GLACIER

-86°C ULTRALOW TEMPERATURE FREEZERS

NUAIRE

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GLACIER
POLAR EDITION -86°C ULTRALOW FREEZER

NuAire Glacier -86°C Ultra-low Temperature Freezer

NuAire Glacier -86°C Ultra-low Temperature Freezers are developed for reliable storage conditions of research samples for laboratories, hospitals, repositories and more. Through research and development, a new focus has been placed on Glacier's refrigeration system, controls, alarms/monitoring, ergonomics, construction and energy efficient operation to make Glacier Freezers the reliable solution for long-term storage of cancer cells, stem cells, cord blood, T-cells, organ/tissue and other samples.

Standard Features

Temperature Uniformity

A cascade refrigeration system that utilizes dual compressors offers a quicker, more reliable way to control storage conditions.

- Quicker temperature recovery after door openings
- Insulated inner doors help maintain interior temperature
- Multi-point gasket seal system ensures a tight seal
- A voltage booster option and surge protection offers dependable operation over a wider range of voltages.

Reliable Storage Conditions

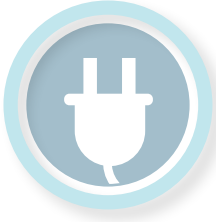
Properly designed compressors located within the refrigeration system offer a dependable freezer.

- Dual compressors run high and low stage refrigerants to maintain temperature uniformity.
- Voltage boosters and surge protection work to maintain proper operation.
- Dependable NuAire construction and service networks provide a NuAire quality product.

Environmentally Friendly

Our commitment is to reduce energy consumption, reduce environmental impact and minimize both pollution and the depletion of natural resources.

- CFC Free Refrigerants
- RoHS Compliant
- Low noise operation down to 47 dba
- Designed to support LEED certification
- Minimal heat output



[1] Easy-In/Easy-Out door latch for one-handed operation, positive seal against gasket. Padlock provision standard.

[2] Universal keyed door lock offers added security.

[3] Integrated, microprocessor-based control system and LED display includes comprehensive set point, alarm, monitoring, diagnostic and communications functions (details on next page).

[4] Circular-chart temperature recorder (optional) mounts easily in pre-engineered mounting space. *

[5] Insulated and gasketed inner doors seal inside to offer additional protection and improve uniformity. Inner door latches are standard. Doors can be easily removed for defrosting.

[6] Front access to washable, electrostatic condenser filter for routine condenser air filter cleaning.

[7] High impact, recessed casters and leveling feet.*

[8] New generation **ArticGard** compressors are specifically designed for low temperature applications.*

[9] Multiple access ports permit insertion of independent probes, instrumentation, liquid N2 or liquid CO2 back-up injectors.*

[10] Commercially available HFC refrigerants are highly efficient, environmentally safe and non-ozone depleting.*

[11] Internal voltage and power management systems assure component protection over wide voltage ranges.*

[12] Remote alarm contacts, optional communication port available.

[13] Vacuum relief valve.

*** not visible**

Construction

Cabinet Insulation
Minimum 5" (12.7 cm) CFC-free foamed-in-place urethane, closed-cell, for thermal protection and structural strength

Aluminum Tape
Increases evaporator surface

Access Ports
One port on back side for CO_2 back-up, One port on bottom for recording (17mm diameter)

