.437	120.0						

The above heating capacity data uses a single Compressor. For dual compressor heating operation use The following multiplication factors:

Total Heat	Heat Absorption	Heat KW
1.831	1.778	2.029

Capacity Correction Factor

Multiply the above data by these factors for performance at reduced airflow.

CFM	Total Cool	Sen. Cool	Heat Reject	Cool KW	Total Heat	Heat Absorp.	Heat KW
900	.936	.855	.947	.993	.983	.961	1.063
950	.947	.879	.956	.994	.986	.968	1.053
1000	.957	.903	.965	.996	.989	.974	1.042
1050	.968	.928	.974	.997	.992	.981	1.032
1100	.979	.952	.982	.998	.994	.987	1.021
1150	.989	.976	.991	.999	.997	.994	1.011

Performance Data

Capacity Data for Unit Size 111 at 1,800 CFM

Water Flow GPM	Water P.D. Ft. Water (psi)	COOLING							HEATING					Water Flow GPM
		Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr.	Sensible Capacity Btu/hr.	Heat Rejection Btu/hr.	Power Input KW	Leaving Water °F	Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr	Heat Absorp. Btu/hr.	Power Input KW	
21.0	8.5 (3.7)	40	90/76	129,843	74,559	149,085	5.638	54.2	40	40	53,590	40,816	3.743	21.0
			95/78	134,192	81,508	153,507	5.659	54.6		50	52,797	39,141	4.001	
			100/80	138,599	113,782	157,982	5.679	55.0		60	52,168	37,475	4.305	
28.0	13.5 (5.8)	40	90/76	126,726	68,984	145,399	5.471	50.4	40	40	54,805	41,337	3.946	28.0
			95/78	130,970	75,414	149,715	5.492	50.7		50	53,949	39,567	4.214	
			100/80	135,271	105,274	154,083	5.512	51.0		60	53,207	37,756	4.527	
21.0	8.5 (3.7)	50	90/76	128,038	72,217	148,894	6.111	64.2	50	40	60,185	46,838	3.910	21.0
			95/78	132,327	78,948	153,262	6.134	64.6		50	59,216	45,009	4.163	
			100/80	136,672	110,208	157,681	6.156	65.0		60	58,494	43,368	4.432	
28.0	13.5 (5.8)	50	90/76	123,769	67,888	143,931	5.907	60.3	50	40	61,675	47,573	4.132	28.0
			95/78	127,914	74,216	148,153	5.930	60.6		50	60,622	45,807	4.341	
			100/80	132,115	103,601	152,425	5.951	60.9		60	59,780	43,842	4.670	
21.0	8.5 (3.7)	70	90/76	117,028	67,314	141,455	7.157	83.5	60	40	66,781	52,862	4.078	21.0
			95/78	120,947	73,588	145,466	7.184	83.9		50	65,638	50,879	4.324	
			100/80	124,919	102,725	149,526	7.210	84.2		60	64,823	49,263	4.559	
28.0	13.5 (5.8)	70	90/76	114,699	62,787	138,395	6.943	79.9	60	40	68,548	53,811	4.318	28.0
			95/78	118,541	68,639	142,326	6.969	80.2		50	67,297	52,050	4.467	
			100/80	122,434	95,817	146,304	6.994	80.5		60	66,354	49,930	4.812	
21.0	8.5 (3.7)	85	90/76	110,106	63,596	137,728	8.093	98.1	70	40	73,376	58,884	4.246	21.0
			95/78	113,794	69,524	141,521	8.124	98.5		50	72,058	56,748	4.486	
			100/80	117,531	97,051	145,356	8.153	98.8		60	71,149	55,156	4.686	
28.0	13.5 (5.8)	85	90/76	107,544	58,880	134,418	7.874	94.6	70	40	75,418	60,047	4.504	28.0
			95/78	111,146	64,368	138,122	7.904	94.9		50	73,970	58,291	4.594	
			100/80	114,796	89,854	141,868	7.932	95.1		60	72,927	56,016	4.955	
21.0	8.5 (3.7)	90	90/76	109,310	64,762	138,287	8.490	103.2						
			95/78	112,971	70,798	142,058	8.522	103.5						
			100/80	116,681	98,830	145,871	8.553	103.9						
28.0	13.5 (5.8)	90	90/76	106,778	59,958	134,961	8.258	99.6						
			95/78	110,354	65,546	138,645	8.289	99.9						
			100/80	113,978	91,499	142,369	8.319	100.2						
21.0	8.5 (3.7)	100	90/76	107,623	67,070	139,570	9.360	113.3						
			95/78	111,228	73,321	143,297	9.396	113.6						
			100/80	114,881	102,352	147,063	9.429	114.0						
28.0	13.5 (5.8)	100	90/76	105,152	62,094	136,215	9.101	109.7						
			95/78	108,674	67,882	139,855	9.136	110.0						
			100/80	112,243	94,759	143,534	9.168	110.3						
28.0	13.5 (5.8)	110	90/76	101,426	60,803	135,472	9.976	119.7						
			95/78	104,823	66,470	138,999	10.014	119.9						
			100/80	108,265	92,789	142,562	10.049	120.2						

The above heating capacity data uses a single Compressor. For dual compressor heating operation use The following multiplication factors:

Total Heat	Heat Absorption	Heat KW
1.92	1.809	2.199

Capacity Correction Factor

Multiply the above data by these factors for performance at reduced airflow.

CFM	Total Cool	Sen. Cool	Heat Reject	Cool KW	Total Heat	Heat Absorp.	Heat KW
1300	.927	.848	.940	.993	.981	.952	1.088
1400	.942	.878	.952	.994	.985	.962	1.070
1500	.956	.909	.964	.996	.989	.971	1.053
1600	.971	.939	.976	.997	.992	.981	1.035
1700	.985	.970	.988	.999	.996	.990	1.018

Performance Data

Capacity Data for Unit Size 141 at 2,400 CFM

Water Flow GPM	Water P.D. Ft. Water (psi)	COOLING							HEATING					Water Flow GPM
		Ent. Water °F	Ent. Air °F	Total Capac-ity Btu/hr.	Sensi-ble Capac-ity Btu/hr.	Heat Rejec-tion Btu/hr.	Power Input KW	Leaving Water °F	Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr	Heat Absorp. Btu/hr.	Power Input KW	
27.0	12.7 (5.5)	40	90/76	160,158	83,563	187,892	8.126	53.9	40	40	69,189	51,541	5.171	27.0
			95/78	165,784	91,254	193,765	8.198	54.4		50	68,614	49,507	5.598	
			100/80	171,292	98,944	199,525	8.272	54.8		60	68,140	47,467	6.057	
36.0	20.4 (8.8)	40	90/76	161,377	83,939	188,453	7.933	50.5	40	40	70,590	52,791	5.215	36.0
			95/78	167,046	91,664	194,364	8.004	50.8		50	69,945	50,696	5.640	
			100/80	172,595	99,388	200,159	8.076	51.1		60	69,332	48,537	6.093	
27.0	12.7 (5.5)	50	90/76	159,271	82,252	189,183	8.764	64.0	50	40	78,337	59,692	5.463	27.0
			95/78	164,866	89,822	195,045	8.842	64.4		50	77,583	57,484	5.889	
			100/80	170,343	97,391	200,793	8.922	64.9		60	76,930	55,239	6.355	
36.0	20.4 (8.8)	50	90/76	157,611	82,605	186,846	8.566	60.4	50	40	80,089	61,243	5.522	36.0
			95/78	163,148	90,208	192,643	8.642	60.7		50	79,238	59,194	5.873	
			100/80	168,568	97,809	198,329	8.720	61.0		60	78,435	56,572	6.406	
27.0	12.7 (5.5)	70	90/76	148,272	79,380	183,037	10.186	83.6	60	40	87,487	67,845	5.755	27.0
			95/78	153,480	86,686	188,554	10.276	84.0		50	86,555	65,465	6.179	
			100/80	158,579	93,990	193,969	10.369	84.4		60	85,723	63,013	6.654	
36.0	20.4 (8.8)	70	90/76	149,469	79,790	183,455	9.958	80.2	60	40	89,590	69,697	5.829	36.0
			95/78	154,720	87,134	189,008	10.046	80.5		50	88,533	67,696	6.105	
			100/80	159,859	94,476	194,457	10.137	80.8		60	87,542	64,610	6.719	
27.0	12.7 (5.5)	85	90/76	141,716	77,179	180,855	11.468	98.4	70	40	96,635	75,997	6.047	27.0
			95/78	146,694	84,282	186,182	11.570	98.8		50	95,524	73,442	6.470	
			100/80	151,567	91,383	191,411	11.674	99.2		60	94,514	70,786	6.952	
36.0	20.4 (8.8)	85	90/76	142,902	77,576	181,210	11.224	95.1	70	40	99,088	78,149	6.135	36.0
			95/78	147,922	84,716	186,571	11.324	95.4		50	97,826	76,194	6.338	
			100/80	152,836	91,854	191,833	11.426	95.7		60	96,645	72,645	7.032	
27.0	12.7 (5.5)	90	90/76	139,451	76,430	180,257	11.956	103.4						
			95/78	144,350	83,464	185,519	12.062	103.7						
			100/80	149,145	90,497	190,685	12.171	104.1						
36.0	20.4 (8.8)	90	90/76	140,633	76,822	180,559	11.698	100.0						
			95/78	145,574	83,892	185,855	11.802	100.3						
			100/80	150,410	90,961	191,054	11.909	100.6						
27.0	12.7 (5.5)	100	90/76	134,802	74,904	179,306	13.039	113.3						
			95/78	139,538	81,798	184,438	13.156	113.7						
			100/80	144,173	88,691	189,477	13.274	114.0						
36.0	20.4 (8.8)	100	90/76	135,973	75,289	179,504	12.754	110.0						
			95/78	140,750	82,218	184,668	12.868	110.3						
			100/80	145,426	89,146	189,740	12.984	110.5						
36.0	20.4 (8.8)	110	90/76	131,155	73,723	178,867	13.979	119.9						
			95/78	135,762	80,508	183,899	14.104	120.2						
			100/80	140,272	87,291	188,843	14.231	120.5						

