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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

ENERGY STAR

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 (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 - 32° C (59° F - 90° F)

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 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

ULT Setpoint	-70°C
Energy Consumption (kW-hr/day)	6.5
Heat Rejection Rate (Btu/hr)	919
Peak Variation from Setpoint (°C)	+4.1/-1.1
Sound (dBa)	49
Average Uniformity at -70°C (°C)	3.2
Average Stability at -70°C (°C)	2.2
Pull Down Time (to -70°C) (hrs)	7.2
Warm Up Time (-70°C to -50°C) (min)	206

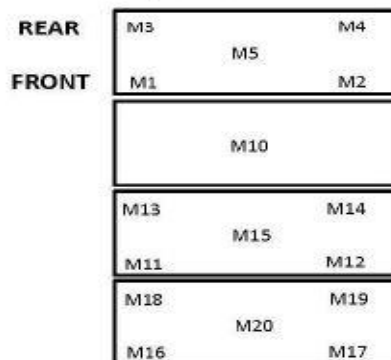500V Upright ULT, Pull Down and Warm Up

500V Upright ULT at -70C Cycle
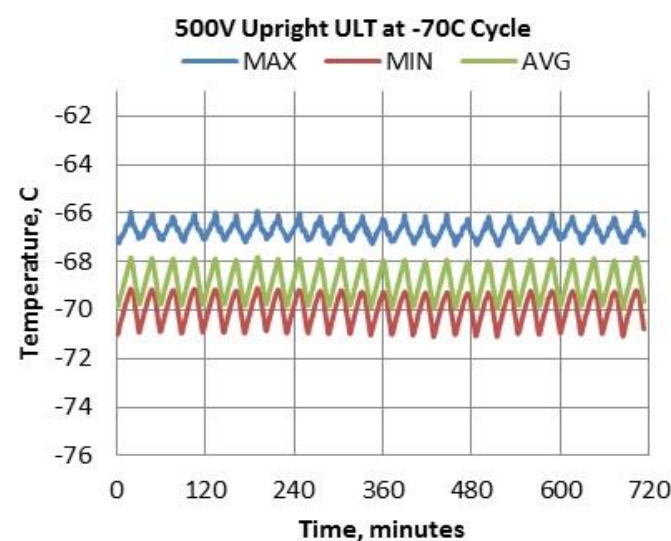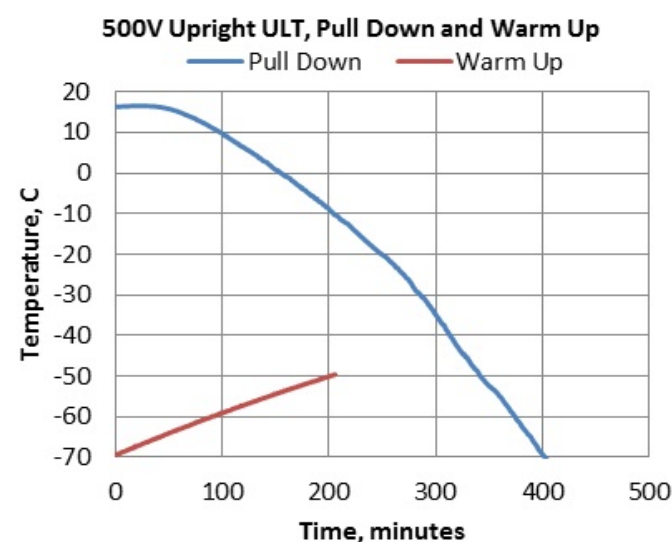
1) Performance is nominal and individual units may vary.
2) Freezer performance will differ due to product amount, product size and operating conditions.
3) Continuous product enhancements may, without notice, result in amendments or omissions to this specification. Thermo Scientific cannot accept responsibility 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 -70C

