**Forma Ultra-Low Temperature Upright DD Freezer**

**Application, Rating and Electrical Data**
- Application: Storage of General (non-flammable) Laboratory Materials
- Storage Volume: 368.1 Liters / 13.0 Cubic Feet
- Temperature Rating: -50°C to -86°C
- Electrical Power: 120V 60 Hz, 1 Phase
- Instrument Rated Current: 16.0 AMP
- Power Plug/Power Cord Length: NEMA 5-20P / IEC Cords, 3.048 Meters (10 Feet)
- Agency Listings: UL, cUL, FDA
- Indoor/Outdoor Usage: Indoor Use Only

**Refrigeration Configuration**
- Refrigeration System: Industrial-Rated Two Stage Cascade System
- Compressor / Number: Hermetic Compressor for Low Temperature Application / 2
- Condenser Type/Number: Enhanced Finned-Tube and Forced-Air Cooled / 1
- Expansion Device: Capillary Tube
- Evaporator Type: Cold Wall With Enhanced Heat Transfer Treatment
- Defrost Method: Manual Defrost
- Refrigerant Charge/Flammability: R404A in 1st Stage / R508B+R290 Mix in 2nd Stage / Non-Flammable

**Controller/Electrical System Configuration and Features**
- Controller Level: Top
- Power Switch: On-Off with Circuit Breaker
- Controller Type: Microprocess Control
- Setpoint Security: NO
- Compressor Safe Guard: High Pressure Cutout Switch / High Temp Cutout Switch / Current protection / Logic protection
- Control Sensor: Single RTD (1000 ohm Platinum RTD)
- Remote Alarm Terminals: RS485, 4-20mA, Dry Contacts
- Adjustable Warm/Cold Alarms: Fully Adjustable
- Auto-Voltage Safeguard: Buck/Boost System

**Dimensions and Construction**
- Interior Dimensions (H x D x W): 1308 H x 492 D x 586 W mm (51.5 H x 19.4 D x 23.1 W in.)
- Exterior Dimensions (H x D x W): 1978 H x 835 D x 912 W mm (77.9 H x 32.9 D x 35.9 W in.)
- Shipping Dimensions: 2096 H x 978 D x 1026 W mm (82.5 H x 38.5 D x 40.4 W in.)
- Insulation: High Density Polyurethane Foam, R-30 (ft²·°F·hr/ Btu)
- Shelves / Capacity: 3 Stainless Steel Shelves Adjustable in 25 mm (1 in) Increment; Maximum Capacity/Shelf: 45.4 kg (100 Lbs.)
- All-Direction Casters: Standard with Locks
- Unit Weight: Approximately 293 kg / 646 lbs.
- Other Options: Electronic Recorder and CO2 or LN2 Back-Up System or Datalogger

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

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 -23°C/49°F (Evap/Cond) condition.

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Typical Cabinet Temperature Map
ULT 13 cuft Unit, 3 Inner Shelves + Base, Double Outer Door

Temperatures are averages during > 12 hours of cycle after reaching setpoint of .80 C

Top View of Shelves

<table>
<thead>
<tr>
<th>REAR</th>
<th>MA3</th>
<th>MA4</th>
</tr>
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<tbody>
<tr>
<td>FRONT</td>
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<td>MA19</td>
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<tr>
<td></td>
<td>MA16</td>
<td>MA17</td>
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</table>

Cabinet Average: -79.4 C
Probe Average: -81.8 C
Peak Variation: +6.1 C / -5.5 C

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<tr>
<th>°C</th>
<th>MA1</th>
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<th>MA3</th>
<th>MA4</th>
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<td>-75.8</td>
<td>-78.5</td>
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<td>-78.7</td>
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<tr>
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<th>MA16</th>
<th>MA17</th>
<th>MA18</th>
<th>MA19</th>
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<tbody>
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19118-BA-T1
NOTE: DUAL DIMENSION IS INCH OVER METRIC

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