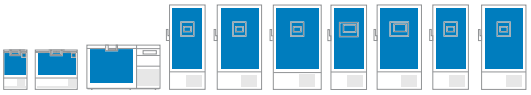
PHCbi

Life Science
Innovator
Since 1966

CRYOGENIC AND ULTRA-LOW TEMPERATURE FREEZERS



VIP® ECO | VIP ECO SMART | FrostLess

Engineered and proven for performance, reliability and uniform storage of critical biological specimens and other life forms.

PHC Corporation of North America

www.phchd.com/us/biomedical

The Global Scientific Refrigeration Solution.

VIP ECO | MDF-DU702VHA-PA
Natural Refrigerant
ENERGY STAR® Certified

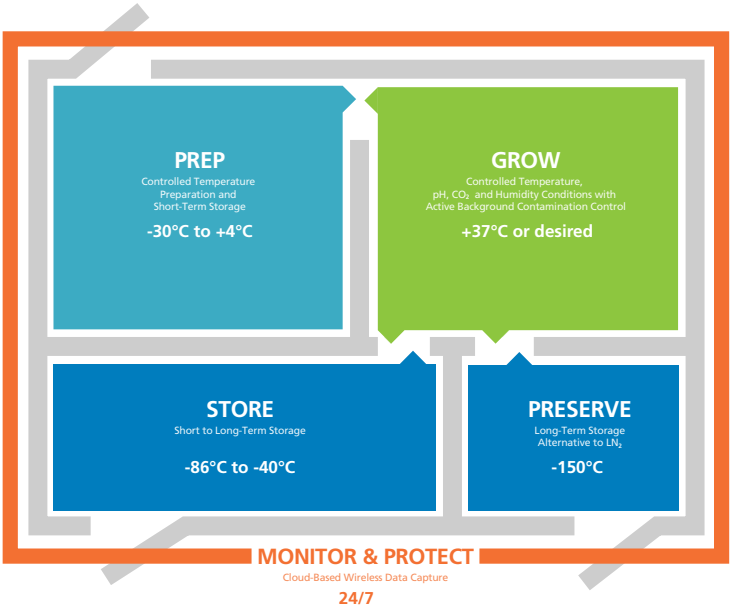
VIP ECO SMART | MDF-DU703VHA-PA
Natural Refrigerant, DUAL VOLTAGE
ENERGY STAR® Certified

Chest Freezers | MDF-C2156VANC-PA
and MDF-DC102VH-PA

FrostLess | MDF-DU700ZHA-PA
Natural Refrigerant
ENERGY STAR® Certified

Harnessing more than fifty years of innovation.

Since 1966, PHC Corporation has introduced next generation cold storage solutions with documented success, each better than the last and each created and tested for reliability and performance. Our manufacturing engineering group invests in the latest industrial design techniques to ensure continuous improvement. We consult with our customers and we listen. As we continue this journey at your side, the PHCbi brand promise will remain the industry standard for performance, reliability, and energy efficiency — without compromise.



Ultra-low temperature freezers play a key role in the life science equation.

Facilities that use PHCbi brand ultra-low temperature freezers include pharmaceutical and biotech laboratories, biorepositories, medical research and academic institutions, government institutions, blood and tissue banks, hospitals, clinics and industrial research.

Product Reliability is a Social Responsibility.

New product introductions based on insufficient life testing are without purpose. We believe innovation includes both a scientific and a social responsibility to the world. As new technologies are developed within and beyond our industry, we explore, evaluate, test and deliberate their benefits with respect to the high-value stored product you entrust us to protect with each product you purchase.

VIP ECO Series Ultra-Low Temperature Freezer Applications:

- Cell Lines
- Tissues
- Specimens
- Subcellular Components

Other applications range from archive storage of broad scale epidemiology research and frozen samples for investigations spanning decades or generations.

Performance, Reliability and Energy Management

Our theory of ultra-low temperature freezer design is based on a three-point objective: performance, reliability and energy management.

PERFORMANCE

The primary purpose of an ultra-low temperature freezer is to protect a stored product by achieving and maintaining a uniform temperature that assures cell viability regardless of where samples are stored inside.

Our measure of performance extends to stability in the steady state, quick pull-down on initial startup or following a power outage, and quick recovery following routine door openings. Superior performance cannot be compromised ever for any reason.

RELIABILITY

While performance is the first test of our product, reliability over the life of the freezer is essential to the protection of your research, peace of mind in your work and return on your investment.

The PHCbi brand reputation for reliability in refrigeration system operation and predictive maintenance is strong.
VIP® ECO Series ultra-low freezers have earned a worldwide reputation for *dependable performance in demanding environments* where critical materials are preserved for generations.

ENERGY MANAGEMENT

Reducing energy consumption is a priority, and as such, we continue to pioneer the development of some of the lowest energy consumption units in the world. As demonstrated by our ENERGY STAR® category leadership for ultra-low temperature freezers, PHCbi brand offers a path toward achieving organization sustainability goals.

The VIP ECO SMART, winner of the ISBER 2023 Outstanding New Product Award, has a daily energy usage of only 5.4 kWh and delivers temperature uniformity of ± 3 or better.[1]

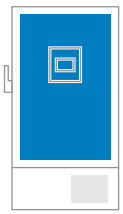
[1] The data reflects performance metrics rather than official product specifications. Results from technical data sheet tests should not be used to establish regulatory parameters for specific customer applications. The performance of the freezer will depend on factors such as the volume of customer products, storage format, selected options, operating conditions, test methods, and adherence to recommended maintenance practices. Ongoing product improvements may lead to changes or omissions in this technical data sheet without prior notice. PHC Corporation of North America disclaims responsibility for any damage, injury, loss, or expenses arising from the misuse of the information provided

NATURAL REFRIGERANTS

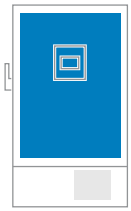
Our models leverage natural refrigerants combined with inverter compressor algorithms (ICA) to yield lower operating costs without compromising reliability and ultra-low temperature performance.

VIP ECO Series, ENERGY STAR Certified

MDF-DU502VH-PA
MDF-DU502VHA-PA
18.6 cu.ft. | 528 L



MDF-DU702VH-PA
MDF-DU702VHA-PA
25.7 cu.ft. | 729 L



MDF-DU901VHA-PA
29.8 cu.ft. | 845 L

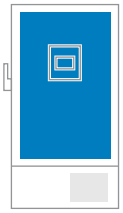
VIP ECO SMART Series, ENERGY STAR Certified

MDF-DU703VHA-PA
25.7 cu.ft. | 729 L

MDF-DU503VHA-PA
18.6 cu.ft. | 528 L

FrostLess Series, ENERGY STAR Certified

MDF-DU500ZHA-PA
18.5 cu.ft. | 525 L



MDF-DU700ZHA-PA
MDF-DU700ZH-PA
25.6 cu.ft. | 725 L

Selection

PHCbi brand ultra-low temperature freezers are available in a range of orientations and sizes. Choose from space-saving upright cabinets and low-profile chest cabinets which are designed for both new laboratories and replacement installations. Larger upright cabinets are configured for high-volume storage in biorepository facilities.

A variety of common components shared across the product line include inventory management accessories and available cloud-based alarm/monitoring systems that use the latest secure wireless technology.

VIP ECO and Sustainability

PHCbi's VIP ECO, VIP ECO SMART, and FrostLess models are ENERGY STAR Certified* for performance and independently tested by a nationally recognized testing laboratory. They offer fast pull-down, quick recovery after door openings, temperature uniformity, and robust tolerance for high ambient conditions.

Natural refrigerants minimize environmental impact while maintaining stable ultra-low temperature conditions required to protect valuable specimens.

A unique variable differential cascade system and proprietary internal heat exchanger increases the performance envelope to apportion cooling power to the cabinet on demand. Energy efficient reserve cooling power is substantiated by fast recovery after door openings.

5-YEAR
PARTS & LABOR
WARRANTY

Warranty

PHC Corporation of North America offers 5-year, parts and labor warranty protection on all ultra-low temperature freezers (North America only).

*Based upon https://www.energystar.gov/productfinder/product/certified-lab-grade-refrigeration/ Website accessed January 11, 2023

VERTICAL COMPONENT INTEGRATION

As a global company, PHC Corporation draws on vast corporate resources and worldwide engineering networks to develop new compressor designs, electronic technologies and balanced energy efficiencies without trading off performance and reliability. Our ***vertical component integration*** initiative assures that PHCbi brand freezers include the latest high performance electronics and subsystems required to deliver sustainable outcomes.

