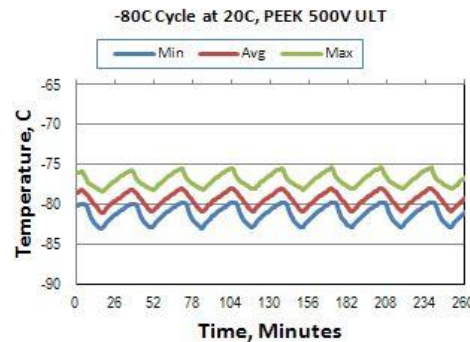
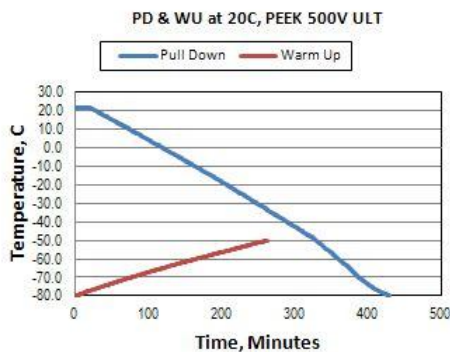




**Technical Data Sheet**  
**Forma Ultra-Low Temperature Upright Freezer**  
 MODEL RELEASE - 65  
 Thermo Fisher Scientific, Asheville, North Carolina

Specifications	Model Number
	Thermo Scientific Forma 88500V
Application, Rating and Electrical Data	
Application	Storage of General (non-flammable) Laboratory Materials
Storage Volume	682 liters / 24.1 cu. ft., 500 Standard 2" Boxes
Temperature Rating	-50°C to -86°C
Electrical Power	230V, 50 Hz, 1 Phase
Instrument Rated Current	9.5 AMP
Building Supply Rating**	15.0A dedicated grounded circuit. Protected by circuit breaker rated for inductive loads
Power Plug/Power Cord Length**	Country Dependant plug / IEC Cords, 3.048 Meters (10 Feet)
Agency Listings	CE
Indoor/Outdoor Usage	Indoor Use Only
Application Environment	Non-Corrosive, Non-Flammable, Non-Explosive, Good Air Ventilation, 15° C - 32° C (59° F - 90° F)
Refrigeration Configuration	
Refrigeration System	Industrial-Rated Two Stage Cascade System
Compressor / Number	Hermetic Compressor for Low Temperature Application / 2
Compressor Capacity*	980 W
Condenser Type/Number	Enhanced Finned-Tube and Forced-Air Cooled / 1
Expansion Device	Capillary Tube
Evaporator Type	Cold Wall With Enhanced Heat Transfer Treatment
Defrost Method	Manual Defrost
Refrigerant Charge/Flammability	R404A in 1st Stage / R508B+R290 Mix in 2nd Stage / Non-Flammable
Controller/Electrical System Configuration and Features	
Controller Level	Top
Power Switch	On-Off with Circuit Breaker
Controller Type	Microprocessor Control with Touch Screen Input and Display. Includes USB System Data Retrieval
Setpoint Security	Yes
Compressor Safe Guard	High Pressure Cutout Switch/High Temp Cutout Switch/Current protection/Logic protection
Control Sensor	Single RTD (1000 ohm Platinum RTD)
Remote Alarm Terminals	RS485/4-20mA output
Adjustable Warm/Cold Alarms	Fully Adjustable
Auto-Voltage Safeguard	Buck/Boost System
Dimensions and Construction	
Interior Dimensions (H x D x W)	1300 H x 686 D x 732 W mm (51.2 H x 27 D x 28.8 W in.)
Exterior Dimensions (H x D x W)	1981 H x 960 D x 963 W mm (78 H x 37.8 D x 37.9 W in.)
Shipping Dimensions	2111 H x 1086 D x 1064 W mm (83.12 H x 42.75 D x 41.88 W in)
Insulation	High R-value Vacuum Insulation Panels and High Density Water-Blown Polyurethane Foam
Door Seal	Silicone-Based High Performance Seal Gasket with Electrical Door Perimeter Heater
Shelves / Capacity	3 Stainless Steel Shelves Adjustable In 25mm (1in) Increments. Max. Cap. per Shelf: 91.7 kg (205 lbs.)
All-Direction Casters	Standard with Locks
Shipping Weight	Approximately 355 kg / 782 lbs.
Other Options	LN2 or CO2 Back Up System, HID Controlled Access, SMS Text, Chart Recorder, 4 or 5 Inner Doors

