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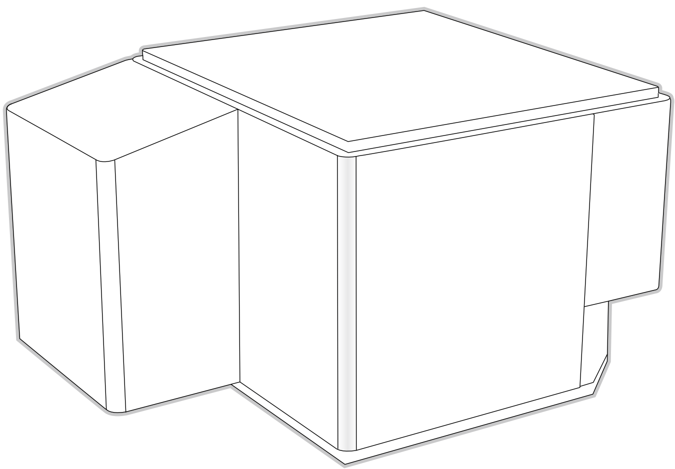
Engineering Data Submittal Manual



Project Name: ____________________
Engineer: ____________________
Contractor: ____________________
Architect: ____________________
Date Received: ____________________
Date Submitted: ____________________

Unit Tag	Model Number

MODELS RT 024 - 060
OUTDOOR SPLIT
COMPRESSOR SECTION
WATER-TO-AIR HEAT PUMPS

Revision A

20D214-09NN

General

Outdoor Split Water-to-Air Two-Stage "RT" Series Geothermal Heat Pumps shall be constructed based on all information to follow. Equipment shall be completely assembled, piped, internally wired, charged with refrigerant, and tested.

Units shall be supplied completely factory built capable of operating over an entering water temperature range from 25° to 120°F (-3.9° to 48.9°C) (extended data tables; Heating 25F – 90F, cooling 50F – 110F) as standard. All equipment listed in this section must be rated and certified in accordance with Air-Conditioning, Heating and Refrigeration Institute/ International Standards Organization (AHRI/ISO 13256-1). All equipment must be tested, investigated, and determined to comply with the requirements of the standards for Heating and Cooling Equipment UL-1995 for the United States and CAN/CSA-C22.2 NO.236 for Canada, by Intertek Testing Laboratories (ETL). The units shall have AHRI/ISO and ETL-US-C labels.

All units shall be fully quality tested by factory run testing under normal operating conditions as described herein. Quality control system shall automatically perform via computer: helium leak check of both the water and refrigerant circuits, pressure tests, double evacuation and accurately charged system, perform detailed heating and cooling mode tests, and quality cross check all operational and test conditions to pass/fail criteria.

Basic Construction

The heat pumps shall be fabricated from UV protected powder coated heavy gauge galvanized steel. This corrosion protection system shall meet the stringent 1000 hour salt spray test per ASTM B117.

Cabinet must conform to ASTM water protection design for outdoor use.

All units must have a minimum of three access panels for serviceability of compressor compartment. See IOM manuals for service clearances.

Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. All factory-installed wiring passing through factory knockouts and openings shall be protected from sheet metal edges at openings by plastic ferrules. Supply and return water connections shall be copper MPT fittings, and shall be securely mounted flush to the cabinet allowing for connection to a flexible hose without the use of a back-up wrench. All water connections and electrical knockouts must be in the compressor compartment as to not interfere with the serviceability of unit.

The unit shall be supplied with extended range internal insulation. All internal water lines and the evaporator side refrigeration tubing shall all have closed cell EPDM insulation. The water to refrigerant coaxial heat exchanger shall be encased in a clam shell rigid foam case and injected with 8lb. spray foam to eliminate any condensation forming on heat exchanger.

Option: Sound attenuating compressor blanket for additional noise reduction.

Refrigerant Circuit

All units shall contain R-410A sealed refrigerant circuit including a high efficiency two stage unloading scroll compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, reversing valve, coaxial refrigerant to water heat exchangers, and safety controls (see controls section). Refrigerant access ports shall be factory installed on high and low pressure refrigerant lines to facilitate field service. All units have factory installed bi-directional filter/drier for added moisture protection. Units to have line set refrigeration back seat service valves with Schrader ports installed.

Hermetic compressors shall be internally sprung. The compressor will be mounted on EPDM rubber grommets secured to the cabinet base for maximized vibration attenuation. Compressor shall have thermal overload protection. Compressor discharge and suction refrigerant lines to have shock loops directly at compressor for additional vibration elimination.

Refrigerant to water coaxial heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design (water coil), shall have enhanced rifled and knurled inner tube, rated to withstand 625 PSIG (4309 kPa) working refrigerant pressure and 500 PSIG (3445 kPa) working water pressure, and designed to have a low water pressure drop (max. 15ft.hd.).

Refrigerant metering shall be accomplished by thermostatic expansion valve only. Expansion valves shall be dual port balanced types with external equalizer for optimum refrigerant metering. The expansion valves must be one directional with the use of a check valve and bypass port. Units shall be designed and tested for operating ranges of entering water temperatures from 25° to 120°F (-3.9° to 48.9°C). Reversing valve shall be four-way solenoid activated refrigerant valve, which shall default to heating mode should the solenoid fail to function.

Option: The unit will be supplied with a cupro-nickel coaxial water to refrigerant heat exchanger (source heat exchanger only).

Option: The unit shall be supplied with a hot water generator (desuperheater) heat exchanger, which shall be double wall and vented.

Electrical
A control box shall be located within the unit compressor compartment and shall contain a 75VA transformer, 24 volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation and control. Reversing valve wiring shall be routed through this electronic controller. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 Volt and provide heating or cooling as required by the remote aquastat/sensor.

Source pump high voltage terminal block including minimum 7amp circuit breaker protection to be provided for field wiring of source pumps.

A detachable low voltage thermostat terminal strip with screw terminals to be provided for field wiring.

An outdoor ambient temperature sensor shall be wired in series with the source circulating pump connection to allow low outdoor temperature operation of the loop pumps independent of the compressor operation.

Solid State Control Board System
Units shall have a solid-state control system. The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference. The control system shall interface with a heat pump type 24V thermostat. The control system shall have the following features:

- Anti-short cycle time delay on compressor operation (5 minutes).
- Random start on power up mode.
- Low voltage protection.
- High voltage protection.
- Unit shutdown on high or low refrigerant pressures.
- Unit shutdown on low temperature (low source coil temp OR low air coil temp).
- Condensate overflow electronic protection.
- Option to reset unit at thermostat or disconnect (soft or hard reset functions)
- Fault retry logic. The same fault trip has to occur 3 times before a hard lockout. If a fault occurs 3 times sequentially without thermostat meeting temperature, then lockout requiring manual reset will occur. A soft or hard reset will restart the unit.
- Ability to defeat time delays for servicing (test mode).
- Light emitting diode (LED) on circuit board to indicate high pressure, low pressure, low/high voltage, low water/air temperature, condensate overflow, high discharge gas temperature, fauty temperature sensor(s), and control voltage status.
- The low-pressure switch shall not be monitored for the first 90 seconds after a compressor start command to prevent nuisance safety trips.
- 24V output to cycle a motorized water valve or other device with compressor contactor
- Water coil low temperature sensing selectable for water or anti-freeze.
- Air coil low temperature sensing.
- High discharge gas temperature sensing.
- Smart desuperheater operation and logic to eliminate any heat transfer from the water tank to the source loop during cooling mode.

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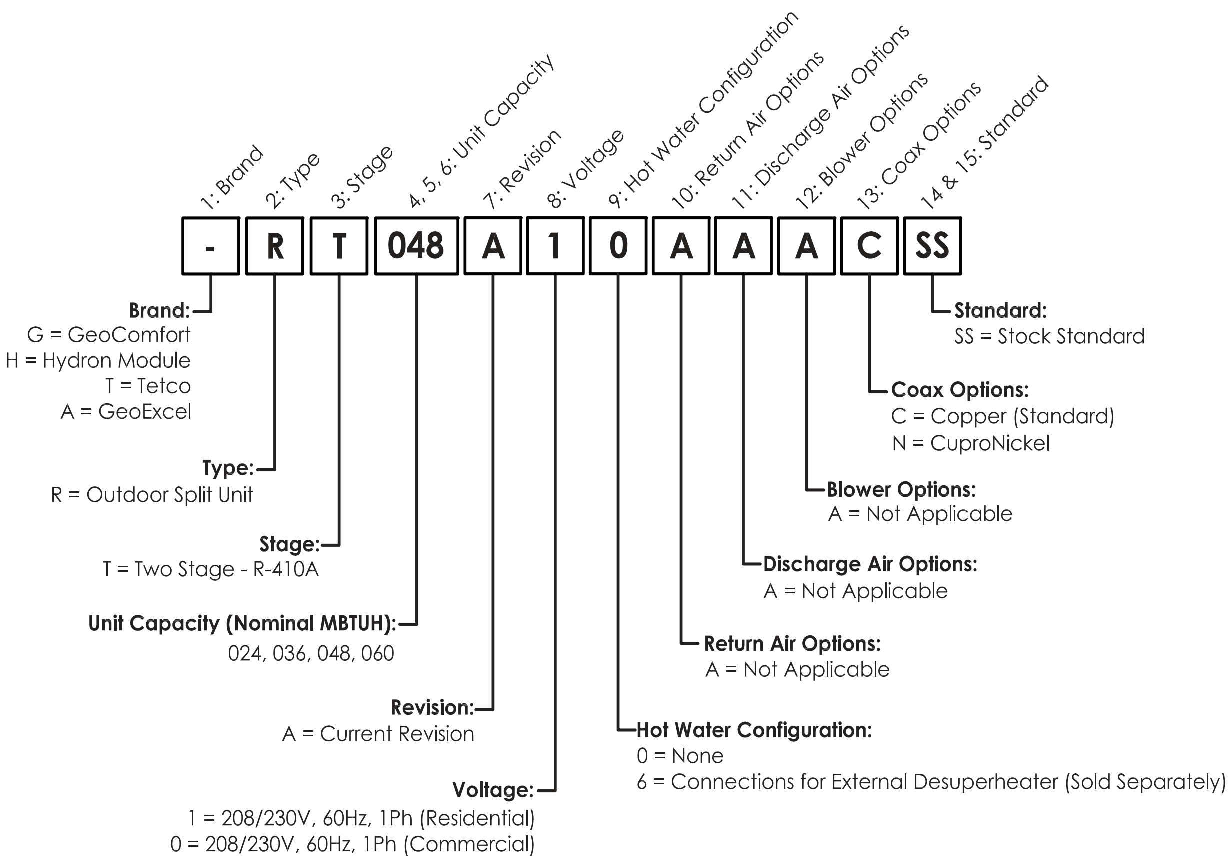
ENGINEERING SPECIFICATIONS:

