



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

**Model Number**

FDE60086FV

**Application, Rating and Electrical Data**

Application	Storage of General (non-flammable) Laboratory Materials
Storage Volume	28.8 cu. ft. (816 liters), 600 Standard 2" Boxes
Temperature Rating	-50°C to -86°C
Electrical Power	230V, 50 Hz, 1 Phase
Instrument Rated Current	6.1 AMP
Building Supply Rating	10.0A (min) 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° C - 32° C (59° F - 90° F)

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

Energy Consumption (kW-hr/day)	14.6
Heat Rejection Rate (Btu/hr)	2080
Peak Variation from Setpoint (°C)	+2.8 / -2.4
Sound (dBA)	50.5
1-min Door Opening Recovery to -75°C (min)	24
Average Uniformity at -80°C (°C)	3.6
Average Stability at -80°C (°C)	1.5
Pull Down Time (to -80°C) (hrs)	6.2
Warm Up Time (-80°C to -50°C) (min)	300

**Dimensions and Construction**

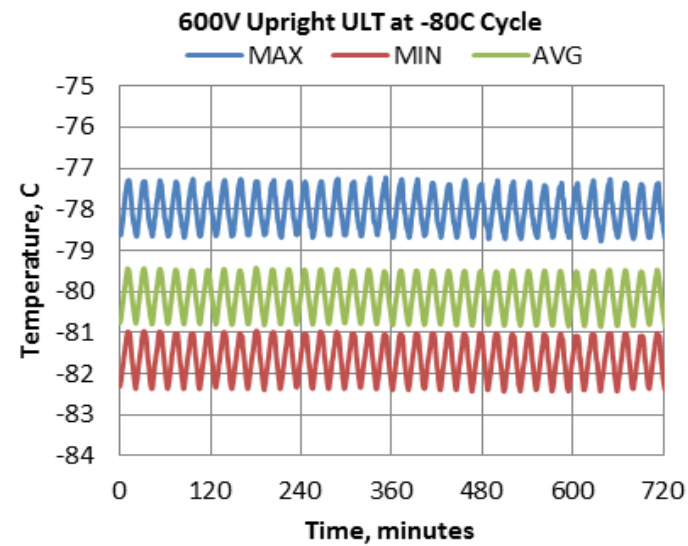
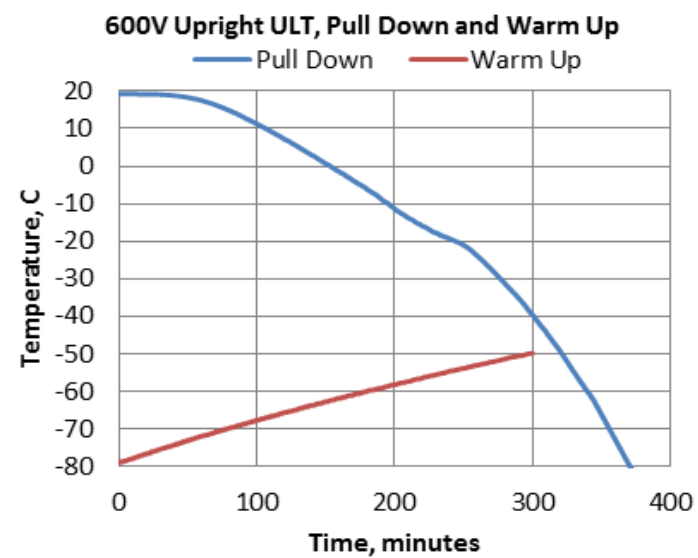
Interior Dimensions (H x D x W)	51.2 x 28.3 x 34.4 in. (1300 x 719 x 874 mm )
Exterior Dimensions (H x D x W)	78 x 38.5 x 39.6 in. (1981 x 978 x 1006 mm )
Shipping Dimensions	83.12 x 42.75 x 47.48 in. (2111 x 1086 x 1206 mm )
Shipping Weight / Net Weight	820 lbs. (372 kg) / 709 lbs. (322 kg)
Insulation	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: 245 lbs. (110 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, Chart Recorder