Door Handle / Latch
Rugged, one-handed operation, fastener for padlock

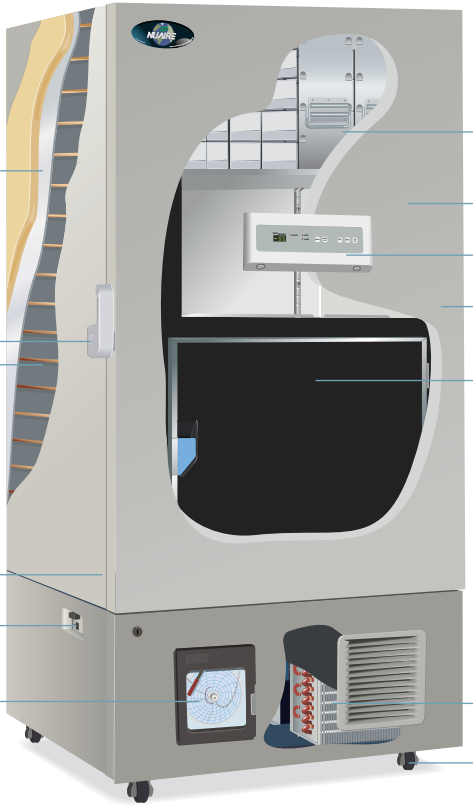
Evaporator
Tube on sheet type

Gasket
Multi-point seal

Remote Alarm Dry Contacts
Power switch, battery back-up alarm

Refrigeration System
Custom engineered compressors, high performance lubricants

Recorder
Optional Cobex® system with mounting plate



Low Profile
Upright design

Inventory Racks
Optional, stainless steel with fiberboard boxes and dividers

Heated Door Seals
Hot gas minimizes frost build-up around door gasket

Control Center
Microprocessor control at eye level

Outer Door
Minimum 3" (7.6 cm) high strength foamed-in-place urethane insulation

Insulated Inner Doors
High impact plastic with recessed handle

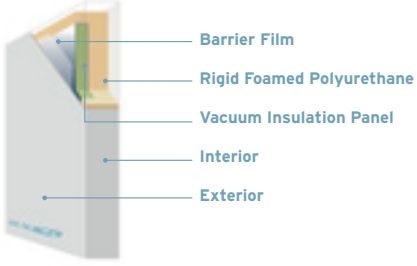
Condenser Fan
Durable fan with aerodynamically designed fan blades

CFC-Free Refrigerants
High stage R407D (HFC), Low stage R508 (HFC)

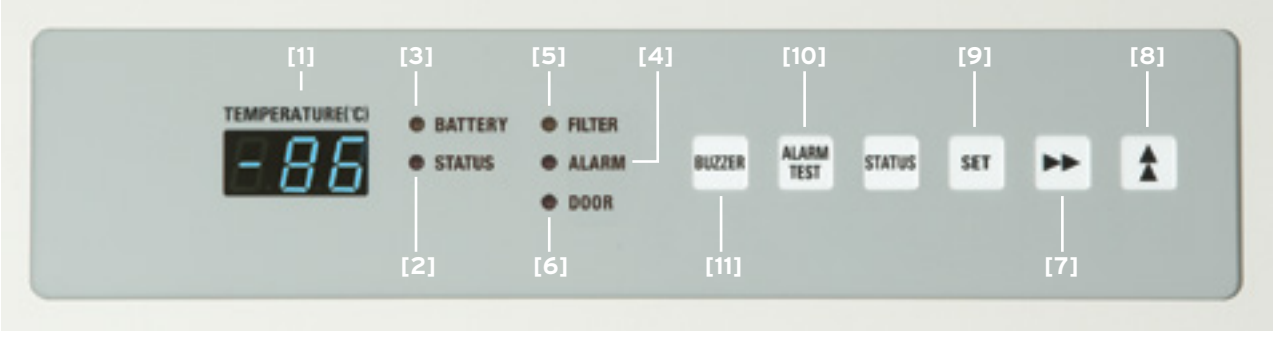
Air Cooled Condenser
Large surface area, copper tube, aluminum fins

Washable Pre-filter
Protects condenser fins against dust build-up

Heavy Duty Casters
For mobility as required



Model NU-9728 features a high-efficiency Vacuum Insulation Panel thin-wall composite design that yields more interior storage volume within a conventional freezer footprint. Vacuum Insulation Panels minimize energy transfer to and from the ultra-low temperature interior. The composite construction, complete with reflective barrier film and structural closed-cell foam, is used on all walls and the outer door. This advanced insulation technology offers structural stability to eliminate distortion, and inhibits moisture accumulation that can lead to icing. Aggregate insulation efficiency minimizes compressor cycle run-time to lower energy costs.



[1] Temperature–Digital display defaults to actual chamber temperature. Display mode changes when set point, alarm parameters, programming and diagnostic functions are performed.

[2] Status Light–Status alert function uses predictive intelligence to determine if freezer is operating within specifications under existing environmental conditions.

[3] Battery Light–Ni-MH battery powers control memory and alarm functions during power failure.