Model Nomenclature Decoder



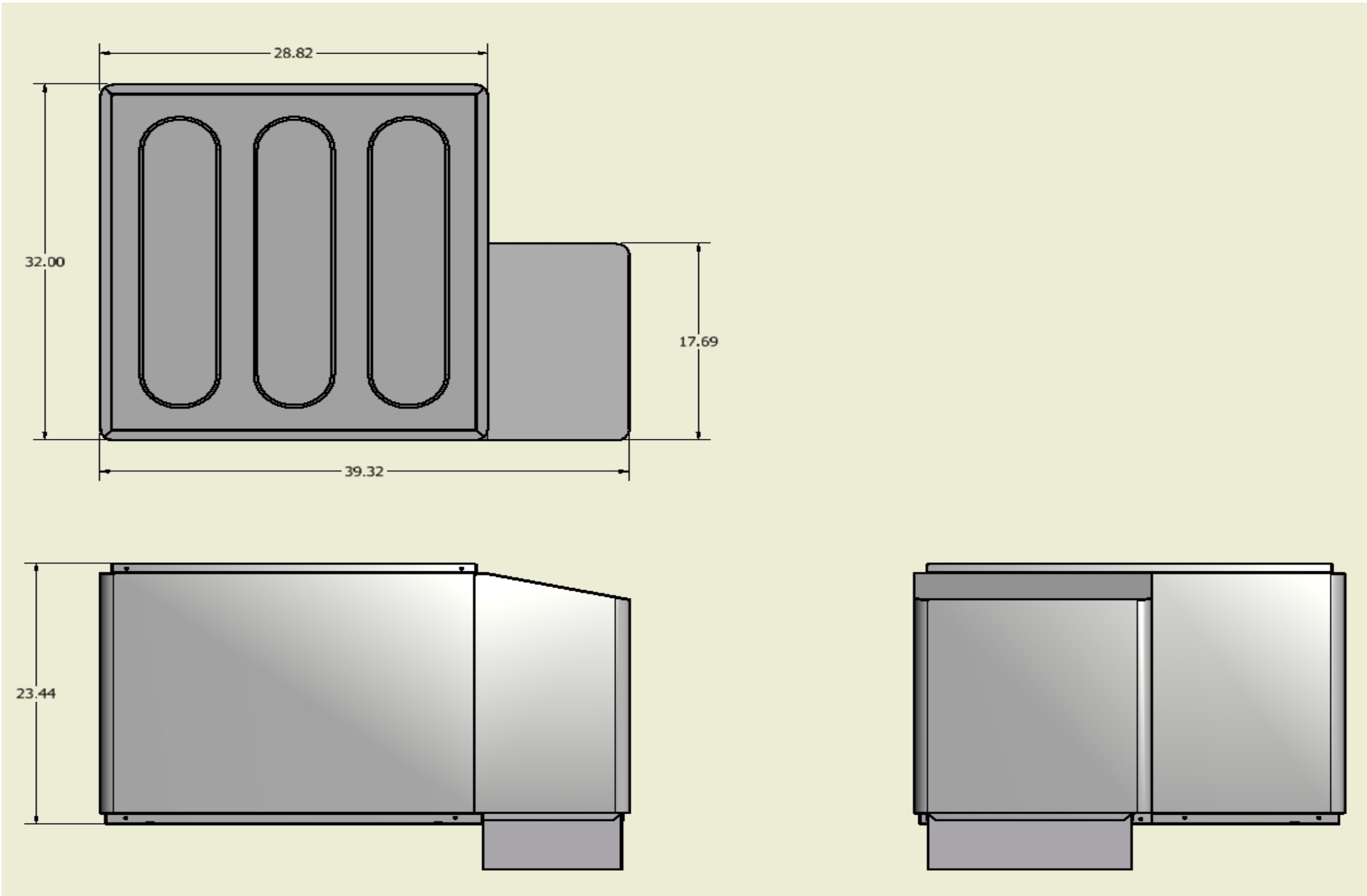
AHRI Performance Data

Ground Loop Heat Pump

MODEL	CAPACITY	HEATING		COOLING	
		Btu/hr	COP	Btu/hr	EER
RT024	Full Load	18,000	3.30	24,600	15.80
	Part Load	14,800	3.80	19,600	20.35
RT036	Full Load	27,200	3.80	36,000	16.70
	Part Load	21,700	4.20	27,800	25.30
RT048	Full Load	36,400	3.90	50,800	18.00
	Part Load	29,800	4.40	39,000	25.40
RT060	Full Load	45,600	3.50	61,500	17.20
	Part Load	37,000	4.10	47,900	24.10

Note:
Rated in accordance with ISO Standard 13256-1 which includes Pump Penalties.
Heating capacities based on 68.0°F DB, 59.0°F WB entering air temperature.
Cooling capacities based on 80.6°F DB, 66.2°F WB entering air temperature.
Entering water temperatures Full Load: 32°F heating / 77°F cooling.
Entering water temperatures Part Load: 41°F heating / 68°F cooling.

Dimensional Data, Cabinet, Duct Flanges, and Installation Clearance



Dimensional Data Table

Model	Dimensional Data			Refrigeration Connection		Water Loop*		Unit Weight (Pounds)
	Height	Width	Depth	Liquid	Suction	IN	OUT	
024	23.4	32.0	28.8	3/8”	7/8”	1” Double O-Ring		180
036	23.4	32.0	28.8	3/8”	7/8”			225
048	23.4	32.0	28.8	3/8”	7/8”			270
060	23.4	32.0	28.8	1/2”	1-1/8”			270

Unit Physical Data

Model	024	036	048	060
Compressor Type	Two Stage Unloading Scroll			
Refrigerant Type	R 410-A			
Heat Exchanger (Source)	Coaxial Copper/Steel (tube in tube)			
Source Option	Coaxial Cupro-Nickel/Steel			

Notes:
All Source water connections are 1” FPT
All Desuperheater connections are 3/4” FPT.
All electrical knockouts are sized for 1/2” or 3/4” conduit
All measurements are in inches.
All drawings are typical, individual models will vary

ENGINEERING SPECIFICATIONS:

Unit Electrical Data

Model	Voltage Code/ HWG Option	60 Hz Power		Compressor		Fan Motor FLA	HWG Pump FLA	Ext. Loop Pump FLA	Total Unit FLA	Min Circuit AMPS	Max Brkr HACR
		Volts	Phase	LRA	RLA						
RT024	00	208/230	1	58.3	11.7	0.0	0.0	4.0	15.7	18.6	30
	10	208/230	1	58.3	11.7	0.0	0.0	4.0	15.7	18.6	30
RT036	00	208/230	1	83.0	15.6	0.0	0.0	4.0	19.6	23.5	35
	10	208/230	1	83.0	15.6	0.0	0.0	4.0	19.6	23.5	35
RT048	00	208/230	1	104.0	21.2	0.0	0.0	5.5	26.7	32.0	50
	10	208/230	1	104.0	21.2	0.0	0.0	5.5	26.7	32.0	50
RT060	00	208/230	1	152.9	27.1	0.0	0.0	5.5	32.6	39.4	60
	10	208/230	1	152.9	27.1	0.0	0.0	5.5	32.6	39.4	60

Notes:

1. All line and low voltage wiring must adhere to the National Electrical Code and local codes, whichever is the most stringent.
2. In determining the correct supply wire size and maximum length, reference NFPA 70, Section 310. If the calculation is close to the maximum allowable ampacity of a particular wire size, use the next size up. This will ensure that no adverse effects occur, such as light dimming and/or shortened compressor life.
3. Min/Max Voltage: 208/230/60 = 187-252

*The external loop pump FLA is based on a maximum of three UP26-116F-230V pumps (1/2hp) for 048-060 and two pumps for 024-036.