VIP ECO Series Refrigeration Platforms

	VIP Plus, Cryogenic	VIP ECO Series, Chest	VIP ECO / VIP ECO SMART, Uprights	FrostLess, Uprights
Compressors	Hybrid auto-cascade (two compressors)	Auto-cascade (single compressor)	Cascade system, (two compressors)	Cascade system, (two compressors)
Refrigerant	Blended refrigerants	Blended natural refrigerants	Natural refrigerants	Natural refrigerants

VIP ECO Series Compressors

Refrigeration compressors are specifically designed and engineered to achieve and maintain ultra-low temperatures. Compressor attributes include apportionment of interior components for strength, lubricating efficiency, pressure and refrigerant flow ratios, motor temperatures and heat removal.

- Uniquely designed heat exchangers have ample surface area to move energy from one stage to another
- Internal lubrication pathways permit the use of the same energy twice in multiple sections of the cooling system
- Compressor operating temperatures are minimized to extend compressor life within designed operating parameters
- Compressors are engineered to tolerate broader voltage deviations typical of real-world installations
- Micro-lubrication within compressor housings and critical internal components are supplemented by a unique cooling oil spray to improve longevity
- Environmentally friendly, natural and non-CFC refrigerants are used throughout the product line
- Cabinets maintain reserve refrigeration power to assure fast temperature recovery following door and lid openings and for assurance of safe operating parameters during periods of high ambient temperatures or voltage fluctuations during area brown-out conditions
- Optional liquid CO_2 or LN_2 back-up systems provide an added measure of protection for stored samples

VIP ECO Upright Refrigeration System Platform

The VIP ECO upright ultra-low temperature freezer uses a variable differential cascade system powered by two variable speed inverter compressors with natural refrigerants. These compressors deliver balanced performance on demand through a proprietary system controller that reads multiple data points throughout the cooling circuit. The control algorithm optimizes individual compressor speed to match high and low-stage demands for cooling, saving energy and increasing responsiveness.

Cascade Reliability

Refrigerants do the work of removing heat (cooling) through a process of expansion and condensation within the circuit. Compressors pump the refrigerant that circulates through the system, expanding and condensing as they absorb heat from the cabinet and reject heat through the condenser. Compressors not intended to tolerate the demands of ultra-low temperature cooling can overheat, diminish cooling performance and shorten compressor life leading to freezer failure. Our compressors are engineered and purpose built to enhance lubrication at all points within the system, a measure that reduces heat and improves reliability.

Using the Same Energy Twice

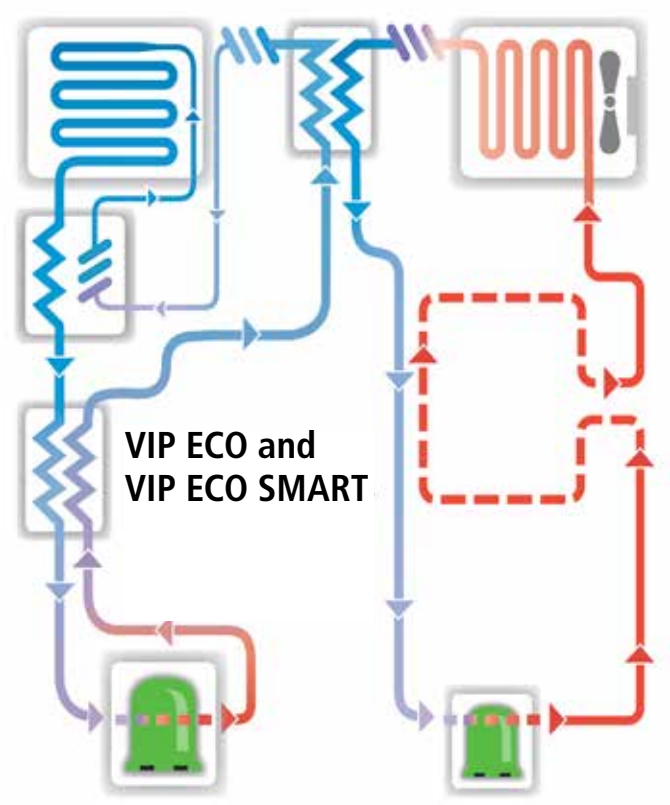
In the cascade system, both the high-stage and low-stage circuits work together to cool both the chamber and compressor operating components in the process. In this unique configuration, the high-stage compressor cools the low-stage circuit which, in turn, cools the cabinet. In the process, the high-stage compressor flows cool refrigerant through compressor oil reservoirs. Multiple lubrication pathways cool all internal bearings and the compressor discharge heads, reducing temperatures at critical points and extending compressor life.

While dependability and uptime remain the most important functions of the product line, improvements in energy management and sustainability, without compromising performance, remain central to our research and development program.

VIP ECO Series Chest, Refrigeration Platform

The VIP ECO Series chest freezer is a low-profile design containing a space-saving auto-cascade cooling circuit. Powered by a single refrigeration compressor, the VIP ECO Series cabinet maintains normal temperature within a setpoint range of -40°C to -80°C. Unique to the chest freezer design are attributes of the thermal mass within the freezer load and the physics of cold air movement during freezer access. Thus, the chest freezer offers a longer warm-up time in the event of a power failure.

The VIP Plus cryogenic freezer uses a reliable, high performance, hybrid auto-cascade refrigeration system designed to achieve cryogenic temperatures of -150°C. This freezer offers air phase cryogenic storage without the need for liquid nitrogen as a primary cooling medium. The cryogenic freezer also comes equipped with a connection fitting for LN_2 supply, to assure vapor phase backup if needed. The robust auto-cascade system delivers exceptional cooling performance and precise temperature control. Superior uniformity is achieved at cryogenic temperatures without stratification.



(left) Compressors used in the PHCbi cascade refrigeration system use refrigeration temperature to maintain operating temperatures at critical points within the circuit, extending compressor life and optimizing operating efficiencies.

Compressor schematic for reference only. Schematic for VIP ECO ultra-low temperature freezer (not shown) varies in arrangement and function of individual components.

CONTROLLER PLATFORMS

VIP ECO | VIP ECO SMART | FrostLess

PHCbi brand ultra-low temperature and cryogenic freezers are managed by a variety of microprocessor-based digital controllers configured for setpoint security, temperature display, system status and alarm functions, and predictive performance advisories.

MDF-DU702VH-PA *MDF-C2156VANC-PA* *MDF-DU703VH-PA* *MDF-DU700ZHA-PA*

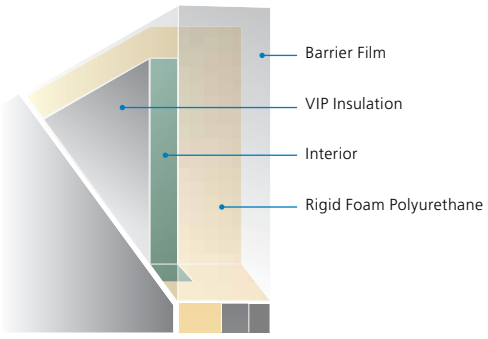
Controller	| A | Touchscreen with Graphical Color LCD Display	| B | LCD Softkey Display (18 Total Buttons)	| C | Touchscreen with Graphical Color LCD Display	| D | Touchscreen with Graphical Color LCD Display
Models	VIP ECO MDF-DU502VH-PA MDF-DU502VHA-PA MDF-DU702VH-PA MDF-DU702VHA-PA MDF-DU901VHA-PA	Cryogenic MDF-C2156VANC-PA	VIP ECO SMART MDF-DU703VHA-PA MDF-DU503VHA-PA	FrostLess MDF-DU500ZHA-PA MDF-DU700ZHA-PA MDF-DU700ZH-PA
Location	Door mounted, eye level	Front, upper right side	Door mounted, eye level	Door mounted, eye level
Information	LCD message center – all freezer functions	LCD message center	10.1" LCD display	LCD message center – all freezer functions
Programming	Touchscreen – menu – all functions	Softkeys	Touchscreen – menu – all functions	Touchscreen – menu – all functions
Facial Recognition	—	—	Included	—
NFC Access	—	—	Optional	—
Temperature Alarms	Indicator on screen – visual message + audible	Indicator on screen – visual message + audible	Indicator on screen – visual message + audible	Indicator on screen – visual message + audible
Power Failure	Visual message + audible	Visual message + audible	Visual message + audible	Visual message + audible
Door/Lid Ajar	Visual message + audible	Visual message + audible	Visual message + audible	Visual message + audible
Alarm Ring Back	Included	Included	Included	Included
Audible Silence	Manual	Manual	Manual	Manual
Alarm Test	Manual	Manual	Manual	Manual
Deviation Alarm	Indicator and visual message	Indicator and visual message	Indicator and visual message	Indicator and visual message
Clean Filter Alert	Indicator	Indicator light	Indicator	Indicator
Replace Battery Indicator	Visual message	Visual message	Visual message	Visual message
Remote Alarm Contacts	NO/NC/Common, 30V, 2A DC	NO/NC/Common, 30V, 2A DC	NO/NC/Common, 30V, 2A DC	NO/NC/Common, 30V, 2A DC
Data Download	USB Port	—	USB Port	USB Port
Display Brightness	Contrast adjustment	Contrast adjustment	Contrast adjustment	Contrast adjustment
LCO_2 / LN_2 Backup	Visual message	—	Visual message	Visual message
Battery	Rechargeable Lead Acid	Rechargeable Lead Acid	Rechargeable Lead Acid	Rechargeable Lead Acid