The above heating capacity data uses a single Compressor. For dual compressor heating operation use The following multiplication factors:

Total Heat	Heat Absorption	Heat KW
1.836	1.712	2.274

Capacity Correction Factor

Multiply the above data by these factors for performance at reduced airflow.

CFM	Total Cool	Sen. Cool	Heat Reject	Cool KW	Total Heat	Heat Absorp.	Heat KW
1800	.946	.885	.946	.949	.974	.953	1.050
1900	.955	.904	.955	.958	.978	.961	1.042
2000	.964	.923	.964	.966	.983	.969	1.033
2100	.973	.943	.973	.975	.987	.977	1.025
2200	.982	.962	.982	.983	.991	.984	1.017
2300	.991	.981	.991	.992	.996	.992	1.008

Performance Data

Capacity Data for Unit Size 181 at 3,000 CFM

Water Flow GPM	Water P.D. Ft. Water (psi)	COOLING							HEATING					Water Flow GPM
		Ent. Water °F	Ent. Air °F	Total Capac-ity Btu/hr.	Sensi-ble Capac-ity Btu/hr.	Heat Rejec-tion Btu/hr.	Power Input KW	Leaving Water °F	Ent. Water °F	Ent. Air °F	Total Capac-ity Btu/hr	Heat Absorp. Btu/hr.	Power Input KW	
33.0	22.0 (9.5)	40	90/76	197,104	102,771	229,620	9.527	53.9	40	40	93,231	71,435	6.386	33.0
			95/78	203,771	112,075	236,558	9.606	54.3		50	92,088	68,559	6.894	
			100/80	210,554	121,348	243,623	9.689	54.8		60	91,193	65,682	7.474	
44.0	36.4 (15.8)	40	90/76	198,587	103,198	230,268	9.282	50.5	40	40	95,644	72,692	6.725	44.0
			95/78	205,305	112,540	237,250	9.360	50.8		50	94,393	69,642	7.252	
			100/80	212,139	121,850	244,358	9.440	51.1		60	93,301	66,506	7.851	
33.0	22.0 (9.5)	50	90/76	196,275	101,344	231,382	10.286	64.0	50	40	105,467	81,974	6.883	33.0
			95/78	202,914	110,519	238,314	10.372	64.4		50	104,037	78,789	7.397	
			100/80	209,669	119,662	245,373	10.461	64.9		60	102,925	75,791	7.950	
44.0	36.4 (15.8)	50	90/76	193,953	101,558	228,160	10.022	60.4	50	40	108,421	83,624	7.265	44.0
			95/78	200,514	110,752	235,006	10.106	60.7		50	106,842	80,561	7.700	
			100/80	207,189	119,914	241,976	10.193	61.0		60	105,518	76,959	8.368	
33.0	22.0 (9.5)	70	90/76	183,246	98,185	224,119	11.976	83.6	60	40	117,707	92,516	7.381	33.0
			95/78	189,444	107,073	230,656	12.075	84.0		50	115,989	89,023	7.901	
			100/80	195,751	115,930	237,317	12.179	84.4		60	114,660	85,902	8.426	
44.0	36.4 (15.8)	70	90/76	184,603	98,578	224,463	11.679	80.2	60	40	121,201	94,560	7.806	44.0
			95/78	190,847	107,502	231,040	11.776	80.5		50	119,296	91,484	8.149	
			100/80	197,200	116,395	237,738	11.877	80.8		60	117,740	87,415	8.885	
33.0	22.0 (9.5)	85	90/76	175,567	95,756	221,627	13.495	98.4	70	40	129,943	103,055	7.878	33.0
			95/78	181,506	104,424	227,950	13.608	98.8		50	127,938	99,253	8.404	
			100/80	187,548	113,062	234,390	13.725	99.2		60	126,393	96,010	8.902	
44.0	36.4 (15.8)	85	90/76	177,022	96,216	222,012	13.182	95.1	70	40	133,978	105,493	8.346	44.0
			95/78	183,010	104,926	228,376	13.292	95.4		50	131,745	102,403	8.597	
			100/80	189,102	113,606	234,857	13.406	95.7		60	129,957	97,868	9.402	
33.0	22.0 (9.5)	90	90/76	172,926	94,888	221,001	14.086	103.4						
			95/78	178,776	103,478	227,252	14.203	103.8						
			100/80	184,727	112,038	233,619	14.325	104.2						
44.0	36.4 (15.8)	90	90/76	174,378	95,342	221,322	13.755	100.1						
			95/78	180,277	103,973	227,613	13.869	100.3						
			100/80	186,278	112,575	234,020	13.988	100.6						
33.0	22.0 (9.5)	100	90/76	167,496	93,118	220,033	15.393	113.3						
			95/78	173,162	101,548	226,138	15.522	113.7						
			100/80	178,926	109,948	232,356	15.655	114.1						
44.0	36.4 (15.8)	100	90/76	168,937	93,564	220,223	15.027	110.0						
			95/78	174,652	102,034	226,366	15.152	110.3						
			100/80	180,466	110,475	232,623	15.282	110.6						
44.0	36.4 (15.8)	110	90/76	162,951	91,618	219,162	16.470	120.0						
			95/78	168,463	99,912	225,144	16.607	120.2						
			100/80	174,070	108,177	231,237	16.750	120.5						

The above heating capacity data uses a single Compressor. For dual compressor heating operation use The following multiplication factors:

Total Heat	Heat Absorption	Heat KW
1.867	1.728	2.353

Capacity Correction Factor

Multiply the above data by these factors for performance at reduced airflow.