Glossary of Terms

CFM = Airflow, Cubic Feet/Minute	HR = Total Heat Of Rejection, Btu/hr
COP = Coefficient of Performance = BTU Output / BTU Input	KW = Total Power Unit Input, Kilowatts
DH = Desuperheater Capacity, Btu/hr	LAT = Leaving Air Temperature, Fahrenheit
EAT = Entering Air Temperature, Fahrenheit (Dry Bulb/Wet Bulb)	LC = Latent Cooling Capacity, Btu/hr
EER = Energy Efficiency Ratio = BTU output/Watts input	SC = Sensible Cooling Capacity, Btu/hr
EWT = Entering Source Water Temperature, Fahrenheit	LWT = Leaving Source Water Temperature, Fahrenheit
ELT = Entering Load Water Temperature, Fahrenheit	LLT = Leaving Load Water Temperature, Fahrenheit
GPM = Water Flow, Gallons Per Minute	TC = Total Cooling Capacity, Btu/hr
HC = Total Heating Capacity, Btu/hr	WPD = Water Pressure Drop, PSI & Feet of Water
HE = Total Heat Of Extraction, Btu/hr	

Sensible Cooling Correction Factors

EAT (WB) °F	EAT (DB) °F				
	70	75	80	85	90
55	1.201	1.289			
60	0.943	1.067	1.192		
65	0.797	0.952	1.106	1.261	
67	0.624	0.812	1.000	1.188	1.343
70		0.697	0.820	0.944	1.067
75			0.637	0.817	0.983

Cooling Correction Factors

EAT (WB) °F	TC	HR	kW
55	0.8215	0.8293	0.8635
60	0.8955	0.9001	0.9205
65	0.9701	0.9715	0.9774
67	1.0000	1.0000	1.0000
70	1.0446	1.0425	1.0335
75	1.1179	1.1124	1.0878

Heating & Cooling Calculations

Heating	Cooling
LAT = EAT + $\frac{HC}{CFM \times 1.08}$	LAT (DB) = EAT (DB) - $\frac{SC}{CFM \times 1.08}$
LWT = EWT - $\frac{HE}{GPM \times 500}$	LWT = EWT + $\frac{HR}{GPM \times 500}$
LC = TC - SC	

Heating Correction Factors

EAT °F	HC	HE	kW
50	1.0465	1.1188	0.8024
55	1.0351	1.0918	0.8436
60	1.0253	1.0645	0.8928
65	1.0108	1.0300	0.9454
70	1.0000	1.0000	1.0000
75	0.9895	0.9701	1.0553
80	0.9742	0.9489	1.0518

Water Flow Selection

Proper flow rate is crucial for reliable operation of geothermal heat pumps. The performance data shows three flow rates for each entering water temperature (EWT column). The general "rule of thumb" when selecting flow rates is the following:

- Top flow rate: Open loop systems (1.5 to 2.0 gpm per ton)
- Middle flow rate: Minimum closed loop system flow rate (2.25 to 2.50 gpm/ton)
- Bottom flow rate: Nominal (optimum) closed loop system flow rate (3.0 gpm/ton)

Although the industry standard is adequate in most areas of North America, it is important to consider the application type before applying this "rule of thumb." Antifreeze is generally required for all closed loop (geothermal) applications. Extreme Southern U.S. locations are the only exception. Open loop (well water) systems cannot use antifreeze, and must have enough flow rate in order to avoid freezing conditions at the Leaving Source Water Temperature (LWT) connection.

Calculations must be made for all systems without antifreeze to determine if the top flow rate is adequate to prevent LWT at or near freezing conditions. The following steps should be taken in making this calculation:

- Determine minimum EWT based upon your geographical area.
- Go to the performance data table for the heat pump model selected and look up the Heat of Extraction (HE) at the "rule of thumb" water flow rate (GPM) and at the design Entering Air Temperature (EAT).
- Calculate the temperature difference (TD) based upon the HE and GPM of the model.
- TD = HE / (GPM x 485).
- Calculate the LWT.
- LWT = EWT - TD.
- If the LWT is below 35-38°F, there is potential for freezing conditions if the flow rate or water temperature is less than ideal conditions, and the flow rate must be increased.

Example 1:
EWT = 50 oF
Flow rate = 4.5 GPM.
Air Flow = 1380 CFM. HE = 29,400 Btuh.
TD = 29,400 / (4.5 x 485) = 13.5 oF
LWT = 50 - 13.5 = 36.5 oF
Water flow rate is acceptable.

Example 2:
EWT = 40 oF
Flow rate = 4.5 GPM.
Air Flow = 1380 CFM. HE = 25,300 Btuh.
TD = 25,300 / (4.5 x 485) = 11.6 oF
LWT = 40 - 11.6 = 28.4 oF
Water flow rate must be increased to avoid freezing.

Performance Data Notes

1. Capacity data is based on 15% (by mass) methanol antifreeze solution (multiplier: 485).
2. Heating data is based on 70°F EAT. Cooling data is based on 80/67°F EAT. Any condition outside performance table(s) requires correction factor(s).
3. Performance data accurate within ±15%.
4. Unit performance test is run without hot water generation.
5. Desuperheater capacity is based upon 2.0 GPM water flow at 70 oF entering water temperature.
6. Capacity data includes fan power but not pump power and it does not reflect fan or pump power correction for AHRI/ISO conditions.
7. Performance data is based upon the lower voltage of dual voltage rated units.
8. Interpolation of unit performance data is permissible; extrapolation is not.
9. Performance data is a result of lab testing and is not related to warranty.
10. Due to variations in installation, actual unit performance may vary from the tabulated data.
11. See Flow Rate Selection above for proper application.
12. Continuous research and development may result in a change to the current product design and specifications without notice.

Model 024, 2 Ton, with MPD024 Full Load Heating Performance

EWT	Flow	WPD		LWT	Heating									
					Aiflow	LAT	HC	HE		COP	Discharge	Suction	Subcooling	Superheat
°F	GPM	PSI	FT	°F	CFM	°F	MBtuh	MBtuh	kW	W/W	PSIG	PSIG	°F	°F
25	6.0	3.8	8.8	20.9	850	87.9	16.4	12.0	1.30	3.70	287.5	73.3	3.5	0.0
				20.8	950	86.0	16.4	12.1	1.27	3.78	284.0	73.2	3.2	0.1
30	3.0	1.1	2.5	21.7	850	88.0	16.5	12.1	1.29	3.75	286.0	75.7	3.6	1.2
				21.6	950	86.1	16.5	12.2	1.27	3.81	282.5	75.6	3.2	1.2
	4.5	2.4	5.6	24.1	850	89.0	17.4	12.9	1.32	3.86	292.8	80.0	3.7	0.4
				24.0	950	87.0	17.4	13.0	1.29	3.95	289.2	79.9	3.4	0.5
	6.0	3.9	9.1	25.4	850	89.6	18.0	13.5	1.33	3.97	295.9	82.5	3.6	0.1
				25.4	950	87.5	18.0	13.5	1.31	4.03	292.2	82.4	3.3	0.1
40	3.0	1.0	2.3	30.0	850	90.9	19.2	14.6	1.35	4.17	302.1	91.4	3.5	1.2
				29.9	950	88.7	19.2	14.7	1.32	4.26	298.3	91.3	3.3	1.3
	4.5	2.2	5.2	32.9	850	92.0	20.2	15.5	1.38	4.29	309.2	96.6	3.6	1.2
				32.9	950	89.7	20.2	15.6	1.35	4.39	305.4	96.4	3.4	1.3
	6.0	3.6	8.4	34.4	850	92.8	20.9	16.2	1.39	4.41	312.4	99.6	3.5	1.3
				34.4	950	90.4	20.9	16.3	1.36	4.50	308.6	99.4	3.2	1.4
50	3.0	0.9	2.1	38.2	850	93.9	21.9	17.1	1.41	4.55	318.0	107.2	3.4	2.3
				38.2	950	91.3	21.9	17.2	1.38	4.65	314.1	107.1	3.1	2.4
	4.5	2.0	4.7	41.7	850	95.1	23.0	18.1	1.44	4.68	325.5	113.3	3.4	3.0
				41.7	950	92.4	23.0	18.2	1.41	4.78	321.5	113.1	3.2	3.1
	6.0	3.3	7.7	43.5	850	96.0	23.9	19.0	1.45	4.83	328.9	116.8	3.2	3.5
				43.5	950	93.3	23.9	19.0	1.43	4.90	324.9	116.6	3.0	3.6
60	3.0	0.9	2.0	46.6	850	96.8	24.6	19.5	1.49	4.84	333.8	123.8	3.2	4.0
				46.5	950	94.0	24.6	19.6	1.46	4.94	329.7	123.6	3.1	4.1
	4.5	2.0	4.5	50.5	850	98.2	25.9	20.7	1.52	4.99	341.7	130.7	3.2	5.4
				50.5	950	95.2	25.9	20.8	1.49	5.09	337.5	130.5	2.9	5.5
	6.0	3.2	7.4	52.6	850	99.2	26.8	21.6	1.53	5.13	345.3	134.8	2.9	6.4
				52.5	950	96.1	26.8	21.7	1.50	5.24	341.1	134.6	2.8	6.4
70	3.0	0.8	2.0	54.9	850	99.7	27.3	21.9	1.58	5.06	349.5	140.6	3.1	6.0
				54.9	950	96.6	27.3	22.0	1.55	5.16	345.2	140.4	2.9	6.1
	4.5	1.9	4.4	59.4	850	101.3	28.7	23.2	1.61	5.22	357.7	148.6	2.9	7.9
				59.3	950	98.0	28.7	23.3	1.58	5.32	353.3	148.3	2.7	8.1
	6.0	3.1	7.1	61.7	850	102.5	29.8	24.2	1.63	5.36	361.5	153.2	2.6	9.3
				61.6	950	99.0	29.8	24.3	1.60	5.46	357.1	153.0	2.5	9.4
80	3.0	0.8	1.7	63.4	850	102.5	29.8	24.1	1.68	5.20	365.0	157.4	2.8	7.9
				63.4	950	99.0	29.8	24.2	1.65	5.29	360.5	157.1	2.6	8.0
	4.5	1.7	3.9	68.3	850	104.2	31.4	25.5	1.72	5.35	373.6	166.2	2.5	10.5
				68.3	950	100.6	31.4	25.6	1.69	5.45	369.0	166.0	2.3	10.5
	6.0	2.7	6.3	70.9	850	105.4	32.5	26.6	1.74	5.47	377.5	171.5	2.2	12.1
				70.8	950	101.7	32.5	26.7	1.70	5.60	372.9	171.2	2.0	12.2
90	3.0	0.7	1.5	72.0	850	105.2	32.3	26.2	1.79	5.29	380.4	174.3	2.3	9.9
				71.9	950	101.5	32.3	26.3	1.76	5.38	375.7	174.0	2.1	10.0
	4.5	1.5	3.4	77.3	850	107.0	34.0	27.8	1.83	5.45	389.3	184.1	1.9	13.0
				77.2	950	103.1	34.0	27.9	1.80	5.54	384.5	183.8	1.8	13.1
	6.0	2.4	5.5	80.1	850	108.3	35.2	28.9	1.85	5.58	393.4	189.9	1.6	15.0
				80.0	950	104.3	35.2	29.0	1.81	5.70	388.6	189.6	1.5	15.1