Our collection of cabinet sizes is strategically engineered to permit quick and easy replacement of older, less efficient freezers with minimal downtime. Existing inventory racks can be used on many models. Freezers are designed to fit through standard doorways of 38" (965 mm), stand-off brackets may be removed and reattached; removal not required for 40" (1016 mm) doorways.

Series and Model	Volume | cu.ft. (L)	Insulation	Frost Control	Door Handle	Vacuum Relief	Door Gasket	Mobility
VIP ECO Series, Upright Models -40°C to -86°C, VIP ECO Natural Refrigerant							
MDF-DU502VH-PA, MDF-DU502VHA-PA	18.6 (528)	VIP Plus	Advanced	EZlatch	Auto + Manual	Quick change	Casters, leveling legs
MDF-DU702VH-PA, MDF-DU702VHA-PA	25.7 (729)	VIP Plus	Advanced	EZlatch	Auto + Manual	Quick change	Casters, leveling legs
MDF-DU901VHA-PA	29.8 (845)	VIP Plus	Advanced	EZlatch	Manual	Field replaceable	Casters, leveling legs
VIP ECO Series, Chest Models -40°C to -80°C							
MDF-DC102VH-PA	3.0 (84)	VIP Plus	Standard	Chest lid handle	–	Field replaceable	Casters, leveling legs
MDF-DC202VH-PA	6.4 (180)	VIP Plus	Standard	Chest lid handle	–	Field replaceable	Casters, leveling legs
Cryogenic Chest Model -125°C to -150°C							
MDF-C2156VANC-PA	8.2 (231)	VIP Plus	Standard	Chest lid handle	–	Field replaceable	Casters, leveling legs
VIP ECO SMART Series, Upright Models -40°C to -86°C, Natural Refrigerant							
MDF-DU503VHA-PA	18.6 (528)	VIP Plus	Advanced	EZlatch (with electric lock)	Auto	Quick change	Casters, leveling legs
MDF-DU703VHA-PA	25.7 (729)	VIP Plus	Advanced	EZlatch (with electric lock)	Auto	Quick change	Casters, leveling legs
FrostLess Series, Upright Models -40°C to -86°C -86°C, Natural Refrigerant, Frost Mitigation							
MDF-DU500ZHA-PA	18.5 (525)	VIP Plus	Advanced Frost Mitigation	EZlatch	Manual	Field replaceable	Casters, leveling legs
MDF-DU700ZHA-PA	25.6 (725)	VIP Plus	Advanced Frost Mitigation	EZlatch	Manual	Field replaceable	Casters, leveling legs
MDF-DU700ZH-PA	25.6 (725)	VIP Plus	Advanced Frost Mitigation	EZlatch	Manual	Field replaceable	Casters, leveling legs

Cabinet Insulation and Finish

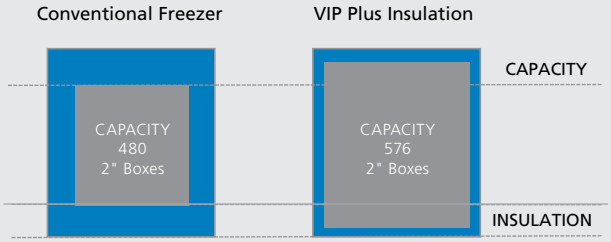
Freezer cabinets are constructed using three insulation techniques, each selected to maximize internal storage volume while maintaining stable interior temperatures over a range of ambient temperatures. Insulation methods include VIP Plus and foamed-in-place techniques. Freezer interiors and exteriors are constructed of heavy gauge galvannealed steel. All external surfaces are powder coated to resist scratches, rust or corrosion.



VIP Plus cabinet insulation offers a thin-profile with superior resistance to heat loss in higher ambient conditions.

VIP PLUS INSULATION

Cabinets with VIP Plus insulation are formed with a composite of thin-profile vacuum insulation panel substrates supported by foamed-in-place insulation within the exterior walls. VIP Plus cabinets offer additional interior storage volume and exceptional insulation value within a compact footprint.



Simple and efficient access to your stored product enhances safety and comfort.

Opening the door or lid on an ultra-low temperature freezer is not an insignificant event. Because extreme inside/outside temperature differentials often exceed 116°C (212°F), careful planning is encouraged before accessing the interior.

To minimize the duration of the door opening, users should know the location of the stored product inside the freezer before accessing. Such best practices lead to better chamber uniformity, faster recovery of setpoint temperature and longer freezer life.

EZlatch

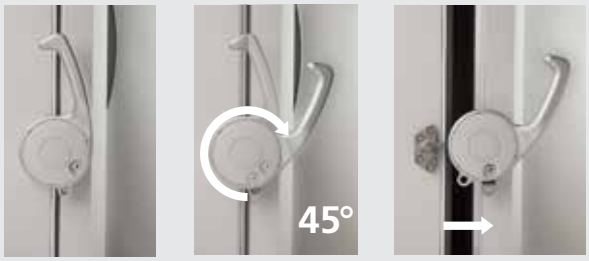
The PHCbi EZlatch door handle spans an arc of 45 degrees in total movement for easy operation. Ergonomically designed for minimal effort and one-handed operation, the EZlatch includes a roller engage trigger with motion stopper to eliminate a false catch or over-torque. The EZlatch includes an integral key lock as well as a provision for a secondary padlock to restrict access.

Our newest offerings, the MDF-DU703VH/VHA-PA and MDF-DU503VH/VHA-PA, feature an integrated electronic lock for a heightened level of security.

EZlatch door handle

EZLATCH DOOR HANDLE

When opening, the handle gently pushes the door away from the face of the cabinet. When closing, it evenly draws the door to the cabinet face against the multi-point gaskets. Excess air trapped between the inner doors and outer door is displaced for enhanced frost reduction.



Standard on models MDF-DU502VH-PA, MDF-DU502VHA-PA, MDF-DU702VH-PA, MDF-DU702VHA-PA, MDF-DU503VH-PA, MDF-DU503VHA-PA, MDF-DU703VH-PA, MDF-DU703VHA-PA, MDF-DU901VHA-PA. MDF-DU500ZHA-PA, and MDF-DU700ZHA-PA.

Frost Control, Upright Cabinets

The upright cabinet outer door is insulated and mounted on heavy duty hinges. The door incorporates a gentle, unobtrusive lift mechanism to resist sagging over time. When closed, the outer door design minimizes space between the outer door and inner doors, which diminishes trapped ambient air volume. This reduces ice buildup and nuisance vacuum which can complicate a quick additional door opening.

Frost Control, Chest Freezers

The chest freezer lid is insulated and attached to heavy-duty hinges supported by gas pistons. The hinges keep the lid in position when fully opened.

Hinges are mounted to the chest cabinet on flanges with oval holes to permit adjustment throughout the life of the freezer. Insulated sub-lids create additional protection against high ambient conditions.

