



**Technical Data Sheet**  
**Thermo Scientific Ultra-Low Temperature Freezer**  
 Upright Model Release - 81  
 Thermo Fisher Scientific, Asheville, North Carolina

**ENERGY STAR® MDEC**  
 (Maximum Daily Energy Consumption)

**0.43 kW-hr/day/cuft**



**Model Number**

Thermo Scientific TSX50086V

**Application, Rating and Electrical Data**

Application	Storage of General (non-flammable) Laboratory Materials
Storage Volume	24.1 cu. ft. (682 liters), 500 Standard 2" Boxes
Temperature Rating	-50°C to -86°C
Electrical Power	230V, 50, 1 Phase
Instrument Rated Current	5.2 AMP
Building Supply Rating	10.0A dedicated grounded circuit
Power Plug / Power Cord	Country Dependant plug / IEC Cords, 10 ft (3.05 m)
Agency Listings	UL, cUL, CE
Application Environment	Non-Corrosive, Non-Flammable, Non-Explosive Indoor Use Only, Ventilated 15 - 32°C (59 - 90°F)

**Dimensions and Construction**

Interior Dimensions (H x D x W)	51.2 x 27 x 28.8 in. (1300 x 686 x 732 mm)
Exterior Dimensions (H x D x W)	78 x 37.8 x 34 in. (1981 x 960 x 864 mm)
Shipping Dimensions	83.12 x 42.75 x 41.88 in. (2111 x 1086 x 1064 mm)
Shipping Weight / Net Weight	696 lbs. (316 kg) / 602 lbs. (273 kg)
Insulation	Vacuum Insulation Panels with High-Density Water-Blown Polyurethane Foam
Door Seal	Silicone-Based Gasket Seal with Electrical Door Perimeter Heater
Shelves	3 Stainless Steel Adjustable Shelves in 1" (25mm) Increments
Shelf Capacity	Max. Capacity per Shelf: 205 lbs. (91.7 kg)
Interior / Exterior Material	Painted Steel (Stainless Steel Option) / Painted Steel
All-Direction Casters	Standard with Locks
Other Options	LN2 or CO2 Back Up System HID Controlled Access, Chart Recorder

**Electrical System Configuration**

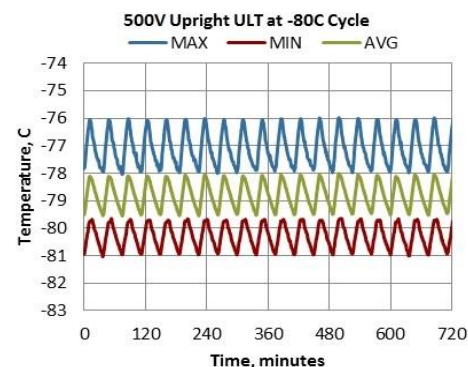
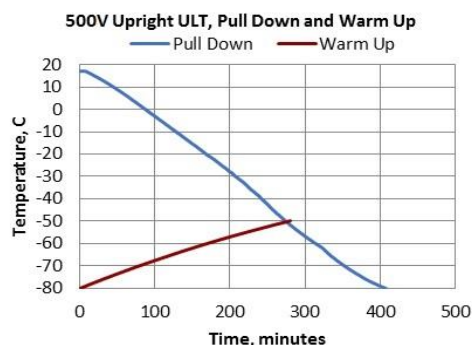
Controller Level	Top
Power Switch	(Front) Soft-touch / (Rear) Main Circuit Breaker
Controller Type	Capacitive Touch Screen Input and Display with USB Data Retrieval
Setpoint Security	Yes
Compressor Safe Guard	High Temp Cutout Switch, Current, Logic protection
Control Sensor	Single RTD (1000 ohm Platinum RTD)
Connectivity / Remote Outputs	Wi-Fi Enabled, RS485/4-20mA output
Thermo Fisher Cloud	InstrumentConnect™ Remote Monitoring
Adjustable Warm/Cold Alarms	Fully Adjustable
Auto-Voltage Safeguard	Buck/Boost System

**Refrigeration Configuration**

Refrigeration System	Two Stage Cascade System
Compressor/Number	Industrial Rated, Hermetically Sealed / 2
Compressor Capacity*	525W (max). VCC
Condenser Type	Enhanced Micro-Channel and Forced-Air Cooled
Expansion Device	Capillary Tube
Evaporator Type	Enhanced Cold Wall Design
Defrost Method	Manual Defrost
Refrigerant (1st/2nd Stage)	R290 / R170+R290 Mix
Environmental Effects	GWP: 3 (R290) / 6 (R170) ODP: 0 (R290); 0 (R170)
Flammable	Yes

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

<b>Standard Performance Mode</b>	Energy Consumption (kW-hr/day)	8.3
	Heat Rejection Rate (Btu/hr)	1185
	Peak Variation from Setpoint (°C)	+6.7 / +2.0
<b>High Performance Mode</b>	Energy Consumption (kW-hr/day)	10.2
	Heat Rejection Rate (Btu/hr)	1451
	Peak Variation from Setpoint (°C)	+4.0 / -1.0
	Sound (dBa)	49.0
	1-min Door Opening Recovery to -75°C (min)	27
	Average Uniformity at -80°C (°C)	3.2
	Average Stability at -80°C (°C)	1.6
	Pull Down Time (to -80°C) (hrs)	6.7
	Warm Up Time (-80°C to -50°C) (min)	281



- 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 -35°C/40°C (Evap/Cond) condition.

