



**Technical Data Sheet**  
**Thermo Scientific Ultra-Low Temperature Freezer**  
Upright Model Release - 90  
Thermo Fisher Scientific, Asheville, North Carolina

**ENERGY STAR®**  
(Daily Energy Consumption)  
**0.24 kW-hr/day/cuft**



**Model Number**

**Thermo Scientific TSX70086FA**

**Application and Rating**

Application	Storage of General (non-flammable) Laboratory Materials
Storage Volume	33.56 cu. ft. (950 liters), 700 Standard 2" Boxes
Temperature Rating	-40°C to -86°C
Electrical Power	100V - 230V 50/60Hz
Instrument Rated Current	8.9A - 4.9A
Recommended Building Supply Rating	Type C circuit protection or similar required, Ensure compliance with local electric code
Power Plug / Power Cord	Country Dependent Plug / IEC Cords, 10 ft (3.05 m)
Agency Listings	UL, cUL, CE, ACT, Energy Star
Application Environment	Non-Corrosive, Non-Flammable, Non-Explosive Indoor Use Only, Ventilated 15 - 32°C (59 - 90°F)
Sound Pressure Level	43.6 dBA @ -80C Setpoint

**Dimensions and Construction**

Interior Dimensions (H x D x W)	51.2 x 28.3 x 40.1 in. (1300 x 719 x 1019 mm)
Exterior Dimensions (H x D x W)	78 x 37.4 x 45.2 in. (1981 x 950 x 1148 mm)
Shipping Dimensions	83 x 45 x 58.25 in. (2108 x 1143 x 1480 mm)
Shipping Weight / Net Weight	880 / 764 lbs (399 / 347 kg)
Insulation	Vacuum Insulation Panels with High-Density Water-Blown Polyurethane Foam, Electric Heater at Breaker Area
Door	Single Outer: Silicone-Based Gasket Seal Number of Inner: 2x Stainless Steel (5x Optional)
Shelves	3x Stainless Steel (4x Optional) Adjustable Shelves in 1" (25 mm) Increments
Shelf Capacity	Shelf: 150 / 285 lbs (68 / 129 kg) General / Rack Storage Cabinet Load not to Exceed: 1140 lbs (517 kg)
Interior / Exterior Wall Material	Painted Steel (Stainless Steel Optional) / Painted Steel
Casters	4x Standard All-Direction with Locks
Locking mechanism	Handle Key Lock and Pad Lock Loop Standard, HID Controlled Access Optional
Back Up Systems	LN2 or CO2 Optional