CFM	Total Cool	Sen. Cool	Heat Reject	Cool KW	Total Heat	Heat Absorp.	Heat KW
2500	.963	.916	.968	.991	.991	.974	1.047
2600	.970	.933	.974	.993	.993	.979	1.038
2700	.978	.950	.981	.995	.995	.984	1.028
2800	.985	.966	.987	.996	.996	.990	1.019
2900	.993	.963	.994	.998	.998	.995	1.009

Performance Data

Capacity Data for Unit Size 221 at 3,700 CFM

Water Flow GPM	Water P.D. Ft. Water (psi)	COOLING Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr.	Sensible Capacity Btu/hr.	Heat Rejection Btu/hr.	Power Input KW	Leaving Water °F	HEATING Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr	Heat Absorp. Btu/hr.	Power Input KW	Water Flow GPM
42.0	12.2 (5.3)	40	90/76	243,757	127,351	285,976	12.370	53.6	40	40	105,425	78,201	7.976	42.0
			95/78	251,887	138,639	294,320	12.433	54.0		50	104,545	75,098	8.628	
			100/80	260,006	150,334	302,673	12.501	54.4		60	104,203	72,191	9.379	
56.0	20.9 (9.1)	40	90/76	246,007	128,042	286,937	11.992	50.2	40	40	108,163	79,415	8.423	56.0
			95/78	254,212	139,391	295,350	12.053	50.5		50	107,171	76,109	9.101	
			100/80	262,406	151,148	303,771	12.120	50.8		60	106,621	72,904	9.879	
42.0	12.2 (5.3)	50	90/76	242,692	125,459	288,202	13.334	63.7	50	40	119,461	90,517	8.480	42.0
			95/78	250,786	136,579	296,528	13.402	64.1		50	118,307	87,138	9.132	
			100/80	258,870	148,101	304,864	13.476	64.5		60	117,659	84,182	9.808	
56.0	20.9 (9.1)	50	90/76	240,266	126,007	284,459	12.948	60.2	50	40	122,817	92,185	8.975	56.0
			95/78	248,280	137,176	292,697	13.014	60.5		50	121,508	88,965	9.535	
			100/80	256,283	148,747	300,945	13.086	60.7		60	120,634	85,304	10.352	
42.0	12.2 (5.3)	70	90/76	226,500	121,298	279,353	15.486	83.3	60	40	133,500	102,837	8.984	42.0
			95/78	234,055	132,050	287,172	15.563	83.7		50	132,073	99,181	9.637	
			100/80	241,599	143,188	295,011	15.650	84.0		60	131,118	96,177	10.238	
56.0	20.9 (9.1)	70	90/76	228,580	121,992	279,896	15.035	80.0	60	40	137,476	104,959	9.527	56.0
			95/78	236,204	132,804	287,780	15.112	80.3		50	135,850	101,825	9.969	
			100/80	243,817	144,007	295,678	15.195	80.6		60	134,651	97,707	10.824	
42.0	12.2 (5.3)	85	90/76	216,944	118,104	276,418	17.426	98.2	70	40	147,536	115,153	9.488	42.0
			95/78	224,180	128,572	283,955	17.514	98.5		50	145,834	111,220	10.142	
			100/80	231,406	139,417	291,511	17.611	98.9		60	144,574	108,168	10.667	
56.0	20.9 (9.1)	85	90/76	219,112	118,822	276,915	16.936	94.9	70	40	152,130	117,729	10.080	56.0
			95/78	226,420	129,354	284,516	17.022	95.2		50	150,187	114,682	10.403	
			100/80	233,718	140,265	292,135	17.116	95.4		60	148,664	110,107	11.297	
42.0	12.2 (5.3)	90	90/76	213,628	117,005	275,754	18.203	103.1						
			95/78	220,753	127,376	283,195	18.295	103.5						
			100/80	227,868	138,120	290,655	18.396	103.8						
56.0	20.9 (9.1)	90	90/76	215,785	117,714	276,148	17.686	99.9						
			95/78	222,982	128,148	283,652	17.776	100.1						
			100/80	230,170	138,957	291,174	17.874	100.4						
42.0	12.2 (5.3)	100	90/76	206,811	114,764	274,802	19.921	113.1						
			95/78	213,709	124,937	282,045	20.022	113.4						
			100/80	220,597	135,475	289,310	20.133	113.8						
56.0	20.9 (9.1)	100	90/76	208,943	115,460	274,984	19.350	109.8						
			95/78	215,912	125,694	282,288	19.448	110.1						
			100/80	222,871	136,296	289,614	19.555	110.3						
56.0	20.9 (9.1)	110	90/76	201,538	113,059	273,923	21.208	119.8						
			95/78	208,260	123,080	281,012	21.316	120.0						
			100/80	214,973	133,462	288,126	21.434	120.3						

The above heating capacity data uses a single Compressor. For dual compressor heating operation use The following multiplication factors:

Total Heat	Heat Absorption	Heat KW
1.893	1.737	2.396

Capacity Correction Factor

Multiply the above data by these factors for performance at reduced airflow.

CFM	Total Cool	Sen. Cool	Heat Reject	Cool KW	Total Heat	Heat Absorp.	Heat KW
2700	.930	.864	.942	.990	.987	.953	1.099
2900	.944	.891	.954	.992	.990	.962	1.079
3100	.958	.918	.965	.994	.992	.972	1.059
3300	.972	.946	.977	.996	.995	.981	1.040
3500	.986	.973	.988	.998	.997	.991	1.020

Performance Data

Capacity Data for Unit Size 271 at 4,500 CFM

Water Flow GPM	Water P.D. Ft. Water (psi)	COOLING Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr.	Sensible Capacity Btu/hr.	Heat Rejection Btu/hr.	Power Input KW	Leaving Water °F	HEATING Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr	Heat Absorp. Btu/hr.	Power Input KW	Water Flow GPM
51.0	9.5 (4.1)	40	90/76	290,597	152,669	339,122	14.218	53.3	40	40	125,424	93,829	9.257	51.0
			95/78	300,287	166,671	349,077	14.295	53.7		50	124,579	90,293	10.046	
			100/80	310,110	180,662	359,185	14.379	54.1		60	124,078	86,757	10.935	
68.0	15.9 (6.9)	40	90/76	292,881	153,370	340,057	13.823	50.0	40	40	127,688	94,500	9.724	68.0
			95/78	302,646	167,436	350,081	13.898	50.3		50	126,723	90,747	10.541	
			100/80	312,546	181,490	360,258	13.979	50.6		60	125,978	86,875	11.457	
51.0	9.5 (4.1)	50	90/76	289,396	150,663	341,870	15.375	63.4	50	40	142,178	108,572	9.847	51.0
			95/78	299,046	164,481	351,806	15.459	63.8		50	141,034	104,725	10.639	
			100/80	308,828	178,288	361,897	15.549	64.2		60	140,153	101,120	11.436	
68.0	15.9 (6.9)	50	90/76	286,046	150,933	336,983	14.924	59.9	50	40	145,046	109,665	10.367	68.0
			95/78	295,584	164,776	346,799	15.006	60.2		50	143,733	106,023	11.049	
			100/80	305,253	178,606	356,768	15.094	60.5		60	142,588	101,611	12.006	
51.0	9.5 (4.1)	70	90/76	270,227	146,197	331,469	17.944	83.0	60	40	158,938	123,319	10.436	51.0
			95/78	279,237	159,605	340,810	18.041	83.4		50	157,494	119,161	11.232	
			100/80	288,371	173,001	350,306	18.147	83.7		60	156,232	115,488	11.938	
68.0	15.9 (6.9)	70	90/76	272,309	146,799	331,871	17.451	79.8	60	40	162,409	124,834	11.009	68.0
			95/78	281,389	160,263	341,276	17.547	80.0		50	160,749	121,304	11.557	
			100/80	290,593	173,714	350,831	17.649	80.3		60	159,204	116,351	12.556	
51.0	9.5 (4.1)	85	90/76	258,936	142,759	328,047	20.249	97.9	70	40	175,693	138,061	11.026	51.0
			95/78	267,570	155,852	337,059	20.360	98.2		50	173,950	133,593	11.824	
			100/80	276,323	168,933	346,217	20.479	98.6		60	172,307	129,851	12.439	
68.0	15.9 (6.9)	85	90/76	261,168	143,508	328,527	19.736	94.7	70	40	179,766	139,999	11.652	68.0
			95/78	269,876	156,670	337,604	19.844	94.9		50	177,759	136,581	12.065	
			100/80	278,704	169,820	346,827	19.960	95.2		60	175,814	131,087	13.105	
51.0	9.5 (4.1)	90	90/76	254,993	141,464	327,314	21.190	102.8						
			95/78	263,496	154,438	336,212	21.306	103.2						
			100/80	272,115	167,401	345,257	21.430	103.5						
68.0	15.9 (6.9)	90	90/76	257,218	142,203	327,685	20.647	99.6						
			95/78	265,795	155,246	336,647	20.760	99.9						
			100/80	274,489	168,276	345,756	20.881	100.2						
51.0	9.5 (4.1)	100	90/76	246,888	138,821	326,279	23.261	112.8						
			95/78	255,120	151,554	334,946	23.389	113.1						
			100/80	263,466	164,274	343,758	23.525	113.5						
68.0	15.9 (6.9)	100	90/76	249,095	139,547	326,426	22.658	109.6						
			95/78	257,400	152,346	335,155	22.782	109.9						
			100/80	265,820	165,133	344,029	22.915	110.1						
68.0	15.9 (6.9)	110	90/76	240,267	136,645	325,027	24.834	119.6						
			95/78	248,278	149,177	333,502	24.970	119.8						
			100/80	256,400	161,699	342,121	25.116	120.1						

The above heating capacity data uses a single Compressor. For dual compressor heating operation use The following multiplication factors:

Total Heat	Heat Absorption	Heat KW
1.854	1.718	2.306

Capacity Correction Factor

Multiply the above data by these factors for performance at reduced airflow.

