



**Technical Data Sheet**  
**Thermo Scientific™ Ultra-Low Temperature Freezer**  
 Upright Model Release - 84  
 Thermo Fisher Scientific, Asheville, North Carolina

**Model Number**

TDE50086FA

**Application, Rating and Electrical Data**

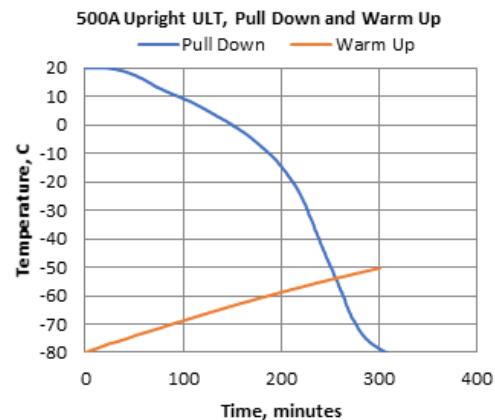
**Typical Performance Characteristics in 20 °C Ambient**

|                          |   |
|--------------------------|---|
| 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         | 115V, 60 Hz, 1 Phase  |
| Instrument Rated Current | 16.7 AMP  |
| Building Supply Rating   | 20A dedicated grounded circuit, Type C circuit protection or similar required, Ensure compliance with local electric code |
| Power Plug / Power Cord  | NEMA 5-20 / IEC Cords, 10 ft (3.05 m)   |
| Agency Listings          | UL, cUL   |
| Application Environment  | Non-Corrosive, Non-Flammable, Non-Explosive<br>Indoor Use Only, Ventilated 15° C - 32° C (59° F - 90° F)                  |

|  |             |
|--|-------------|
| Energy Consumption (kW-hr/day)             | 12.8        |
| Heat Rejection Rate (Btu/hr)               | 1820        |
| Peak Variation from Setpoint (°C)          | +4.5 / -3.2 |
| Sound (dBa)                                | 50.0        |
| 1-min Door Opening Recovery to -75°C (min) | 21          |
| Average Uniformity at -80°C (°C)           | 5.7         |
| Average Stability at -80°C (°C)            | 2.2         |
| Pull Down Time (to -80°C) (hrs)            | 5.2         |
| Warm Up Time (-80°C to -50°C) (min)        | 302         |

**Dimensions and Construction**

|                                 |   |
|---------------------------------|---|
| Interior Dimensions (H x D x W) | 51.2 x 28.3 x 28.8 in. (1300 x 719 x 732 mm)  |
| Exterior Dimensions (H x D x W) | 78 x 38.5 x 34 in. (1981 x 978 x 864 mm)  |
| Shipping Dimensions (H x D x W) | 83.12 x 42.75 x 41.88 in. (2111 x 1086 x 1064 mm)   |
| Shipping Weight / Net Weight    | 734 lbs. (333 kg) / 640 lbs. (290 kg)   |
| Insulation                      | Vacuum Insulation Panels with High-Density Water-Blown Polyurethane Foam  |
| Door Seal                       | Silicone-Based High Performance Seal Gasket with Electrical Cabinet Perimeter Heater                            |
| Shelves                         | 3 Stainless Steel Adjustable Shelves in 1" (25mm) Increments  |
| Shelf Capacity                  | Maximum Capacity per Shelf: 205 lbs. (91.7 kg)<br>Cabinet Load not to Exceed 1140lb (517.1 kg)                  |
| Interior / Exterior Material    | Painted Steel (Stainless Steel Option) / Painted Steel  |
| All-Direction Casters           | Standard with Locks   |
| Other Options                   | LN2 or CO2 Backup System, Chart Recorder, VIC Capacitive Touch Screen Input and Display with USB Data Retrieval |