[4] Alarm Light–Alarm indicator lamp glows when freezer is in alarm condition; alarm ring back is factory set for 30 minutes, adjustable in 10 minute increments from 10 to 60 minutes.

[5] Filter Light–Filter indicator lamp glows when electrostatic filter requires removal for cleaning.

[6] Door Light–Door alarm indicator has 2 minute delay until audible alarm activates; delay time is adjustable.

[7] Right Arrow–Set point entry advances digital display to next position.

[8] Up Arrow–Set point entry advances digital to next value from 0 to 9.

[9] Set Button–Press to set temperature; set button is also used for other diagnostic functions.

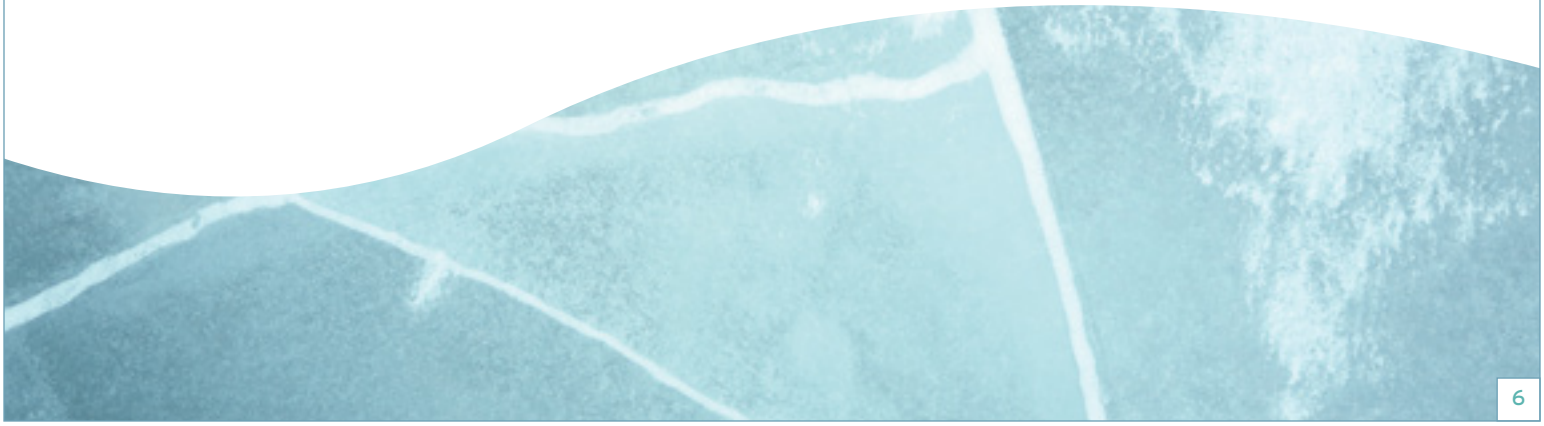
[10] Alarm Test Button–Alarm test verifies readiness of alarm function and Ni-MH battery charge.

[11] Buzzer Button–Buzzer silence temporarily mutes alarm.

[12] Compressor start-up delay sequence delays re-start after building power failure; allows facility power to reach equilibrium to permit smooth compressor start-up.

Alarms

Alarm Type	Event	Visual Alarm	Audible Alarm	Signal to Alarm Contact
Status Alert	Abnormal ambient Temperature (too high or too low), or abnormal freezer loading (too much warm product at once)	Flashing STATUS Indication Light	None	None
High Temperature	Interior chamber cools beyond high temp set point	Flashing ALARM Indication Light; LED Display Flashes Actual Chamber Temp.	Periodic Beep. A 15 minute delay after programming the set point avoids a premature event.	Yes
Low Temperature	Interior chamber warms beyond low temp set point			Yes
Power Failure	Loss of Power		Periodic Beep	Yes
System Monitoring Failure	Sensor Abnormality	Error Code	Solid Beep	No
Status Alert	Freezer Running Under Stress Low Voltage High Ambient Temperature	Lamp Illuminated	None	No
Auto Return	Touch key is not pressed for 90 seconds	None		No
Door Alarm	Door Ajar	OPEN lamp on	Solid Beep	Yes



Energy Saver Cascade Cooling System

One of the most important concepts in designing a superior energy saving ultra-low freezer is how efficiently heat is exchanged between the high and low stage circuits. By providing optimum heat exchange pathways in the design, it not only increases efficiency of the system, leading to greater energy savings, but it will also have an effect of reducing stress on the compressors, leading to greater overall system reliability.

