

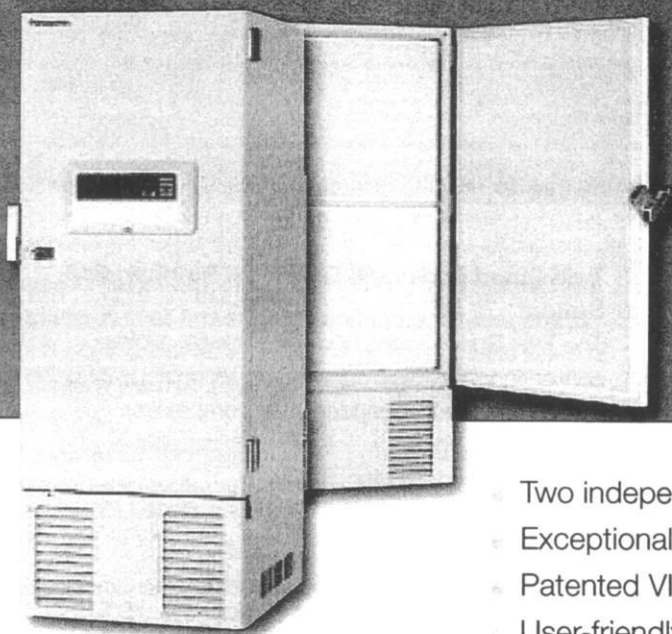
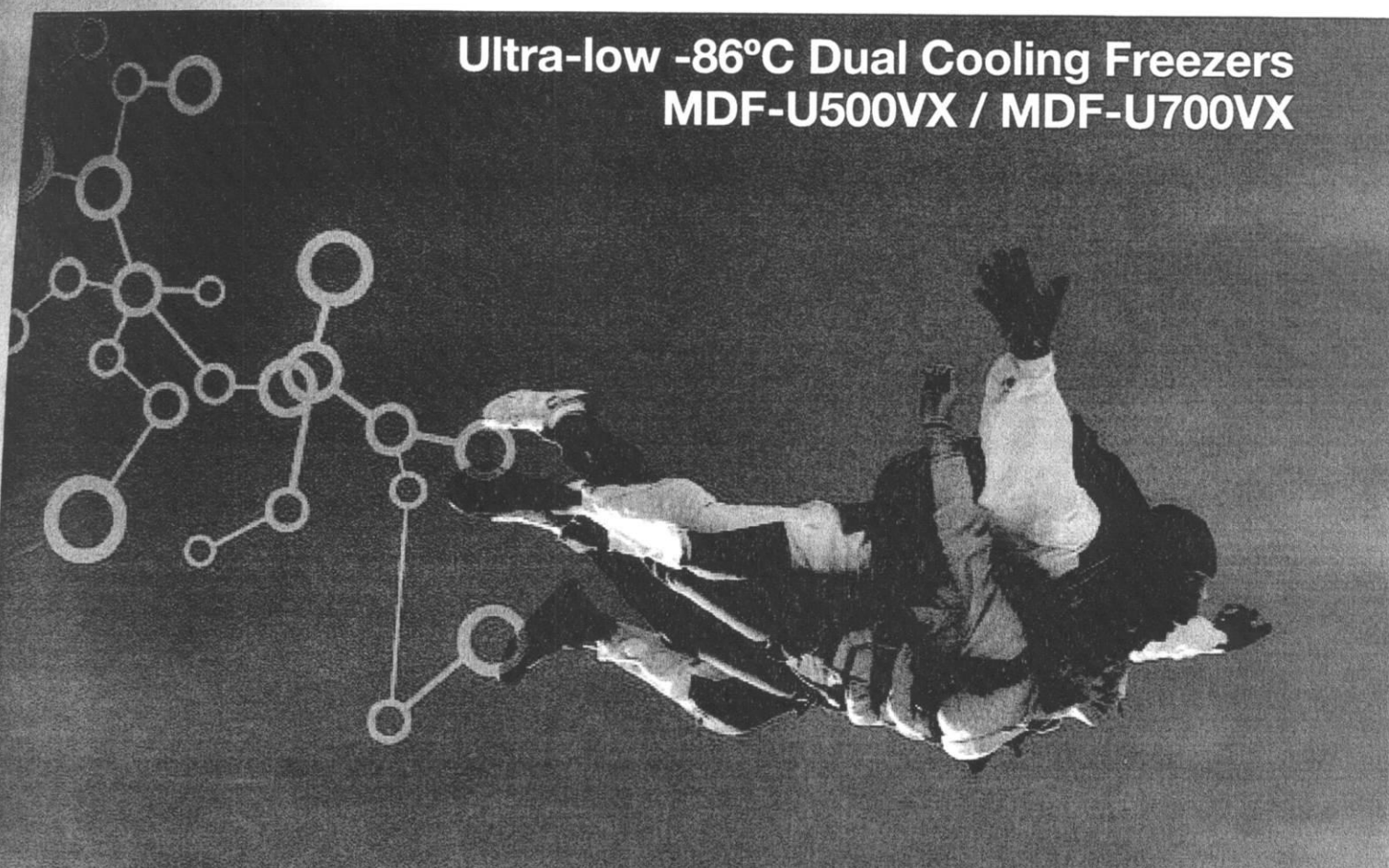
**anasonic**