Selected VIP ECO models feature a multi-point peripheral gasket, designed for field replacement without tools, while the freezer remains loaded and in operation.*

** Selected models only.*

- Insulated inner doors with gaskets minimize cold air loss during door openings and include positive latches to hold firmly against all compartments
- Multi-point door gaskets create micro air breaks around the face of the cabinet, restricting moisture migration into the cabinet and minimizing frost. Gasket composition withstands extreme relative temperature differentials ensuring a full peripheral door seal
- To minimize frost and protect the cabinet seal, all materials at the door/cabinet interface are engineered to minimize passive heat transmission from the outside to the inside and to reduce cold surfaces in contact with moist, ambient air
- Some heat output from the refrigeration system is diverted to the non-temperature conduction extrusion to resist mold and moisture accumulation, which can cause frost and ice buildup

Vacuum Relief

When the freezer is opened and closed, the temperature differential of cabinet air versus. ambient air creates a vacuum within the cabinet as the air cools and reduces volume. Although this vacuum is released slowly over time, immediate re-entry into the freezer requires a vacuum relief override to accelerate the process.

We use two vacuum relief processes, including a manually initiated relief, as well as an automatic vacuum relief. Both simplify opening the door after a recent access.
The manual vacuum port is conveniently located on the cabinet side wall.

Vacuum Relief		
	Automatic	Manual
MDF-DU503VH-PA	✓	
MDF-DU503VHA-PA	✓	
MDF-DU703VH-PA	✓	
MDF-DU703VHA-PA	✓	
MDF-DU502VH-PA	✓	✓
MDF-DU502VHA-PA	✓	✓
MDF-DU702VH-PA	✓	✓
MDF-DU702VHA-PA	✓	✓
MDF-DU901VHA-PA		✓
MDF-DU500ZHA-PA		✓
MDF-DU700ZHA-PA		✓
MDF-DU700ZH-PA		✓

SPECIFICATIONS

Chest Models ,VIP ECO Series and Cryogenic

Model Number		MDF-DC102VH-PA	MDF-DC202VH-PA	MDF-C2156VANC-PA
External Dimensions (W × D × H) [1]	inches | mm	22.0 × 27.1 × 39.1 | 558 × 688 × 993	40.1 × 27.1 × 39.1 | 1018 × 688 × 993	68.1 × 30.1 × 39.8 | 1730 × 765 × 1010
Internal Dimensions (W × D × H)	inches | mm	15.9 × 19.3 × 16.8 | 405 × 490 × 426	34.1 × 19.3 ×16.8 | 865 × 490 × 426	29.9 × 19.5 × 24.5 | 760 × 495 × 622
Volume	cu.ft. | liters	3.0 | 84	6.4 | 180	8.2 | 231
Net Weight	lbs | kg	187.4 | 85	253.5 | 115	716.5 | 325
Capacity (2" boxes)	qty	42	119	165
Capacity (3" boxes)	qty	30	85	105
Inventory Racks (2" boxes)	qty	6	17	15
Inventory Racks (3" boxes)	qty	6	17	15
Performance				
Warranty [2]		5 years parts and labor	5 years parts and labor	3 years parts and labor | 5 year compressor parts
Cooling Performance [3]	°C	-86	-86	-150
Temperature Setting Range [3]	°C	-40 to -86 in 1° increments	-40 to -86 in 1° increments	-125 to -152
Temperature Control Range [3]	°C	-40 to -80 in 1° increments	-40 to -80 in 1° increments	-125 to -150
Control				
Controller		Microcomputer control system	Microcomputer control system	Microprocessor
Display		Organic EL display	Organic EL display	LCD
Temperature Sensor		Platinum resistance (Pt 1,000 Ω)	Platinum resistance (Pt 1,000 Ω)	Pt-1000
Refrigeration				
Refrigeration System		Cold wall (single compressor auto cascade system)	Cold wall (single compressor auto cascade system)	Cascade with auto-cascade low stage
Compressors	W	(1) 550	(1) 550	(2) 1100, variable speed
Refrigerant		Mixed HC refrigerant (R-290, R-170, R-50)	Mixed HC refrigerant (R-290, R-170, R-50)	High-stage HFC Low-stage HFC Mixed
Insulation Thickness, Material	inches I mm	Rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels	Rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels	5.31 I 135, rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels
Construction				
Exterior Material		Painted steel	Painted steel	Painted steel
Interior Material		Painted steel	Painted steel	Aluminum
Outer Door	qty	1	1	1 (key lock with provision for optional pad lock)
Inner Doors / Lids	qty	1 (styrene foam)	2 (styrene foam)	2 (insulated, ABS, stainless steel frames, positive latches)
Access Ports	qty	2: back, bottom	2: back, bottom	1: near temperature sensor
Access Port Diameter	inches | mm	0.6 | 17	0.6 | 17	1.5 | 40
Casters	qty	4 (2 leveling feet)	4 (2 leveling feet)	6 (3 leveling feet on front base)
Alarms		(V = Visual Alarm, B = Buzzer Alarm, R = Remote Alarm)		
Power Failure		V-B-R	V-B-R	V-B-R
Temperature (High and Low)		V-B-R	V-B-R	V-B-R
Sensor Failure		V-B-R	V-B-R	V-B-R
Lid Open		-	-	V-B
Remote Alarm Contacts		Allowable contact capacity: DC 30 V, 2 A [4]	Allowable contact capacity: DC 30 V, 2 A [4]	Allowable contact capacity: DC 30 V, 2 A [4]
Electrical and Noise Level				
Power Supply		115V, NEMA 5-15P, 60HZ, 9.8 ft cord length	115V, NEMA 5-15P, 60HZ, 9.8 ft cord length	220V, 1Ø, NEMA 6-15P, 60HZ, 9.8 ft cord length
Noise Level [5]	dB(A)	52	52	51
Temperature Recorder				
Back-Up Cooling Kit		MDF-UB8I-PW [6]	MDF-UB8I-PW [6]	LN_2 Back-up standard
Circular Type	6", 7 day circular	MTR-G85A	MTR-G85A	MTRC954*
Chart Paper	52 charts per box	RP-G85-PW	RP-G85-PW	C72101106REV (-210°C to +110°C)*
Ink Pen	pack of 6	PG-R-PW	PG-R-PW	R252*
Optional Communication System				
Wireless, Cloud-Based, Automatic Data Management		LabSVIFT™ [7] | LabAlert®* | V-SafeRX		

[1] Exterior dimensions of main cabinet only, excluding handle and other external projections
[2] Current warranty offered at time of printing and may be subject to change; US and Canada only
[3] Air temperature measured at freezer center, ambient temperature +30°C, no load
[4] Standard signal and interface cables with a maximum length of 30 meters are recommended.
[5] Nominal value, background noise 20 dB(A)
[6] Settable range of the injection start temperature is -70°C to -50°C.
[7] Requires MTR-480 to operate as Gen 2 on LabSVIFT System.
*Manufactured by others.