Top View of Shelves

Front View

REAR

| M3 | | M4 |
| | M5 | |

FRONT

| M1 | | M2 |

| M10 |

M13		M14
	M15	
M11		M12

M18		M19
	M20	
M16		M17

1: -68.4C
3: -68.6C

5: -68.6C

2: -68.2C
4: -68.8C

10: -69.9C

11: -69.6C
13: -69.9C

15: -69.7C

12: -69.6C
14: -69.9C

20: -67.4C

16: -67.3C
18: -67.8C

● Probe

17: -66.7C
19: -67.4C

Cabinet Average: -68.9 C
Probe Average: -66.0 C
Peak Variation: +4.1 C / -1.1 C
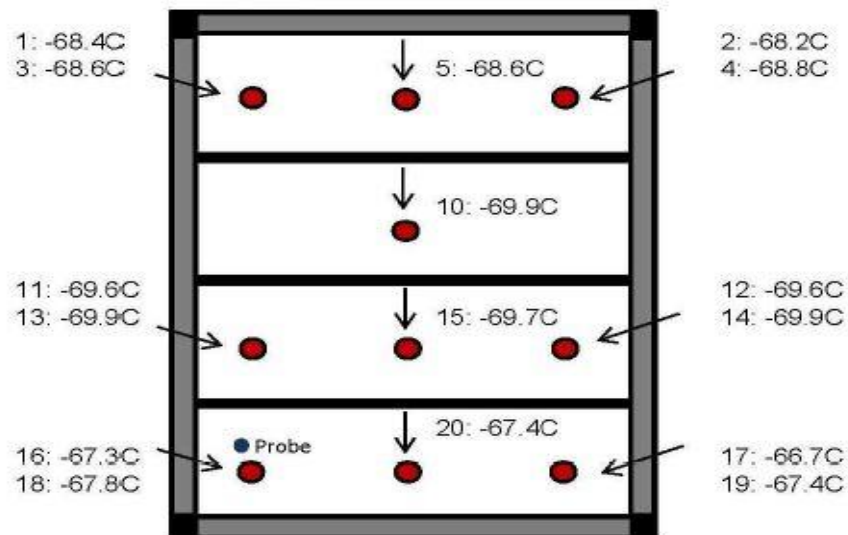
19554-PP-T11

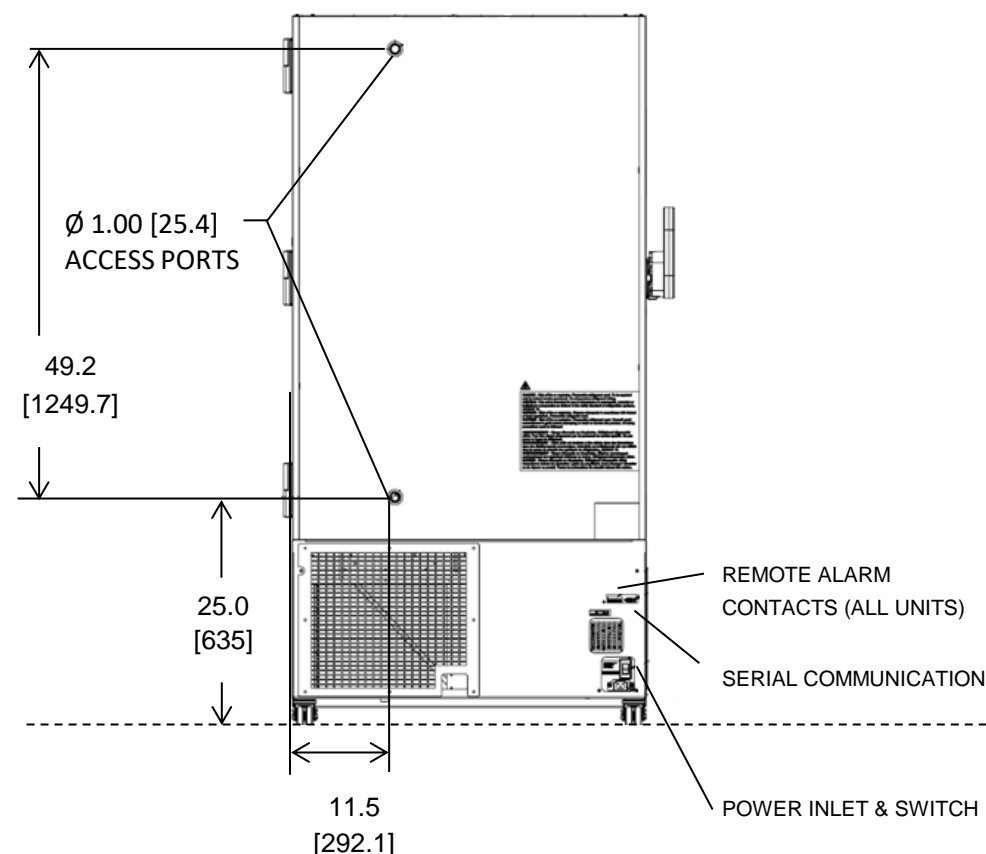|	M1	M2	M3	M4	M5	M10	M11	M12	M13
Avg	-68.4	-68.2	-68.6	-68.8	-68.6	-69.9	-69.6	-69.6	-69.9
Max	-66.8	-66.6	-67	-67.2	-67	-68.8	-68.9	-68.7	-69.1
Min	-69.8	-69.6	-70.1	-70.3	-70.1	-71	-70.6	-70.6	-71.1