PRILLOHA A

Panasonic... the new name for SANYO

## Twin Guard Series

### Ultra-low -86°C Dual Cooling Freezers MDF-U500VX / MDF-U700VX

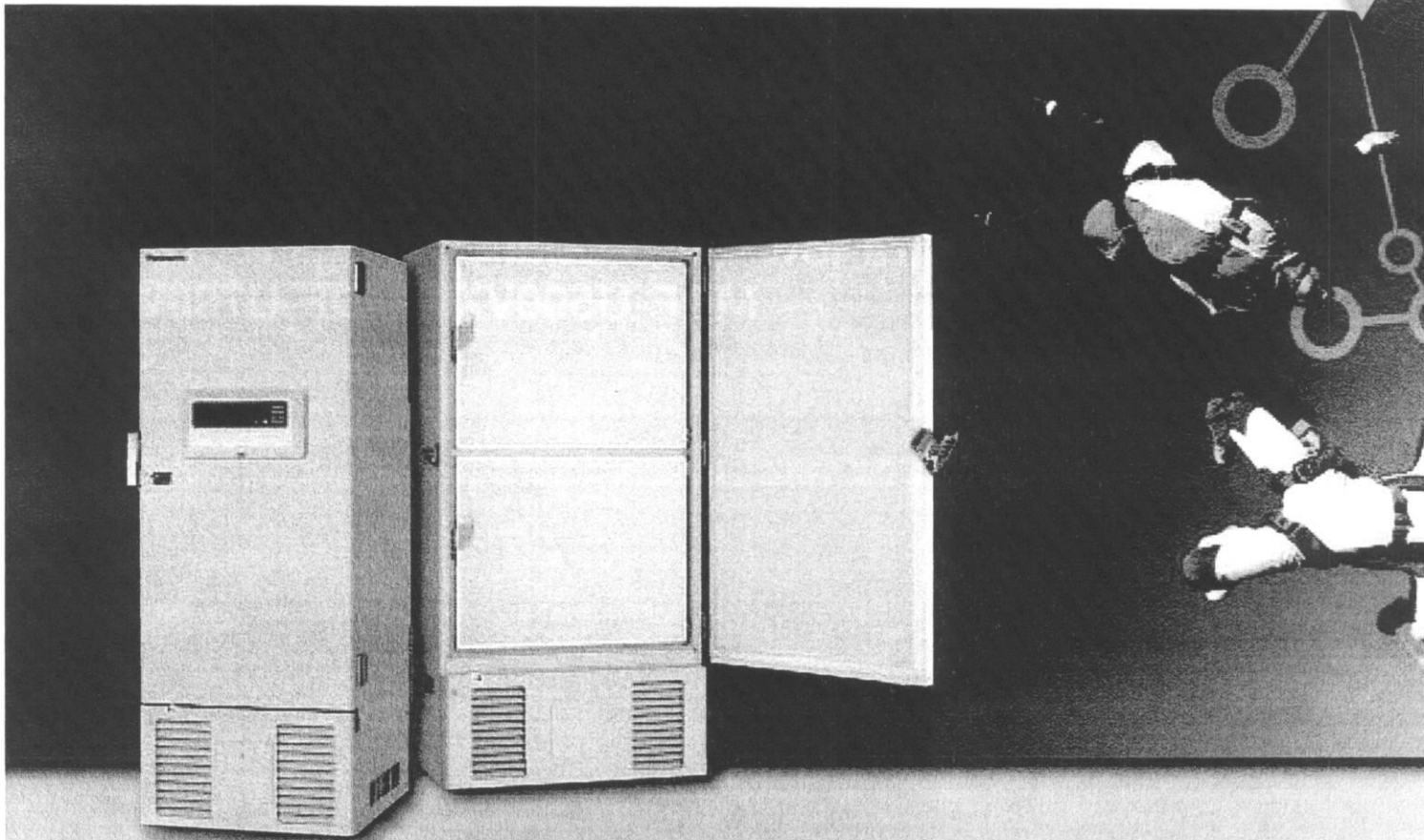


There are times when  
extra back-up is essential

Securing samples,  
changing lives

- Two independent refrigeration systems in one -86°C freezer.
- Exceptionally uniform and reliable temperature.
- Patented VIP PLUS construction maximises interior volume.
- User-friendly design and low running costs.
- MDF-U700VX certified as a Class IIa Medical Device (93/42/EEC & 2007/47/EC).

Securing samples, changing lives



### Secure storage with New Dual Cooling System

The Twin Guard Dual Cooling System is newly designed to provide the highest level of security for valuable biological samples. Two individually controlled compressors provide a reliable and exceptionally stable  $-86^{\circ}\text{C}$  ultra-low temperature environment. In the case of unexpected failure of one of the cooling circuits, the other circuit will maintain the freezer continuously in the  $-70^{\circ}\text{C}$  range, protecting samples until service can be arranged.

### The Safest Ultra-Low Freezer for Long-Term Storage of Critical Biologicals

The Panasonic Twin Guard Series satisfies the industry demand for safe, long-term storage of biological material. Two, independent refrigeration systems, combined with optional liquid Nitrogen or liquid  $\text{CO}_2$  back-up systems, offer a circle of protection unmatched in the marketplace. Developed for use with conventional inventory racks and boxes, the Twin Guard Series is ideal for storage of sensitive, high-value samples.