NEMA	Plug (P)	Receptacle (R)
5-15		
6-15		

Model Number		MDF-DU502VH-PA	MDF-DU502VHA-PA
External Dimensions (W × D × H) [1]	inches | mm	31.1 × 34.7 × 78.5 | 790 × 882 × 1993	31.1 × 34.7 × 78.5 | 790 × 882 × 1993
Internal Dimensions (W × D × H)	inches | mm	24.8 × 23.6 × 55.1 | 630 × 600 × 1400	24.8 × 23.6 × 55.1 | 630 × 600 × 1400
Volume	cu.ft. | liters	18.6 | 528	18.6 | 528
Net Weight	lbs | kg	542 | 246	542 | 246
Capacity (2" Boxes)	qty	384	384
Capacity (3" Boxes)	qty	256	256
Inventory Racks (2" Boxes)	qty	16	16
Inventory Racks (3" Boxes)	qty	16	16
Performance			
Warranty [2]		5 years parts and labor	5 years parts and labor
Cooling Performance [3]	°C	-40 to -86	-50 to -86
Temperature Setting Range [3]	°C	-40 to -90 in 1° increments	-50 to -90 in 1° increments
Temperature Control Range [3]	°C	-40 to -86 in 1° increments	-50 to -86 in 1° increments
Control			
Controller		Microprocessor, touchscreen data entry, password protected	Microprocessor, touchscreen data entry, password protected
Display		LCD color touchscreen	LCD color touchscreen
Temperature Sensor		Pt-1000	Pt-1000
Refrigeration			
Refrigeration System		Synchronized variable speed cascade system	Synchronized variable speed cascade system
Compressors	qty	(2) 750, variable speed	(2) 750, variable speed
Refrigerant		R-170 (ethane) R-290 (propane)	R-170 (ethane) R-290 (propane)
Insulation Thickness, Material	inches | mm	3.1 | 80, rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels	3.1 | 80, rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels
Construction			
Exterior Material		Painted electrogalvanized steel	Painted electrogalvanized steel
Interior Material		Powder coated electrogalvanized steel	Powder coated electrogalvanized steel
Outer Door	qty	1 (key lock, with provision for optional pad lock)	1 (key lock, with provision for optional pad lock)
Inner Doors	qty	2 (insulated, ABS, with stainless steel frames, positive latches)	2 (insulated, ABS, with stainless steel frames, positive latches)
Shelves	qty	3 (adjustable)	3 (adjustable)
Shelf Dimensions (W × D)	inches | mm	24.2 × 21.0 | 615 × 534	24.2 × 21.0 | 615 × 534
Max. Load per Shelf	lbs | kg	110 | 50	110 | 50
Auto Vacuum Relief	qty	1: in door	1: in door
Manual Relief	qty	1: lower left side	1: lower left side
Access Ports [4]	qty	3: upper back wall (back-up system), bottom left (recorder sensor), bottom right (access)	3: upper back wall (back-up system), bottom left (recorder sensor), bottom right (access)
Access Port Diameter	inches | mm	0.6 | 17	0.6 | 17
Casters	qty	4 (2 leveling feet on front base)	4 (2 leveling feet on front base)
Alarms		(V = Visual Alarm, B = Buzzer Alarm, R = Remote Alarm)	
Power Failure		V-B-R	V-B-R
Temperature (High and Low)		V-B-R	V-B-R
Sensor Failure		V-B-R	V-B-R
Door Open		V-B	V-B
Battery Check		V	V
Fan Motor Check		V	V
Cooling Circuit Abnormality		V	V
Remote Alarm Contacts		DC 30V 2A (normally open, normally closed, common)	DC 30V 2A (normally open, normally closed, common)
Electrical and Noise Level			
Power Supply		220V, 1Ø, 60Hz, NEMA 6-15P, requires NEMA 6-15R receptacle	115V, 1Ø, 60Hz, NEMA 5-20P, requires NEMA 5-20R receptacle
Voltage Booster		N/A	N/A
Noise Level [5]	dB(A)	46	46
Options			
Inner Door Kit with Option of 4 or 5 Inner Doors		MDF-5ID4-PW (4 inner doors) MDF-5ID5-PW (5 inner doors)	MDF-5ID4-PW (4 inner doors) MDF-5ID5-PW (5 inner doors)
Liquid CO_2 Back-Up System [6]		MDF-UB7-PW	MDF-UB7-PW
Liquid Nitrogen Back-Up System [6]		MDF-UB7-PW-LN2	MDF-UB7-PW-LN2
Temperature Recorder			
Circular Type	6", 7 day	MTR-G85C	MTR-G85A
Chart Paper	52 charts/box	RP-G85-PW	RP-G85-PW
Ink Pen	pack of 6	PG-R-PW	PG-R-PW
Optional Communication System			
Wireless, Cloud-Based, Automatic Data Management		LabSVIFT™ [7] | LabAlert®* | V-SafeRX	

[1] Exterior dimensions of cabinet excluding handle, rear stand-off brackets and other external projections.
[2] Current warranty offered at time of printing and may be subject to change; US and Canada only.
[3] Air temperature measured at freezer center, ambient temperature +30°C, no load.
[4] A chart recorder and a liquid CO_2 back-up system each occupy a separate access port.
[5] Nominal value, background noise 20 dB(A).
[6] Settable range of the injection start temperature is -70°C to -50°C.
[7] Requires MTR-480 to operate as Gen 2 on LabSVIFT System.
*Manufactured by others.

NEMA	Plug (P)	Receptacle (R)
5-20		
6-15		

SPECIFICATIONS

VIP ECO Upright -86°C, Natural Refrigerant Series

Model Number		MDF-DU702VH-PA	MDF-DU702VHA-PA
External Dimensions (W × D × H) [1]	inches | mm	40.6 × 36.8 × 78.5 | 1030 × 935 × 1993 [2]	40.6 × 36.8 × 78.5 | 1030 × 935 × 1993
Internal Dimensions (W × D × H)	inches | mm	34.3 × 23.6 × 55.1 | 870 × 600 × 1400	34.3 × 23.6 × 55.1 | 870 × 600 × 1400
Volume	cu.ft. | liters	25.7 | 729	25.7 | 729
Net Weight	lbs | kg	613 | 278	613 | 278
Capacity (2" Boxes)	qty	576	576
Capacity (3" Boxes)	qty	384	384
Inventory Racks (2" Boxes)	qty	24	24
Inventory Racks (3" Boxes)	qty	24	24
Performance			
Warranty [3]		5 years parts and labor	5 years parts and labor
Cooling Performance [4]	°C	-40 to -86	-50 to -86
Temperature Setting Range [4]	°C	-40 to -86 in 1° increments	-50 to -90 in 1° increments
Temperature Control Range [4]	°C	-40 to -86 in 1° increments	50 to -86 in 1° increments
Control			
Controller		Microprocessor, touchscreen data entry, password protected	Microprocessor, touchscreen data entry, password protected
Display		LCD color touchscreen	LCD color touchscreen
Temperature Sensor		Pt-1000	Pt-1000
Refrigeration			
Refrigeration System		Synchronized variable speed cascade system	Synchronized variable speed cascade system
Compressors	qty	(2) 750, variable speed	(2) 750, variable speed
Refrigerant		R-170 (ethane) R-290 (propane)	R-170 (ethane) R-290 (propane)
Insulation Thickness, Material	inches | mm	3.1 | 80, rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels	3.1 | 80, rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels
Construction			
Exterior Material		Painted electrogalvanized steel	Painted electrogalvanized steel
Interior Material		Powder coated electrogalvanized steel	Powder coated electrogalvanized steel
Outer Door	qty	1 (key lock, with provision for optional pad lock)	1 (key lock, with provision for optional pad lock)
Inner Doors	qty	2 (insulated, ABS, with stainless steel frames, positive latches)	2 (insulated, ABS, with stainless steel frames, positive latches)
Shelves	qty	3 (adjustable)	3 (adjustable)
Shelf Dimensions (W × D)	inches | mm	33.6 × 21.0 | 855 × 534	33.6 × 21.0 | 855 × 534
Max. Load per Shelf	lbs | kg	110 | 50	110 | 50
Auto Vacuum Relief	qty	1: in door	1: in door
Manual Relief	qty	1: lower left side	1: lower left side
Access Ports [5]	qty	3: upper back wall (back-up system), bottom left (recorder sensor), bottom right (access)	3: upper back wall (back-up system), bottom left (recorder sensor), bottom right (access)
Access Port Diameter	inches | mm	0.6 | 17	0.6 | 17
Casters	qty	4 (2 leveling feet on front base)	4 (2 leveling feet on front base)
Alarms			(V = Visual Alarm, B = Buzzer Alarm, R = Remote Alarm)
Power Failure		V-B-R	V-B-R
Temperature (High and Low)		V-B-R	V-B-R
Sensor Failure		V-B-R	V-B-R
Door Open		V-B	V-B
Battery Check		V	V
Fan Motor Check		V	V
Cooling Circuit Abnormality		V	V
Remote Alarm Contacts		DC 30V 2A (normally open, normally closed, common)	DC 30V 2A (normally open, normally closed, common)
Electrical and Noise Level			
Power Supply		220V, 1Ø, 60Hz, NEMA 6-15P, requires NEMA 6-15R receptacle	115V, 1Ø, 60Hz, NEMA 5-20P, requires NEMA 5-20R receptacle
Voltage Booster		N/A	N/A
Noise Level [6]	dB(A)	46	46
Options			
Inner Door Kit with Option of 4 or 5 Inner Doors		MDF-7ID4-PW (4 inner doors) MDF-7ID5-PW (5 inner doors)	MDF-7ID4-PW (4 inner doors) MDF-7ID5-PW (5 inner doors)
Liquid CO_2 Back-Up System [7]		MDF-UB7-PW	MDF-UB7-PW
Liquid Nitrogen Back-Up System [7]		MDF-UB7-PW-LN2	MDF-UB7-PW-LN2
Temperature Recorder			
Circular Type	6", 7 day	MTR-G85C	MTR-G85A
Chart Paper	52 charts/box	RP-G85-PW	RP-G85-PW
Ink Pen	pack of 6	PG-R-PW	PG-R-PW
Optional Communication System			
Wireless, Cloud-Based, Automatic Data Management		LabSVIFT™ [8] | LabAlert®* | V-SafeRX	

[1] Exterior dimensions of cabinet excluding handle, rear stand-off brackets and other external projections.
[2] Consult product web page for doorway entry instructions, less than 36.8": www.phchd.com/us/biomedical/preservation/ultra-low-freezers/mdf-du702vhpa.
[3] Current warranty offered at time of printing and may be subject to change; US and Canada only.
[4] Air temperature measured at freezer center, ambient temperature +30°C, no load.
[5] A chart recorder and a liquid CO_2 back-up system each occupy a separate access port.
[6] Nominal value, background noise 20 dB(A).
[7] Settable range of the injection start temperature is -70°C to -50°C.
[8] Requires MTR-480 to operate as Gen 2 on LabSVIFT System.
*Manufactured by others.