**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*	559 W
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



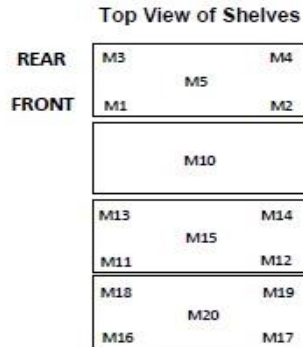
- 1) Performance is nominal and individual units may vary.
- 2) Freezer performance will differ due to product amount, product size and operating conditions.
- 3) Continuous product enhancements may, without notice, result in amendments or omissions to this specification. Thermo Scientific cannot accept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

\* Manufacturer measured compressor capacity taken at standard -35°C/45°C (Evap/Cond) condition.

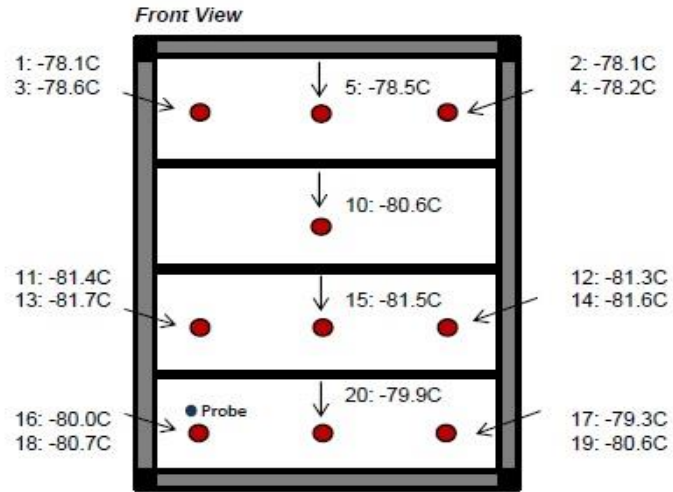


Typical Cabinet Temperature Map  
 ULT 600, 3 Inner-Shelves + Base, Single Outer Door

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



Cabinet Average: -80.1 C  
 Probe Average: -80.0 C  
 Peak Variation: +2.8 C / -2.4 C



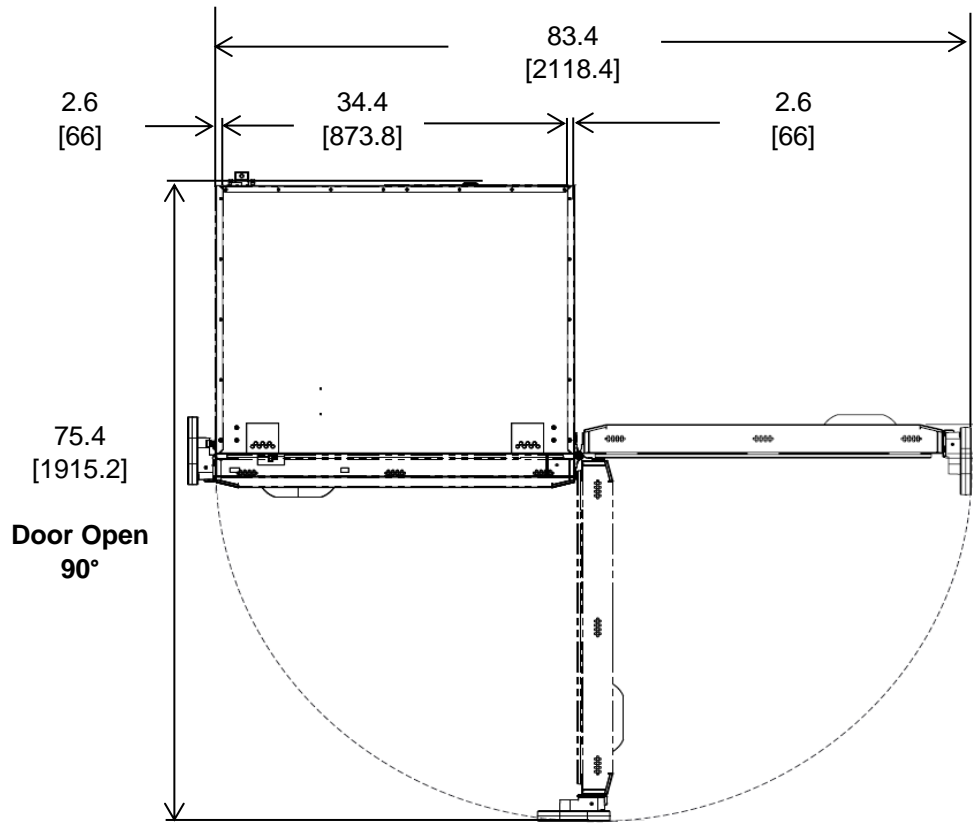
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	M1	M2	M3	M4	M5	M10	M11	M12	M13
Avg	-78.1	-78.1	-78.6	-78.2	-78.5	-80.6	-81.4	-81.3	-81.7
Max	-77.4	-77.3	-77.6	-77.2	-77.6	-79.8	-80.7	-80.7	-81
Min	-78.8	-78.9	-79.5	-78.9	-79.2	-81.4	-82.1	-82	-82.4