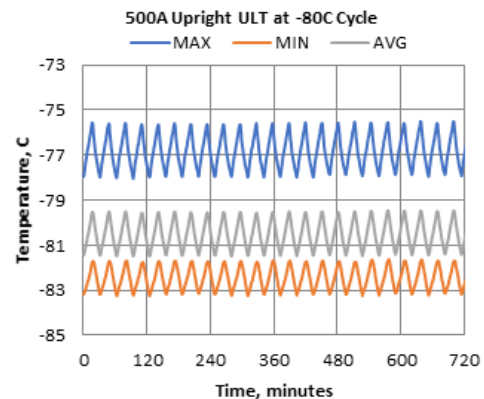


**Electrical System Configuration**

|                               |   |
|-------------------------------|---|
| Controller Level              | Top   |
| Power Switch                  | (Rear) Main Circuit Breaker   |
| Controller Type               | HIC Interface: 7-segment Display with Capacitive Touch Screen Buttons |
| Setpoint Security             | Yes   |
| Compressor Safe Guard         | High Temp Cutout Switch, Current, Logic protection                    |
| Control Sensor                | Single RTD (1000 ohm Platinum RTD)                                    |
| Connectivity / Remote Outputs | RS485/4-20mA output/Dry Contacts                                      |
| Thermo Fisher Cloud           | InstrumentConnect™ Remote Monitoring (compatible)                     |
| Adjustable Warm/Cold Alarms   | Fully Adjustable  |

**Refrigeration Configuration**

|                             |   |
|-----------------------------|---|
| Refrigeration System        | Two Stage Cascade System                            |
| Compressor/Number           | Industrial Rated, Hermetically Sealed / 2           |
| Compressor Capacity*        | 509 W   |
| Condenser Type              | Enhanced Tube and Fin with Forced-Air Cooling       |
| 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)<br>ODP: 0 (R290); 0 (R170) |
| Flammable                   | Yes   |



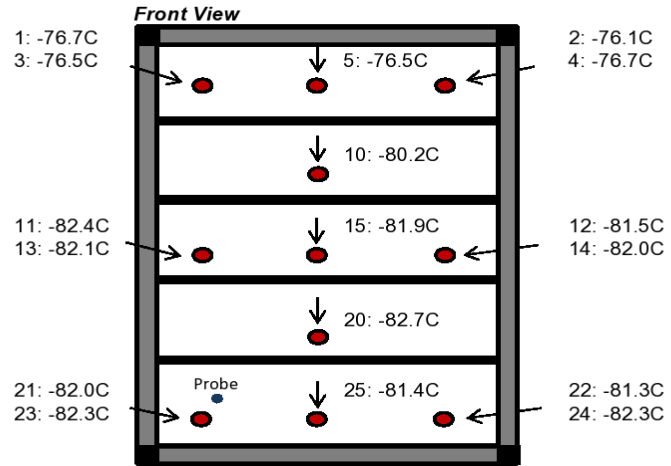
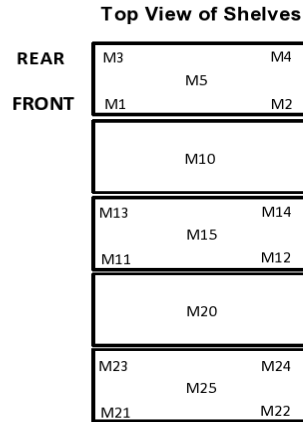
1) Data is representative of performance and not published product specifications. Technical data sheet test results should not be referenced in developing any regulatory parameters for specific customer usage.  
 2) Freezer performance will vary based on customer product volume, storage format, operating conditions, test methodology and performing recommended maintenance.  
 3) Continuous product enhancements may, without notice, result in amendments or omissions to this technical data sheet. 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/45°C (Evap/Cond) condition.



Typical Cabinet Temperature Map  
 ULT 400, 4 Inner-Shelves + Base, Single Outer Door