NEMA	Plug (P)	Receptacle (R)
5-20		
6-15		

Model Number		MDF-DU901VHA-PA
External Dimensions (W × D × H) [1]	inches | mm	45.3 × 34.3 × 78.5 | 1150 × 870 × 1993
Internal Dimensions (W × D × H)	inches | mm	39.8 × 23.6 × 55.1 | 1010 × 600 × 1400
Volume	cu.ft. | liters	29.8 | 845
Net Weight	lbs | kg	723 | 328
Capacity (2" Boxes)	qty	672
Capacity (3" Boxes)	qty	448
Inventory Racks (2" Boxes)	qty	28
Inventory Racks (3" Boxes)	qty	28
Performance		
Warranty [2]		5 years parts and labor
Cooling Performance [3]	°C	-50 to -86
Temperature Setting Range [3]	°C	-50 to -90 in 1° increments
Temperature Control Range [3]	°C	-50 to -86 in 1° increments
Control		
Controller		Microprocessor, touchscreen data entry, password protected
Display		LCD color touchscreen
Temperature Sensor		Pt-1000
Refrigeration		
Refrigeration System		Synchronized variable speed cascade system
Compressors	W	(2) 1000, variable speed
Refrigerant		High-stage R-290 natural refrigerant Low-stage R-170 natural refrigerant
Insulation Thickness, Material	inches | mm	3.1 | 78, rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels
Construction		
Exterior Material		Painted electrogalvanized steel
Interior Material		Powder coated electrogalvanized steel
Outer Door	qty	1 (key lock with provision for optional padlock)
Inner Doors	qty	2 (insulated, ABS, stainless steel frames, positive latches)
Shelves	qty	3 (adjustable)
Shelf Dimensions (W × D)	inches | mm	38.9 × 20.9 | 988 × 533
Max. Load per Shelf	lbs | kg	110 | 50
Max. Load - Total Freezer	lbs | kg	1266 | 414.4
Manual Vacuum Relief	qty	1: lower left side
Access Ports	qty	2: back wall and chamber floor
Access Port Diameter	inches | mm	0.6 | 17
Casters	qty	4 (2 leveling feet on front base)
Alarms		(V = Visual Alarm, B = Buzzer Alarm, R = Remote Alarm)
Power Failure		V-B-R
Temperature (High and Low)		V-B-R
Sensor Failure		V-B-R
Door Open		V-B
Battery Check		V
Remote Alarm Contacts		DC 30V 2A (normally open, normally closed, common)
Electrical and Noise Level		
Power Supply		115V, 1Ø, NEMA 5-20P, requires NEMA 5-20R receptacle
Noise Level [4]	dB(A)	52
Options		
Inner Door Kit with 4 Smaller Doors [5]		MDF-9ID-PW
Liquid CO_2 Back-Up System [6]		MDF-UB7-PW
Liquid Nitrogen Back-Up System [6]		MDF-UB7-PW-LN2
Temperature Recorder		
Circular Type	6", 7 day circular	MTR-G85A
Chart Paper	52 charts per box	RP-G85-PW
Ink Pen	pack of 6	PG-R-W
Optional Communication System		
Wireless, Cloud-Based, Automatic Data Management		LabSVIFT™ [7] | LabAlert®* | V-SafeRX

[1] Exterior dimensions of cabinet excluding handle, rear stand-off brackets and other external projections. Consult product web page for doorway entry instructions, less than 36": www.phchd.com/us/biomedical/preservation/ultra-low-freezers/mdf-du901vha-pa.
[2] Current warranty offered at time of printing and may be subject to change; US and Canada only.
[3] Air temperature measured at freezer center, ambient temperature +30°C, no load.
[4] Nominal value, background noise 20 dB(A).
[5] Installation of small inner door kit may affect usable storage capacity.
[6] Settable range of the injection start temperature is -70°C to -50°C.
[7] Requires MTR-480 to operate as Gen 2 on LabSVIFT System.
*Manufactured by others.

ACCESSORIES

A comprehensive list of inventory systems, temperature recorders, CO_2 back-up systems and other accessories are available. Contact PHC Corporation of North America for details.

Maximum Daily Energy Consumption (MDEC)

VIP ECO Model	MDEC (kWh/cu.ft.)	ENERGY STAR Certification
MDF-DU502VH-PA	**0.35**	4788321237
MDF-DU502VHA-PA	**0.37**	4788723268
MDF-DU702VH-PA	**0.31**	4787624502
MDF-DU702VHA-PA	**0.29**	4788723268
MDF-DU901VHA-PA	**0.30**	4789267856
MDF-DU503VH-PA	**0.27**	4790599807
MDF-DU503VHA-PA	**0.27**	4790599807
MDF-DU703VH-PA	**0.21**	4709599804
MDF-DU703VHA-PA	**0.21**	4709599804
MDF-DU500ZHA-PA	**0.33**	4791176682
MDF-DU700ZHA-PA	**0.29**	4790998194

SPECIFICATIONS

VIP ECO SMART Upright -86°C, Natural Refrigerant Series

Model Number		MDF-DU503VHA-PA
External Dimensions (W × D × H) [1]	inches | mm	31.1 × 34.7 × 78.5 | 790 × 882 × 1993
Internal Dimensions (W × D × H)	inches | mm	24.8 × 23.6 × 55.1 | 630 × 600 × 1400
Volume	cu.ft. | liters	18.6 | 528
Net Weight	lbs | kg	531 | 241
Capacity (2" Boxes)	qty	384
Capacity (3" Boxes)	qty	256
Inventory Racks (2" Boxes)	qty	16
Inventory Racks (3" Boxes)	qty	16
Performance		
Warranty [2]		5 years parts and labor
Cooling Performance [3]	°C	-40 to -86
Temperature Setting Range [3]	°C	-40 to -90 in 1° increments
Temperature Control Range [3]	°C	-40 to -86 in 1° increments
Control		
Controller		Microprocessor with non-volatile memory, USB connectivity, IOT Ready
Display		LCD Touchscreen
Temperature Sensor		RTD
Refrigeration		
Refrigeration System		Synchronized variable speed cascade system
Compressors	W	(2) 750, variable speed
Refrigerant		R-170 (ethane) R-290 (propane)
Insulation Thickness, Material	inches | mm	Rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels
Construction		
Exterior Material		Painted steel
Interior Material		Painted steel
Outer Door	qty	1 lock with set of 2 keys and electronic lock (provision for optional pad lock)
Inner Doors	qty	2 insulated stainless steel with latch
Shelves	qty	3 (adjustable)
Shelf Dimensions (W × D)	inches | mm	24.2 × 21 | 615 × 534
Max. Load per Shelf	lbs | kg	110 | 50
Vacuum Relief	qty	1 Auto
Access Ports	qty	3
Access Port Diameter	inches | mm	0.6 | 17
Casters	qty	4 (2 leveling feet on front base)
Alarms (V = Visual Alarm, B = Buzzer Alarm, R = Remote Alarm, A= Adjustable, L=Logged)		
Power Failure		V-B-R-L
Temperature (High and Low)		V-B-R-L-A
Sensor Failure		V-B-R-L
Door Open		V-B-L
Maintenance Alert		V
Remote Alarm Contacts		DC 30V 2A (normally open, normally closed, common)
Electrical and Noise Level		
Power Supply		220V, 1Ø, 60Hz, NEMA 6-15P, 9.2ft (2800 mm) Cord Length (220V Power cord in chamber with standard accessories) 115V, 1Ø, 60Hz, NEMA 5-15P, 8.2 ft (2500 mm) Cord Length (115V Power cord standard configuration)
Noise Level [4]	dB(A)	46
Options		
Inner Door Kit with 4 Smaller Doors [5]		MDF-5ID4-PW
Inner Door Kit with 5 Smaller Doors [5]		MDF-5ID5-PW
Liquid CO_2 Back-Up System [6]		MDF-UB9-PW
Liquid Nitrogen Back-Up System [6]		MDF-UB9-PW-LN2
NFC Module		MTR-NFC-PW
Proximinity Cards (NFC Cards)		MTR-IC-PW (5)
Sensor Mounting Upright ULT		MTR-DU700SF-PW
Optional Communication System		
Wireless, Cloud-Based, Automatic Data Management		LabSVIFT™ [7] | LabAlert®* | V-SafeRX
4-20mA Output Module		MTR-420MA-PW Equipment Powered | MTR420MAC- Equipment Powered* | MTR420MAL- Loop Powered*

