INTRODUCING

THE STIRLING VAULT 100™

Stirling
ULTRACOLD

WE'LL NEVER STOP INNOVATING FOR YOU

The life sciences companies and research institutions that rely on our products work toward innovations in their fields every day. These organizations — and the people who depend on them — deserve our commitment to keep developing better ULT freezers that help them do the impossible.

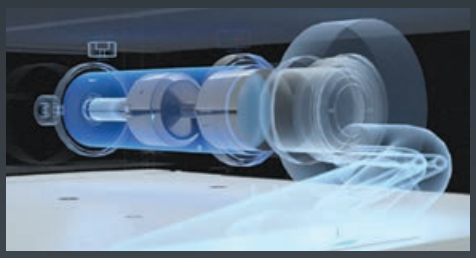
That's why we've designed the new Stirling VAULT100 with a more robust engine, unprecedented temperature uniformity and range, and an updated interface that shares freezer health analytics, putting you more in touch with your work than ever before.

- First ULT freezer with a -100 to -20°C temperature range
- Best temperature uniformity and adherence to setpoint in the market
- Large user interface display with onboard predictive analytics and freezer diagnostics
- New, more robust, free-piston Stirling engine design
- 360-degree sustainability approach

Check out What's Under the Hood

The M6D free-piston Stirling engine builds on the advantages of our industry-changing engine technology, delivering the most robust Stirling engine yet. This new linear motor is more efficient and reliable than ever before.

The simplicity of the engine is its superpower. This engine design has very few moving parts, so there's less to maintain and fewer components that can fail. Supported by gas bearings, its moving parts are always in contactless linear motion — free of the friction, heat, wear and need for oil that shorten the life of compressors in other ULT systems. Using continuous modulation with advanced electronics, rather than the stop/start temperature control of compressor-based units, the VAULT100 engine further reduces the chance of failure and need for ongoing maintenance, providing your team with more peace of mind.



REDEFINING COLD

ENERGY STAR

More in Control of Variability Than Ever Before

For facilities that must meet Good Manufacturing Practices (GMP) and other industry standards, accurately controlling a ULT storage environment can mean the difference between success and failure. Temperature uniformity of your equipment — the measure of how much your freezer temperature deviates from the setpoint throughout the cabinet — shouldn't be a variable. Stirling Ultracold doesn't leave temperature uniformity and GMP-readiness to chance. We've engineered the VAULT100 to hold unsurpassed temperature uniformity so you can be more in control of your variables than ever before.

Most other ULT freezer manufacturers are satisfied with maintaining temperature uniformity to within +/-8°C. That's not good enough for us — or you. The VAULT100 surpasses regulatory thresholds using a new thermodynamically engineered cabinet design, three sealed inner doors with high-strength magnetic latch, and ambient air-repelling door gaskets to maintain temperature uniformity at +/-3°C at -80°C. The VAULT100 can run continuously at -100°C with better steady-state temperature stability and uniformity than most other ULT freezers at -80°C, giving you peace of mind that your samples are safer than ever.

+/- 3°C* **TEMPERATURE UNIFORMITY @ -80°C**

Built for Fast Recovery

Lab techs open freezer doors throughout the day as they add or remove biological samples. With all that disruption, some ULT freezers can struggle to get back to setpoint, because there can be a 100°C (or more) difference between ambient and lab freezer cabinet temperatures. This slow temperature recovery can threaten the integrity of your work.

We've built the VAULT100 for fast temperature recovery with your everyday facility challenges in mind. Its enhanced engine, electronics and cabinet/inner door design ensure it gets back to temperature quickly. And when operating at setpoints down to -100°C, your samples may never be exposed to temperatures above -70°C to -80°C range during/after a typical door opening.

** Within testing protocol margin of error*

Your samples are safer than ever in the VAULT100, which has better steady-state temperature stability and uniformity at -100°C than most ULT freezers at -80°C.

360-Degree Sustainability

Known as an industry leader in ULT sustainability, Stirling takes a well-rounded approach to sustainable cold storage solutions. Our aim is to make gains in efficiency and sustainability to lower your lifetime cost of ownership. To do this, we address multiple environmental impacts over lifetime freezer operation and go beyond kWh/day ratings.

The VAULT100 only uses 5.8 kWh* per day (steady state). It's far more efficient than standard compressor-based units, even when operating down to -100°C setpoint. Further, third-party testing has validated the VAULT100's superior performance. The first in the industry to receive an ENERGY STAR® certification, Stirling Ultracold has also received an ACT Label from My Green Lab confirming a low Environmental Impact Factor (EIF).

But beyond energy savings, the VAULT100 has the largest sample storage volume per square foot of floor space. This higher storage density helps increase your lifetime savings by reducing your overall infrastructure footprint with lower plug load, back-up power, floorspace and HVAC costs. Stirling's holistic approach to sustainability means thinking past kWh savings and then some. An investment in a Stirling product means lower lifetime infrastructure costs, lower maintenance costs, and significantly lowering your operating costs per sample.

** ENERGY STAR Final Test method at -80°C (112°F) setpoint.*

Keeping You Connected to Your Work

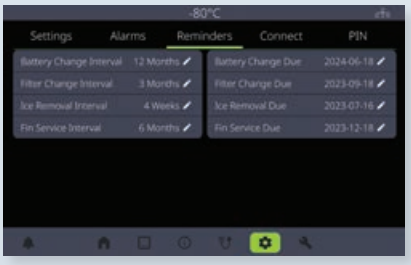
Achieve new levels of monitoring, performance and maintenance information with the VAULT100. An improved, larger user interface with built-in ethernet port and onboard predictive freezer analytics keep you more connected to your work and the equipment that help make it happen.