CFM	Total Cool	Sen. Cool	Heat Reject	Cool KW	Total Heat	Heat Absorp.	Heat KW
3300	.934	.862	.945	.990	.989	.957	1.095
3500	.945	.885	.954	.992	.991	.964	1.079
3700	.956	.908	.963	.993	.993	.971	1.063
3900	.967	.931	.973	.995	.995	.979	1.048
4100	.978	.954	.982	.997	.996	.986	1.032
4300	.989	.977	.991	.998	.998	.993	1.016

Performance Data

Capacity Data for Unit Size 321 at 5,400 CFM

Water Flow GPM	Water P.D. Ft. Water (psi)	COOLING Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr.	Sensible Capacity Btu/hr.	Heat Rejection Btu/hr.	Power Input KW	Leaving Water °F	HEATING Ent. Water °F	Ent. Air °F	Total Capacity Btu/hr	Heat Absorp. Btu/hr.	Power Input KW	Water Flow GPM
60.0	11.0 (4.7)	40	90/76	358,136	190,705	414,187	16.423	53.8	40	40	150,208	115,205	10.256	60.0
			95/78	369,995	207,912	426,407	16.528	54.2		50	149,076	111,007	11.154	
			100/80	382,202	224,727	438,984	16.637	54.6		60	148,329	106,803	12.167	
80.0	18.6 (8.1)	40	90/76	361,605	191,744	415,866	15.898	50.4	40	40	154,166	117,248	10.817	80.0
			95/78	373,579	209,046	428,189	16.001	50.7		50	152,878	112,768	11.752	
			100/80	385,904	225,950	440,873	16.106	51.0		60	151,828	108,142	12.800	
60.0	11.0 (4.7)	50	90/76	356,089	187,609	416,687	17.755	63.9	50	40	170,441	133,173	10.919	60.0
			95/78	367,881	204,537	428,868	17.869	64.3		50	168,934	128,579	11.824	
			100/80	380,017	221,078	441,405	17.987	64.7		60	167,724	124,265	12.733	
80.0	18.6 (8.1)	50	90/76	353,167	188,698	411,753	17.165	60.3	50	40	175,297	135,900	11.543	80.0
			95/78	364,862	205,724	423,825	17.276	60.6		50	173,571	131,489	12.330	
			100/80	376,899	222,359	436,249	17.390	60.9		60	172,030	126,219	13.423	
60.0	11.0 (4.7)	70	90/76	331,372	180,852	402,068	20.714	83.4	60	40	190,681	151,147	11.583	60.0
			95/78	342,345	197,171	413,491	20.846	83.8		50	188,797	146,156	12.494	
			100/80	353,639	213,114	425,255	20.983	84.2		60	187,124	141,732	13.300	
80.0	18.6 (8.1)	70	90/76	334,762	182,004	403,230	20.061	80.1	60	40	196,434	154,559	12.269	80.0
			95/78	345,847	198,426	414,756	20.190	80.4		50	194,269	150,214	12.908	
			100/80	357,257	214,472	426,618	20.323	80.7		60	192,238	144,301	14.045	
60.0	11.0 (4.7)	85	90/76	316,620	175,675	396,380	23.370	98.2	70	40	210,915	169,116	12.247	60.0
			95/78	327,104	191,526	407,378	23.520	98.6		50	208,654	163,728	13.163	
			100/80	337,895	207,013	418,697	23.675	99.0		60	206,519	159,194	13.866	
80.0	18.6 (8.1)	85	90/76	319,928	176,748	397,335	22.680	94.9	70	40	217,564	173,212	12.995	80.0
			95/78	330,522	192,696	408,427	22.826	95.2		50	214,962	168,934	13.486	
			100/80	341,426	208,278	419,843	22.976	95.5		60	212,440	162,378	14.668	
60.0	11.0 (4.7)	90	90/76	311,619	174,053	395,081	24.454	103.2						
			95/78	321,938	189,758	405,937	24.611	103.5						
			100/80	332,559	205,102	417,110	24.773	103.9						
80.0	18.6 (8.1)	90	90/76	314,909	175,112	395,883	23.725	99.9						
			95/78	325,337	190,913	406,832	23.878	100.2						
			100/80	336,070	206,351	418,101	24.035	100.5						
60.0	11.0 (4.7)	100	90/76	301,351	170,744	392,964	26.842	113.1						
			95/78	311,330	186,151	403,532	27.015	113.5						
			100/80	321,601	201,203	414,409	27.193	113.8						
80.0	18.6 (8.1)	100	90/76	304,596	171,784	393,451	26.034	109.8						
			95/78	314,682	187,284	404,109	26.202	110.1						
			100/80	325,063	202,428	415,079	26.374	110.4						
	18.6		90/76	293,801	168,211	391,191	28.535	119.8						

The above heating capacity data uses a single Compressor. For dual compressor heating operation use The following multiplication factors:

Total Heat	Heat Absorption	Heat KW
1.891	1.755	2.388

Capacity Correction Factor

Multiply the above data by these factors for performance at reduced airflow.

CFM	Total Cool	Sen. Cool	Heat Reject	Cool KW	Total Heat	Heat Absorp.	Heat KW
4400	.958	.906	.965	.992	.992	.973	1.058
4600	.966	.925	.972	.994	.994	.978	1.046
4800	.975	.944	.978	.995	.995	.984	1.035
5000	.983	.962	.982	.997	.997	.989	1.023
5200	.992	.981	.986	.998	.998	.995	1.012

Performance Data

Capacity Data for Unit Size 381 at 6,300 CFM

Water Flow GPM	Water P.D. Ft. Water (psi)	COOLING							HEATING					Water Flow GPM
		Ent. Water °F	Ent. Air °F	Total Capac-ity Btu/hr.	Sensi-ble Capac-ity Btu/hr.	Heat Rejec-tion Btu/hr.	Power Input KW	Leaving Water °F	Ent. Water °F	Ent. Air °F	Total Capac-ity Btu/hr	Heat Absorp. Btu/hr.	Power Input KW	
72.0	15.3 (6.6)	40	90/76	415,533	224,542	480,955	19.168	53.4	40	40	171,642	133,263	11.245	72.0
			95/78	429,021	245,368	494,886	19.298	53.7		50	170,343	128,470	12.269	
			100/80	442,149	267,739	508,437	19.422	54.1		60	169,704	123,823	13.443	
96.0	26.2 (11.4)	40	90/76	419,411	225,640	482,784	18.568	50.1	40	40	176,121	135,677	11.850	96.0
			95/78	433,025	246,568	496,827	18.694	50.4		50	174,643	130,564	12.915	
			100/80	446,275	269,045	510,487	18.814	50.6		60	173,663	125,437	14.130	
72.0	15.3 (6.6)	50	90/76	412,754	221,147	483,553	20.744	63.4	50	40	195,488	154,670	11.960	72.0
			95/78	426,151	241,659	497,430	20.884	63.8		50	193,750	149,411	12.991	
			100/80	439,191	263,691	510,928	21.019	64.2		60	192,518	144,579	14.046	
96.0	26.2 (11.4)	50	90/76	409,624	222,055	478,049	20.048	60.0	50	40	201,008	157,897	12.631	96.0
			95/78	422,920	242,650	491,808	20.184	60.2		50	199,020	152,823	13.536	
			100/80	435,861	264,770	505,192	20.314	60.5		60	197,413	146,923	14.793	
72.0	15.3 (6.6)	70	90/76	383,294	213,691	466,020	24.238	82.9	60	40	219,341	176,083	12.674	72.0
			95/78	395,735	233,511	479,016	24.401	83.3		50	217,164	170,359	13.714	
			100/80	407,845	254,797	491,663	24.559	83.7		60	215,339	165,341	14.649	
96.0	26.2 (11.4)	70	90/76	387,245	214,823	467,386	23.481	79.7	60	40	225,903	180,124	13.413	96.0
			95/78	399,814	234,748	480,498	23.640	80.0		50	223,404	175,088	14.156	
			100/80	412,048	256,148	493,251	23.792	80.3		60	221,169	168,416	15.457	
72.0	15.3 (6.6)	85	90/76	365,578	207,969	458,994	27.371	97.7	70	40	243,187	197,490	13.389	72.0
			95/78	377,444	227,258	471,493	27.556	98.1		50	240,571	191,301	14.436	
			100/80	388,993	247,975	483,647	27.733	98.4		60	238,153	186,097	15.252	
96.0	26.2 (11.4)	85	90/76	369,268	209,122	459,986	26.580	94.6	70	40	250,790	202,345	14.194	96.0
			95/78	381,254	228,518	472,586	26.760	94.8		50	247,781	197,347	14.777	
			100/80	392,920	249,350	484,839	26.932	95.1		60	244,919	189,901	16.120	
72.0	15.3 (6.6)	90	90/76	359,461	206,079	457,234	28.647	102.7						
			95/78	371,129	225,193	469,564	28.841	103.0						
			100/80	382,485	245,722	481,552	29.027	103.4						
96.0	26.2 (11.4)	90	90/76	363,128	207,217	458,048	27.811	99.5						
			95/78	374,915	226,437	470,477	28.000	99.8						
			100/80	386,387	247,079	482,564	28.180	100.1						
72.0	15.3 (6.6)	100	90/76	346,918	202,223	454,283	31.458	112.6						
			95/78	358,178	220,979	466,270	31.671	113.0						
			100/80	369,138	241,124	477,925	31.874	113.3						
96.0	26.2 (11.4)	100	90/76	350,530	203,340	454,730	30.530	109.5						
			95/78	361,908	222,200	466,813	30.737	109.7						
			100/80	372,982	242,456	478,562	30.935	110.0						
96.0	26.2 (11.4)	110	90/76	338,108	199,111	452,316	33.463	119.4						
			95/78	349,082	217,579	464,064	33.689	119.7						
			100/80	359,764	237,413	475,485	33.906	119.9						