[1] Exterior dimensions of cabinet excluding handle, rear stand-off brackets and other external projections.
[2] Current warranty offered at time of printing and may be subject to change; US and Canada only.
[3] Air temperature measured at freezer center, ambient temperature +30°C, no load.
[4] Nominal value, background noise 20 dB(A).
[5] Installation of small inner door kit may affect usable storage capacity.
[6] Settable range of the injection start temperature is -70°C to -50°C.
[7] Requires MTR-480 to operate as Gen 2 on LabSVIFT System.

NEMA	Plug (P)	Receptacle (R)
5-15		
6-15		

Model Number		MDF-DU703VHA-PA
External Dimensions (W × D × H) [1]	inches | mm	40.6 × 34.7 × 78.5 | 1030 × 882 × 1993
Internal Dimensions (W × D × H)	inches | mm	24.8 × 23.6 × 55.1 | 630 × 600 × 1400
Volume	cu.ft. | liters	25.7 | 729
Net Weight	lbs | kg	608 | 276
Capacity (2" Boxes)	qty	576
Capacity (3" Boxes)	qty	384
Inventory Racks (2" Boxes)	qty	24
Inventory Racks (3" Boxes)	qty	24
Performance		
Warranty [2]		5 years parts and labor
Cooling Performance [3]	°C	-40 to -86
Temperature Setting Range [3]	°C	-40 to -90 in 1° increments
Temperature Control Range [3]	°C	-40 to -86 in 1° increments
Control		
Controller		Microprocessor with non-volatile memory, USB connectivity, IOT Ready
Display		LCD Touchscreen
Temperature Sensor		RTD
Refrigeration		
Refrigeration System		Synchronized variable speed cascade system
Compressors	W	(2) 750, variable speed
Refrigerant		R-170 (ethane) R-290 (propane)
Insulation Thickness, Material	inches | mm	Rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels
Construction		
Exterior Material		Painted steel
Interior Material		Painted steel
Outer Door	qty	1 lock with set of 2 keys and electronic lock (provision for optional pad lock)
Inner Doors	qty	2 insulated stainless steel with latch
Shelves	qty	3 (adjustable)
Shelf Dimensions (W × D)	inches | mm	33.7 × 21 | 855 × 534
Max. Load per Shelf	lbs | kg	110 | 50
Vacuum Relief	qty	1 Auto
Access Ports	qty	3
Access Port Diameter	inches | mm	0.6 | 17
Casters	qty	4 (2 leveling feet on front base)
Alarms	**(V = Visual Alarm, B = Buzzer Alarm, R = Remote Alarm, A= Adjustable, L=Logged)**	
Power Failure		V-B-R-L
Temperature (High and Low)		V-B-R-L-A
Sensor Failure		V-B-R-L
Door Open		V-B-L
Maintenance Alert		V
Remote Alarm Contacts		DC 30V 2A (normally open, normally closed, common)
Electrical and Noise Level		
Power Supply		220V, 1Ø, 60Hz, NEMA 6-15P, 9.2ft (2800 mm) Cord Length (220V Power cord in chamber with standard accessories) 115V, 1Ø, 60Hz, NEMA 5-15P, 8.2 ft (2500 mm) Cord Length (115V Power cord standard configuration)
Noise Level [4]	dB(A)	46
Options		
Inner Door Kit with 4 Smaller Doors [5]		MDF-7ID4-PW
Inner Door Kit with 5 Smaller Doors [5]		MDF-7ID5-PW
Liquid CO_2 Back-Up System [6]		MDF-UB9-PW
Liquid Nitrogen Back-Up System [6]		MDF-UB9-PW-LN2
NFC Module		MTR-NFC-PW
Proximinity Cards (NFC Cards)		MTR-IC-PW (5)
Sensor Mounting Upright ULT		MTR-DU700SF-PW
Optional Communication System		
Wireless, Cloud-Based, Automatic Data Management		LabSVIFT™ [7] | LabAlert®* | V-SafeRX
4-20mA Output Module		MTR-420MA-PW Equipment Powered | MTR420MAC- Equipment Powered* | MTR420MAL- Loop Powered*

[1] Exterior dimensions of cabinet excluding handle, rear stand-off brackets and other external projections.
[2] Current warranty offered at time of printing and may be subject to change; US and Canada only.
[3] Air temperature measured at freezer center, ambient temperature +30°C, no load.
[4] Nominal value, background noise 20 dB(A).
[5] Installation of small inner door kit may affect usable storage capacity.
[6] Settable range of the injection start temperature is -70°C to -50°C.
[7] Requires MTR-480 to operate as Gen 2 on LabSVIFT System.

NEMA	Plug (P)	Receptacle (R)
5-15		
6-15		

SPECIFICATIONS

FrostLess Upright -86°C, Natural Refrigerant, Frost Mitigation Series

Model Number		MDF-DU500ZHA-PA
External Dimensions (W × D × H) [1]	inches | mm	31.1 × 34.7 × 78.5 | 790 × 882 × 1993
Internal Dimensions (W × D × H)	inches | mm	24.8 × 23.9 × 55.1 | 630 × 607 × 1400
Volume	cu.ft. | liters	18.5 | 525
Net Weight	lbs | kg	547 | 248
Capacity (2" Boxes)	qty	352 (Fiberboard only)
Capacity (3" Boxes)	qty	224
Inventory Racks (2" Boxes)	qty	(8) SUR 624 and (8) SUR 524 or (8) SDR 624 and (8) SDR 524
Inventory Racks (3" Boxes)	qty	(8) SUR 434 and (8) SUR 334 or (8) SDR 434 and (8) SDR 334
Performance		
Warranty [2]		5 years parts and labor
Cooling Performance [3]	°C	-40 to -86
Temperature Setting Range [3]	°C	-40 to -90 in 1° increments
Temperature Control Range [3]	°C	-40 to -86 in 1° increments
Control		
Controller		Microprocessor with non-volatile memory, USB data retrieval
Display		LCD Touchscreen
Temperature Sensor		RTD
Refrigeration		
Refrigeration System		Cold Wall (Synchronized variable speed cascade system)
Compressors	W	920 W Variable | 920 W Variable
Refrigerant		R-290 | R-170
Insulation Thickness, Material	inches | mm	Rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels
Construction		
Exterior Material		Painted steel
Interior Material		Painted steel
Outer Door	qty	1 lock with set of 2 keys and electronic lock (provision for optional pad lock)
Inner Doors	qty	2 VIP insulated with latch
Shelves	qty	2 Stainless Adjustable | Dedicated Center Shelf
Shelf Dimensions (W × D)	inches | mm	2 Stainless Adjustable: 24.2 × 21 | 615 × 534 1 Dedicated Center: 24.2 × 18.1 | 615 × 461
Max. Load per Shelf	lbs | kg	110 | 50
Vacuum Relief	qty	1 Manual
Access Ports	qty	3: upper wall (back-up system), bottom left (recorder sensor), bottom right (access)
Access Port Diameter	inches | mm	0.6 | 17
Casters	qty	4 | 2
Alarms	(V = Visual Alarm, B = Buzzer Alarm, R = Remote Alarm, A= Adjustable, L=Logged)	
Power Failure		V-B-R-L
Temperature (High and Low)		V-B-R-L-A
Sensor Failure		V-B-R-L
Door Open		V-B-L
Maintenance Alert		V-L
Remote Alarm Contacts		DC 30V 2A (normally open, normally closed, common)
Electrical and Noise Level		
Power Supply		115V, NEMA 5-15P, 60 Hz 8ft cord length
Noise Level [4]	dB(A)	52
Options		
Circular Type Chart Recorders		MTR-G85A*
Chart Paper / Ink Pen		RP-G85-PW / PG-R-W*
Backup System [6]		MDF-UB7-PW | MDF-UB7-PW-LN2
Optional Communication System		
Wireless, Cloud-Based, Automatic Data Management		LabSVIFT™ [5] | LabAlert®* | V-SafeRX
4-20mA Output Module		MTR-420MA-PW Equipment Powered | MTR420MAC- Equipment Powered* | MTR420MAL- Loop Powered*