Heating data based on 70 °F EAT. See Correction Factors at end of section for different conditions
LWT is based on 15% (by volume) methanol antifreeze solution only or 485 multiplier
Capacity does not include fan watts
Performance data accurate within ± 10%
Discharge pressure is ± 20 PSI; Suction pressure is ± 10 PSI
SubCooling is ± 5 °F; Superheat is ± 6 °F

ENGINEERING SPECIFICATIONS:

Model 024, 2 Ton, with MPD024 Full Load cooling Performance

					Cooling										
EWT	Flow	WPD		LWT	Aiflow	TC	SC		HR		EER	Discharge	Suction	Subcooling	Superheat
°F	GPM	PSI	FT	°F	CFM	MBtuh	MBtuh	S/T	MBtuh	kW	Btuh/W	PSIG	PSIG	°F	°F
50	3.0	1.0	2.4	72.7	850	29.5	20.6	0.70	33.1	1.06	27.8	218.3	135.1	20.3	14.8
				72.7	950	29.5	21.1	0.72	33.1	1.06	27.8	218.6	136.6	20.2	14.7
	4.5	2.0	4.6	65.2	850	29.7	20.5	0.69	33.1	0.99	30.0	201.8	134.1	16.3	15.3
				65.2	950	29.7	21.1	0.71	33.1	0.99	30.0	202.0	135.6	16.2	15.3
	6.0	3.2	7.3	61.3	850	29.8	20.6	0.69	33.0	0.95	31.4	193.5	134.2	14.1	15.4
				61.4	950	29.8	21.1	0.71	33.1	0.96	31.0	193.7	135.7	14.0	15.3
60	3.0	1.0	2.3	82.4	850	28.6	20.3	0.71	32.6	1.18	24.2	255.6	137.5	21.0	13.7
				82.4	950	28.6	20.8	0.73	32.6	1.18	24.2	255.9	139.0	20.7	13.7
	4.5	1.9	4.3	74.9	850	28.8	20.3	0.70	32.6	1.10	26.2	236.2	136.5	16.6	14.2
				74.9	950	28.8	20.8	0.72	32.6	1.10	26.2	236.5	138.0	16.4	14.3
	6.0	3.0	6.8	71.2	850	28.9	20.3	0.70	32.5	1.06	27.3	226.5	136.6	14.1	14.3
				71.2	950	28.9	20.8	0.72	32.6	1.07	27.0	226.8	138.1	14.0	14.3
70	3.0	0.9	2.1	92.1	850	27.6	20.0	0.72	32.1	1.32	20.9	296.5	139.9	21.5	12.8
				92.1	950	27.6	20.5	0.74	32.1	1.33	20.8	296.9	141.4	21.3	12.8
	4.5	1.7	4.0	84.7	850	27.8	20.0	0.72	32.0	1.24	22.4	274.0	138.9	17.0	13.3
				84.7	950	27.8	20.5	0.74	32.0	1.24	22.4	274.4	140.4	16.8	13.4
	6.0	2.7	6.3	81.0	850	27.9	20.0	0.72	32.0	1.19	23.4	262.8	139.0	14.5	13.4
				81.0	950	27.9	20.5	0.73	32.0	1.20	23.3	263.1	140.5	14.3	13.5
80	3.0	0.8	1.9	101.7	850	26.5	19.5	0.74	31.6	1.49	17.8	341.3	141.4	22.4	12.5
				101.7	950	26.5	20.0	0.75	31.6	1.49	17.8	341.7	142.9	22.1	12.6
	4.5	1.6	3.6	94.4	850	26.7	19.4	0.73	31.4	1.39	19.2	315.4	140.4	18.1	13.1
				94.4	950	26.7	19.9	0.75	31.4	1.39	19.2	315.8	141.9	17.9	13.1
	6.0	2.5	5.8	90.8	850	26.8	19.5	0.73	31.4	1.34	20.0	302.5	140.4	15.5	13.2
				90.8	950	26.8	20.0	0.75	31.4	1.34	20.0	302.8	142.0	15.3	13.2
90	3.0	0.7	1.7	111.3	850	25.2	18.9	0.75	31.0	1.71	14.7	395.2	142.9	23.4	12.6
				111.4	950	25.2	19.4	0.77	31.1	1.72	14.7	395.7	144.4	23.0	12.6
	4.5	1.4	3.2	104.2	850	25.4	18.8	0.74	30.9	1.60	15.9	365.2	141.8	19.4	13.2
				104.2	950	25.4	19.3	0.76	30.9	1.61	15.8	365.7	143.4	19.2	13.2
	6.0	2.2	5.1	100.6	850	25.5	18.9	0.74	30.8	1.55	16.5	350.3	141.9	17.0	13.2
				100.6	950	25.5	19.4	0.76	30.8	1.55	16.5	350.7	143.5	16.8	13.3
100	3.0	0.7	1.5	121.0	850	23.7	18.4	0.78	30.6	2.03	11.7	460.8	145.3	24.2	12.8
				121.0	950	23.7	18.9	0.80	30.6	2.03	11.7	461.4	146.9	23.9	12.8
	4.5	1.3	2.9	113.9	850	23.9	18.4	0.77	30.3	1.89	12.6	425.9	144.3	20.2	13.4
				113.9	950	23.9	18.8	0.79	30.4	1.90	12.6	426.4	145.9	19.9	13.4
	6.0	2.0	4.6	110.3	850	23.9	18.4	0.77	30.1	1.83	13.1	408.4	144.4	18.0	13.4
				110.3	950	23.9	18.9	0.79	30.1	1.83	13.1	408.9	146.0	17.6	13.5
110	3.0	0.6	1.3	130.8	850	22.1	17.9	0.81	30.2	2.37	9.3	530.1	147.8	26.3	13.1
				130.8	950	22.1	18.3	0.83	30.2	2.38	9.3	530.8	149.4	26.0	13.2
	4.5	1.1	2.5	123.7	850	22.3	17.8	0.80	29.8	2.21	10.1	489.9	146.8	21.0	13.7
				123.7	950	22.3	18.3	0.82	29.9	2.22	10.0	490.6	148.4	20.8	13.7
	6.0	1.7	4.0	120.2	850	22.3	17.9	0.80	29.6	2.13	10.5	469.8	146.9	18.3	13.7
				120.2	950	22.3	18.3	0.82	29.6	2.14	10.4	470.4	148.5	18.0	13.8

Cooling data based on 80/67 °F EAT. See Correction Factors at end of section for different conditions
LWT is based on 15% (by volume) methanol antifreeze solution only or 485 multiplier
Capacity does not include fan watts
Performance data accurate within ± 10%
Discharge pressure is ± 20 PSI; Suction pressure is ± 10 PSI
SubCooling is ± 5 °F; Superheat is ± 6 °F