The new cap tube heat exchanger is but the latest step in increasing the available heat exchange areas in the system. This patent pending innovation drastically increases the efficiency of the entire system. The end result is less energy consumption, while improving the overall efficiency of the freezer.

Cascade Cooling System

A Low Stage Capillary Tub
Liquid refrigerant under pressure is passed through the capillary tube where it evaporates in the low stage evaporator to absorb heat energy from the product stored in the freezer.

B Evaporator Coil
The evaporator coil is wrapped around the exterior shell to provide proper temperature uniformity within vacuum insulation panels and foamed-in-place urethane insulation.

C Capillary Tube
Low stage capillary tube heat exchanger provides heat transfer between high and low temperature points offering better energy efficiency.

D Low Stage Refrigerant
Commonly available worldwide, R508

E Low Stage Heat Exchange
Heat is efficiently transferred from the low stage to the high stage.

F Low Stage Compressor
The compressor pumps refrigerant through the low stage circuit.

G Air Cooled Pre-Condenser
Removes heat energy from the high stage refrigerant en route to the low stage compressor.

H Low Stage Oil Heat Exchange
High stage refrigerant passes through the low-stage oil pump to cool oil resulting in high-stage refrigerant being used to increase the durability of the low stage compressor.

I Inter Stage Heat Exchanger
To increase overall system efficiency heat energy is transferred to the high stage circuit.

J High Stage Oil Heat Exchange
High stage refrigerant passes through the high stage oil to cool lubricating oil en route to the low stage compressor through the air-cooled pre-condenser. Thereby increasing the reliability of the high stage compressor.

K High Stage Capillary Tube
Liquid refrigerant under pressure is passed through the capillary tube where it evaporates in the inter stage heat exchanger to absorb heat energy from the low stage refrigerant circuit.

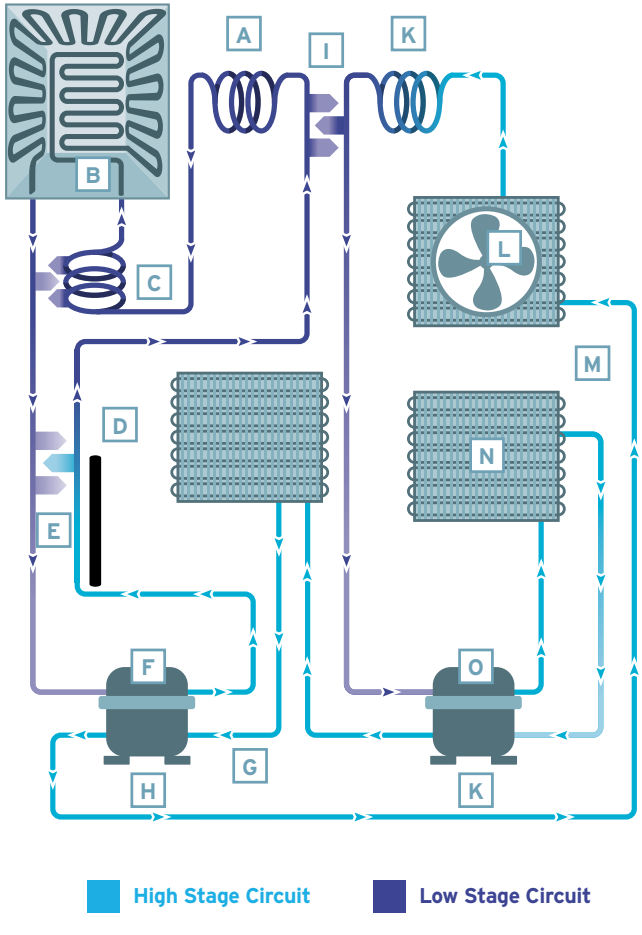
L Main Condenser and Motor/Fan
An exclusive triple pass forced air condenser increases overall system efficiency by providing maximum surface area for heat rejection.