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



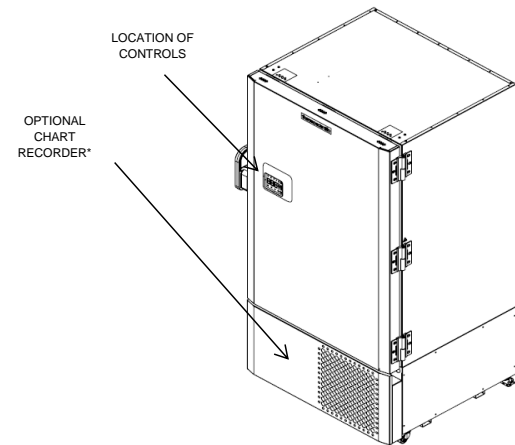
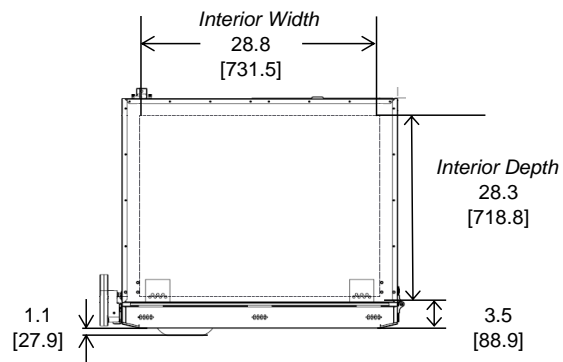
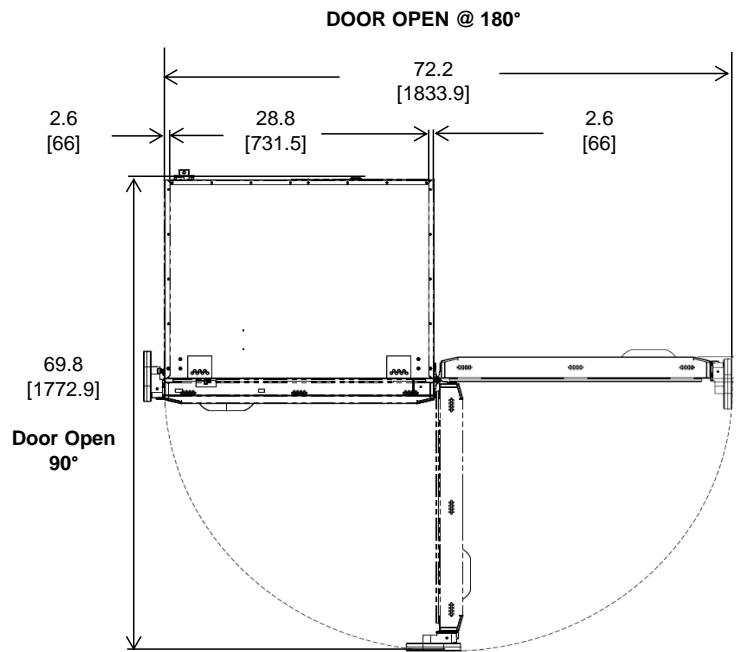
**Cabinet Average:** -80.7 C  
**Probe Average:** -82.2 C  
**Peak Variation:** +6.0 C / -4.0 C