Model 036, 3 Ton, with MPD036 Full Load heating Performance

					Heating									
EWT	Flow	WPD		LWT	Aiflow	LAT	HC	HE		COP	Discharge	Suction	Subcooling	Superheat
°F	GPM	PSI	FT	°F	CFM	°F	MBtuh	MBtuh	kW	W/W	PSIG	PSIG	°F	°F
25	9.0	3.5	8.1	20.8	1200	89.2	24.9	18.5	1.89	3.86	303.2	71.1	7.4	37.1
				20.7	1350	87.1	24.9	18.9	1.76	4.15	290.4	69.0	8.3	34.8
30	4.5	1.3	3.1	21.5	1200	89.4	25.2	18.5	1.95	3.79	303.2	74.2	8.1	36.1
				21.3	1350	87.3	25.2	19.0	1.81	4.08	290.4	71.9	9.0	33.8
	7.0	2.5	5.8	24.2	1200	90.4	26.4	19.7	1.97	3.93	308.7	79.3	7.5	33.5
				24.1	1350	88.1	26.4	20.1	1.84	4.20	295.7	76.9	8.5	31.1
	9.0	3.6	8.4	25.4	1200	90.8	26.9	20.1	1.98	3.98	310.9	81.1	7.1	32.1
				25.3	1350	88.4	26.9	20.6	1.85	4.26	297.9	78.6	8.1	29.8
40	4.5	1.3	2.9	30.0	1200	92.2	28.8	21.9	2.03	4.16	317.5	88.8	6.6	27.2
				29.7	1350	89.8	28.9	22.5	1.89	4.48	304.2	86.0	7.7	25.1
	7.0	2.4	5.5	33.2	1200	93.3	30.2	23.2	2.06	4.30	323.3	94.9	5.9	24.5
				33.0	1350	90.7	30.2	23.6	1.92	4.61	309.8	92.0	7.1	22.3
	9.0	3.4	7.9	34.6	1200	93.8	30.8	23.7	2.07	4.36	325.7	97.0	5.4	23.1
				34.5	1350	91.1	30.8	24.2	1.93	4.68	312.0	94.0	6.7	21.0
50	4.5	1.2	2.7	38.4	1200	95.1	32.5	25.3	2.12	4.49	332.2	103.5	5.2	20.0
				38.2	1350	92.3	32.5	25.7	1.98	4.81	318.3	100.3	6.6	17.9
	7.0	2.2	5.1	42.1	1200	96.2	34.0	26.7	2.15	4.63	338.3	110.6	4.4	17.3
				42.0	1350	93.3	34.0	27.2	2.00	4.98	324.1	107.2	5.8	15.1
	9.0	3.2	7.4	43.7	1200	96.8	34.7	27.3	2.16	4.71	340.7	113.0	3.9	15.9
				43.6	1350	93.8	34.7	27.8	2.01	5.06	326.4	109.6	5.3	13.6
60	4.5	1.1	2.6	46.9	1200	97.9	36.2	28.5	2.26	4.69	347.9	119.8	4.4	15.3
				46.7	1350	94.8	36.2	29.0	2.11	5.03	333.3	116.1	6.0	13.0
	7.0	2.2	5.0	51.2	1200	99.2	37.8	30.0	2.29	4.84	354.3	128.0	3.4	12.5
				51.0	1350	96.0	37.9	30.6	2.14	5.19	339.4	124.1	5.1	10.2
	9.0	3.1	7.1	52.9	1200	99.8	38.6	30.8	2.30	4.92	356.8	130.9	2.9	11.1
				52.8	1350	96.5	38.6	31.3	2.15	5.26	341.8	126.9	4.6	8.7
70	4.5	1.1	2.5	55.5	1200	100.8	39.9	31.6	2.42	4.83	364.5	136.4	4.0	12.9
				55.2	1350	97.4	39.9	32.2	2.25	5.20	349.1	132.2	5.8	10.4
	7.0	2.0	4.7	60.2	1200	102.2	41.7	33.3	2.45	4.99	371.1	145.8	2.9	9.9
				60.0	1350	98.6	41.7	33.9	2.29	5.34	355.5	141.3	4.8	7.5
	9.0	2.9	6.7	62.2	1200	102.9	42.6	34.2	2.46	5.08	373.8	149.0	2.3	8.4
				62.0	1350	99.2	42.6	34.8	2.30	5.43	358.1	144.5	4.3	5.9
80	4.5	0.9	2.1	64.0	1200	103.6	43.6	34.9	2.56	4.99	381.5	152.0	3.7	11.8
				63.7	1350	99.9	43.6	35.5	2.38	5.37	365.4	147.4	5.6	9.0
	7.0	1.7	4.0	69.2	1200	105.2	45.6	36.8	2.59	5.16	388.5	162.4	2.5	8.8
				69.0	1350	101.3	45.6	37.3	2.42	5.52	372.1	157.5	4.6	6.1
	9.0	2.5	5.8	71.4	1200	105.9	46.5	37.6	2.61	5.22	391.2	166.1	1.9	7.2
				71.2	1350	101.9	46.5	38.2	2.43	5.61	374.8	161.0	4.0	4.5
90	4.5	0.8	1.8	72.5	1200	106.5	47.3	38.1	2.70	5.13	398.8	167.7	3.4	11.7
				72.3	1350	102.4	47.3	38.7	2.52	5.50	382.1	162.6	5.5	8.7
	7.0	1.4	3.3	78.2	1200	108.2	49.5	40.2	2.74	5.29	406.1	179.3	2.1	8.6
				78.0	1350	104.0	49.5	40.8	2.56	5.67	389.1	173.8	4.4	5.6
	9.0	2.1	4.8	80.6	1200	109.0	50.5	41.1	2.75	5.38	409.0	183.3	1.5	6.9
				80.4	1350	104.6	50.5	41.7	2.57	5.76	391.9	177.7	3.8	3.8

Heating data based on 70 °F EAT. See Correction Factors at end of section for different conditions

LWT is based on 15% (by volume) methanol antifreeze solution only or 485 multiplier

Capacity does not include fan watts

Performance data accurate within ± 10%

Discharge pressure is ± 20 PSI; Suction pressure is ± 10 PSI

SubCooling is ± 5 °F; Superheat is ± 6 °F

ENGINEERING SPECIFICATIONS:

Model 036, 3 Ton, with MPD036 Full Load cooling Performance

					Cooling										
EWT	Flow	WPD		LWT	Aiflow	TC	SC		HR		EER	Discharge	Suction	Subcooling	Superheat
°F	GPM	PSI	FT	°F	CFM	MBtuh	MBtuh	S/T	MBtuh	kW	Btuh/W	PSIG	PSIG	°F	°F
50	4.5	1.4	3.1	69.1	1250	36.1	24.2	0.67	41.6	1.61	22.4	233.1	112.3	27.0	33.9
				68.8	1350	35.9	24.2	0.67	41.1	1.52	23.6	213.8	112.3	24.7	33.8
	7.0	2.4	5.6	62.0	1250	35.8	23.7	0.66	40.9	1.49	24.0	214.0	110.3	22.6	36.2
				61.9	1350	35.6	23.7	0.67	40.4	1.41	25.2	196.3	110.3	20.6	36.1
	9.0	3.1	7.1	59.4	1250	36.2	24.0	0.66	41.1	1.45	25.0	207.4	111.1	20.5	35.1
				59.3	1350	36.0	24.0	0.67	40.7	1.37	26.3	190.3	111.1	18.5	35.0
60	4.5	1.2	2.8	79.9	1250	37.3	25.5	0.68	43.4	1.80	20.7	269.5	121.7	26.4	26.5
				79.7	1350	37.1	25.5	0.69	42.9	1.70	21.8	247.2	121.7	24.3	26.4
	7.0	2.2	5.1	72.6	1250	37.0	25.0	0.68	42.7	1.67	22.2	247.4	119.5	21.7	28.9
				72.4	1350	36.8	25.0	0.68	42.2	1.58	23.3	226.9	119.5	19.8	28.8
	9.0	2.8	6.4	69.9	1250	37.4	25.3	0.68	43.0	1.63	22.9	239.8	120.5	19.4	27.7
				69.7	1350	37.2	25.3	0.68	42.4	1.53	24.3	220.0	120.5	17.6	27.6
70	4.5	1.1	2.5	90.7	1250	38.2	26.6	0.70	45.1	2.02	18.9	308.7	130.4	25.5	20.0
				90.4	1350	38.0	26.6	0.70	44.5	1.91	19.9	283.1	130.4	23.9	19.9
	7.0	2.0	4.6	83.0	1250	37.8	26.0	0.69	44.2	1.88	20.1	283.3	128.0	20.8	22.4
				82.8	1350	37.6	26.0	0.69	43.6	1.77	21.2	259.9	128.0	19.3	22.3
	9.0	2.5	5.7	80.2	1250	38.2	26.4	0.69	44.4	1.82	21.0	274.6	129.0	18.4	21.3
				80.1	1350	38.0	26.4	0.69	43.9	1.72	22.1	251.9	129.0	17.0	21.2
80	4.5	1.0	2.3	100.7	1250	37.5	26.6	0.71	45.2	2.26	16.6	352.3	135.0	24.8	16.4
				100.4	1350	37.3	26.6	0.71	44.6	2.13	17.5	323.2	135.0	23.9	16.3
	7.0	1.8	4.1	93.0	1250	37.1	26.1	0.70	44.3	2.10	17.7	323.4	132.5	20.5	18.7
				92.9	1350	36.9	26.1	0.71	43.7	1.98	18.6	296.7	132.5	19.5	18.6
	9.0	2.2	5.2	90.2	1250	37.5	26.4	0.70	44.5	2.04	18.4	313.5	133.6	18.1	17.6
				90.1	1350	37.3	26.4	0.71	43.9	1.92	19.4	287.6	133.6	17.0	17.4
90	4.5	0.9	2.1	110.4	1250	35.8	26.1	0.73	44.5	2.55	14.0	402.8	137.5	24.0	14.5
				110.1	1350	35.6	26.1	0.73	43.8	2.41	14.8	369.5	137.5	24.1	14.4
	7.0	1.6	3.7	102.8	1250	35.5	25.6	0.72	43.6	2.37	15.0	369.7	135.0	20.2	16.7
				102.6	1350	35.3	25.6	0.73	42.9	2.23	15.8	339.1	135.0	19.9	16.6
	9.0	2.0	4.7	100.0	1250	35.9	25.9	0.72	43.7	2.30	15.6	358.4	136.1	17.8	15.6
				99.9	1350	35.7	25.9	0.73	43.1	2.17	16.5	328.8	136.1	17.6	15.5
100	4.5	0.8	1.9	120.2	1250	34.1	25.7	0.75	44.0	2.91	11.7	460.3	140.6	23.3	12.5
				119.8	1350	33.9	25.7	0.76	43.3	2.75	12.3	422.2	140.6	23.7	12.4
	7.0	1.5	3.4	112.6	1250	33.7	25.2	0.75	42.9	2.70	12.5	422.5	138.1	19.5	14.8
				112.5	1350	33.6	25.2	0.75	42.3	2.55	13.2	387.5	138.1	20.0	14.7
	9.0	1.8	4.3	109.9	1250	34.1	25.5	0.75	43.0	2.62	13.0	409.5	139.2	17.0	13.6
				109.7	1350	33.9	25.5	0.75	42.3	2.47	13.7	375.7	139.2	17.6	13.5
110	4.5	0.7	1.7	129.7	1250	31.9	25.1	0.79	43.1	3.29	9.7	520.5	142.9	23.7	11.3
				129.4	1350	31.8	25.1	0.79	42.4	3.11	10.2	477.4	142.9	23.4	11.2
	7.0	1.3	3.1	122.4	1250	31.6	24.6	0.78	42.0	3.05	10.4	477.7	140.4	18.7	13.5
				122.2	1350	31.5	24.6	0.78	41.3	2.88	10.9	438.2	140.4	19.3	13.4
	9.0	1.7	3.9	119.6	1250	32.0	24.9	0.78	42.1	2.96	10.8	463.1	141.5	16.0	12.4
				119.5	1350	31.8	24.9	0.78	41.4	2.80	11.4	424.8	141.5	16.8	12.3