	M14	M15	M16	M17	M18	M19	M20
Avg	-69.9	-69.7	-67.3	-66.7	-67.8	-67.4	-67.4
Max	-68.9	-69	-66.6	-66	-66.7	-65.9	-66.4
Min	-71	-70.6	-67.9	-67.3	-68.8	-68.4	-68.1

DOOR OPEN @ 180°

72.2
[1833.9]

2.6
[66]

28.8
[731.5]

2.6
[66]

69.8
[1772.9]

Door Open 90°

Interior Width
28.8
[731.5]

Interior Depth
28.3
[718.8]

0.5
[12.7]

3.5
[88.9]

LOCATION OF CONTROLS

OPTIONAL CHART RECORDER*
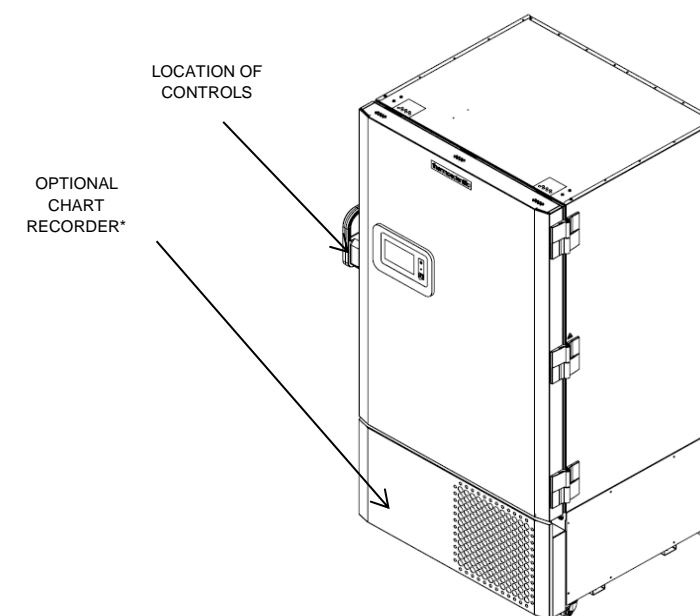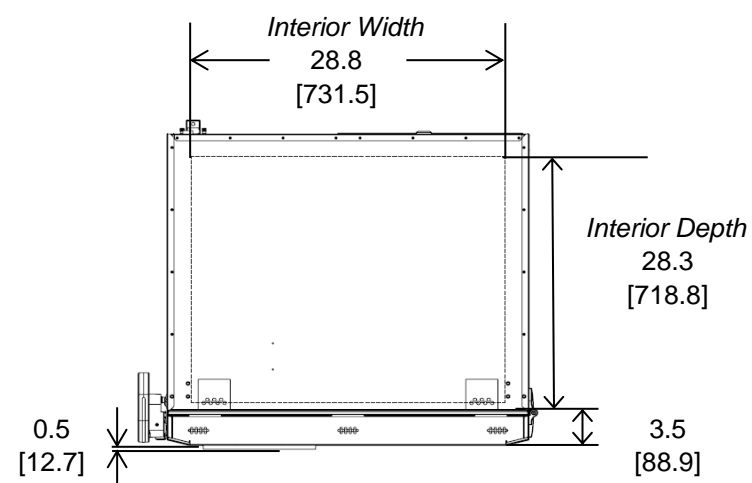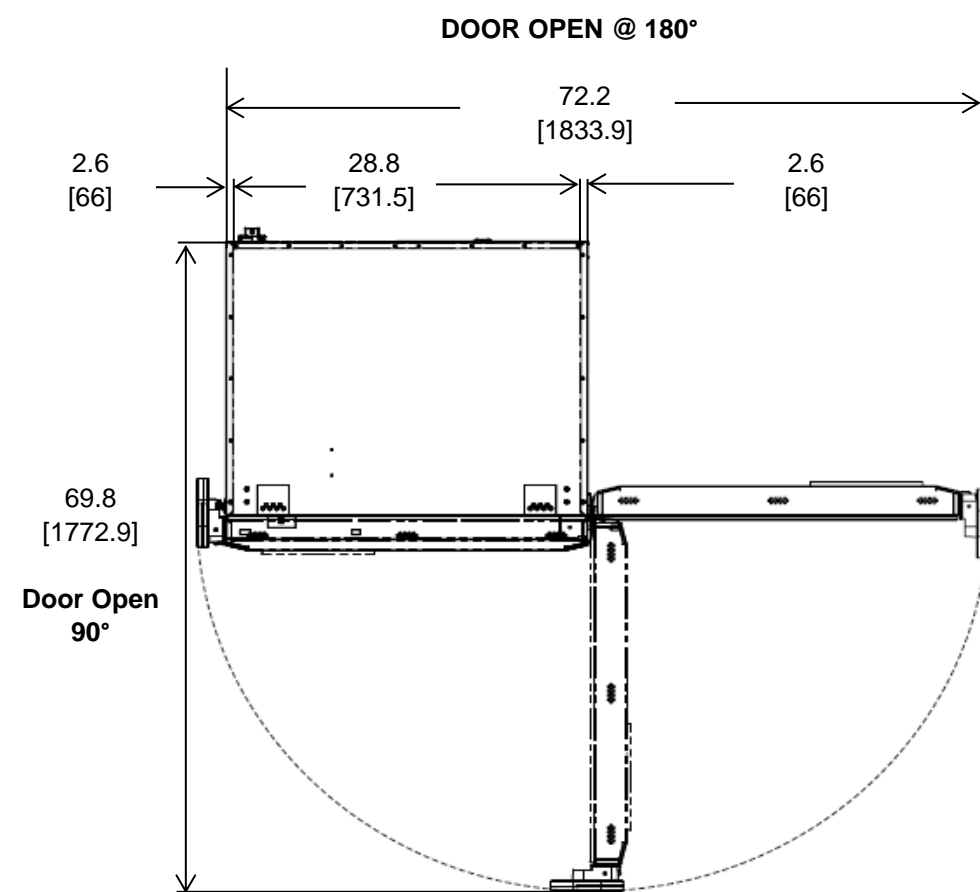
*Chart recorder/Back up systems are stand alone on 300 models.

