

Specifications

System Net Cooling Capacity— Full Cool

MAGNUM, MAGNUM SL Models — Air Cooled Condensing*

Return air to evaporator coil inlet	460/230V, 3 Phase, 60 Hz Power			380/190V, 3 Phase, 50 Hz Power		
	Net Cooling Capacity		Power Consump	Net Cooling Capacity		Power Consump
	60 Hz Capacity B/hr	60 Hz Capacity kW	60 Hz Power kW	50 Hz Capacity B/hr	50 Hz Capacity kW	50 Hz Power kW
21.1 C (70 F)	54,000	15.813	11.8	46,000	13.470	9.2
1.7 C (35 F)	42,000	12.299	11.2	36,000	10.542	8.7
-17.8 C (0 F)	25,000	7.321	7.8	21,300	6.237	6.2
-28.9 C (-20 F)	17,300	5.066	6.9	14,400	4.217	5.4
-35 C (-31 F)	14,000	4.100	6.4	12,000	3.514	5.0

*System net cooling capacity with a 37.8 C (100 F) ambient air temperature and R-404A.

MAGNUM, MAGNUM SL Models — Water Cooled Condensing*

Return air to evaporator coil inlet	460/230V, 3 Phase, 60 Hz Power		
	Net Cooling Capacity		Power Consump
	60 Hz Capacity B/hr	60 Hz Capacity kW	60 Hz Power kW
2 C (35 F)	23,850	6.990	9.2
-18 C (0 F)	23,066	6.760	8.0
-29 C (-20 F)	17,333	5.080	6.5
-35 C (-31 F)	13,887	4.070	5.9

*Unit capacity water cooled condenser at 37.8 C (100 F) water temperature at 60 HZ power @30 liter/min (8 Gal/min)

MAGNUM, MAGNUM SL Models — Water Cooled Condensing*

Return air to evaporator coil inlet	460/230V, 3 Phase, 60 Hz Power		
	Net Cooling Capacity		Power Consump
	60 Hz Capacity B/hr	60 Hz Capacity kW	60 Hz Power kW
2 C (35 F)	35076	10.280	10.9
-18 C (0 F)	25113	7.360	6.9
-29 C (-20 F)	21598	6.330	7.5
-35 C (-31 F)	15115	4.430	5.2

*Unit capacity water cooled condenser at 30 C (86 F) water temperature at 60 HZ power @30 liter/min (8 Gal/min)

MAGNUM 20 Model — Air Cooled Condensing*

Return air to evaporator coil inlet	460/230V, 3 Phase, 60 Hz Power			380/190V, 3 Phase, 50 Hz Power		
	Net Cooling Capacity		Power Consump	Net Cooling Capacity		Power Consump
	60 Hz Capacity B/hr	60 Hz Capacity kW	60 Hz Power kW	50 Hz Capacity B/hr	50 Hz Capacity kW	50 Hz Power kW
21.1 C (70 F)	49,000	14.348	11.6	41,800	12.240	9.1
1.7 C (35 F)	31,800	11.157	10.8	32,800	9.605	8.4
-17.8 C (0 F)	22,700	6.647	7.2	19,100	5.593	5.7
-28.9 C (-20 F)	15,700	4.597	6.1	13,300	3.895	4.8
-35 C (-31 F)	12,700	3.719	5.5	11,400	3.338	4.3

*System net cooling capacity with a 37.8 C (100 F) ambient air temperature and R-404A.

Evaporator Airflow Specifications
System Net Heating Capacity*

	460/230V, 3 Phase, 60 Hz Power			380/190V, 3 Phase, 50 Hz Power		
	Heating Capacity			Heating Capacity		
	Watts	Kcal/hr	BTU/hr	Watts	Kcal/hr	BTU/hr
MAGNUM	5,800	4,990	19,800	4,900	4,215	16,720

*System net heating capacity includes electric resistance rods and fan heat.

MAGNUM

External Static Pressure (water column)	460/230V, 3 Phase, 60 Hz Power				380/190V, 3 Phase, 50 Hz Power			
	High Speed		Low Speed		High Speed		Low Speed	
	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min
0 mm (0 in.)	6,560	3,860	3,170	1,865	5,480	3,225	2,710	1,595
10 mm (0.4 in.)	5,820	3,425	1,770	1,040	4,530	2,665	930	545
20 mm (0.8 in.)	5,000	2,940	—	—	3,750	2,205	—	—
30 mm (1.2 in.)	4,430	2,610	—	—	2,930	1,725	—	—
40 mm (1.6 in.)	3,520	2,070	—	—	1,870	1,100	—	—