The above heating capacity data uses a single Compressor. For dual compressor heating operation use The following multiplication factors:

Total Heat	Heat Absorption	Heat KW
1.905	1.782	2.386

Capacity Correction Factor

Multiply the above data by these factors for performance at reduced airflow.

	Total Cool	Sen. Cool	Heat Reject	Cool KW	Total Heat	Heat Absorp.	Heat KW
5100	.959	.900	.965	.992	.992	.976	1.057
5300	.966	.917	.971	.993	.993	.980	1.048
5500	.973	.933	.977	.995	.995	.984	1.038
5700	.980	.950	.983	.996	.996	.988	1.029
5900	.986	.967	.988	.997	.997	.992	1.019
6100	.993	.983	.994	.999	.999	.996	1.010

Hot Gas Reheat Coil Capacity

Unit Size	Conditions Entering the Unit				Unit Cooling Capacity			Reheat Coil Capacity		
	EA, °F	EW, °F	CFM	GPM	Total	SEN.	LAT- °F,db	Btu/hr	TR, °F	LAT- °F,db
071	95/78	85	1200	18.0	72,250	41,988	62.9	19,629	15.0	77.9
111	95/78	85	1800	28.0	111,146	64,368	62.2	30,253	15.4	77.6
141	95/78	85	2400	36.0	147,992	84,716	62.6	40,028	15.3	77.9
181	95/78	85	3000	44.0	183,010	104,926	62.9	49,840	15.2	78.2
221	95/78	85	3700	56.0	226,420	129,354	62.9	60,473	15.0	77.9
271	95/78	85	4500	68.0	269,876	156,670	63.1	73,635	15.0	78.1
321	95/78	85	5400	80.0	330,522	192,696	62.3	91,049	15.5	77.7
381	95/78	85	6300	96.0	381,254	228,518	61.7	108,546	15.8	77.5

The above data represents a method of estimating the hot gas reheat coil capacity. The reheat coil operates in the cooling mode. The reheat coil temperature rise is across the reheat coil only. The leaving air temperature is after the reheat coil. The reheat coil capacity will decrease as the entering air temperature decreases. Capacity is Btu/hr.

EA =- Entering air temperature. EW = Entering water temperature. TR = Temperature rise. Lat = Leaving air temperature.

Hot Water Preheat Coil Capacity Data

		CFM							
Unit Size	**GPM**	**900**	**1000**	**1200**	**1400**	**1600**	**1800**	**2000**	**WPD**
071 and 111	10	95.6	102.3	114.7	125.8	135.8	144.7	152.8	2.1
	20	100.5	108.1	122.1	134.9	146.5	157.1	166.8	7.9
	30	102.3	110.2	124.9	138.3	150.6	161.8	172.2	17.1
	P.D.	0.03	0.03	0.05	0.06	0.07	0.09	0.11	
		CFM							
Unit Size	**GPM**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**WPD**
141 and 181	10	176.2	186.7	196.3	205.1	213.4	221.0	228.1	1.5
	20	193.6	206.5	218.6	229.9	240.5	250.5	260.1	5.5
	30	200.2	214.2	227.3	239.6	251.3	262.4	272.9	11.9
	P.D.	0.07	0.08	0.09	0.11	0.12	0.14	0.16	
		CFM							
Unit Size	**GPM**	**2400**	**2800**	**3200**	**3600**	**4000**	**4400**	**4800**	**WPD**
221 and 271	20	193.7	210.2	225.4	239.2	251.9	263.6	274.5	4.4
	30	201.0	219.0	235.6	250.8	264.8	277.9	290.0	9.4
	40	204.9	223.7	241.0	257.1	271.9	285.7	298.6	16.3
	P.D.	0.05	0.06	0.07	0.09	0.11	0.13	0.15	
		CFM							
Unit Size	**GPM**	**4000**	**4400**	**4800**	**5200**	**5600**	**6000**	**6400**	**WPD**
321 and 381	30	296.3	311.5	325.7	339.0	351.6	363.5	374.8	6.4
	40	304.0	320.0	335.1	349.3	362.7	375.4	387.5	11.1
	50	308.9	325.5	341.1	355.8	369.8	383.0	395.7	17.0
	P.D.	0.06	0.07	0.08	0.10	0.11	0.12	0.14	

Capacity is based on 40°F leaving air and 180°F entering water temperature. Capacity is in MBH (Btu/hr. x 1000). Performance is MBH. PD = Air pressure drop (inches of water). WPD = Water pressure drop in feet of water for the water coil. WPD does not include the water control valve.

Application Limits

	Cooling		Heating	
	Std. Temp.	Low Temp.	Std. Temp.	Low Temp.
Minimum entering water	55°F	30°F	50°F	25°F
Maximum entering water	110°F	110°F	90°F	90°F
Minimum entering air	60°F	60°F	40°F	40°F
Maximum entering air	100°F	100°F	80°F	80°F

The minimum leaving water temperature is 35°F.
The maximum leaving water temperature is 115°F.
Only one maximum condition can exist at the same Time. The compressor can start at 40°F entering air temperature and 70°F entering water with both air And water at nominal flow rates.

Fan Performance Data

Unit Size 071

CFM	External Static Pressure																	
	.2		.3		.4		.5		.6		.8		1.0		1.2		1.4	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1000	1343	.50	1384	.50	1424	.50	1463	.60	1503	.60	1579	.60	1655	.70	1726	.80	1798	.80
1200	1404	.70	1440	.70	1475	.70	1511	.70	1546	.80	1614	.80	1682	.90	1749	1.00	1812	1.00
1300	1444	.80	1777	.80	1511	.80	1543	.90	1577	.90	1641	1.00	1705	1.00	1768	1.10	1830	1.10
1400	1487	.90	1518	.90	1550	1.00	1581	1.00	1612	1.00	1674	1.10	1734	1.10	1794	1.20	1854	1.30

Unit Size 111

CFM	External Static Pressure																	
	.3		.4		.5		.6		.8		1.0		1.2		1.4		1.6	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1300	1120	.30	1147	.40	1188	.40	1187	.40	1332	.36	1374	.46	1444	.56	1508	.80	1539	.66
1400	1162	.60	1197	.70	1234	.70	1263	.80	1342	.78	1404	.88	1469	.98	1529	1.10	1558	1.08
1500	1176	.70	1211	.80	1247	.80	1281	.90	1348	.90	1412	1.00	1475	1.10	1534	1.20	1563	1.20
1600	1187	.80	1221	.90	1255	.90	1288	.90	1354	1.00	1417	1.10	1477	1.20	1537	1.30	1566	1.30
1800	1217	1.00	1248	1.10	1279	1.10	1310	1.10	1371	1.20	1430	1.30	1489	1.40	1546	1.50	1573	1.50
2000	1245	1.20	1283	1.30	1312	1.30	1369	1.40	1376	1.50	1452	1.60	1507	1.70	1561	1.70	1587	1.80