[1] Exterior dimensions of cabinet excluding handle, rear stand-off brackets and other external projections.
[2] Current warranty offered at time of printing and may be subject to change; US and Canada only.
[3] Air temperature measured at freezer center, ambient temperature +30°C, no load.
[4] Nominal value, background noise 20 dB(A).
[5] Requires MTR-480 to operate as Gen 2 on LabSVIFT System.
[6] Settable range of the injection start temperature is -70°C to -50°C.
*Manufactured by others.

Model Number		MDF-DU700ZHA-PA	MDF-DU700ZH-PA
External Dimensions (W × D × H) [1]	inches | mm	40.6 × 34.7 × 78.5 | 1030 × 882 × 1993	
Internal Dimensions (W × D × H)	inches | mm	34.3 × 23.9 × 55.1 | 870 × 607 × 1400	
Volume	cu.ft. | liters	25.6 | 725	
Net Weight	lbs | kg	622 | 282	
Capacity (2" Boxes)	qty	528 (Fiberboard only)	
Capacity (3" Boxes)	qty	336	
Inventory Racks (2" Boxes)	qty	(12) SUR 624 and (12) SUR 524 or (12) SDR 624 and (12) SDR 524	
Inventory Racks (3" Boxes)	qty	(12) SUR 434 and (12) SUR 334 or (12) SDR 434 and (12) SDR 334	
Performance			
Warranty [2]		5 years parts and labor	
Cooling Performance [3]	°C	-40 to -86	
Temperature Setting Range [3]	°C	-40 to -90 in 1° increments	
Temperature Control Range [3]	°C	-40 to -86 in 1° increments	
Control			
Controller		Microprocessor with non-volatile memory, USB data retrieval	
Display		LCD Touchscreen	
Temperature Sensor		RTD	
Refrigeration			
Refrigeration System		Cold Wall (Synchronized variable speed cascade system)	
Compressors	W	920 W Variable | 920 W Variable	
Refrigerant		R-290 | R-170	
Insulation Thickness, Material	inches | mm	Rigid polyurethane foam (PUF) + VIP Plus vacuum insulated panels	
Construction			
Exterior Material		Painted steel	
Interior Material			
Outer Door	qty	1 lock with set of 2 keys and electronic lock (provision for optional pad lock)	
Inner Doors	qty	2 VIP insulated with latch	
Shelves	qty	2 Stainless Adjustable | Dedicated Center Shelf	
Shelf Dimensions (W × D)	inches | mm	2 Stainless Adjustable: 33.7 × 21 | 855 × 534 1 Dedicated Center: 33.7 × 18.1 | 855 × 461	
Max. Load per Shelf	lbs | kg	110 | 50	
Vacuum Relief	qty	1 Manual	
Access Ports	qty	3: upper wall (back-up system), bottom left (recorder sensor), bottom right (access)	
Access Port Diameter	inches | mm	0.6 | 17	
Casters	qty	4 | 2	
Alarms	(V = Visual Alarm, B = Buzzer Alarm, R = Remote Alarm, A= Adjustable, L=Logged)		
Power Failure		V-B-R-L	
Temperature (High and Low)		V-B-R-L-A	
Sensor Failure		V-B-R-L	
Door Open		V-B-L	
Maintenance Alert		V-L	
Remote Alarm Contacts		DC 30V 2A (normally open, normally closed, common)	
Electrical and Noise Level			
Power Supply		115V, NEMA 5-15P, 60Hz 8ft cord length	220V, NEMA 6-15P, 60 Hz 8ft cord length
Noise Level [4]	dB(A)	52	
Options			
Circular Type Chart Recorders		MTR-G85A	MTR-G85C
Chart Paper / Ink Pen		RP-G85-PW / PG-R-W	
Backup System [6]		MDF-UB7-PW | MDF-UB7-PW-LN2	
Optional Communication System			
Wireless, Cloud-Based, Automatic Data Management		LabSVIFT™ [5] | LabAlert®* | V-SafeRX	
4-20mA Output Module		MTR-420MA-PW Equipment Powered | MTR420MAC- Equipment Powered* | MTR420MAL- Loop Powered*	

[1] Exterior dimensions of cabinet excluding handle, rear stand-off brackets and other external projections.
[2] Current warranty offered at time of printing and may be subject to change; US and Canada only.
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[6] Settable range of the injection start temperature is -70°C to -50°C.
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SERVICES

PHC Corporation of North America offers a full line of pre-delivery and on-site calibration and validation services. Validation services range from process/manufacturing audits, quality compliance, risk assessment and software qualification. Advanced technology is integrated with contemporary processes for turnkey solutions using NIST calibrated instrumentation for validation and qualification in accordance with all current GxP Regulations (GMP, GLP, GCP), ISO, FDA 21 CFR Part 11, CAP, AABB, CLIA, USDA, local standards and other regulations. Our calibration services are specially designed to verify quality compliance and ensure display accuracy to manufacturing and regulatory specifications. Procedures and documentation are designed to conform to NIST/ISO requirements. ISO/IEC 17025* calibration is available upon request.

We also offer installation and continued technical services.
Visit www.phchd.com/us/biomedical/services to learn more.

*Calibration, as well as IOQ/FAT documentation, are available upon request and quoted separately. ISO/IEC 17025.2005 specifies the general competence to carry out testing and/ or calibration including sampling. It covers testing and calibration preformed using standard methods, non-standard methods and laboratory-developed methods. (Ref: ISO Website, May 2016).

MONITORING SYSTEMS AND COMMUNICATIONS

PHCNA offers real-time monitoring and notification systems designed to safeguard your investment in stored products. Our independent wireless-monitoring solutions for refrigerators and freezers utilize a secure, cloud-based platform, that provide easy access and customizable dashboards without the need for software installation. Compliant with FDA 21 CFR Part 11, our systems ensure alerts, logging and reports for pharmaceuticals and vaccines. Scalable to meet the needs of growing facilities, they support multiple units and locations by adapting seamlessly to various scenarios.

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Complementary product lines under the PHCbi brand include the space saving and energy efficient VIP® ECO and TwinGuard®ultra-low temperature freezers, cryogenic and biomedical freezers, pharmacy and high performance refrigerators, cell culture CO_2 and multigas incubators, programmable heated and refrigerated microbiological incubators and Drosophila/Plant Growth Chambers.

For more product information, please call PHC Corporation of North America at 800-858-8442, email info@us.phchd.com or visit www.phchd.com/us/biomedical.

Specifications are subject to change without notice.
For latest specification information contact PHC Corporation of North America at info@us.phchd.com.

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PHC Corporation of North America
PHC Corporation of North America is a leader in laboratory equipment for biopharmaceutical, life sciences, academic, healthcare and government markets. The company is operated as a subsidiary of PHC Holdings Corporation, Tokyo, Japan, which is a global healthcare company involved in the three core businesses of Medical Devices, Healthcare IT and Life Sciences. Product lines under the new PHCbi brand include the space saving and energy efficient VIP® ECO, TwinGuard® and VIP Series ultra-low temperature freezers, cryogenic and biomedical freezers, pharmacy and high performance refrigerators, cell culture CO_2 and multigas incubators, programmable heated and refrigerated microbiological incubators and Drosophila/Plant Growth Chambers. For more information, please call PHC Corporation of North America at 800-858-8442, email info@us.phchd.com or visit www.phchd.com/us/biomedical.