MAGNUM SL

External Static Pressure (water column)	460/230V, 3 Phase, 60 Hz Power				380/190V, 3 Phase, 50 Hz Power			
	High Speed		Low Speed		High Speed		Low Speed	
	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min
0 mm (0 in.)	5,658	3,330	2,773	1,632	4,715	2,775	2,311	1,360
10 mm (0.4 in.)	5,097	3,000	1,612	949	4,248	2,500	1,344	791
20 mm (0.8 in.)	4,417	2,600	510	300	3,682	2,167	425	250
30 mm (1.2 in.)	3,908	2,300	—	—	3,257	1,917	—	—
40 mm (1.6 in.)	3,228	1,900	—	—	2,690	1,583	—	—

MAGNUM 20

External Static Pressure (water column)	460/230V, 3 Phase, 60 Hz Power				380/190V, 3 Phase, 50 Hz Power			
	High Speed		Low Speed		High Speed		Low Speed	
	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min	m ³ /hr	ft ³ /min
0 mm (0 in.)	4,000	2,350	2,000	1,180	3,300	1,940	1,650	970
10 mm (0.4 in.)	3,500	2,060	1,450	850	2,600	1,530	900	530
20 mm (0.8 in.)	2,900	1,710	—	—	1,800	1,060	—	—
30 mm (1.2 in.)	2,200	1,300	—	—	1,100	650	—	—
40 mm (1.6 in.)	1,400	820	—	—	—	—	—	—

Electrical System Specifications

Compressor Motor: Type Kilowatts Horsepower RPM Locked Rotor Amps	460/380V, 60/50 Hz, 3 Phase 4.48 kW @ 460V, 60 Hz 6.0 hp @ 460V, 60 Hz 3550 RPM @ 460V, 60 Hz 70 amps @ 460V, 60 Hz
Condenser Fan Motor: Type Kilowatts Horsepower Number: All Models Motor: RPM Full Load Amps Locked Rotor Amps	460/380V, 60/50 Hz, 3 Phase 0.55 kW @ 460V, 60 Hz 0.75 hp @ 460V, 60 Hz 1 1725 RPM @ 460V, 60 Hz 1.0 amps @ 460V, 60 Hz; 1.0 amps @ 380V, 50 Hz 3.9 amps @ 460V, 60 Hz; 3.7 amps @ 380V, 50 Hz
Evaporator Fan Motors: Type Kilowatts Horsepower Number: CSR20SL CSR40SL CSR40	460/380V, 60/50 Hz, 3 Phase 0.75 kW @ 460V, 60 Hz 1.0 hp @ 460V, 60 Hz 3 2 2

Electrical System Specifications

Motor: RPM (Each): High Speed Low Speed Full Load Amps (Each): High Speed Low Speed Locked Rotor Amps: High Speed Low Speed	3450 RPM @ 460V, 60 Hz 1725 RPM @ 460V, 60 Hz 1.6 amps @ 460V, 60 Hz 0.8 amps @ 460V, 60 Hz 10.5 amps @ 460V, 60 Hz 9.0 amps @ 460V, 60 Hz
Electrical Resistance Heater Rods: Type Number Watts (Each) Current Draw (Amps)	460/380V, 60/50 Hz, 3 Phase 6 680 Watts @ 460V, 60 Hz 5 amps total @ 460V across each phase at heater contractor
Control Circuit Voltage:	29 Vac @ 60 Hz 24 Vac @ 50 Hz
Evaporator Overheat Switch: Opens Closes	54 ± 3 C (130 ± 5 F) 32 ± 4.5 C (90 ± 8 F)

Refrigeration System Specifications

Compressor: Model No.:	ZMD18KVE-TFD-277, Scroll
Refrigerant Charge: MAGNUM, MAGNUM SL, MAGNUM 20 Water-Cooled Condenser-Receiver Tank (Option)	4.0 Kg (8.0 lb.) R-404A 4.8 Kg (8.8 lb.) R-404A
Compressor Oil Capacity	1.77 liter (60 oz.)*
Compressor Oil Type:	Polyol Ester Based Type (required), (refer to Tool Catalog)**

*When the compressor is removed from the unit, oil level should be noted or the oil removed from the compressor should be measured so that the same amount of oil can be maintained in the replacement compressor.