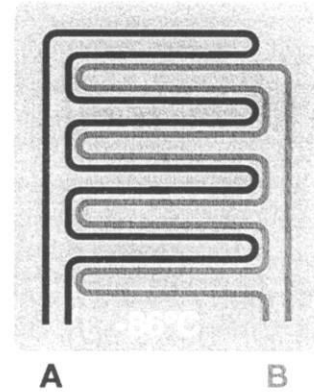
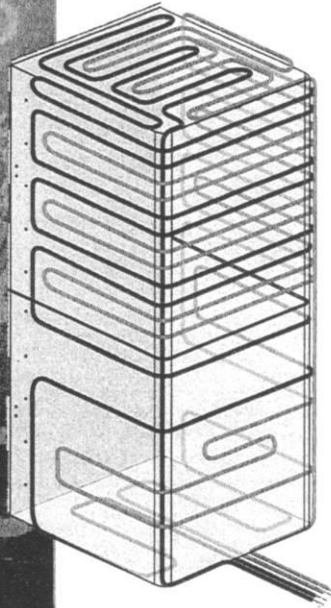
### Twin Guard Series $-86^{\circ}\text{C}$ Dual°Cool Refrigeration System

The Twin Guard Series Ultra-low Freezer avoids conventional cascade refrigeration technology by using two completely independent one-compressor, autocascade cooling systems, each capable of maintaining ultra-low temperatures.

- Each refrigeration circuit includes a closed-loop cold-wall evaporator configured in parallel to the other.
- Conventional ULT freezers with single or cascade refrigeration circuits cannot achieve the  $-70^{\circ}\text{C}$  range when one compressor fails.

## Dual Cooling System

*Independent systems: efficient ultra-low cooling is achieved through two independent evaporator circuits surrounding the interior chamber.*



## Ultra-Critical Installations and Applications Overview

Application	Justification	Benefit
Stem Cells, Cord Blood, T-Cells, Engineered Tissue, Organ/Tissue, Vaccines, Bone Marrow, Hybridomas, Lymphocytes, Cancer Cells, Clinical Specimens, Fibroblasts, Ova, Sperm	Highly sensitive to temperature fluctuations or uneven storage temperatures at different positions within the interior chamber.	Enhanced temperature uniformity, top-to-bottom, front-to-back, assures sample stability at all inventory locations.
BSL-3/4 or Highly Secured Labs	Restricted access to the contained laboratory limits serviceability.	Twin Guard Series extends critical time necessary to react in the event of mechanical failure.

- Independent evaporators and cooling fans assure back up status at all times, eliminating system failure due to sub-component failure in conventional cascade systems consisting of mutually dependent high- and low-stage systems.

An unique ECO mode deploys both systems in overlapping cycles to maintain  $-86^{\circ}\text{C}$  and to reduce energy consumption.

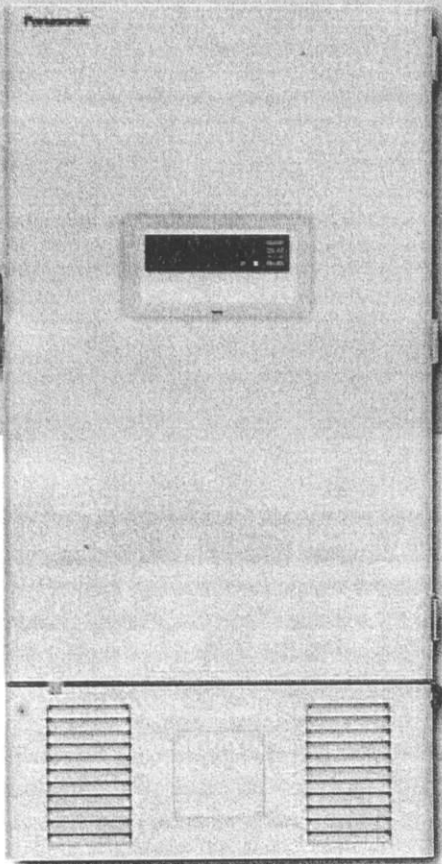
Evaporator coils embedded in the patented, high-tech, Panasonic VIP PLUS vacuum-insulated thin-wall cabinet are strategically oriented to deliver the best temperature uniformity at all shelf levels, top-to-bottom

- and front-to-back.
- New Panasonic-designed Cool Safe refrigeration compressors feature innovative refrigerant feedback processes to reduce compressor temperature, thereby extending compressor life and minimizing heat output.