Unit Size 141

CFM	External Static Pressure																	
	.3		.4		.5		.6		.8		1.0		1.2		1.4		1.6	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	1403	1.03	1427	1.21	1455	1.14	1486	1.32	1546	1.43	1609	1.54	1661	1.584	—	—	—	—
2000	1423	1.30	1446	1.43	1474	1.48	1503	1.54	1561	1.65	1622	1.76	1672	1.848	—	—	—	—
2200	1442	1.54	1465	1.65	1491	1.65	1520	1.76	1574	1.87	1633	1.98	1683	2.09	—	—	—	—
2400	1460	1.76	1482	1.87	1508	1.87	1535	1.98	1587	2.09	1642	2.20	1692	2.31	1741	2.42	1790	2.53
2600	1483	2.09	1504	2.09	1530	2.20	1555	2.20	1605	2.31	1660	2.42	1707	2.64	1755	2.75	1801	2.86

CFM	1.8			
	RPM	BHP	RPM	BHP
1800	—	—	—	—
2000	—	—	—	—
2200	—	—	—	—
2400	—	—	—	—
2600	1847	2.97		

Unit Size 181

CFM	External Static Pressure																	
	04		.5		.6		.8		1.0		1.2		1.4		1.6		1.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2500	1033	1.86	1052	1.92	1070	1.968	1107	2.08	1147	2.22	1181	2.355	1216	2.488	1252	2.613	1285	2.70
2600	1042	2.00	1060	2.06	1078	2.11	1114	2.23	1153	2.37	1187	2.50	1221	2.64	1256	2.75	1289	2.86
2700	1049	2.12	1067	2.19	1085	2.24	1120	2.39	1158	2.51	1192	2.64	1226	2.75	1259	2.86	1291	3.08
2800	1058	2.27	1076	2.32	1093	2.41	1127	2.52	1164	2.365	1198	2.75	1230	2.97	1263	3.08	1295	3.19
3000	1077	2.55	1094	2.62	1111	2.68	1143	2.83	1179	2.97	1211	3.08	1242	3.25	1273	3.30	1305	3.52

CFM	2.0	
	RPM	BHP
2500	1318	2.80
2600	1321	2.97
2700	1324	3.19
2800	1327	3.30
3000	1335	3.66

Fan Performance Data

Unit Size 221 and 271

CFM	External Static Pressure																	
	.50		.75		1.00		1.25		1.50		1.75		2.00		2.25		2.50	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2600	602	.59	677	.69	752	.78	815	.94	878	1.09	941	1.25	1004	1.41	1057	1.52	1110	1.63
2800	622	.68	693	.77	764	.86	827	1.03	889	1.20	951	1.38	1013	1.55	1062	1.65	1114	1.76
3000	643	.76	710	.85	777	.94	839	1.13	900	1.32	962	1.50	1023	1.69	1067	1.79	1119	1.89
2300	665	.91	731	1.02	797	1.13	857	1.32	916	1.51	975	1.70	1035	1.89	1079	2.01	1124	2.13
3400	687	1.06	753	1.19	818	1.32	875	1.52	932	1.71	989	1.90	1046	2.10	1092	2.23	1137	2.37
3600	710	1.20	774	1.36	838	1.52	893	1.71	948	1.91	1003	2.11	1058	2.30	1104	2.46	1150	2.61
3800	732	1.35	795	1.53	859	1.71	911	1.91	964	2.11	1017	2.31	1069	2.51	1116	2.68	1163	2.85
4000	754	1.50	817	1.70	879	1.90	930	2.10	980	2.31	1031	2.51	1081	2.71	1129	2.90	1176	3.09
4200	780	1.72	842	1.94	903	2.16	952	2.37	1002	2.58	1051	2.70	1100	3.00	1147	3.20	1194	3.40
4400	806	1.94	867	2.18	927	2.42	975	2.64	1023	2.85	1071	3.07	1119	3.29	1165	3.50	1212	3.71
4600	832	2.15	892	2.42	952	2.68	998	2.90	1045	3.13	1091	3.35	1138	3.57	1184	3.80	1229	4.03
4800	858	2.37	917	2.66	976	2.94	1021	3.17	1066	3.40	1112	3.63	1157	3.86	1202	4.10	1247	4.34
5000	884	2.59	942	2.90	1000	3.20	1044	3.44	1088	3.68	1132	3.91	1176	4.15	1221	4.40	1265	4.65

Unit Size 321 and 381

CFM	External Static Pressure																	
	.50		.75		1.00		1.25		1.50		1.75		2.00		2.25		2.50	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4600	760	1.84	815	2.09	870	2.35	923	2.57	976	2.79	1028	3.01	1081	3.32	1125	3.49	1169	3.88
4800	784	2.02	837	2.30	890	2.58	941	2.80	992	3.03	1042	3.25	1093	3.47	1138	3.74	1184	4.09
5000	807	2.20	859	2.51	910	2.81	959	3.04	1008	3.26	1056	3.49	1105	3.71	1151	4.00	1198	4.29
5200	832	2.51	881	2.80	930	3.09	979	3.33	1027	3.57	1076	3.80	1124	4.04	1167	4.31	1211	4.58
5400	856	2.81	9.3	3.10	950	3.38	998	3.63	1047	3.87	1095	4.12	1143	4.37	1183	4.62	1224	4.87
5600	881	3.12	925	3.39	970	3.66	1018	3.92	1066	4.18	1114	4.44	1162	4.70	1199	4.93	1237	5.16
5800	905	3.42	948	3.69	990	3.95	1038	4.22	1086	4.49	1133	4.76	1181	5.03	1215	5.24	1250	5.45
6000	930	3.73	970	3.98	1010	4.23	1058	4.51	1105	4.80	1153	5.08	1200	5.36	1231	5.55	1263	5.74
6200	955	4.14	995	4.40	1034	4.66	1080	4.96	1127	5.26	1173	5.56	1219	5.86	—	—	—	—
6400	981	4.56	1019	4.83	1058	5.10	1103	5.41	1148	5.73	1193	6.04	1238	6.35	—	—	—	—
6600	1006	4.97	1044	5.25	1081	5.53	1125	5.86	1170	6.19	1214	6.52	1258	6.85	—	—	—	—
6800	1032	5.39	1068	5.68	1105	5.97	1148	6.31	1191	6.66	1234	7.00	1277	7.34	—	—	—	—

Physical Data

Unit Size	No. Refrig. Circuits	R-22 (oz.) Charge		Coil Area Sq. Ft.	Fan Motor HP	Blower Size Dia. X Wdth. In.	Filter Size	Water Conns. FPT	Operating Weight LBS.	Shipping Weight LBS.
		Ckt 1	Ckt 2							
071	2	96.0	40.5	5.0	1	9 x 4	(2) 20 x 25	1 1/4	1200	1250
111	2	98.0	57.5	5.0	1 or 2	10 x 6		1 1/4	1500	1575
141	2	136.0	87.5	6.6	2 or 3	10 x 8		1 1/4	2000	2100
181	2	144.0	89.0	6.6	2 or 3	15 x 6		1 1/4	2550	2625
221	2	264.0	160.0	8.9	2,3, or 5	15 x 11	(4) 16 x 20 (2) 16 x 25	2	1800	1900
271	2	352.0	202.0	8.9	2,3, or 5	15 x 11		2	2250	2400
321	2	408.0	160.0	12.4	3,5, or 71/2	15 x 11		2 1/2	3000	3200
381	2	416.0	224.0	12.4	3,5, or 71/2	15 x 11		2 1/2	3825	3975