**Typical Performance Characteristics in 20 ° C Ambient**



Test Unit Number:	18768-97
Avg Cabinet Temp at -80 C Cycle (C):	-79.4
PV from Setpoint, High Performance (C):	+ 4.6 / - 3.1
PV from Setpoint, Energy Saving (C):	+ 8.0 / - 1.4
Uniformity at -80C, High Performance (C):	4.4
Stability at -80C, High Performance (C):	3.2
1-min Door Open Recovery to -75C (min)	20
Duty Cycle at -80C, High Performance (%):	50.0%
Cycle (on/off) rate at -80C, High Performance (min):	17 / 17
Energy Consumption, High Performance (kWh/day):	15.3
Heat rejection at -80C, High Performance (Btu/hr):	2180
Energy Consumption, Energy Saving (kWh/day):	13.5
Heat rejection at -80C, Energy Saving (Btu/hr):	1917
Pulldown Time to -80C (hrs):	7.17
Warmup Time (-80 to -50 C) (minutes):	263

- 1) Performance is nominal and individual units may vary.
- 2) Freezer performance will differ due to product amount, product size and operating conditions.
- 3) Continuous product enhancements may, without notice, result in amendments or omissions to this specification. Thermo Scientific cannot accept responsibility for damage, injury, loss or expenses resulting from misapplication of the information herein.

\* Manufacturer measured compressor capacity taken at standard -23°C/49°C (Evap/Cond) condition.

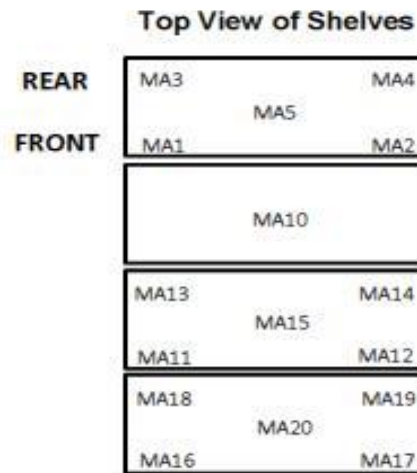
\*\* For Australian/New Zealand Units: Due to different wiring regulations in Australia and New Zealand, a 10A dedicated ground circuit, protected by a circuit breaker rated for inductive loads is required for this unit. The power cord is AS/NZS 3112: 10A (2.5m length). Contact your local sales representative for more information.