M High Stage Refrigerant
Commonly available worldwide. Selected for optimum cooling performance in compliance with international environmental protection laws.

N Air Cooled Pre-Condenser
Removes heat energy from the high stage refrigerant en route to the high stage oil reservoir.

O High Stage Compressor
The compressor pumps refrigerant through the high stage circuit.

P Instrumentation (Not Shown)
Temperature and pressure sensors throughout the high and low stage circuits transmit information to the 'Status Alert' central controller for operation, monitoring, interpretation and component protection.



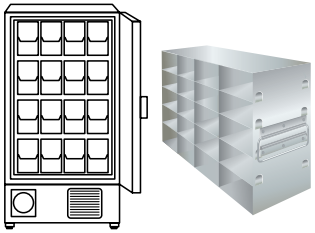
CO_2 Back-Up System
Will maintain -70˚C
at a 45 Kg. / Hr. rate.

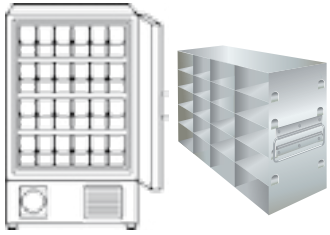
Surge Suppressor
Tough, Safe Metal Housing

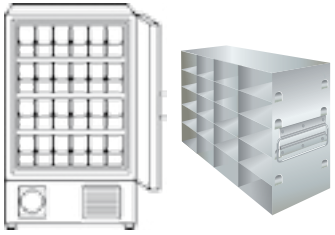
2" or 3" Fiberboard Boxes

Cryo Safety Gloves
Protection for Hands
and Arms

Temperature Recorder
Easy to Install







Model	NU-9483	NU-9668	NU-9728
Rack Capacity	16 Racks	24 Racks	24 Racks
		Adjustable Freezer Rack for 2" or 3" Boxes	
Part #	UFMC-45-2-3	UFMC-45-2-3	UFMC-46-2-3
2" Box Capacity	320 (4 deep, 5 high)	480 (4 deep, 5 high)	576 (4 deep, 6 high)
3" Box Capacity	192 (4 deep, 3 high)	288 (4 deep, 3 high)	384 (4 deep, 4 high)
		Prepackaged Freezer Rack with 2" Boxes	
Part #	SV-HL-20-2-81	SV-HL-20-2-81	SV-HL-20-2-81
2" Box Capacity	320 (4 deep, 5 high)	480 (4 deep, 5 high)	480 (4 deep, 5 high)

Maximum Capacity

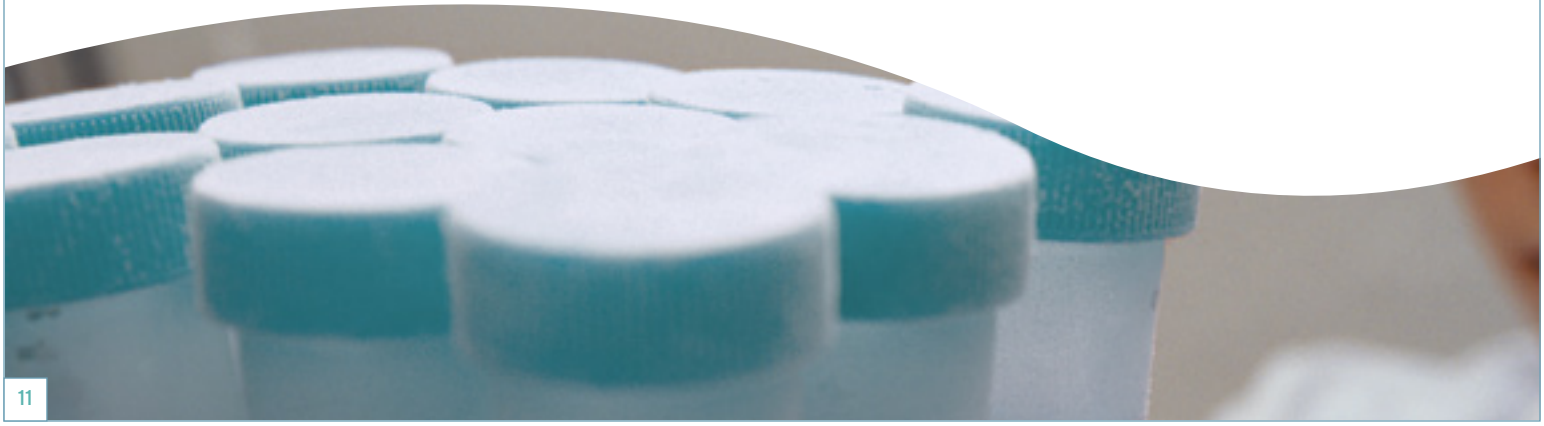
Model	NU-9483	NU-9668	NU-9728
Configuration / Rack Positions	4 Columns / 4 Rows	6 Columns / 4 Rows	6 Columns / 4 Rows
# of 2" (51 mm) 2 ml Fiberboard Boxes in Racks	384	480	576
# of 2 ml Sample Vials, 2" (51 mm) Box, 100 Cell Dividers	32,000	48,000	57,600
# of 3" (76 mm) 4 ml Fiberboard Boxes in Racks	192	336	384
# of 4 ml Sample Vials, 3" (76 mm) Box, 100 Cell Dividers	19,200	33,600	38,400
# of Standard Microplates, Foil Cover in Racks	2,016	3,024	3,456
# of Standard Microplates, Lid Cover in Racks	1,632	2,448	2,596