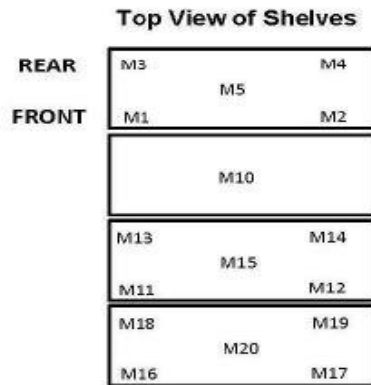
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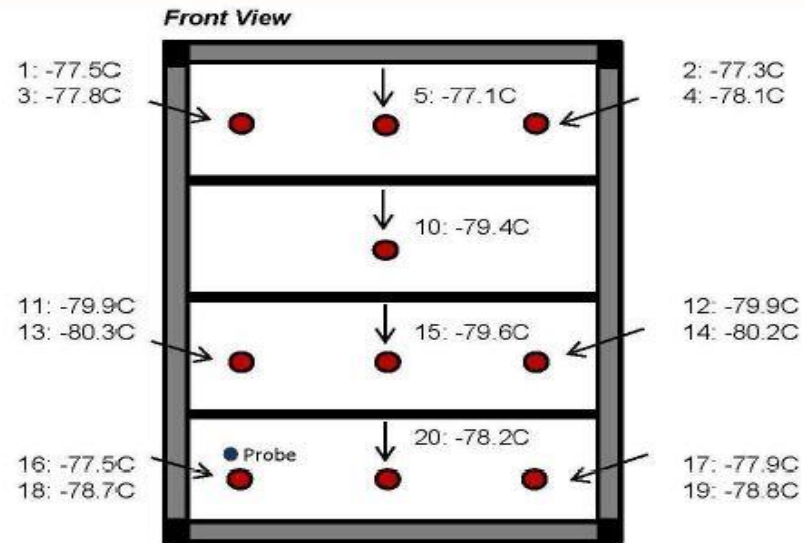


Typical Cabinet Temperature Map  
 ULT 500, 3 Inner-Shelves + Base, Single Outer Door

Temperatures are averages during > 12 cycles after reaching a setpoint of -80C



**Cabinet Average:** -78.8 C  
**Probe Average:** -79.4 C  
**Peak Variation:** +4.0 C / -1.0 C

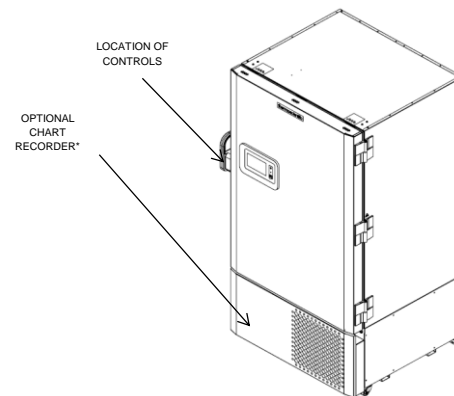
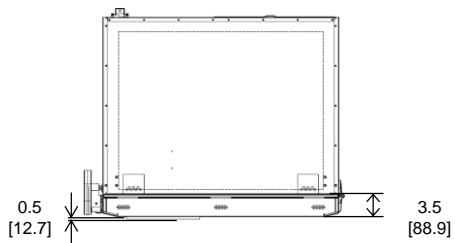
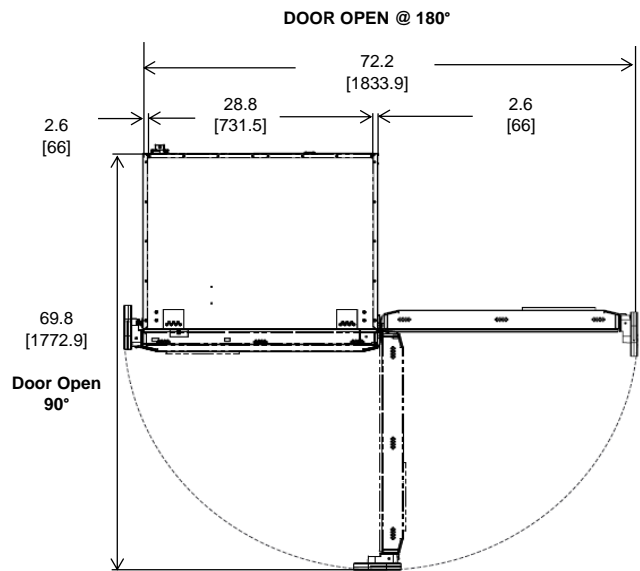