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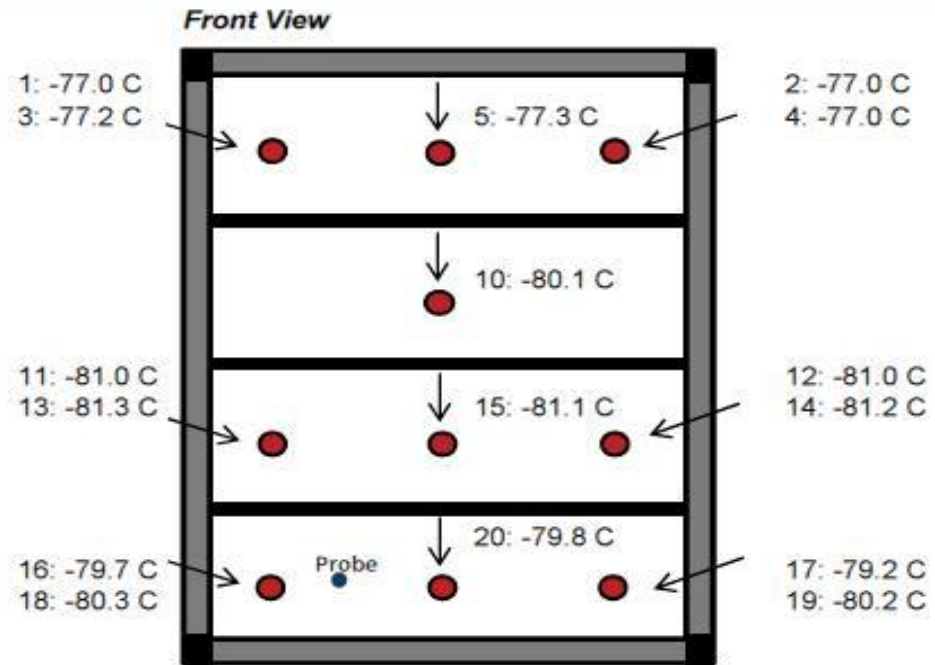
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Typical Cabinet Temperature Map  
PEEK 500 Size, 4 Inner-Door Unit