NU-9000 Series -86°C Ultralow Temperature Freezers

Specifications

Model	Interior Volume	Footprint	Interior Dimensions (W x D x H)	Exterior Dimensions (W x D x H)	Weight	Temperature Range	Electrical*	Warranty
NU-9483	17.1 ft^3 487 L	8.37 ft^2 0.78 m^2	24.8 x 23.6 x 50.4 in. (630 x 600 x 1280 mm)	35.0 x 34.4 x 78.3 In. (890 x 870 x 1990 mm)	706 lbs (320 kg)	-50˚C to -86˚C	**GA**: 115V / 60Hz **E**: 230V / 50Hz	2 Year Parts & Labor (US & CA) 4 Year Parts (Global)
NU-9668	23.5 ft^3 668 L	10.63 ft^2 0.99 m^2	34.2 x 23.6 x 50.4 in (870 x 600 x 1280 mm)	44.5 x 34.4 x 78.3 in. (1130 x 867 x 1990 mm)	794 lbs (360kg)	-50˚C to -86˚C	**E**: 230V / 50Hz	2 Year Parts & Labor (US & CA) 4 Year Parts (Global)
NU-9728	25.7 ft^3 728 L	9.51 ft^2 0.88 m^2	34.2 x 23.6 x 55.1 in. (870 x 600 x 1400 mm)	39.8 x 34.4 x 78.3 in. (1010 x 870 x 1990 mm)	820 lbs (373 kg)	-50˚C to -86˚C	**GA**: 115V / 60Hz	2 Year Parts & Labor (US & CA) 4 Year Parts (Global)