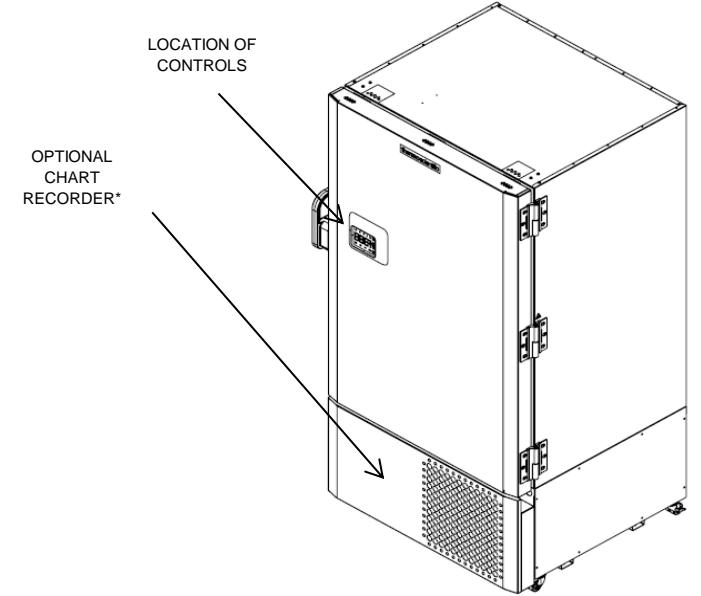
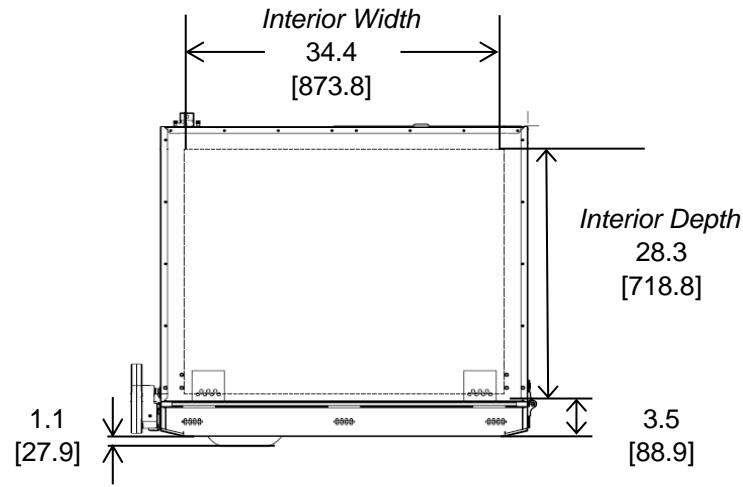
	M14	M15	M16	M17	M18	M19	M20
Avg	-81.6	-81.5	-80	-79.3	-80.7	-80.6	-79.9
Max	-80.9	-80.9	-79.5	-78.7	-79.9	-79.9	-79.4
Min	-82.3	-82.2	-80.8	-80.1	-81.5	-81.5	-80.5