Temperatures are averages during > 20  
cycles after reaching setpoint of -80 C



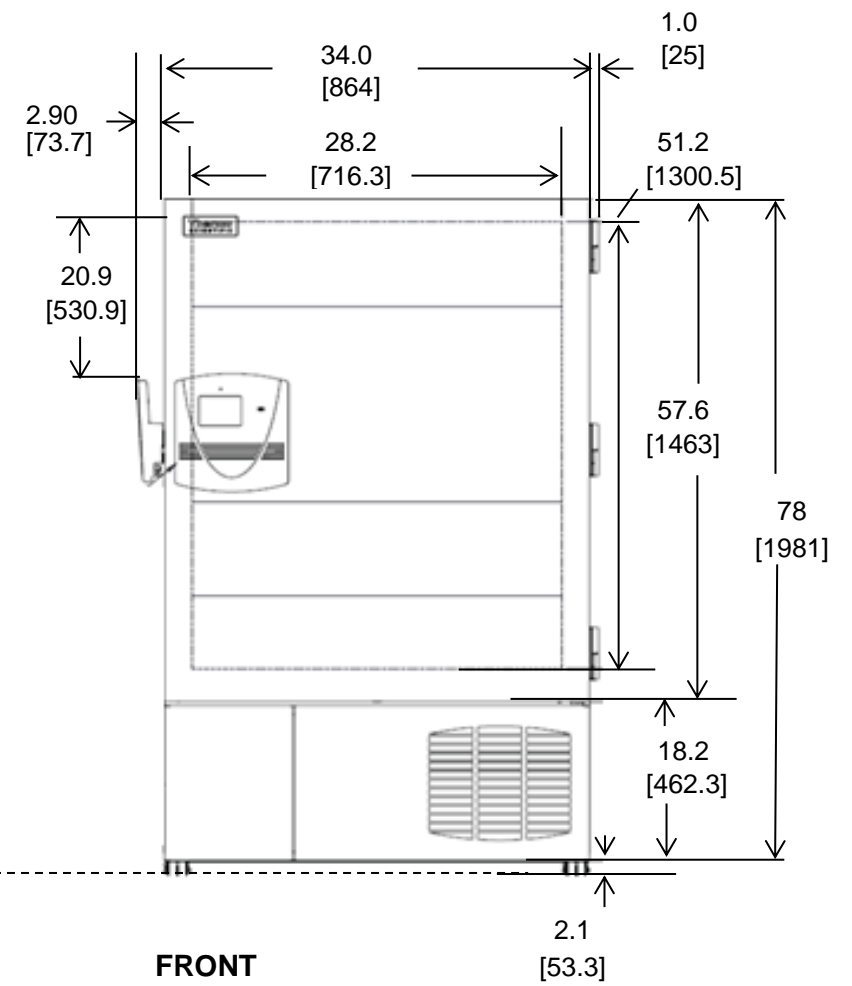
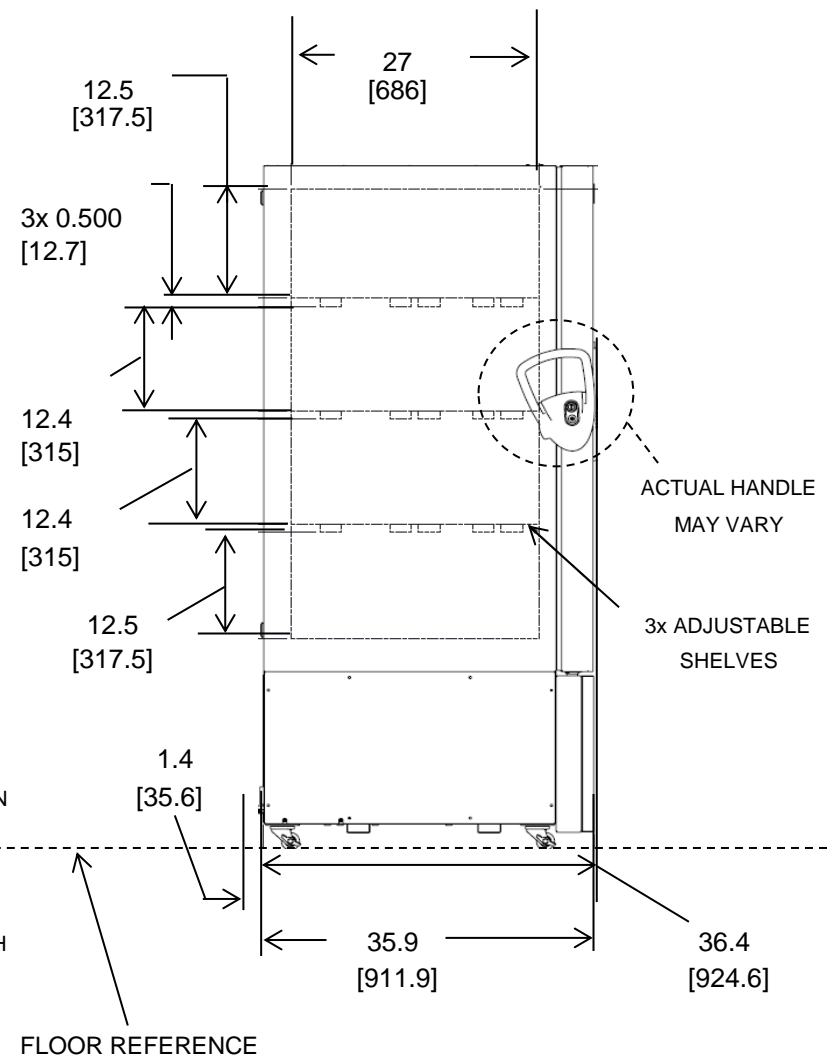
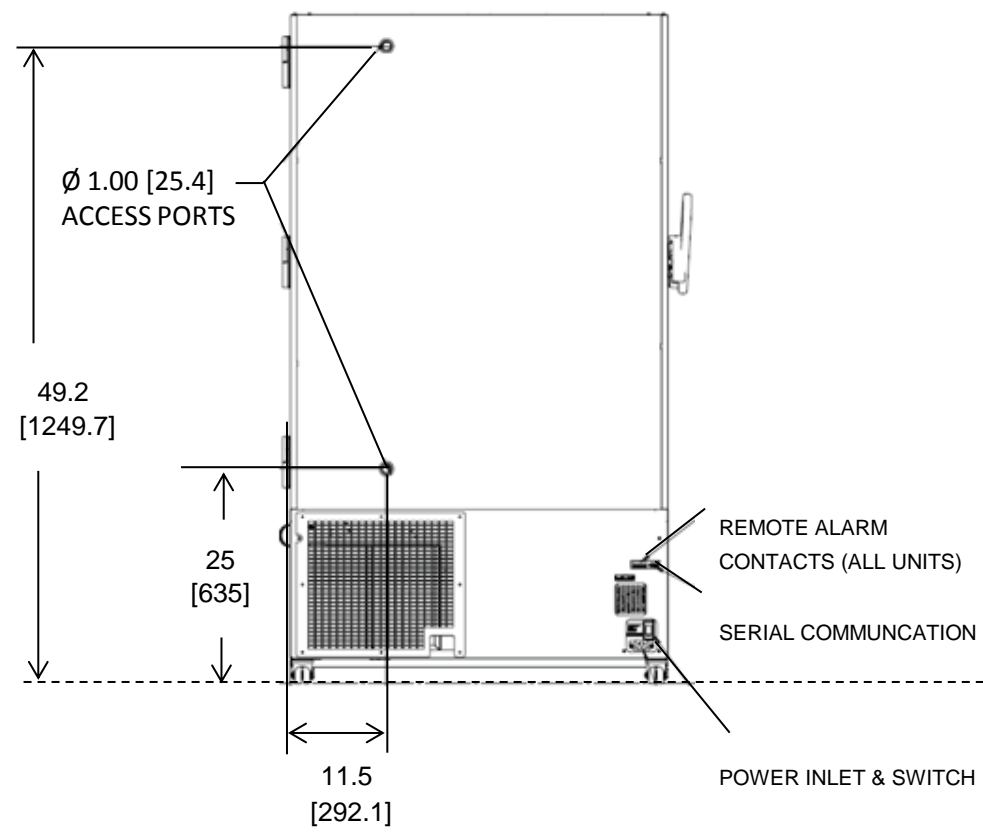
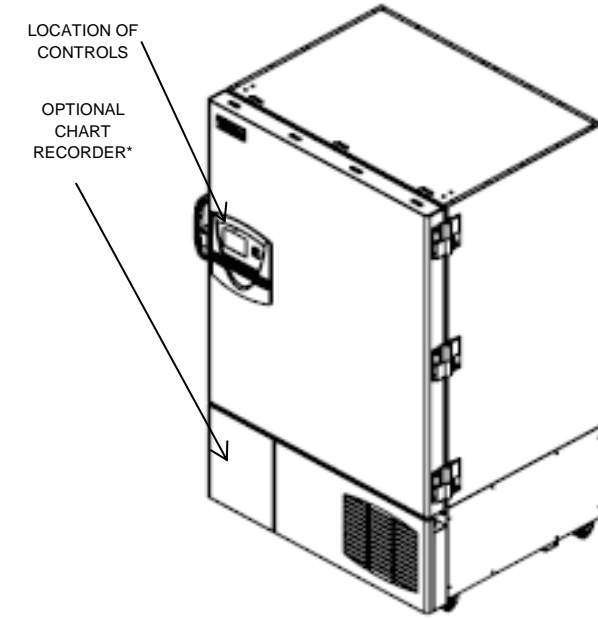
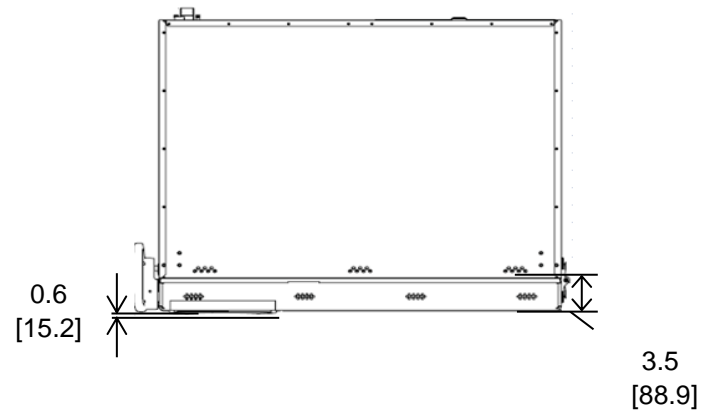
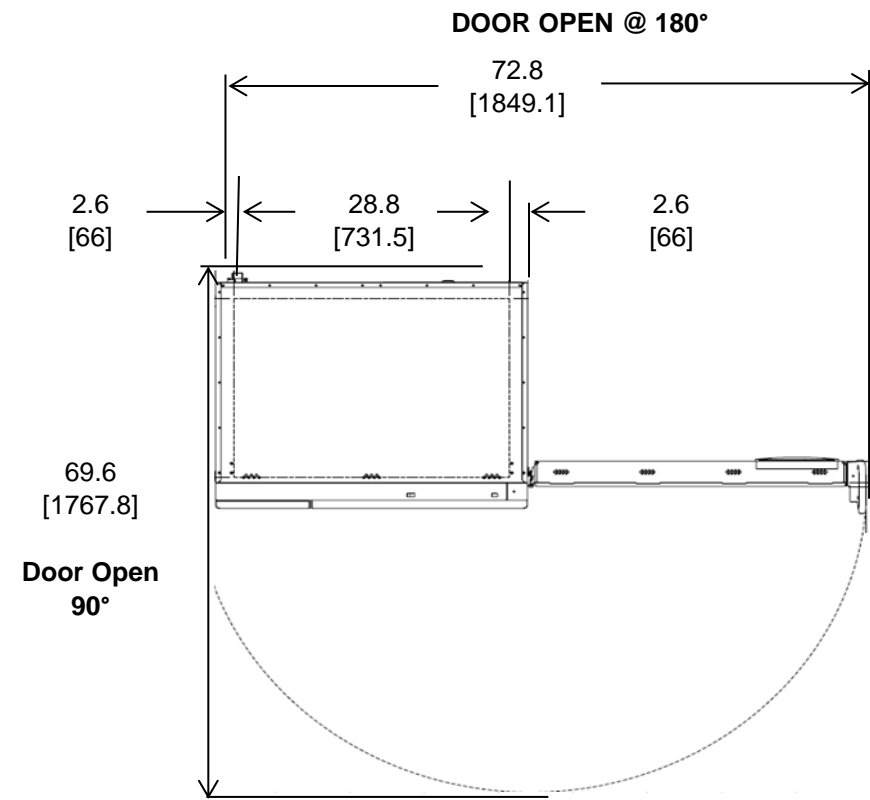