# Securing samples, changing lives

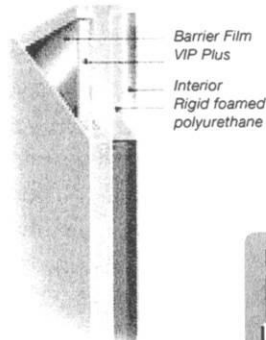
## Failure Mode Comparison Twin Guard Series vs. Conventional Cascade Freezer

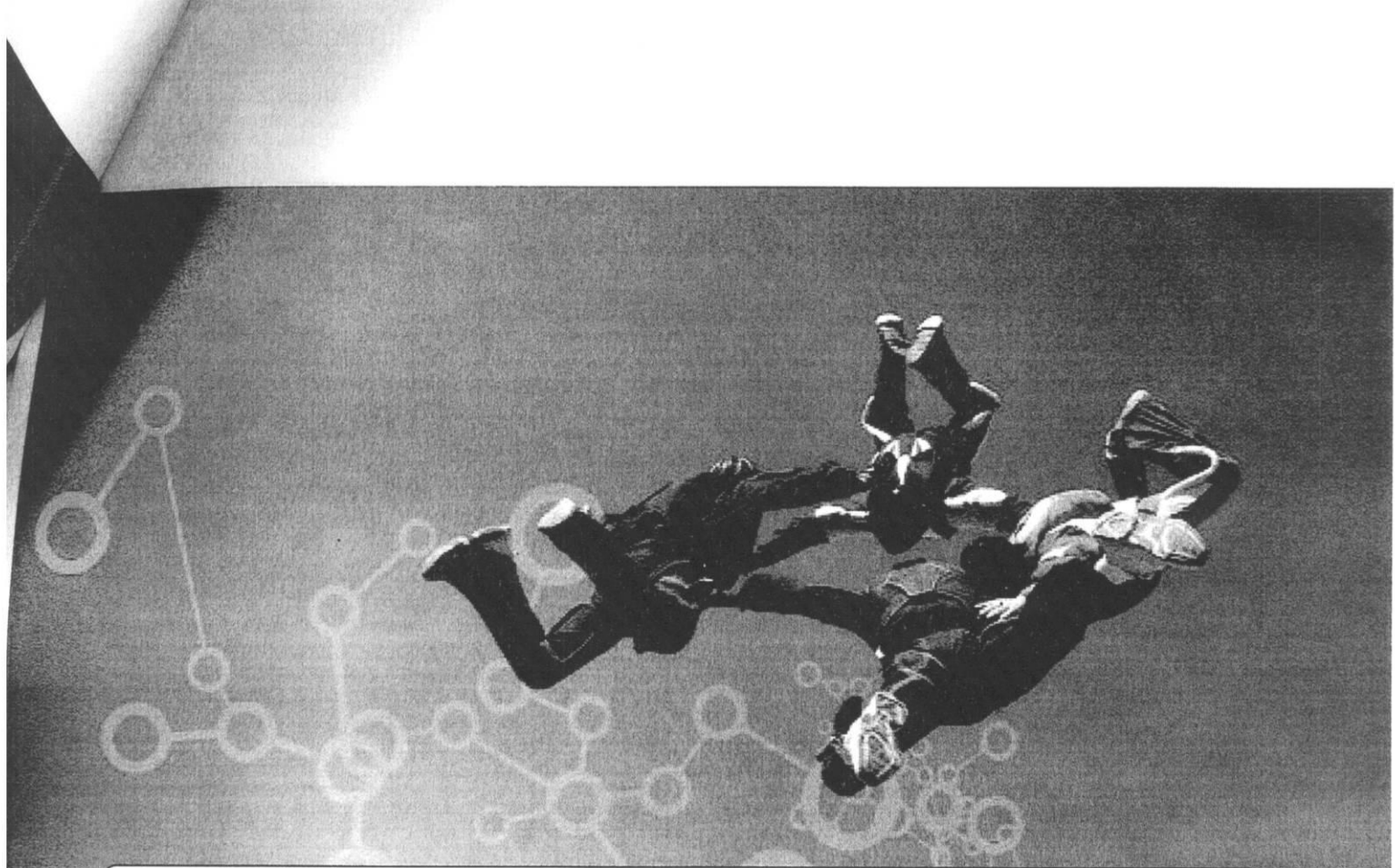
Event	Conventional Freezer No Back-Up	Conventional Freezer, with Back-Up System	Panasonic Twin Guard Series
Fan Failure	Freezer Fails	Freezer fails, CO <sub>2</sub> or LN <sub>2</sub> back-up system offers short term protection until contents can be removed and repairs initiated	If one fan fails the second fan automatically maintains energy exchange
High Stage Compressor Failure	Freezer Fails		No high or low stage used. Two refrigeration systems, each with a separate compressor, operate independently during normal operation. If one compressor fails internal temperature is maintained indefinitely in the -70°C range with back-up compressor. Optional LN <sub>2</sub> or CO <sub>2</sub> back-up system offers additional protection
Low Stage Compressor Failure	Freezer Fails		



### High efficiency insulation with VIP PLUS Technology

Panasonic's latest development in vacuum insulation is VIP PLUS technology. This revolutionary vacuum insulation cabinet construction reduces the wall thickness by approximately one half and achieves up to 30% more storage capacity than a conventionally insulated freezer, maximizing storage capacity and saving valuable lab space. Just as importantly, VIP PLUS insulation contributes to the overall energy efficiency of the MDF-U500VX and MDF-U700VX.