19715-B-60-1

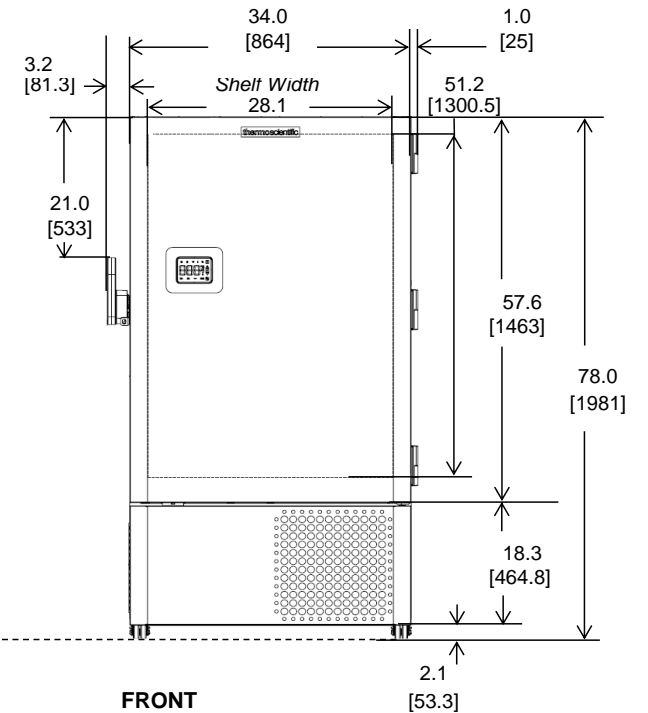
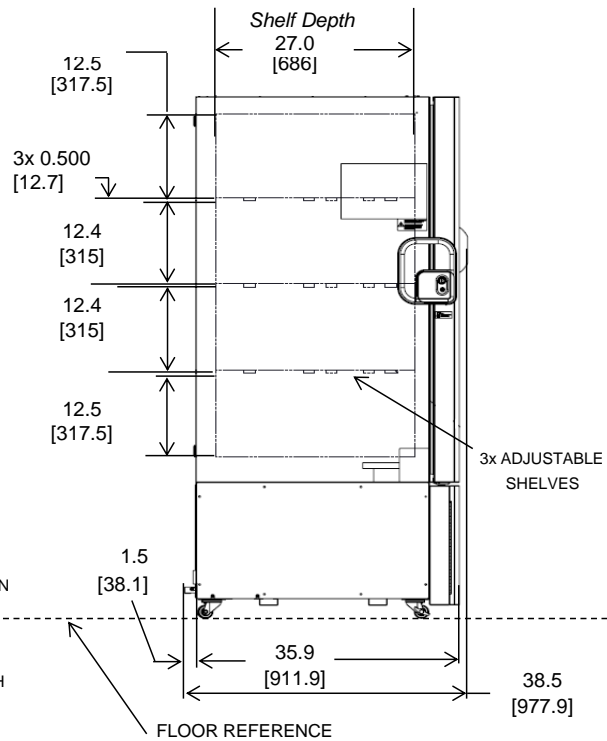
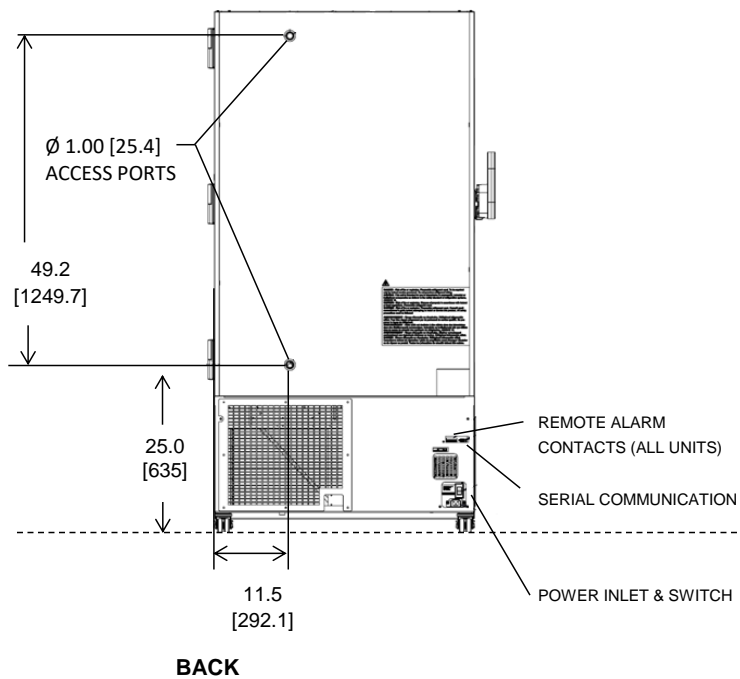
|     | M1    | M2    | M3    | M4    | M5    | M10   | M11   | M12   | M13   |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Avg | -76.7 | -76.1 | -76.5 | -76.7 | -76.5 | -80.2 | -82.4 | -81.5 | -82.1 |
| Max | -74.6 | -74   | -74.4 | -74.7 | -74.4 | -78.2 | -80.8 | -80   | -80.2 |
| Min | -78.5 | -77.8 | -78.3 | -78.4 | -78.3 | -81.9 | -83.9 | -82.9 | -83.7 |

|     | M14   | M15   | M20   | M21   | M22   | M23   | M24   | M25   |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|
| Avg | -82   | -81.9 | -82.7 | -82   | -81.3 | -82.3 | -82.3 | -81.4 |
| Max | -80.3 | -80.3 | -81.5 | -80.8 | -79.9 | -80.9 | -80.5 | -80.2 |
| Min | -83.5 | -83.4 | -84   | -83.4 | -82.6 | -84   | -83.9 | -82.8 |

Thermo Fisher Scientific Proprietary and Confidential



\*Chart recorders are stand alone on 300/400 models  
\*Backup systems are stand alone on 300 models.



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

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

**thermo**  
scientific

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