**Cabinet Average:** -79.4 C  
**Probe Average:** -80.2 C  
**Peak Variation:** +4.6 / -3.1 C



18768-97

°C	MA1	MA2	MA3	MA4	MA5	MA10	MA11	MA12	MA13
Avg	-77.0	-77.0	-77.2	-77.0	-77.3	-80.1	-81.0	-81.0	-81.3
Max	-75.4	-75.6	-75.6	-75.4	-75.7	-78.2	-79.7	-79.6	-79.8
Min	-78.4	-78.4	-78.6	-78.5	-78.8	-81.8	-82.4	-82.5	-83.0

	MA14	MA15	MA16	MA17	MA18	MA19	MA20
Avg	-81.2	-81.1	-79.7	-79.2	-80.3	-80.2	-79.8
Max	-79.6	-79.7	-78.5	-77.9	-78.9	-78.5	-78.4
Min	-83.1	-82.7	-81.4	-81.1	-82.5	-82.5	-81.7



**BACK**

**NOTE: DUAL DIMENSION IS INCH OVER METRIC**

DO NOT USE FOR ENGINEERING PURPOSES. SUBJECT TO CHANGE WITHOUT NOTICE.

**Thermo**  
SCIENTIFIC

**24 cuft Upright Freezer**  
4 Inner Doors  
Single Outer Door  
Top Mount Controls