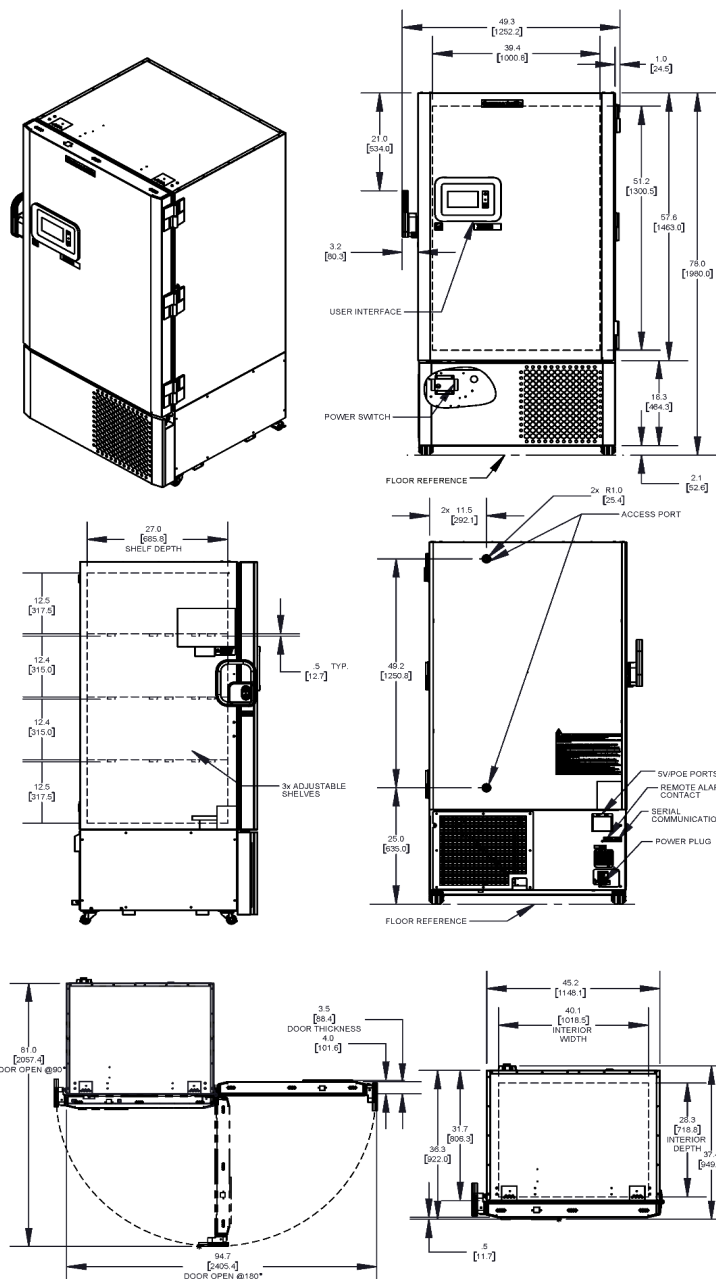
**Electrical System Configuration**

Power Switch	Soft-touch UI / Main Circuit Breaker (Behind Grill Door)
Controller Type	Capacitive Touch Screen Input and Display with USB Data Retrieval at Eye Level
Control Security	Setpoint Setting, User Log In Access
Compressor Safe Guard	High Temp Cutout Switch, Current, Logic protection
Control Sensor	Single RTD (1000 ohm Platinum RTD, class B, -196°C)
Remote Outputs	RS485, 4-20 mA Output, Remote Alarm Dry Contacts
Thermo Fisher Cloud	InstrumentConnect™ Compatible with Accessory
Adjustable Warm/Cold Alarms	Adjustable in 1°C Increments
Accessory Power	5V, POE

**Refrigeration Configuration**

Refrigeration System	Two Stage Cascade System
Compressor/Number	Variable Speed Industrial Rated, Hermetically Sealed / 2
Compressor Capacity*	938 W (max. speed)
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

**Dimensions in inch [metric in: mm]**



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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 LBP: ASHRAE condition.

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Not all products are available in all countries. Please consult your local sales representative for details.



**Performance Data Sheet -80°C Setpoint**  
**Thermo Scientific Ultra-Low Temperature Freezer**  
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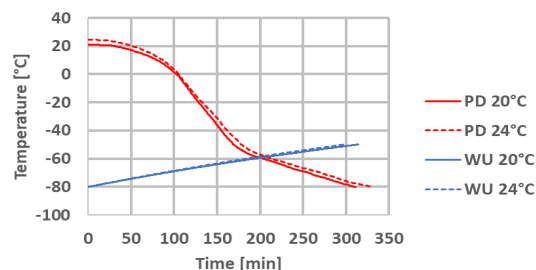
Model Number