### Twin Guard Series Features, Benefits and Performance Advantages

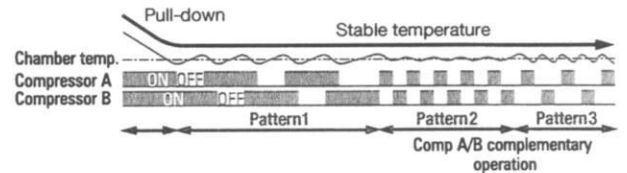
What It Is	What It Does	Why It Is Important
-86 Dual°Cool Refrigeration Technology	Two independent refrigeration systems operate together or individually, depending on demand and performance environment.	One refrigeration system is available to back-up the other in the event of a component failure.
ECO mode Performance	Two independent refrigeration systems running in overlapping cycles.	ECO mode optimizes run time, minimizes energy costs and maximizes interior temperature uniformity.
Environmentally Friendly Refrigerants	Eliminates potential for ozone depletion while maintaining cooling capacity.	Complies with the Montreal Protocol and IEC for safety and efficiency.
Filterless Condenser Design	Transfers energy from the refrigeration system with minimal heat output.	Eliminates the need for an air filter and the associated maintenance and cleaning, optimizes heat exchange and minimizes compressor heat build-up over time.
Patented VIP PLUS Vacuum Panel Composite Insulation	Combines high-efficiency vacuum panels with conventional polyurethane structural foam and barrier film into a high-tech wall assembly.	Increases interior volume within conventional dimensions offering more storage capacity per m <sup>2</sup> of occupied floor space.
Integrated Graphical LCD Control Center	Combines all control, alarm, monitoring and data management functions into a single door-mounted system controller.	High visibility LCD display provides a convenient user interface to setpoints, current and previous temperature status, alarm parameters, internal diagnostics, communications and security.
Structural Enhancement	Integrates inventory management, access and site installation.	Cabinet design attributes include high-strength, lockable door latches and doors, latchable inner doors, adjustable shelves, vacuum release port and locking casters to simplify operation, installation and to satisfy local codes.
Compliant to International Standards	Assures quality standards, safety and performance criteria are met or exceeded.	Essential for compliance with CE, RoHS and other third-party standards and recommended practices.

# Reduced power consumption

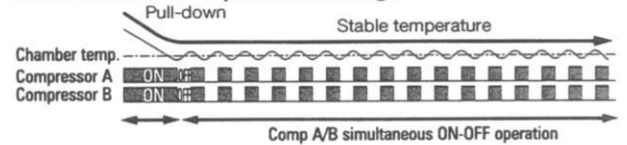
## Industry first intelligent ECO mode operation

Using the industry's first ECO mode operation, the Twin Guard freezer's microprocessor controller constantly monitors the load status on the freezer to optimize the operation of the two compressors to minimize energy use whilst protecting valuable samples.

### ECO mode operation image



### NORMAL mode operation image




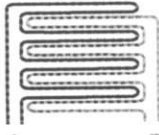
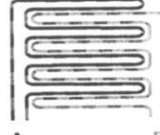


The Panasonic Twin Guard Series Freezer can be set for Normal or ECO mode operation, depending on ambient temperature and load. ECO mode is recommended for 90-95% of applications.

Although both refrigeration systems are completely independent, ECO mode establishes an overlapping cycle

to significantly reduce energy consumption while optimizing interior uniformity from top-to-bottom and front-to-back for protection of high value materials.

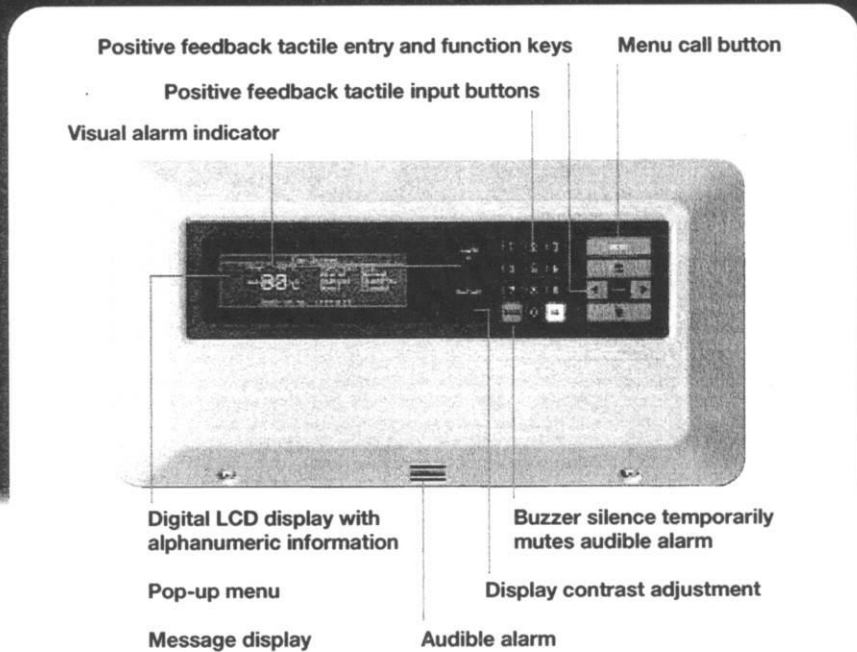
Normal mode maintains the most repeatable, cycling wave form for the strictest of GMP applications.