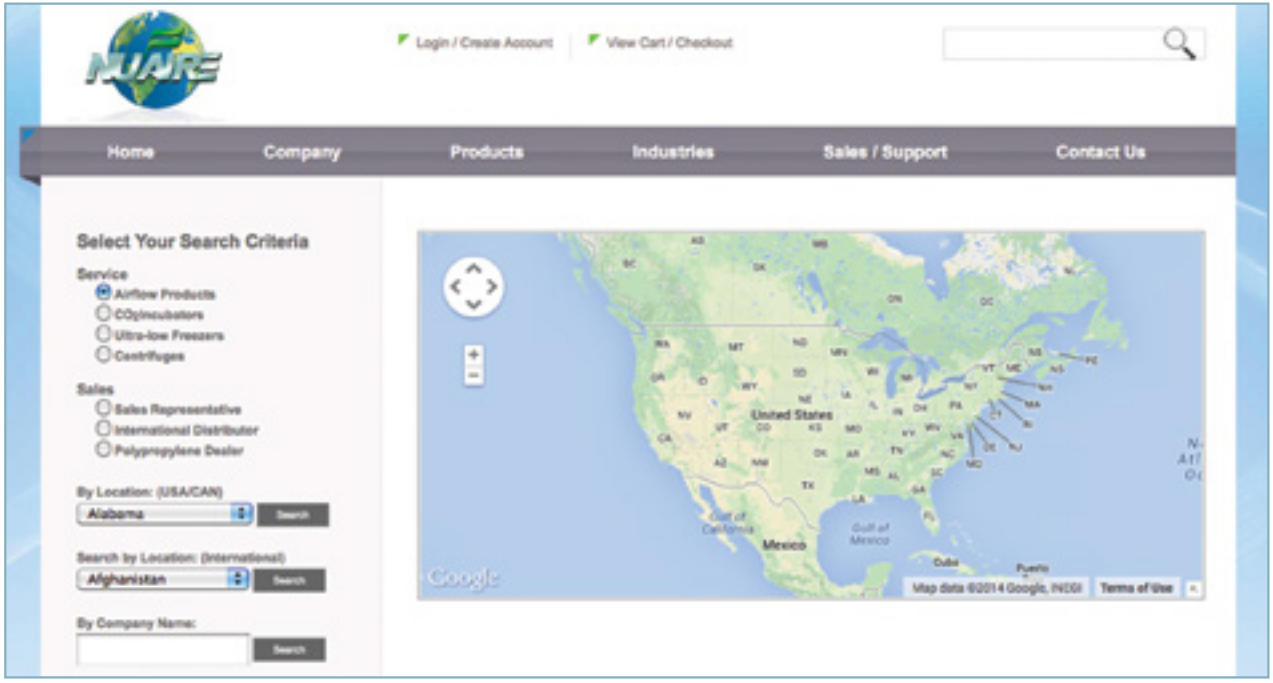
*Specify model with appropriate letter suffix for electrical specifications. "NU-9728GA" for 115 Vac / 60 Hz



Model	NU-9483	NU-9668	NU-9728
High Stage	1100 W	1100 W	750 W 1 HP
Low Stage	1100 W	1100 W	1100 W 1 1/2 HP
Voltage Booster	GC Models Only	GC Models Only	No
Noise Level	Standard (≤49 dba)	Standard (≤49 dba)	Standard (≤49 dba)
Shelf	Stainless steel, adjustable 3 shelves (23.9" w x 21" d) Max Load 110 lbs (50kg) / shelf	Stainless steel, adjustable 3 shelves (848 mm w x 533 mm d) Max Load 110 lbs (50kg) / shelf	
Access Port	0.066" (17 mm) diameter / 2 locations (back/bottom left)		
Refrigerants	HFC Refrigerants High Stage; R-404A / Low Stage; R-508	HFC Refrigerants High Stage; R-407D / Low Stage; R-508	HFC Refrigerants High Stage; R-404A / Low Stage; R-508B
Alarm	High/low temp, Power failure, Filter check, Batter check		High temp. alarm, Low temp. alarm, Power failure alarm, Door alarm, Filter alarm
Remote Alarm Contact			
Accessories	1 set keys, 1 scraper		1 set of key, 1 scraper, 1 stick for air intake port cleaner
Inner Door Configuration	Two (2)		
Seismic Brackets	Standard; hard connect to facility wall		
Leveling Feet	Standard		
Insulation	Rigid polyurethane foamed-in place		Vacuum insulation panel; Rigid polyurethane foamed-in place
Temperature Controller	Microcomputer control system		
Temperature Display	Digital		
Thermal Sensor	Platinum resistance (Pt 1000Ω)		
Battery	Nickel-metal-hydride battery, DC 6 V, 1100 mAh, Auto-recharge (5HR-AAC)		

To Locate a NuAire Sales or Service Representative

Please visit NuAire's Web site at: www.nuaire.com and select the 'Sales Team' menu item. Information can be found there for both United States and international distributors.



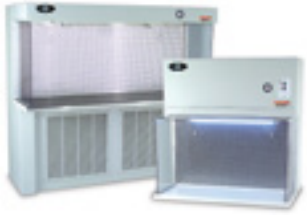
NuAire's Family of Products

IN VITROCELL ES energy saver

CO_2 Incubators

LABGARD ES energy saver

Biological Safety Cabinets



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