BMS/BAS INTEGRATION

Incorporate ULT performance data directly into your existing BMS/BAS system. The built-in ethernet port and BACnet interface help provide Real-time event monitoring, so you can set alerts and be notified of door openings, temperature fluctuations and even engine status.

Onboard Predictive Analytics and Freezer Diagnostics

Unlike compressor-based systems, the Stirling engine has several sensors built into the system that collect a rich data set which the onboard analytics then use to provide predictive diagnostics. This provides a window into engine and freezer health you don't get with other ULT freezers. The VAULT100 will give you guidance for preventive maintenance and proactive service recommendations that are unique to your unit, its current operating conditions and stage of life, helping you to avoid unexpected cooling failures and the potential loss of sample integrity that come with them. Using diagnostic lights like those found on a car's dashboard, the new VAULT100 user interface allows you to be more in tune with your work than any other ULT freezer on the market.



Specifications

Note: Specifications are preliminary and subject to change without notice. Refer to stirlingultracold.com for the latest specifications.

Application, rating and electric data

Item	Specification
Application	Storage of general (non-flammable) laboratory materials
Storage Volume	795 liters (28 cu. ft.)
Storage Capacity	600 standard 2" boxes in optional racks; optional 700-box system available separately
Temperature Range	-100°C to -20°C (-148°F to -4°F), adjustable to 1°C increments
Electric Power	120 to 240 VAC at 50/60 Hz
Power Plugs Available	NEMA 5-15P plug requires standard NEMA 5-15R receptacle (120V); Length: 3048 mm (120 in.), or NEMA 6-15P plug requires standard NEMA 6-15R receptacle (240V); Length: 2997 mm (118 in.) *Specify when ordering*
Maximum Power (Current)	1,200 watts (10 amps @120 V, 5 amps @240 V), nominal
Auto-Voltage Capability	120 to 240 VAC at 50/60 Hz (accepting universal inputs)
Electric Supply Rating	15 amp or greater grounded circuit
Certification/Agency Listing	cULus, CE, ENERGY STAR®, ACT
Noise	< 42 dB(A) at 1 meter from front of freezer in steady state operation
Indoor/Outdoor Use	Indoor use only
Application Environment	Non-corrosive, non-flammable, non-explosive
Ambient Operating Temp	5°C to 35°C (41°F to 95°F)
Useful Life	15 years, nominal

Controller

Interface	Graphical user interface with touchscreen inputs
Controller Type	Microprocessor with touchscreen input and display
Security	Optional PIN requirement built in
Warm and Cold Alarms	Fully adjustable
Control Sensor	One RTD (PT100 Class A)
Event Log	All alarms, door openings, setpoint changes, power outage
Dry Contacts	Normally Closed, Normally Open and Common; activated by power outage or any alarm condition
Temperature Log	12 months available graphically
Battery Back-up	24-hour battery back-up for touchscreen and temperature display
Internet Connectivity	Optional Ethernet connection transmitting in BACnet™
Defrost Method	Adjustable gasket heater as needed

Refrigeration system

Item	Specification
Cooling Engine	Helium-charged, 10-gr, free-piston Stirling engine with continuous modulation
Heat Transport System	Gravity-driven thermosiphon
Refrigerant	R-170 (ethane) HFC/HCFC-free, 90 g (3 oz)
Evaporator	Cold wall (inner liner)
Heat Rejection	Finned heat exchanger with forced air cooling. Air inlet: Right side of top cover, through air filter Air outlet: Left side of top cover, upward

Performance data

Steady State Energy Use	5.8 kWh/day at -80°C (112°F) (ENERGY STAR® Final Test Method)
9-Position Temperature Uniformity‡	±3°C* (at -80°C)
Single-Position Temperature Stability (Steady State)	±0.2°C* from -80°C setpoint
Recovery From Door Opening	26 minutes at -80°C (ENERGY STAR® Final Test Method)
Pull-Down From 25°C Ambient	5.5 hours @ ambient to -80°C (-112°F)
Warm-up Profile	3.8 hours to -60°C at -80°C (empty cabinet) 9.3 hours to -40°C at -80°C (empty cabinet)
Heat Dissipation	754 Btu/h @ steady state at -75°C 889 Btu/h with 6 door openings at -75°C

Dimensions and construction

Interior (H x D x W)	1542 H x 706 D x 732 mm W | (60.7 x 27.8 x 28.8 in.)
Exterior (H x D x W)	1996 H x 871 D x 915 mm W | (78.6 x 34.3 x 36 in.)
Net Weight, Five Shelves No Load	295 kg (650 lbs.)
Shipping (H x D x W)	2134 x 1092 x 1168 mm | (84 x 43 x 46 in.)
Shipping Weight	345 kg (760 lbs.)
Insulation	High-performance, vacuum-insulated panels and polyurethane foam using the Ecomate® environmentally friendly, SNAP-compliant blowing agent
Gasket Heater	User-adjustable duty cycle
Shelves	5 stainless steel, adjustable in 12.7 mm (0.5 in.) increments
Inner Doors	3 insulated with magnetic latches
Options	CO_2 and LN_2 back-up systems, additional shelves, international plug(s), 4-20 mA – Temperature transmitter: 0°C to -100°C (4-20mA), loop power (8 to 35 Vdc) is required

† There is no need for special wiring or a 20-amp breaker on a 120V line.

‡ ENERGY STAR® Final Test Method.

** Within testing protocol margin of error.*

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