Thermo Scientific TSX70086FA

**Performance**

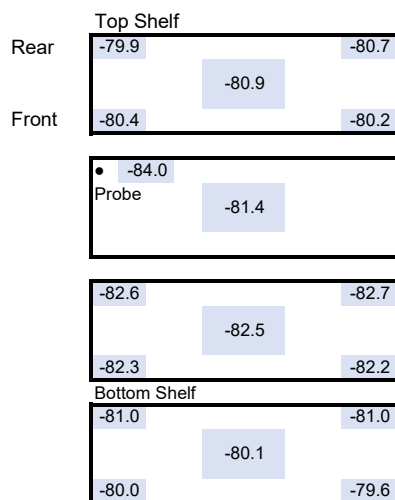
Ambient	°C	20	24
Energy Consumption	kWh/day	8.2	9.3
Heat Rejection Rate	Btu/h	1169	1318
Peak Variation from Setpoint	°C	-2.7/0.8	-2.7/1.1
Average Uniformity	°C	3.3	3.6
Average Stability	°C	0.2	0.2
Average Cabinet Temperature	°C	-81.2	-81.0
1-min Door Opening Recovery to -75°C	min	19.2	26.5
Pull Down Time to -80°C	min	307	329
Warm Up Time -80°C to -50°C	min	303	278

**Pull Down and Warm Up at 20°C and 24°C Ambient**



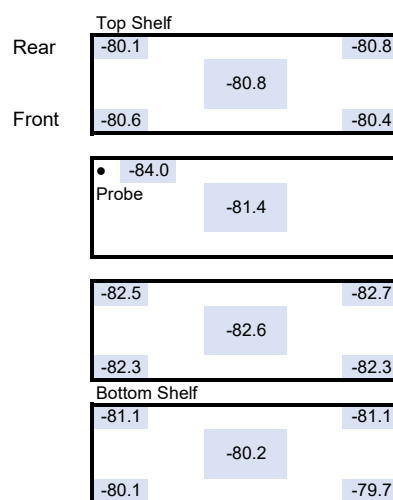
**Cabinet Temperature Distribution [°C]**

**20°C Ambient**

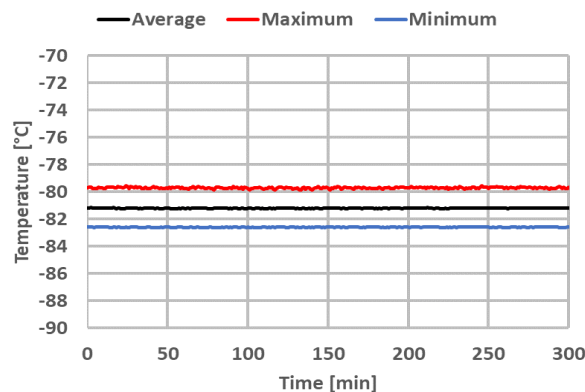
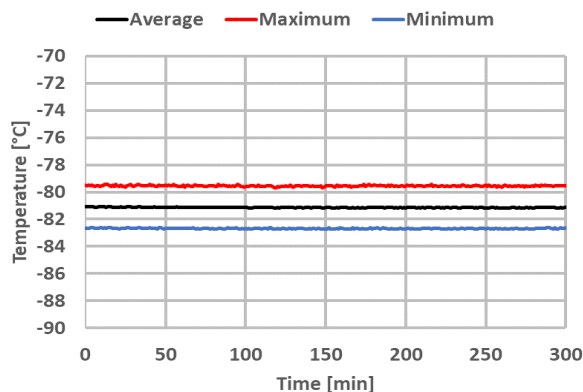


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**24°C Ambient**



20360-H-8



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**Performance Data Sheet Warm Setpoints**  
**Thermo Scientific Ultra-Low Temperature Freezer**  
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Thermo Fisher Scientific, Asheville, North Carolina