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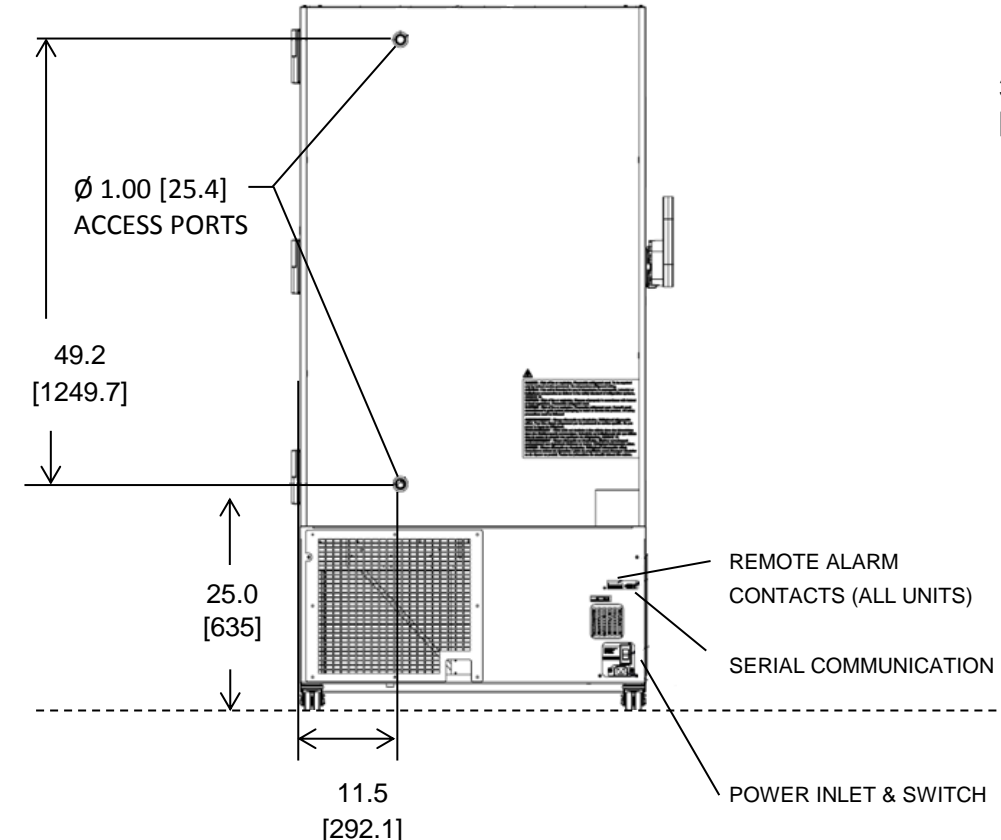
**DOOR OPEN @ 180°**