## Twin Guard -86 Dual°Cool Refrigeration System

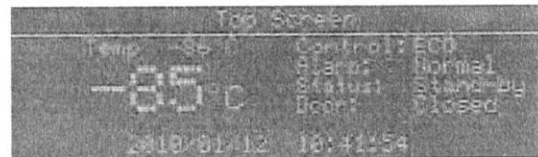
<b>Status</b>	System A and B ON	System A and B ON, Cycling On/Off	System A and B ON, Cycling On/Off	System A ON	System B ON
<b>Function</b>	Maximum Pull-Down and Recovery Capacity	ECO mode	Normal Mode	Back-Up for System B	Back-Up for System A
<b>Performance</b>	Establishes highly uniform -86°C storage temperature; maximizes recovery following door openings and heat load additions in ECO and Normal Mode.	Maintains better energy management at high or low ambient temperatures as well as excellent top-to-bottom uniformity.	Maintains excellent top-to-bottom uniformity. Maintains most repeatable, cycling wave form for the strictest of GMP applications.	Maintains minimum -65°C reserve temperature.	Maintains minimum -65°C reserve temperature.
					
	A B	A B	A B	A B	A B

## Intelligent interface

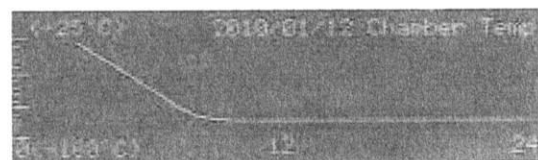
The Twin Guard Series is managed by an integrated microprocessor controller with LCD information center to simplify all freezer functions. Uniform ultra-low temperature is achieved through a combination of performance systems supervised by the controller complete with alarm, programming and diagnostic protocols.



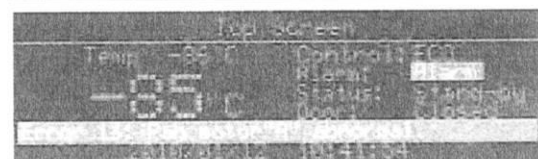
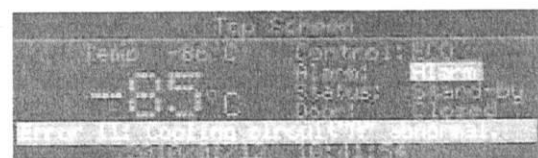
- The control panel is center mounted in the outer door for easy, eye-level access.
- Control and information center includes an intuitive pop-up menu, high resolution LCD for inputs, outputs and performance at-a-glance.
- Tactile feedback, touch pad data shift and entry keys simplify operation.
- Multi-point data logging offers a graphical display for temperature verification at-a-glance.
- Precise logic systems control and adjust to temperature setpoints and alarm parameters.
- Setpoint, alarm and programmable inputs are established through pop-up menus and function keys.
- Standard parameters are factory-set for quick start-up, and all parameters can be changed as required.
- Logged parameters can be exported to remote databases, off-site alarm or data capture systems through optional communications board module for compliance monitoring. An optional PC interface permits remote transmission; see Options.
- A remote alarm terminal mounted at the side of the cabinet can be connected to an external alarm system.
- Both refrigeration systems, including compressors and fan motors are background monitored for performance.
- Out-of-compliance notifications and warnings are automatically displayed with audible warnings when necessary.



All performance attributes are displayed on a large, visually intuitive alphanumeric display.



Internal temperature log files are displayed in graphical form over time.

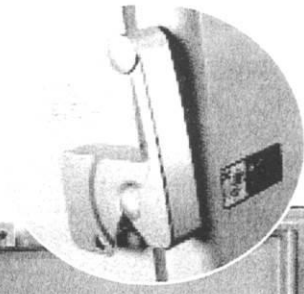


Out-of-compliance events are announced by visual and audible warnings. Error codes quickly identify problem sources and permit fast diagnosis and remediation.

# Twin Guard Series features

Efficient

Multiple access ports permit insertion of independent probes, instrumentation or liquid Nitrogen or liquid CO<sub>2</sub> back-up injectors.



Easy-In/Easy-Out door latch for smooth, one-handed operation, positive seal against gasket. Provision for padlock.

A vacuum relief valve is mounted in the left wall.

Remote alarm contacts and optional communication port available; see Options.

Universal keyed door lock offers added security.

Insulated and gasketed inner doors seal inside to offer additional protection, improve uniformity. Inner door latches are standard.

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



Integrated, microprocessor-based control system and LCD display information center includes comprehensive setpoint, alarm, monitoring, diagnostic and communications functions.

New, air-cooled Super Condenser energy transfer technology maintains optimum condenser air flow and eliminates the need for an air filter and the associated periodic cleaning and maintenance.

New generation Panasonic designed Cool Safe compressors are specifically designed for one-compressor, aut cascade applications.

Twin Guard Series -86 Dual<sup>®</sup>Cool refrigeration circuits offer two systems in one, each providing back-up for the other, or working together in ECO mode operation for additional energy savings.