Cooling data based on 80/67 °F EAT. See Correction Factors at end of section for different conditions
LWT is based on 15% (by volume) methanol antifreeze solution only or 485 multiplier
Capacity does not include fan watts
Performance data accurate within ± 10%
Discharge pressure is ± 20 PSI; Suction pressure is ± 10 PSI
SubCooling is ± 5 °F; Superheat is ± 6 °F

Model 048, 4 Ton, with MPD060 Full Load heating Performance Data

					Heating									
EWT	Flow	WPD		LWT	Aiflow	LAT	HC	HE		COP	Discharge	Suction	Subcooling	Superheat
°F	GPM	PSI	FT	°F	CFM	°F	MBtuh	MBtuh	kW	W/W	PSIG	PSIG	°F	°F
25	12.0	6.0	13.8	20.8	1500	90.4	33.0	24.4	2.52	3.84	278.5	72.2	0.8	3.4
				20.8	1700	88.0	33.0	24.6	2.47	3.92	273.1	72.2	0.7	3.4
30	6.0	1.9	4.4	21.5	1500	90.6	33.3	24.7	2.51	3.89	278.9	73.8	0.9	3.7
				21.4	1700	88.1	33.3	24.9	2.46	3.97	273.4	73.8	0.9	3.7
	9.0	3.7	8.5	24.1	1500	91.4	34.6	25.9	2.54	3.99	282.0	77.6	1.0	3.4
				24.0	1700	88.8	34.6	26.1	2.49	4.07	276.5	77.6	0.9	3.4
	12.0	5.8	13.5	25.4	1500	91.9	35.4	26.7	2.56	4.05	283.7	80.0	0.9	3.1
				25.4	1700	89.3	35.4	26.8	2.51	4.13	278.2	80.0	0.9	3.1
40	6.0	1.8	4.1	29.8	1500	93.8	38.5	29.6	2.61	4.32	290.4	88.3	1.0	4.8
				29.8	1700	91.0	38.5	29.8	2.56	4.41	284.7	88.3	1.0	4.8
	9.0	3.4	8.0	32.9	1500	94.6	39.9	30.9	2.65	4.41	293.7	92.9	1.0	5.2
				32.9	1700	91.7	39.9	31.0	2.60	4.50	287.9	92.9	1.0	5.2
	12.0	5.5	12.7	34.5	1500	95.2	40.9	31.8	2.67	4.49	295.5	95.7	0.9	5.4
				34.5	1700	92.3	40.9	32.0	2.61	4.59	289.7	95.7	0.9	5.4
50	6.0	1.7	3.9	38.3	1500	96.7	43.2	34.0	2.71	4.67	301.1	101.7	1.0	7.4
				38.2	1700	93.5	43.2	34.2	2.65	4.78	295.2	101.7	1.0	7.4
	9.0	3.2	7.5	41.9	1500	97.7	44.9	35.5	2.75	4.79	304.5	107.0	1.0	8.6
				41.8	1700	94.5	44.9	35.7	2.69	4.89	298.5	107.0	1.0	8.6
	12.0	5.2	11.9	43.7	1500	98.4	46.0	36.5	2.77	4.87	306.3	110.3	0.9	9.0
				43.7	1700	95.1	46.0	36.8	2.71	4.97	300.3	110.3	1.0	9.0
60	6.0	1.6	3.7	47.1	1500	99.0	46.9	37.4	2.79	4.93	309.6	113.0	1.1	10.7
				47.1	1700	95.5	46.9	37.6	2.73	5.03	303.6	113.0	1.1	10.7
	9.0	3.1	7.1	51.1	1500	100.1	48.7	39.0	2.83	5.04	313.1	118.9	1.1	12.6
				51.0	1700	96.5	48.7	39.2	2.77	5.15	307.0	118.9	1.1	12.6
	12.0	4.9	11.3	53.1	1500	100.8	49.9	40.2	2.85	5.13	315.0	122.5	1.0	13.5
				53.1	1700	97.2	49.9	40.4	2.79	5.24	308.9	122.5	1.0	13.5
70	6.0	1.5	3.5	56.3	1500	100.6	49.6	39.9	2.85	5.10	316.1	121.6	1.2	15.0
				56.2	1700	97.0	49.6	40.1	2.79	5.21	309.9	121.6	1.2	15.0
	9.0	2.9	6.8	60.5	1500	101.8	51.5	41.6	2.89	5.22	319.6	128.0	1.1	17.6
				60.4	1700	98.1	51.5	41.8	2.83	5.33	313.3	128.0	1.2	17.6
	12.0	4.7	10.8	62.6	1500	102.6	52.8	42.9	2.91	5.32	321.6	131.9	1.1	18.8
				62.6	1700	98.8	52.8	43.1	2.85	5.43	315.3	131.9	1.2	18.8
80	6.0	1.4	3.3	65.7	1500	101.9	51.6	41.7	2.90	5.21	321.1	127.9	1.3	20.7
				65.6	1700	98.1	51.6	41.9	2.84	5.32	314.8	127.9	1.4	20.7
	9.0	2.8	6.5	70.0	1500	103.1	53.6	43.6	2.94	5.34	324.7	134.6	1.3	24.0
				70.0	1700	99.2	53.6	43.8	2.88	5.45	318.3	134.6	1.4	24.0
	12.0	4.5	10.3	72.3	1500	103.9	54.9	44.8	2.96	5.44	326.7	138.7	1.2	25.6
				72.3	1700	99.9	54.9	45.0	2.90	5.55	320.3	138.7	1.3	25.6
90	6.0	1.4	3.2	75.2	1500	102.8	53.2	43.2	2.94	5.30	325.2	133.2	1.4	26.8
				75.1	1700	99.0	53.2	43.4	2.88	5.41	318.9	133.2	1.5	26.8
	9.0	2.7	6.2	79.7	1500	104.1	55.3	45.1	2.98	5.44	328.9	140.1	1.4	30.8
				79.6	1700	100.1	55.3	45.3	2.92	5.55	322.4	140.1	1.5	30.8
	12.0	4.3	9.9	82.0	1500	104.9	56.6	46.4	3.00	5.53	330.9	144.4	1.3	32.7
				82.0	1700	100.8	56.6	46.6	2.94	5.64	324.4	144.4	1.4	32.7

Heating data based on 70 °F EAT. See Correction Factors at end of section for different conditions
LWT is based on 15% (by volume) methanol antifreeze solution only or 485 multiplier
Capacity does not include fan watts
Performance data accurate within ± 10%
Discharge pressure is ± 20 PSI; Suction pressure is ± 10 PSI
SubCooling is ± 5 °F; Superheat is ± 6 °F

ENGINEERING SPECIFICATIONS:

Model 048, 4 Ton, with MPD060 Full Load cooling Performance

					Cooling										
EWT	Flow	WPD		LWT	Aiflow	TC	SC		HR		EER	Discharge	Suction	Subcooling	Superheat
°F	GPM	PSI	FT	°F	CFM	MBtuh	MBtuh	S/T	MBtuh	kW	Btuh/W	PSIG	PSIG	°F	°F
50	6.0	1.8	4.0	72.1	1600	57.3	40.0	0.70	64.4	2.07	27.7	216.1	136.5	11.4	14.5
				72.2	1750	57.5	40.5	0.70	64.6	2.08	27.6	216.1	137.4	11.2	14.6
	9.0	3.2	7.3	64.8	1600	57.9	40.0	0.69	64.5	1.92	30.2	197.4	135.9	7.2	15.0
				64.8	1750	58.1	40.5	0.70	64.7	1.93	30.1	197.4	136.7	7.1	15.1
	12.0	4.9	11.4	61.1	1600	58.1	40.1	0.69	64.4	1.86	31.2	188.5	135.5	5.4	15.4
				61.1	1750	58.4	40.6	0.70	64.8	1.87	31.2	188.5	136.3	5.2	15.5
60	6.0	1.7	3.9	81.9	1600	55.6	39.4	0.71	63.6	2.33	23.9	256.1	138.6	14.3	13.8
				81.9	1750	55.8	39.9	0.72	63.8	2.33	23.9	256.2	139.4	14.0	13.9
	9.0	3.1	7.1	74.6	1600	56.2	39.4	0.70	63.6	2.16	26.0	234.0	137.9	9.8	14.2
				74.6	1750	56.4	39.9	0.71	63.8	2.17	26.0	234.1	138.7	9.6	14.3
	12.0	4.8	11.0	70.9	1600	56.4	39.5	0.70	63.6	2.10	26.9	223.5	137.5	7.8	14.7
				71.0	1750	56.6	40.0	0.71	63.8	2.10	27.0	223.5	138.4	7.6	14.7
70	6.0	1.6	3.7	91.5	1600	53.8	38.7	0.72	62.7	2.62	20.5	299.4	140.6	16.9	13.2
				91.6	1750	54.0	39.2	0.73	63.0	2.63	20.5	299.5	141.5	16.6	13.3
	9.0	2.9	6.8	84.4	1600	54.4	38.7	0.71	62.7	2.44	22.3	273.6	139.9	12.2	13.7
				84.4	1750	54.6	39.2	0.72	62.9	2.44	22.4	273.6	140.8	12.0	13.7
	12.0	4.6	10.5	80.8	1600	54.6	38.8	0.71	62.7	2.36	23.1	261.2	139.6	10.1	14.1
				80.8	1750	54.8	39.3	0.72	62.9	2.37	23.1	261.3	140.4	9.9	14.2
80	6.0	1.6	3.6	101.3	1600	51.8	37.8	0.73	61.9	2.95	17.6	347.8	142.5	19.5	12.9
				101.3	1750	52.0	38.3	0.74	62.1	2.95	17.6	347.9	143.4	19.3	13.0
	9.0	2.8	6.6	94.1	1600	52.3	37.8	0.72	61.6	2.74	19.1	317.8	141.8	15.2	13.4
				94.2	1750	52.6	38.3	0.73	62.0	2.75	19.1	317.8	142.7	14.9	13.5
	12.0	4.4	10.2	90.6	1600	52.5	37.9	0.72	61.5	2.65	19.8	303.4	141.4	13.1	13.8
				90.6	1750	52.7	38.4	0.73	61.8	2.66	19.8	303.5	142.3	12.8	13.8
90	6.0	1.5	3.5	111.0	1600	49.5	36.8	0.74	61.0	3.36	14.7	404.2	144.3	21.7	13.1
				111.0	1750	49.7	37.3	0.75	61.2	3.37	14.7	404.3	145.2	21.4	13.2
	9.0	2.8	6.4	103.9	1600	50.0	36.8	0.74	60.7	3.13	16.0	369.3	143.6	17.9	13.5
				104.0	1750	50.2	37.3	0.74	60.9	3.13	16.0	369.4	144.5	17.6	13.6
	12.0	4.3	9.9	100.4	1600	50.2	36.9	0.74	60.5	3.03	16.6	352.7	143.2	16.0	14.0
				100.4	1750	50.4	37.4	0.74	60.7	3.03	16.6	352.8	144.1	15.7	14.0
100	6.0	1.5	3.4	120.7	1600	46.8	35.6	0.76	60.1	3.90	12.0	469.4	146.4	23.3	13.7
				120.7	1750	47.0	36.1	0.77	60.3	3.91	12.0	469.5	147.3	23.0	13.8
	9.0	2.7	6.2	113.7	1600	47.3	35.6	0.75	59.7	3.62	13.1	428.8	145.7	19.2	14.2
				113.7	1750	47.5	36.1	0.76	59.9	3.63	13.1	428.9	146.6	18.9	14.3
	12.0	4.2	9.7	110.2	1600	47.5	35.7	0.75	59.5	3.51	13.5	409.5	145.3	17.4	14.6
				110.3	1750	47.7	36.1	0.76	59.7	3.52	13.6	409.6	146.2	17.2	14.7
110	6.0	1.5	3.4	130.4	1600	44.0	34.3	0.78	59.3	4.47	9.8	537.7	148.5	26.1	14.7
				130.4	1750	44.2	34.7	0.79	59.5	4.48	9.9	537.8	149.4	25.7	14.8
	9.0	2.6	6.1	123.4	1600	44.5	34.3	0.77	58.7	4.15	10.7	491.3	147.7	20.6	15.2
				123.5	1750	44.7	34.7	0.78	58.9	4.16	10.7	491.4	148.6	20.3	15.2
	12.0	4.1	9.5	120.0	1600	44.7	34.4	0.77	58.4	4.02	11.1	469.1	147.3	18.5	15.6
				120.1	1750	44.8	34.8	0.78	58.6	4.03	11.1	469.2	148.2	18.1	15.7

Cooling data based on 80/67 °F EAT. See Correction Factors at end of section for different conditions
LWT is based on 15% (by volume) methanol antifreeze solution only or 485 multiplier
Capacity does not include fan watts
Performance data accurate within ± 10%
Discharge pressure is ± 20 PSI; Suction pressure is ± 10 PSI
SubCooling is ± 5 °F; Superheat is ± 6 °F

Model 060, 5 Ton, with MPD060 Full Load heating Performance

EWT	Flow	WPD		LWT	Heating									
					Aiflow	LAT	HC	HE		COP	Discharge	Suction	Subcooling	Superheat
°F	GPM	PSI	FT	°F	CFM	°F	MBtuh	MBtuh	kW	W/W	PSIG	PSIG	°F	°F
25	15.0	10.8	25.0	21.0	1700	91.6	39.7	28.8	3.20	3.64	289.4	65.7	0.7	4.7
				21.0	1850	89.9	39.7	28.9	3.17	3.67	286.8	65.4	0.6	4.9
30	7.5	3.4	7.9	21.4	1700	93.1	42.4	31.2	3.29	3.78	293.1	73.3	0.8	2.2
				21.4	1850	91.2	42.4	31.3	3.26	3.81	290.5	73.0	0.8	2.3
	11.5	6.6	15.3	24.1	1700	94.0	44.1	32.7	3.33	3.88	296.2	76.9	1.0	1.7
				24.1	1850	92.1	44.1	32.8	3.30	3.92	293.5	76.5	0.8	1.9
	15.0	10.6	24.4	25.4	1700	94.6	45.1	33.7	3.35	3.95	297.9	79.1	0.9	1.2
				25.4	1850	92.6	45.1	33.7	3.33	3.97	295.2	78.8	0.9	1.4
40	7.5	3.2	7.4	30.0	1700	96.3	48.2	36.5	3.44	4.11	305.6	88.0	1.0	3.0
				30.0	1850	94.1	48.2	36.5	3.42	4.13	302.9	87.6	1.0	3.1
	11.5	6.2	14.3	33.2	1700	97.3	50.1	38.2	3.48	4.22	308.8	92.2	1.1	3.2
				33.1	1850	95.1	50.1	38.3	3.46	4.24	306.1	91.9	1.1	3.2
	15.0	9.9	22.8	34.6	1700	97.9	51.2	39.2	3.51	4.27	310.6	95.0	1.0	3.0
				34.6	1850	95.6	51.2	39.3	3.48	4.31	307.8	94.6	1.0	3.1
50	7.5	3.0	6.9	38.6	1700	99.2	53.7	41.5	3.59	4.38	317.4	102.1	1.1	5.0
				38.6	1850	96.9	53.7	41.6	3.56	4.42	314.5	101.7	1.0	5.1
	11.5	5.8	13.4	42.2	1700	100.4	55.8	43.4	3.63	4.51	320.7	107.0	1.1	5.8
				42.2	1850	97.9	55.8	43.5	3.61	4.53	317.8	106.6	1.0	5.9
	15.0	9.2	21.3	43.9	1700	101.0	57.0	44.5	3.66	4.56	322.6	110.2	1.0	6.1
				43.9	1850	98.5	57.0	44.6	3.63	4.60	319.6	109.8	0.9	6.2
60	7.5	2.8	6.5	47.0	1700	102.8	60.2	47.3	3.78	4.67	329.3	118.9	1.1	6.4
				47.0	1850	100.1	60.2	47.4	3.76	4.69	326.3	118.5	1.0	6.4
	11.5	5.5	12.6	51.1	1700	104.0	62.5	49.4	3.83	4.78	332.8	124.7	1.0	7.8
				51.1	1850	101.3	62.5	49.5	3.80	4.82	329.8	124.2	1.1	7.9
	15.0	8.7	20.1	53.0	1700	104.8	63.9	50.7	3.86	4.85	334.7	128.4	1.0	8.3
				53.0	1850	102.0	63.9	50.8	3.83	4.89	331.7	127.9	1.0	8.4
70	7.5	2.7	6.1	55.6	1700	105.9	65.9	52.4	3.96	4.88	339.5	134.4	1.1	8.7
				55.6	1850	103.0	65.9	52.5	3.93	4.91	336.4	133.9	1.1	8.8
	11.5	5.2	11.9	60.2	1700	107.3	68.4	54.7	4.01	5.00	343.0	140.9	1.0	10.8
				60.2	1850	104.2	68.4	54.8	3.98	5.04	339.9	140.3	1.0	10.9
	15.0	8.3	19.0	62.3	1700	108.1	70.0	56.2	4.04	5.08	345.0	145.1	1.0	11.7
				62.3	1850	105.0	70.0	56.3	4.01	5.12	341.9	144.5	1.0	11.8
80	7.5	2.5	5.8	64.8	1700	107.7	69.3	55.4	4.08	4.98	346.4	144.8	1.0	13.3
				64.7	1850	104.7	69.3	55.5	4.05	5.01	343.3	144.3	1.1	13.3
	11.5	4.9	11.3	69.6	1700	109.2	72.0	57.9	4.12	5.12	350.1	151.8	1.1	16.0
				69.6	1850	106.0	72.0	58.0	4.09	5.16	346.9	151.2	1.0	16.0
	15.0	7.8	18.0	71.8	1700	110.1	73.6	59.4	4.15	5.20	352.0	156.4	1.0	17.1
				71.8	1850	106.8	73.6	59.5	4.12	5.24	348.9	155.7	0.9	17.2
90	7.5	2.4	5.5	74.0	1700	109.4	72.4	58.1	4.18	5.08	352.6	154.7	1.1	18.1
				74.0	1850	106.2	72.4	58.2	4.15	5.11	349.4	154.1	1.0	18.1
	11.5	4.6	10.7	79.1	1700	111.0	75.2	60.8	4.23	5.21	356.3	162.2	1.0	21.4
				79.1	1850	107.6	75.2	60.9	4.20	5.25	353.1	161.5	1.1	21.4
	15.0	7.4	17.0	81.4	1700	111.9	76.9	62.4	4.26	5.29	358.4	167.0	0.9	22.9
				81.4	1850	108.5	76.9	62.5	4.23	5.33	355.1	166.4	1.0	22.9