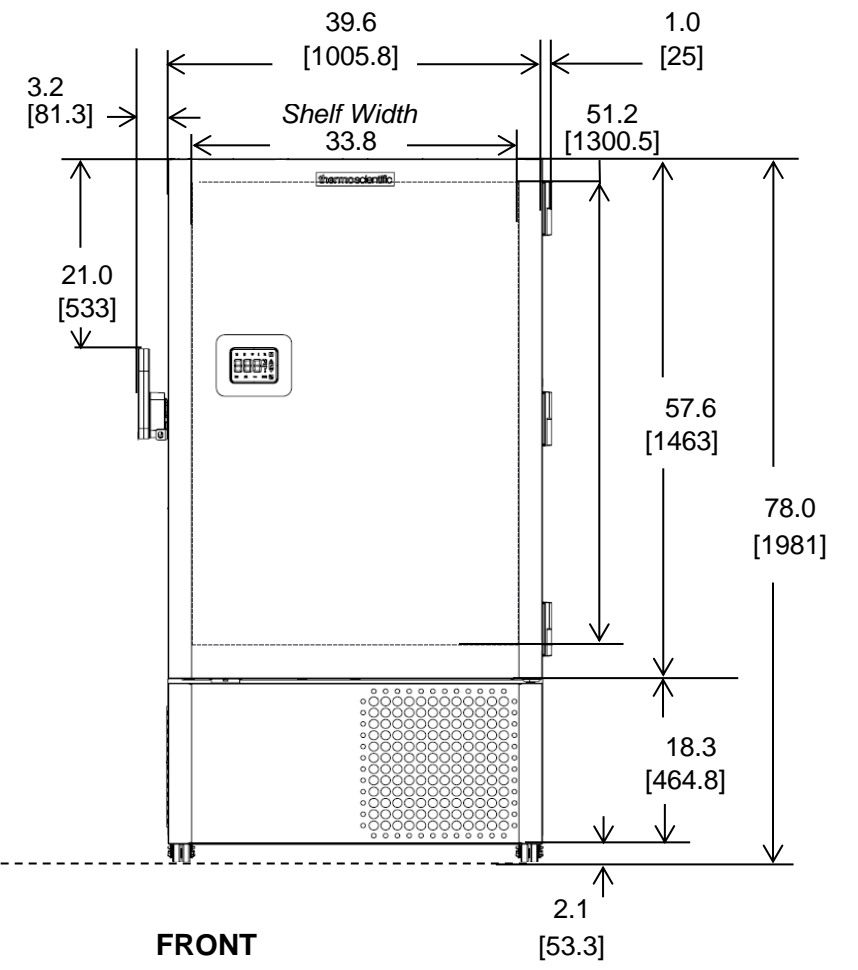
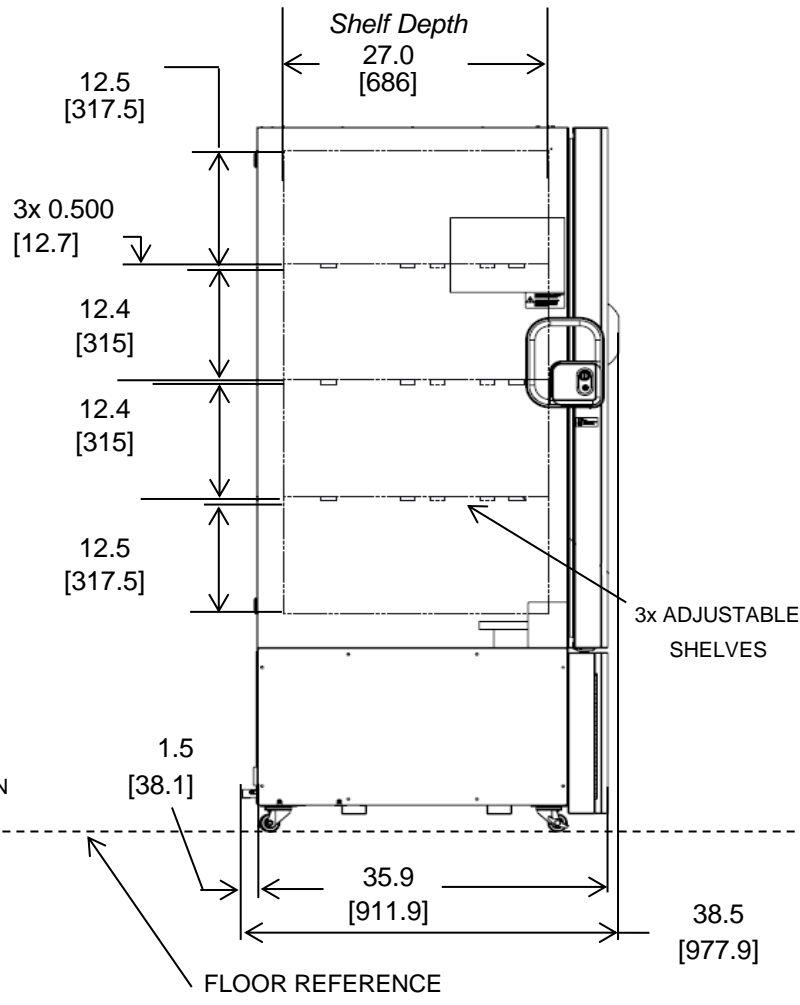
**Door Open 90°**



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



**BACK**



**FRONT**

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

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



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