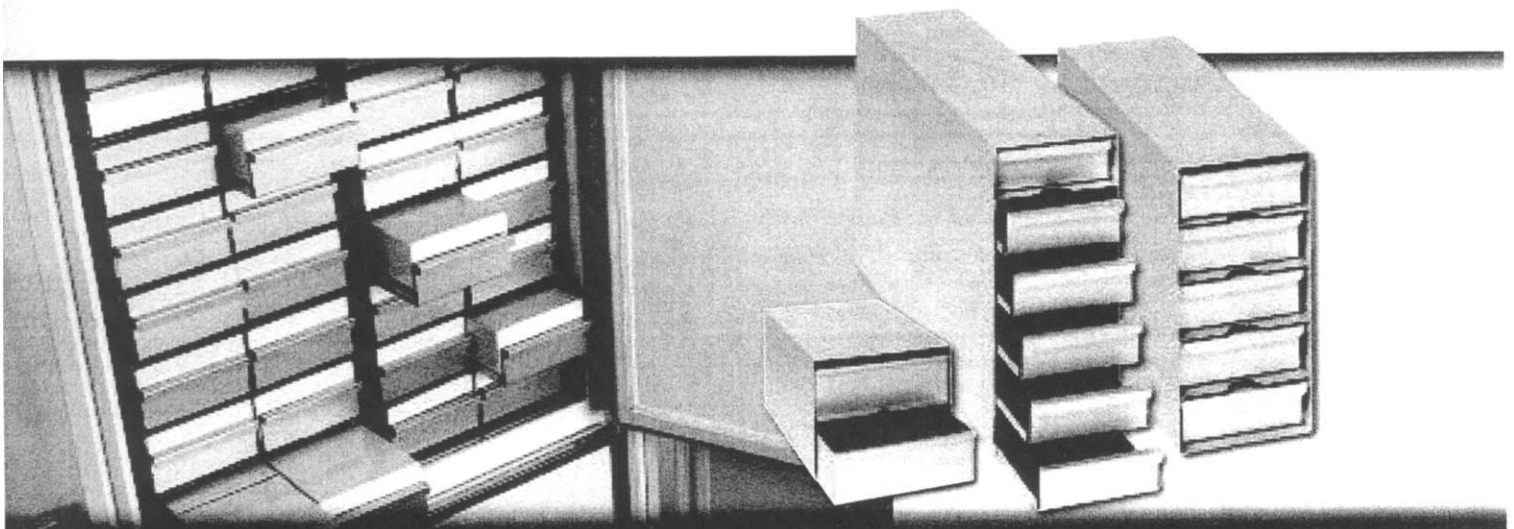
# Efficient sample management

Organizing the space in your freezer can help to make your work more efficient. Both cost and time savings can result from good sample management. In addition to improving efficiency, choosing the right inventory system will also improve sample handling and reduce the risk of sample deterioration.

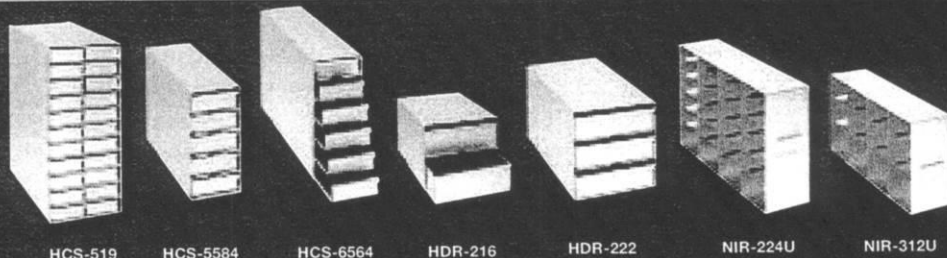
An organized freezer will provide you with:

- Time savings - locate, retrieve and replace your samples easily and quickly
- Cost savings - organized samples and cell lines can help to reduce the number of freezers
- Added sample security and energy savings - samples are better protected and are less exposed to ambient temperatures as door opening times can be reduced when placing and retrieving samples, which also reduces energy use.

Panasonic's racks are made of stainless steel or anodized aluminum. The aluminum racks are very light, yet sturdy and corrosion free.



All boxes are available: in Polypropylene (P) or carton (A) as 2 inch (1) or 3 inch (2)



Upright freezer model	Vertical rack type	Box type	Rack/quantity Wesbart (aluminium)	Total boxes	Rack/quantity Tenak (stainless steel)	Total boxes
MDF-U500VX-PE	with trays	(P) A1	4 x HCS-519	352		
	with trays	(P) A1	8 x HCS-5584 + 8 x HCS-6564	352	8 x TE-HCS-254COM + 8 x TE-HCS-264COM	352
	side opening	(P) A1	8 x NIR-220U + 8 x NIR-224U	352	8 x TE-NIR-254CLA + 8 x TE-NIR-264CLA	352
	with trays	(P) A2	8 x HCS-4804 + 8 x HCS-3804	224	8 x TE-HCS-334COM + 8 x TE-HCS-344COM	224
	side opening	(P) A2	8 x NIR-316U + 8 x NIR-312U	224	8 x TE-NIR-334CLA + 8 x TE-NIR-344CLA	224
MDF-U700VX-PE	with trays	(P) A1	6 x HCS-519	528		
	with trays	(P) A1	12 x HCS-5584 + 12 x HCS-6564	528	12 x TE-HCS-254COM + 12 x TE-HCS-264COM	528
	side opening	(P) A1	12 x NIR-220U + 12 x NIR-224U	528	12 x TE-NIR-254CLA + 12 x TE-NIR-264CLA	528
	with trays	(P) A2	12 x HCS-4804 + 12 x HCS-3804	336	24 x TE-HCS-344COM	384
	side opening	(P) A2	12 x NIR-316U + 12 x NIR-312U	336	24 x TE-NIR-344CLA	384