Ø 1.00 [25.4] ACCESS PORTS

49.2
[1249.7]

25.0
[635]

REMOTE ALARM CONTACTS (ALL UNITS)

SERIAL COMMUNICATION

POWER INLET & SWITCH

11.5
[292.1]

BACK

Shelf Depth
27.0
[686]

12.5
[317.5]

3x 0.500
[12.7]

12.4
[315]

12.4
[315]

12.5
[317.5]

3x ADJUSTABLE SHELVES

1.5
[38.1]

35.9
[911.9]

37.8
[960.1]

FLOOR REFERENCE

34.0
[864]

1.0
[25]

3.2
[81.3]

Shelf Width
28.1
[713.7]

51.2
[1300.5]

21.0
[533]

57.6
[1463]

78.0
[1981]

18.3
[464.8]

FRONT

2.1
[53.3]
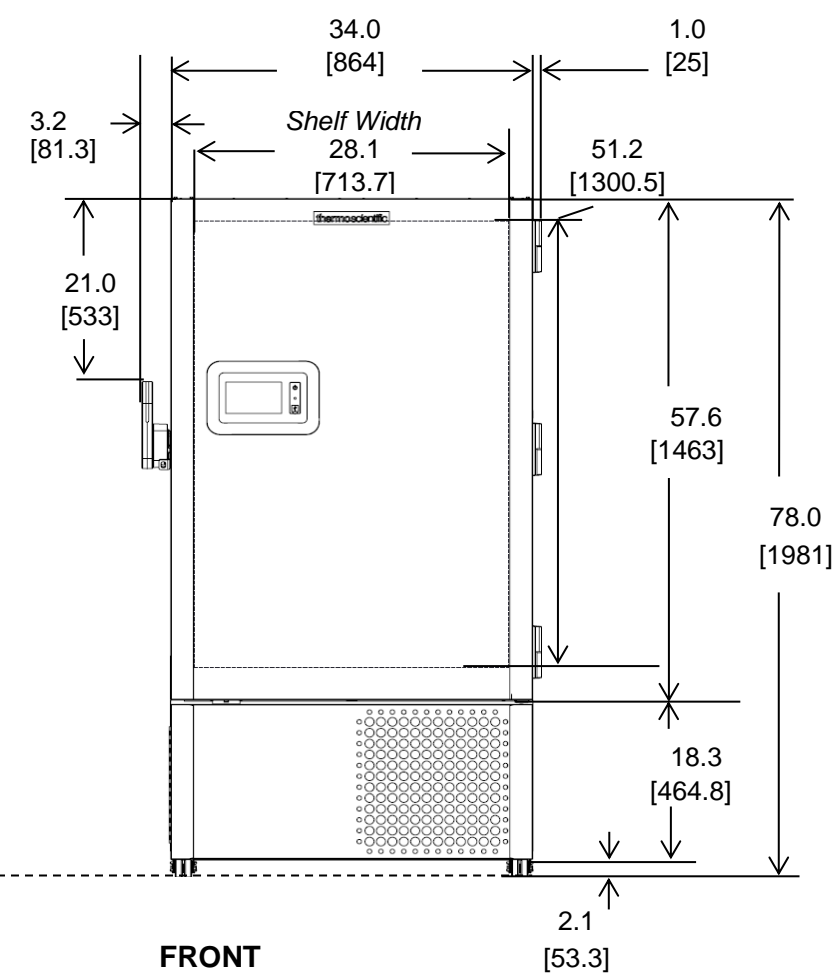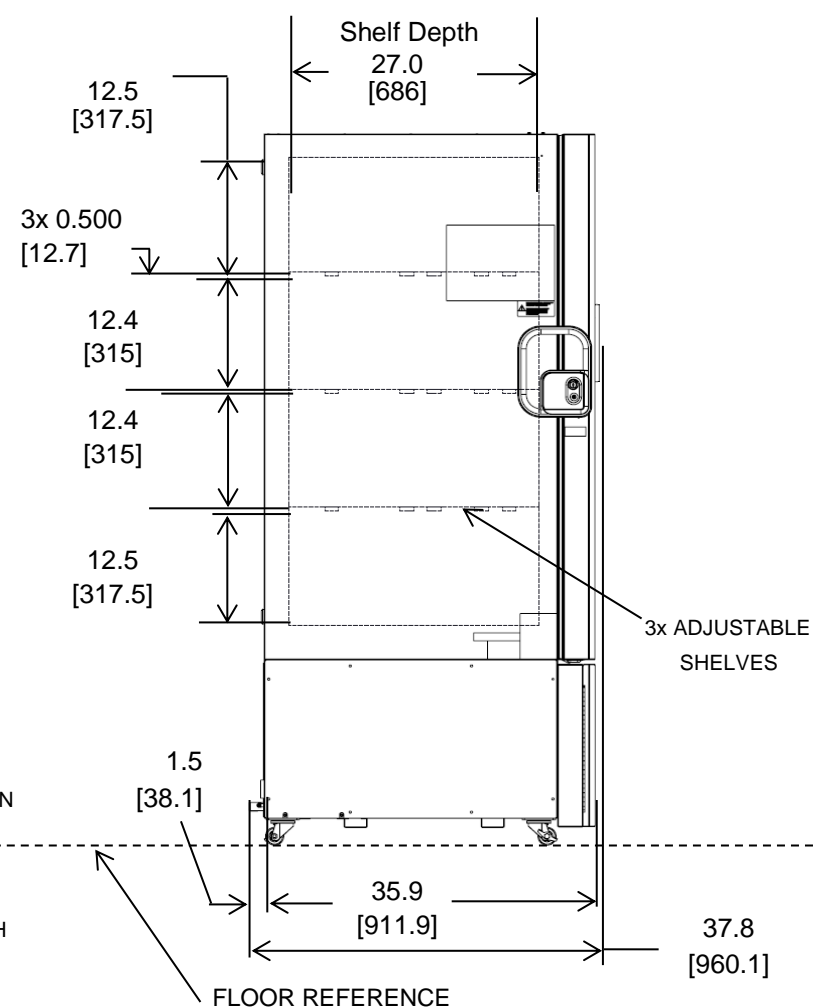
NOTE: DUAL DIMENSION IS INCH OVER METRIC

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

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