Electrical Data

Unit Size	Fan Motor HP	Voltage	Compressor		Fan Motor FLA	Total Amps	Minimum / Maximum Volts	Minimum Circuit Ampacity	Maximum Breaker Size
			RLA	LRA					
F071MHC	1	208-230/60/3	11.4	77	3.8	26.6	187/253	29.5	40
G071MHC		460/60/3	5.7	39	1.9	13.3	414/506	14.7	20
K071MHC		575/60/3	4.7	31	1.1	10.5	515/632	11.7	15
J071MHC		380/50/3	6.8	39	2.0	15.6	342/420	17.3	20
F111MHC	1	208-230/60/3	16.4	91	3.8	36.6	187/253	40.7	50
G111MHC		460/60/3	7.9	50	1.9	17.6	414/506	19.6	25
K111MHC		575/60/3	5.7	37	1.1	12.5	515/632	13.9	15
J0111MHC		380/50/3	9.3	54	2.0	20.6	342/420	22.9	30
F111MHC	2	208-230/60/3	16.4	91	7.1	39.9	187/253	44.0	60
G111MHC		460/60/3	7.9	50	3.5	19.2	414/506	21.2	25
K111MHC		575/60/3	5.7	37	2.4	13.8	515/632	15.2	20
J0111MHC		380/50/3	9.3	54	3.6	22.1	342/420	24.5	30
F141MHC	2	208-230/60/3	20.7	156	7.1	48.5	187/253	53.7	70
G141MHC		460/60/3	10.0	75	3.5	23.5	414/506	26.0	35
K141MHC		575/60/3	8.2	54	2.4	18.8	515/632	20.9	25
J0141MHC		380/50/3	10.7	70	3.6	25.0	342/420	27.6	35
F141MHC	3	208-230/60/3	20.7	156	9.4	50.8	187/253	56.0	70
G141MHC		460/60/3	10.0	75	4.4	24.4	414/506	26.9	35
K141MHC		575/60/3	8.2	54	3.6	20.0	515/632	22.1	30
J0141MHC		380/50/3	10.7	70	4.8	26.2	342/420	28.9	35
F181MHC	2	208-230/60/3	20.7	156	7.1	48.5	187/253	53.7	70
G181MHC		460/60/3	10.0	75	3.5	23.5	414/506	26.0	35
K181MHC		575/60/3	8.2	54	2.4	18.8	515/632	20.9	25
J0181MHC		380/50/3	10.7	70	3.6	25.0	342/420	27.6	35
F181MHC	3	208-230/60/3	20.7	156	9.4	50.8	187/253	56.0	70
G181MHC		460/60/3	10.0	75	4.4	24.4	414/506	26.9	35
K181MHC		575/60/3	8.2	54	3.6	20.0	515/632	22.1	30
J0181MHC		380/50/3	10.7	70	4.8	26.2	342/420	28.9	35
F221MHC	2	208-230/60/3	33.6	225	7.1	74.3	187/253	82.7	110
G221MHC		460/60/3	17.3	114	3.5	38.1	414/506	42.4	50
K221MHC		575/60/3	13.5	80	2.4	29.4	515/632	32.8	45
F221MHC	3	208-230/60/3	33.6	225	9.4	76.6	187/253	85.0	110
G221MHC		460/60/3	17.3	114	4.4	39.0	414/506	43.3	60
K221MHC		575/60/3	13.5	80	3.6	30.6	515/632	34.0	45
F221MHC	5	208-230/60/3	33.6	225	16.1	83.3	187/253	91.7	125
G221MHC		460/60/3	17.3	114	6.9	41.5	414/506	45.8	60
K221MHC		575/60/3	13.5	80	5.1	32.1	515/632	35.5	45
F271MHC	2	208-230/60/3	42	239	7.1	91.1	187/253	101.6	125
G271MHC		460/60/3	19.2	125	3.5	41.9	414/506	46.7	60
K271MHC		575/60/3	13.8	80	2.4	30.0	515/632	33.5	45
F271MHC	3	208-230/60/3	42	239	9.4	93.4	187/253	103.9	150
G271MHC		460/60/3	19.2	125	4.4	42.8	414/506	47.6	60
K271MHC		575/60/3	13.8	80	3.6	31.2	515/632	34.7	45
F271MHC	5	208-230/60/3	42	239	16.1	100.1	187/253	110.6	150
G271MHC		460/60/3	19.2	125	6.9	45.3	414/506	50.1	80
K21MHC		575/60/3	13.8	80	5.1	32.7	515/632	36.2	60
F321MHC	3	208-230/60/3	47.1	350	9.4	103.6	187/253	115.4	150
G321MHC		460/60/3	25.0	158	4.4	54.4	414/506	60.7	80
K321MHC		575/60/3	19.9	125	3.6	43.4	515/632	48.4	60
F321MHC	5	208-230/60/3	47.1	350	16.1	110.3	187/253	122.1	150
G321MHC		460/60/3	25.0	158	6.9	56.9	414/506	63.2	80
K321MHC		575/60/3	19.9	125	5.1	44.9	515/632	49.9	60
F321MHC	7 1/2	208-230/60/3	47.1	350	23.0	117.2	187/253	129.0	175
G321MHC		460/60/3	25.0	158	10.0	60.0	414/506	66.3	90
K321MHC		575/60/3	19.9	125	7.7	47.5	515/632	52.5	70
F381MHC	3	208-230/60/3	52.6	340	9.4	114.6	187/253	127.8	175
G381MHC		460/60/3	25.6	173	4.4	55.6	414/506	62.0	90
K381MHC		575/60/3	21.2	132	3.6	46.0	515/632	51.3	70
F381MHC	5	208-230/60/3	52.6	340	16.1	121.3	187/253	134.5	175
G381MHC		460/60/3	25.6	173	6.9	58.1	414/506	64.5	90
K381MHC		575/60/3	21.2	132	5.1	47.5	515/632	52.8	70
F381MHC	7 1/2	208-230/60/3	52.6	340	23.0	128.2	187/253	141.4	175
G381MHC		460/60/3	25.6	173	10.0	61.2	414/506	67.6	90
K381MHC		575/60/3	21.2	132	7.7	50.1	515/632	55.4	70

208-203 volt units are shipped for 208 volt operation. For 230 volt operation, change the red tap on the transformer to the orange tap.
NOTE: Fuse protection must be dual element, time delay (Class RK5) type or HACR circuit breaker

Unit Specification

General: Furnish and install 100% Outdoor Air make-up air heat pumps as indicated on the plans and listed in the unit schedule. Units shall be designed to treat 100% outdoor air to satisfy the minimum outdoor air requirements per ASHRAE Standard 62-89. The unit shall be designed to operate over a wide range of outdoor air conditions. All units must be factory run tested in both the heating and cooling modes. Each unit shall be shipped on a wood skid.

Unit Construction: The unit shall be of heavy duty construction with multiple rails under the unit supporting and strengthening the bottom panel. The outer casing and internal supports shall be fabricated from G-60 galvanized steel. The outer casing and interior metal parts exposed to moisture and cold temperatures shall be insulated with non-fiberglass polyether foam reinforced with an aluminized Mylar face. Side panels shall allow full access to the filter, preheat, compressor, coil, and fan sections. A separate panel shall provide access to the control box. Supply and return water connections shall be NPT copper fittings located outside the cabinet for connection to flexible hoses. The entering air and supply air connections shall have duct collars.

Unit Configuration: The unit shall be a ceiling-mounted horizontal unit complete with brackets for connection to hanging rods. The unit shall be of the straight-through design with outdoor air entering the back of the unit and proceeding straight through to the discharge opening. Piping and electrical shall enter on the side of the unit. The following sections are described in the order of the airflow path.

Damper Section: Each unit shall have a multi-blade damper designed to be closed when the building is not occupied. The damper blade edges shall be gasketed for minimum leakage. The spring return damper motor shall drive the damper open when the unit is powered and shall include an end switch to allow fan and compressor operation only if the damper is open.

Filter Section: Each unit shall have a 2" thick filter rack to accommodate 30% pleated filters and an optional 4" thick rack to accommodate optional 85% filters. The filters shall be accessible from either side.

Preheat Section: Each unit shall have (electric) (hot water) (steam) preheat to bring cold outdoor air up to temperature to allow compressor heating.

Each unit shall have a U.L. listed, two-stage electric preheat coil. The electric heater shall require a power source separate from the main unit. The heater shall have nichrome wire elements and include thermal limits, duct high limit, air proving switch and nonfused disconnect switch. The heater shall have its own control box to house all the electrical devices to control the electric heater.

Each unit shall have a 2-row water coil. The coil shall have aluminum fins bonded to seamless copper tubes. Each unit shall have a 1-row steam coil. The coil shall have aluminum fins bonded to seamless copper tubes.