Heating data based on 70 °F EAT. See Correction Factors at end of section for different conditions

LWT is based on 15% (by volume) methanol antifreeze solution only or 485 multiplier

Capacity does not include fan watts

Performance data accurate within ± 10%

Discharge pressure is ± 20 PSI; Suction pressure is ± 10 PSI

SubCooling is ± 5 °F; Superheat is ± 6 °F

ENGINEERING SPECIFICATIONS:

Model 060, 5 Ton, with MPD060 Full Load cooling Performance

					Cooling										
EWT	Flow	WPD		LWT	Aiflow	TC	SC		HR		EER	Discharge	Suction	Subcooling	Superheat
°F	GPM	PSI	FT	°F	CFM	MBtuh	MBtuh	S/T	MBtuh	kW	Btuh/W	PSIG	PSIG	°F	°F
50	7.5	3.0	7.0	71.3	1750	68.6	45.2	0.66	77.4	2.57	26.7	204.6	126.7	17.6	19.5
				71.2	1950	68.4	45.8	0.67	77.2	2.59	26.4	203.1	127.4	19.2	12.8
	11.5	5.6	12.9	63.8	1750	68.7	45.2	0.66	77.0	2.42	28.4	188.6	126.3	12.7	20.3
				63.8	1950	68.5	45.8	0.67	76.8	2.43	28.2	187.3	127.0	14.4	13.6
	15.0	8.9	20.5	60.6	1750	69.1	45.5	0.66	77.1	2.34	29.5	180.1	126.0	10.0	20.2
				60.6	1950	68.9	46.2	0.67	77.0	2.36	29.2	178.8	126.7	11.7	13.4
60	7.5	2.9	6.6	81.1	1750	67.1	45.0	0.67	76.9	2.86	23.5	242.8	130.0	18.9	16.2
				81.1	1950	66.9	45.6	0.68	76.7	2.87	23.3	241.1	130.7	21.0	9.7
	11.5	5.3	12.2	73.7	1750	67.2	45.0	0.67	76.4	2.69	25.0	223.9	129.6	13.6	17.1
				73.7	1950	67.1	45.6	0.68	76.3	2.71	24.8	222.3	130.3	15.6	10.5
	15.0	8.4	19.4	70.5	1750	67.6	45.4	0.67	76.5	2.60	26.0	213.7	129.3	10.6	16.9
				70.5	1950	67.4	46.0	0.68	76.3	2.62	25.7	212.2	130.0	12.6	10.3
70	7.5	2.7	6.3	91.0	1750	65.4	44.7	0.68	76.3	3.18	20.6	283.8	133.1	20.1	13.4
				90.9	1950	65.3	45.3	0.69	76.2	3.20	20.4	281.7	133.9	22.5	7.1
	11.5	5.0	11.6	83.6	1750	65.5	44.7	0.68	75.7	3.00	21.8	261.6	132.7	14.4	14.3
				83.6	1950	65.4	45.3	0.69	75.7	3.01	21.7	259.7	133.4	16.8	7.8
	15.0	8.0	18.4	80.4	1750	65.9	45.1	0.68	75.8	2.90	22.7	249.7	132.4	11.2	14.1
				80.4	1950	65.7	45.7	0.70	75.7	2.92	22.5	247.9	133.1	13.6	7.7
80	7.5	2.6	6.0	100.6	1750	62.9	43.6	0.69	75.0	3.55	17.7	329.7	135.3	21.9	12.7
				100.6	1950	62.7	44.2	0.70	74.9	3.57	17.6	327.3	136.1	24.6	6.3
	11.5	4.8	11.1	93.3	1750	63.0	43.6	0.69	74.4	3.34	18.9	303.9	134.9	16.0	13.4
				93.3	1950	62.8	44.2	0.70	74.3	3.36	18.7	301.8	135.7	18.8	7.0
	15.0	7.6	17.5	90.2	1750	63.3	43.9	0.69	74.3	3.23	19.6	290.1	134.6	12.7	13.3
				90.2	1950	63.2	44.5	0.70	74.3	3.25	19.4	288.1	135.4	15.5	6.9
90	7.5	2.5	5.8	110.2	1750	59.8	42.1	0.70	73.4	4.00	15.0	382.4	137.2	23.3	13.2
				110.2	1950	59.7	42.7	0.72	73.5	4.03	14.8	379.6	138.0	26.3	6.7
	11.5	4.6	10.6	103.1	1750	59.9	42.1	0.70	72.8	3.77	15.9	352.5	136.8	17.8	13.9
				103.0	1950	59.7	42.7	0.72	72.6	3.79	15.8	350.0	137.5	20.8	7.5
	15.0	7.3	16.9	100.0	1750	60.2	42.4	0.70	72.7	3.65	16.5	336.5	136.5	14.5	13.8
				100.0	1950	60.1	43.0	0.72	72.6	3.67	16.4	334.1	137.2	17.5	7.3
100	7.5	2.4	5.6	119.9	1750	56.8	40.9	0.72	72.4	4.57	12.4	441.6	139.4	23.6	13.8
				119.9	1950	56.7	41.5	0.73	72.4	4.60	12.3	438.4	140.2	27.1	7.2
	11.5	4.5	10.3	112.8	1750	56.9	40.9	0.72	71.6	4.30	13.2	407.1	139.0	18.1	14.6
				112.8	1950	56.8	41.5	0.73	71.6	4.33	13.1	404.2	139.8	21.6	7.9
	15.0	7.1	16.4	109.8	1750	57.2	41.2	0.72	71.4	4.16	13.8	388.6	138.7	14.9	14.4
				109.8	1950	57.1	41.8	0.73	71.4	4.19	13.6	385.8	139.4	18.4	7.8
110	7.5	2.4	5.4	129.6	1750	53.7	39.6	0.74	71.3	5.17	10.4	503.5	141.5	24.5	14.9
				129.6	1950	53.5	40.2	0.75	71.2	5.20	10.3	499.9	142.3	28.2	8.1
	11.5	4.4	10.1	122.6	1750	53.8	39.6	0.74	70.4	4.87	11.0	464.2	141.0	17.9	15.8
				122.6	1950	53.6	40.2	0.75	70.3	4.90	10.9	460.8	141.8	21.6	8.9
	15.0	6.9	16.0	119.6	1750	54.1	39.9	0.74	70.2	4.71	11.5	443.1	140.7	14.5	15.6
				119.6	1950	53.9	40.5	0.75	70.1	4.74	11.4	439.9	141.5	18.3	8.7

Cooling data based on 80/67 °F EAT. See Correction Factors at end of section for different conditions

LWT is based on 15% (by volume) methanol antifreeze solution only or 485 multiplier

Capacity does not include fan watts

Performance data accurate within ± 10%

Discharge pressure is ± 20 PSI; Suction pressure is ± 10 PSI

SubCooling is ± 5 °F; Superheat is ± 6 °F

Revision Table

Date	Note	Page
06DEC2019	Unit Electrical Data Table updated	6
08NOV2019	AHRI Data updated (024 model only)	4
25FEB2015	Updated nomenclature	-
21JAN2015	Final posted to server	-
14JAN2015	Document Created	-
13JAN2015	Corrections made per Eng input, published	-
22DEC2014	Created	ALL

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