**Do not use or add standard synthetic or mineral oils to the refrigeration system. If Ester based oil becomes contaminated with moisture or with standard oils, dispose of properly — *Do Not Use!*

High Pressure Cutout Switch: Cutout Cutin	3240 ± 48 kPa, 32.4 ± 0.5 bar, 470 ± 7 psig 2586 ± 262 kPa, 25.9 ± 2.6 bar, 375 ± 38 psig
Low Pressure Cutout Switch: Cutout Cutin	-17 to -37 kPa, -0.17 to -0.37 bar, 5 to 11 in. Hg vacuum 28 to 48 kPa, 0.28 to 0.48 bar, 4 to 7 psig
High Pressure Relief Valve: Relief Temperature	99 C, 210 F

Refrigeration System Specifications (Continued)

Vapor Injection Control: Modulation Cool or Power Limit	Vapor injection valve is energized (open) continuously when the compressor duty cycle (ON time) is 100 percent (Full Cool). High compressor discharge temperature may cause the vapor injection valve to energize (open) but only while the Compressor Digital Control valve is not energized (closed).
Compressor Discharge Temperature Control: Vapor Injection Valve Energizes (Opens)	138 C (280 F)
Vapor Injection Valve De-energizes (Closes)	6 C (10.7 F) below energize temperature (132 C [123 F])
Compressor Shutdown (Auto Reset)	148 C (298 F)
Vapor Injection Valve (Compressor): Voltage	24 Vac
Current	0.85 amps
Cold Resistance	5.6 ohms
Compressor Digital Control Valve: Voltage	24 Vac
Current Draw	0.85 amps
Water Pressure Switch (Option): Close	117 ± 21 kPa, 1.17 ± 0.20 bar, 17 ± 3 psig
Open	35 ± 21 kPa, 0.35 ± 0.20 bar, 5 ± 3 psig

Normal R-404A System Operating Pressures (Scroll Compressor)

Container Temp.	Operating Mode	Ambient Temp.	Suction Pressure	Discharge Pressure
21 C (70 F)	Cool	27 to 38 C, 80 to 100 F	410 to 670 kPa, 4.10 to 6.70 bar, 59 to 97 psig	2140 to 2650 kPa, 21.40 to 26.50 bar, 310 to 385 psig
		16 to 27 C, 60 to 80 F	400 to 600 kPa, 4.00 to 6.00 bar, 58 to 87 psig	1725 to 2140 kPa, 17.25 to 21.40 bar, 250 to 310 psig
2 C (35 F)	Cool	27 to 38 C, 80 to 100 F	385 to 425 kPa, 3.85 to 4.25 bar, 56 to 62 psig	1860 to 2380 kPa, 18.60 to 23.80 bar, 270 to 345 psig
		16 to 27 C, 60 to 80 F	345 to 385 kPa, 3.45 to 3.85 bar, 50 to 56 psig	1450 to 1860 kPa, 14.50 to 18.60 bar, 210 to 270 psig**
-18 C (0 F)	Cool	27 to 38 C, 80 to 100 F	214 to 228 kPa, 2.14 to 2.28 bar, 31 to 33 psig	1515 to 2035 kPa, 15.15 to 20.35 bar, 220 to 295 psig**
		16 to 27 C, 60 to 80 F	200 to 215 kPa, 2.00 to 2.15 bar, 29 to 31 psig	1100 to 1515 kPa, 11.00 to 15.15 bar, 160 to 220 psig**
-29 C (-20 F)	Cool	27 to 38 C, 80 to 100 F	145 to 160 kPa, 1.45 to 1.60 bar, 21 to 23 psig	1450 to 1965 kPa, 14.50 to 19.65 bar, 210 to 285 psig**
		16 to 27 C, 60 to 80 F	130 to 145 kPa, 1.30 to 1.45 bar, 19 to 21 psig	1035 to 1450 kPa, 10.35 to 14.50 bar, 150 to 210 psig**

Suction and discharge pressures vary too greatly during Modulation Cool to use for evaluating or diagnosing refrigeration system performance. During the Modulation Cool mode, the suction pressure will vary between 100 and 450 kPa, 1.0 and 4.5 bar, 15 and 65 psig depending upon the percent (percent) cooling capacity.