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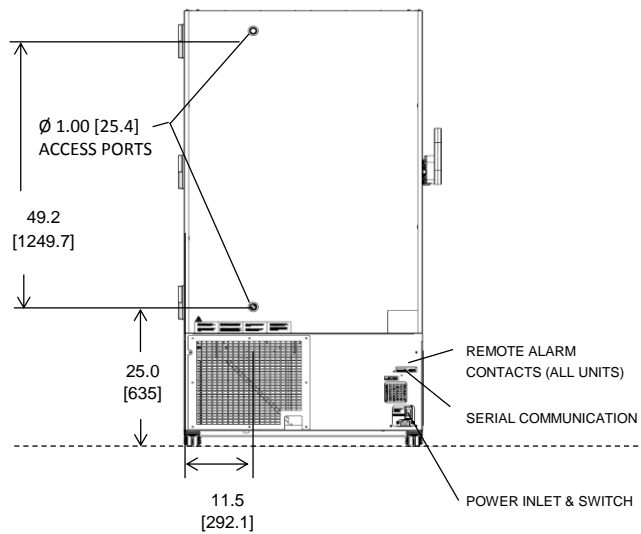
	M1	M2	M3	M4	M5	M10	M11	M12	M13
Avg	-77.5	-77.3	-77.8	-78.1	-77.1	-79.4	-79.9	-79.9	-80.3
Max	-76.4	-76.2	-76.8	-76.9	-76	-78.6	-79.2	-79.3	-79.6
Min	-78.4	-78.2	-78.7	-79	-78	-80.1	-80.6	-80.5	-81

	M14	M15	M16	M17	M18	M19	M20
Avg	-80.2	-79.6	-77.5	-77.9	-78.7	-78.8	-78.2
Max	-79.6	-79	-76.7	-77.3	-77.9	-78	-77.6
Min	-80.9	-80.3	-78.5	-78.7	-79.6	-79.7	-78.9

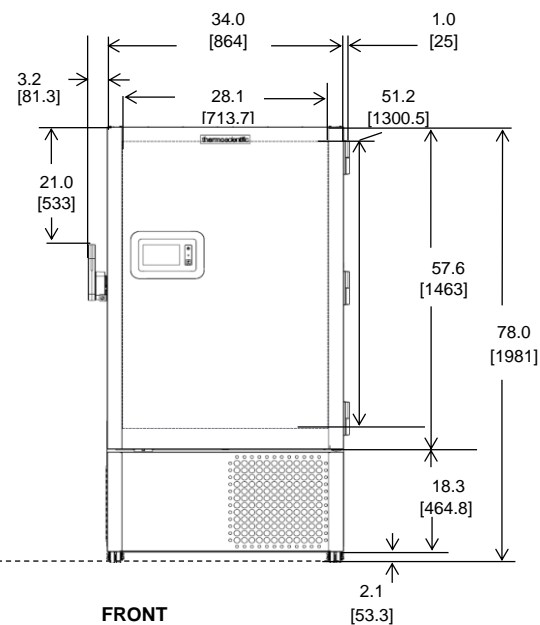
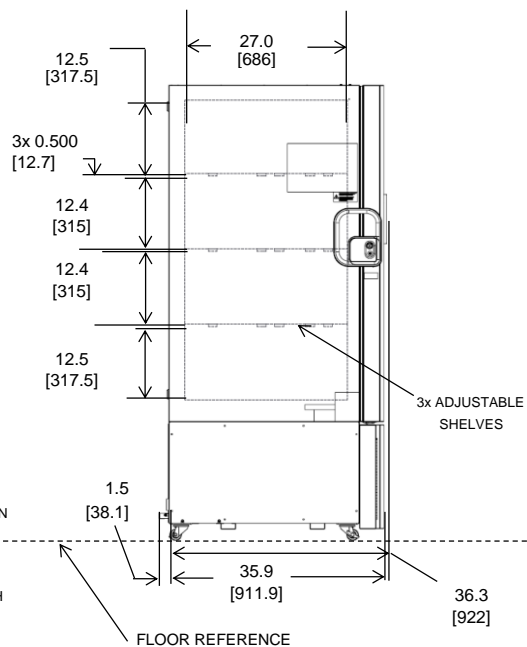
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\*Chart recorder/Back up systems are stand alone on 300 models.



**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**  
2 Inner Doors  
Single Outer Door  
Top Mount Controls