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**Performance**

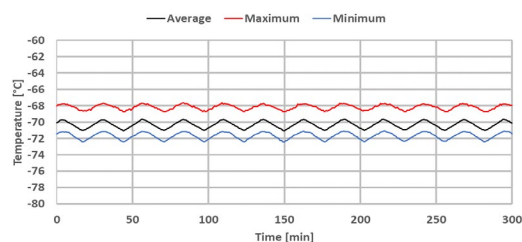
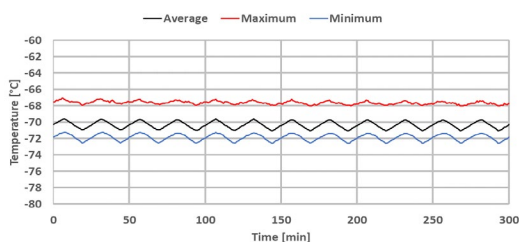
Ambient	°C	20				24			
Setpoint	°C	-70	-60	-50	-40	-70	-60	-50	-40
Energy Consumption	kWh/day	5.4	4.2	3.7	3.2	6.1	4.7	4.0	3.6
Heat Rejection Rate	Btu/h	771	604	527	460	871	675	573	514
Peak Variation from Setpoint	°C	-2.6/2.4	-3.3/3	-4.5/5.1	-8.4/8	-2.5/2.5	-2.7/3.3	-3.9/5.3	-7.5/8.4
Average Uniformity	°C	3.5	4.3	7.3	10.0	3.3	4.2	6.7	9.9
Average Stability	°C	1.4	1.8	1.4	3.2	1.2	1.5	1.3	2.9
Average Cabinet Temperature	°C	-70.4	-60.4	-49.7	-37.6	-70.3	-60.3	-49.6	-37.5

Setpoint

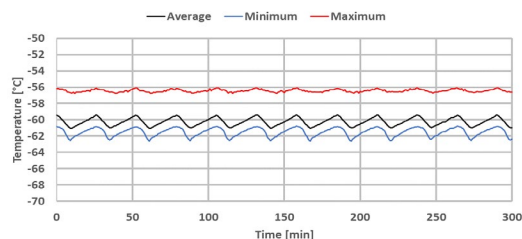
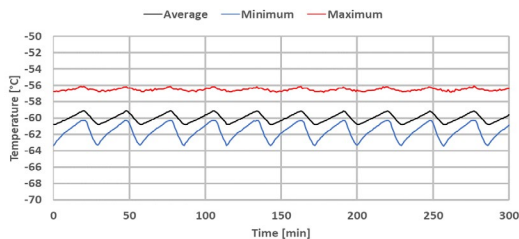
20°C ambient

24°C ambient

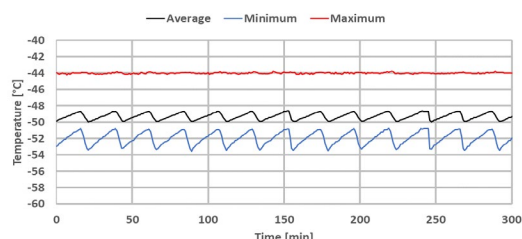
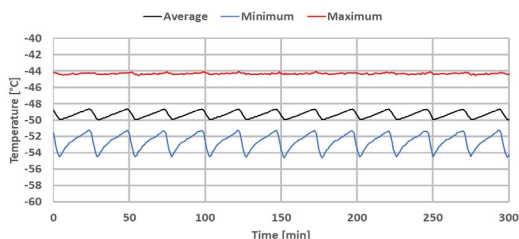
-70°C



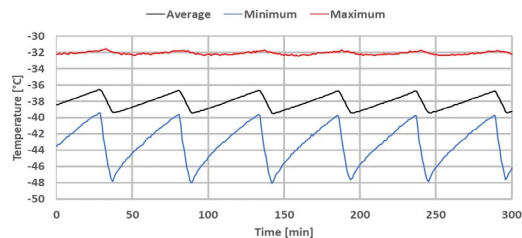
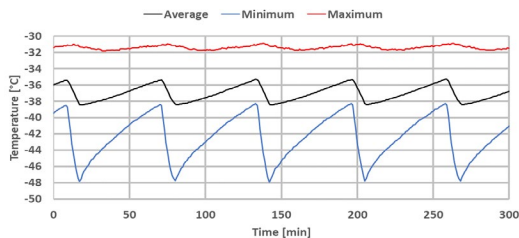
-60°C



-50°C



-40°C



20360-H-8

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