Coil Section: Each unit shall have a 4-row evaporator coil with interlaced coil circuiting located in the draw-through position. The coil shall have aluminum fins bonded to seamless copper tubes and be rated for 450 psig refrigerant pressure. An insulated drain pan shall extend beyond the evaporator coil and have a 7/8" O.D. drain connection extending through the side of the unit.

Hot Gas Reheat Coil: Each unit shall have a 1-row gas reheat coil for dehumidification located in the coil section. The reheat coil shall operate from the lead compressor refrigerant circuit in the cooling mode to increase the discharge air temperature by allowing hot refrigerant to reheat the conditioned air.

Refrigeration System: Each unit shall have dual refrigerant circuits including hermetic compressors with scroll technology, reversing valve, thermal expansion valves, interlaced circuit air coil, coaxial water-to refrigerant coils, high and low side access valves and safety controls.

The two refrigerant circuits shall operate in specific modes. One circuit shall lead in the cooling mode for cooling-only operation and include the hot gas reheat coil. The second circuit shall provide heating and cooling. The second circuit shall include refrigerant receiver, suction accumulator, and check valves to enable the circuit to operate over a wide range of entering air and entering water temperature. Both refrigerant circuits shall include hot gas bypass control.

Each compressor shall have thermal overload protection and shall be mounted on neoprene isolators as recommended by the compressor manufacturer. All compressors shall be mounted on heavy gauge steel channels to minimize noise and vibration. The water-to-refrigerant coil shall be coaxial design with copper inner tube and steel outer tube and rated at 450 psig on the refrigerant side and 400 psig on the water side.

Unit Specification

Safety circuits shall be capable of starting and operating at 40 F to 70 F entering air temperatures in the heating mode and 60 F to 110 F entering air temperatures in the cooling mode. The unit shall be capable of operating with entering water in the range of 40 F to 110 F.

Fan Section: Each unit shall have a belt-driven fan assembly and a three-phase, open drip-proof motor with rigid base, ball bearings and overload protection. A variable-pitch motor sheave and fan pulley shall allow fan speed adjustment. Each unit offers various drive packages with different fan motor horsepower and sheaves to accomplish various fan speed ranges.

Electrical: All electrical components shall be housed in a separate enclosure with its own access panel. Controls shall include fan relay, compressor contactors, hot gas reheat solenoid relay, and 24 volt trans-formers. Each compressor circuit shall have a lockout relay to disable compressor operation in the event of a trip of any of the safety switches. The lockout relay shall be reset from the main disconnect switch. Each unit shall have a terminal strip located in the main control box to accept connection of field-mounted controls for cooling and/or heating operation.

Optional Temperature Control System: each shall have a factory mounted, microprocessor based control system. The control system shall control operation of the unit from the outside temperature and humidity.

The temperature control system shall include an outdoor air temperature sensor with adjustable set points for heating and cooling and an outdoor air humidity sensor with an adjustable set point. A temperature sensor located in the discharge air shall control operation of the hot gas reheat coil to increase the discharge air temperature if it falls lower than 55 F (adjustable). A mixed air temperature sensor located between the preheat coil and the air coil shall monitor the entering air temperature to the coil to assure operation of the refrigerant circuit only when the air temperature is within a designated range. The outdoor air damper shall be controlled with a spring-return actuator to open when the fan is on and close when the fan is off.

Units with an electric preheat coil shall be controlled from the outdoor air and mixed air temperature sensors to preheat cold outdoor air to allow further heating via the refrigeration system. Units with a hot water preheat coil shall be controlled from the outdoor air and mixed air sensors top reheat cold outdoor air to allow further heating via the refrigeration system. A freezestat shall close the outdoor air damper and stop fan and compressor operation if the mixed air temperature is below 33 F for more than 4 minutes. The freezestat lockout control is a manual reset device.

An air proving switch shall suspend unit operation if no airflow is detected. A hand held device shall connect the microprocessor to allow changes to set points.

Optional Low Temperature Operation: The unit shall be able to operate on an earth-coupled loop for geothermal applications with entering water temperatures in the range of 20 F to 110 F.

Optional Cupronickel Heat Exchanger: The standard coaxial heat exchanger shall be replaced with a cupronickel inner tube to allow operation with ground water, city water, or brackish water.

Optional Dual Heating Circuits: The unit shall have both circuits capable of compressor heating for increased capacity.

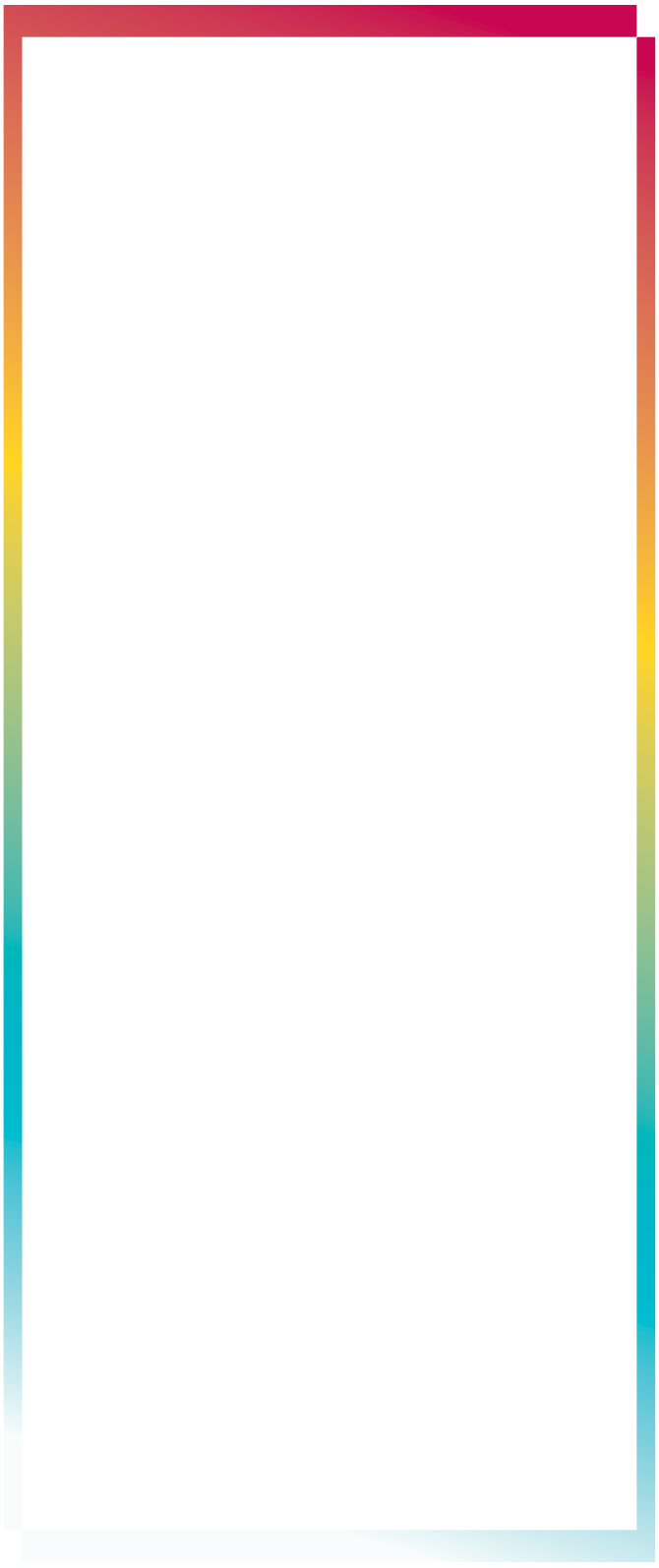
Optional Modulating Hot Gas Reheat Control: The standard single two-position reheat valve shall be replaced with two modulating valves for precise hot gas reheat control.

Optional Bottom Drain Connection: The unit shall have a 7/8" O.D. copper drain connection under the unit.

Optional Compressor Warranty: The unit compressor shall be warranted for an additional four years.

Optional Refrigerant Circuit Warranty: The refrigerant circuit components shall be warranted for an additional four years.

Field Installed Accessories: The unit shall have stainless steel braided supply and return water hoses with male NPT steel fittings and a swivel at one end. The hoses shall be rated at 200 psig working pressure



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

Catalog C-28D—May 2009

Mammoth®

www.mammothwebco.com
info@mammothwebco.com