**Discharge pressure is determined by condenser fan cycling.

MP-3000a Controller Specifications

Temperature Controller:	
Type	MP-3000a microprocessor with thermostat, digital thermometer, programming keypad, mode indicators, LED display and LCD display for displaying unit operating and cargo information
Setpoint Range	-35.0 to +30.0 C (-31.0 to +86.0 F)
Digital Temperature Display	-60.0 to +80.0 C (-76.0 to +176.0 F)
Controller Software (Original Equipment):	
Version	See controller identification decal
Defrost Initiation:	
Evaporator Coil Sensor	<ul style="list-style-type: none"> • Manual Switch or Demand Defrost Initiation: Coil must be below 18 C (65 F). Defrost cycle starts when technician or controller requests defrost initiation. • Timed Defrost Initiation: Coil must be below 10 C (50 F). Defrost cycle starts 1 minute after the hour immediately following a defrost timer request for defrost initiation. For example, if the defrost timer requests a defrost cycle at 7:35, the defrost cycle will start at 8:01. Datalogger will record a Defrost event for each interval in which a Defrost cycle is pending or active (i.e. both the 8:00 and 9:00 data logs).
Demand Defrost	<p>Demand defrost function initiates defrost when:</p> <ul style="list-style-type: none"> • Temperature difference between the return air sensor and defrost (evaporator coil) sensor is too large for 90 minutes • Temperature difference between the left hand and right hand supply air sensors is too large and unit has operated for 90 minutes since last defrost • Temperature difference between the supply air sensors and return air sensor is too large
Defrost Timer:	
Chilled mode	<ul style="list-style-type: none"> • Supply Temperature at 5.1 C (41.2 F) or Above: Every 8 hours of compressor operation. • Supply Temperature at 5.0 C (41.0 F) or Below: Every 2.5 hours of compressor operation. Defrost interval increases 0.5 hours each timed defrost interval. Defrost synchronization creates step intervals of 3, 4, 4, 5, 5, 6, 6 and 7 hours. Maximum time interval in Chilled mode is 7 hours.
Frozen mode	Every 8 hours of compressor operation. Defrost interval increases 2 hours each timed defrost interval. Maximum time interval in Frozen mode is 24 hours.
Reset to Base Time	Defrost timer resets if the unit is off more than 12 hours, setpoint is changed more than 5 C (9 F) or PTI pretrip test occurs.
Defrost Termination:	
Defrost (Coil) Sensor	<p>Chilled mode: Terminates defrost when coil sensor temperature rises to 30 C (86 F); or exceeds 18 C (65 F) for 35 minutes/45 minutes if voltage is less than 440 volts.</p> <p>Frozen mode: Terminates defrost when coil sensor temperature rises to 30 C (86 F); or exceeds 8 C (46 F) for 35 minutes/45 minutes if voltage is less than 440 volts.</p>
Termination Timer	Terminates defrost after 90 minutes at 60 HZ operation if coil sensor has not terminated defrost (120 minutes at 50 Hz operation)
Power Off	Turning Unit On/Off switch Off terminates defrost

MP-3000a Controller Specifications (Continued)

Compressor Shutdown Protection (Auto Reset):	
Stops Compressor	148 C (298 F)
Allows Compressor Start	90 C (194 F)
Bulb Mode:	
Evaporator Fan Speed Settings	Flow High: High speed only Flow Low: Low speed only Flow Cycle: Fans will cycle between low and high speed every 60 minutes
Defrost Termination Temperature Setting	4 to 30 C (40 to 86 F)

Physical Specifications

Fresh Air Exchange Venting System (Adjustable):	
MAGNUM and MAGNUM SL	0 to 285 m ³ /hr (0 to 168 ft ³ /min.) @ 60 Hz 0 to 237 m ³ /hr (0 to 139 ft ³ /min.) @ 50 Hz
MAGNUM 20	0 to 160 m ³ /hr (0 to 96 ft ³ /min.) @ 60 Hz 0 to 134 m ³ /hr (0 to 79 ft ³ /min.) @ 50 Hz
Evaporator Fan Blade Specifications:	
MAGNUM:	
Diameter	355 mm (14.0 in.)
Pitch	25°
Number of Fans	2
MAGNUM SL:	
Diameter	312 mm (12.25 in.)
Pitch	30°
Number of Fans	2
MAGNUM 20:	
Diameter	270 mm (10.6 in.)
Pitch	25°
Number of Fans	3
Weight (net):	
MAGNUM 20 Base Unit	392Kg (865 lb.)
MAGNUM SL Base Unit	402 Kg (885 lb.)
MAGNUM Base Unit	422 Kg (930 lb.)
Full TRANSFRESH®Option	13 Kg (28 lb.)
Water-cooled Condenser-Receiver Option	13.6 Kg (30 lb.)
Unit Dimensions: see Figure 2	
A = Flange Width	2025.5 mm (79.74 in.)
B = Gasket Width	1935 mm (76.18 in.)
C = Unit Width	1894 mm (74.57 in.)
D = Flange Height	2235.2 mm (88.00 in.)
E = Gasket Height	2140 mm (84.25 in.)
F = Unit Height	2094 mm (82.44 in.)
G = Gasket Depth	72 mm (2.83 in.) from back of flange
H = Maximum Protrusion	37 mm (1.46 in.) from back of flange
I = Unit Depth: MANGUM 20	335.0 mm (13.18 in.) from back of flange
MAGNUM SL	378.0 mm (14.88 in.) from back of flange
MAGNUM	420.0 mm (16.54 in.) from back of flange
J = MANGUM and MAGNUM SL	Evaporator Access Door
K = MAGNUM 20 and MAGNUM SL	Evaporator Access Door