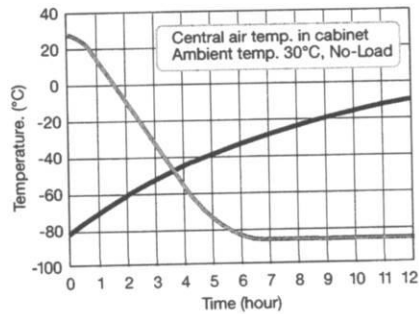
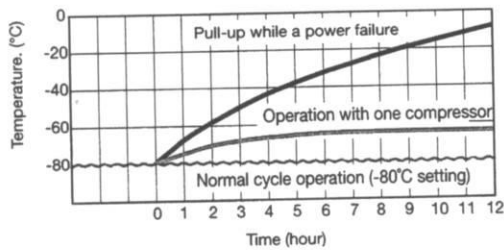
### User-Friendly Design

Comprehensive alarms including high/low temperatures, door ajar, power failure alarm and part replacement notification help to keep samples safe even in an emergency.

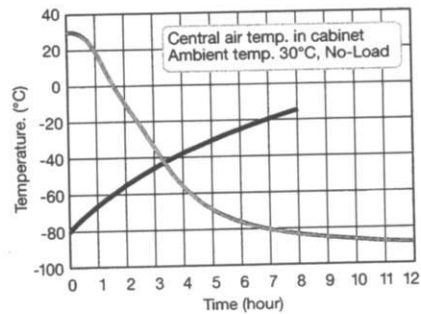
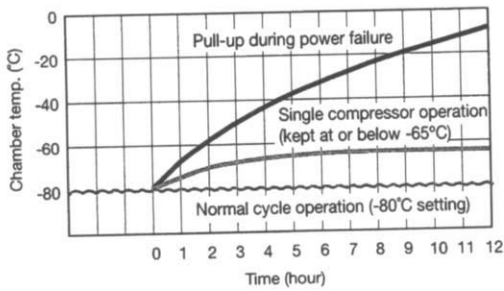
- A vacuum release port allows smooth door opening when the door is tightened by negative pressure generated from the temperature difference between chamber and ambient environment.
- Filterless construction eliminates bothersome filter cleaning.
- New rugged, one-handed outer door latch allows a padlock to be attached.

### Performance Charts:

MDF-U500VX

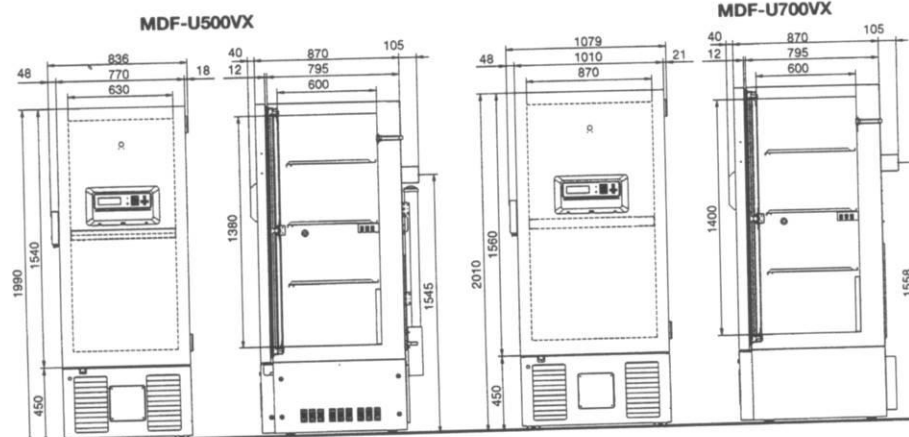


MDF-U700VX

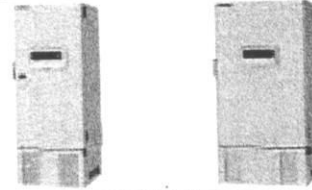


— Pull-up characteristics during power failure  
 — Pull-down characteristics

### Dimensions



PUF = Rigid polyurethane foamed insulation  
 V = Visual alarm  
 B = Buzzer alarm  
 R = Remote alarm



MODEL		MDF-U500VX-PE	MDF-U700VX-PE
<b>Dimensions</b>			
External dimensions (W x D x H) <sup>1)</sup>	mm	770 x 870 x 1990	1010 x 870 x 2010
Internal dimensions (W x D x H)	mm	630 x 600 x 1380	870 x 600 x 1400
Volume	litres	519	728
Net weight (approx)	kg	320	383
<b>Performance</b>			
Cooling performance <sup>2)</sup>	°C		-86
Temperature setting range	°C		-50 ~ -90
Temperature control range <sup>2)</sup>	°C		-50 ~ -86
<b>Control</b>			
Controller		Microprocessor Non-volatile memory	
Display		LCD	
Temperature sensor		Pt-1000	
<b>Refrigeration</b>			
Refrigeration system		Independent Dual-Cooling	
Compressor	W	2 x 1100	
Refrigerant		HFC Mixed	
Insulation material		PUF / VIP PLUS	
Insulation thickness	mm	70	
<b>Alarms</b>			
Power failure		V-B-R	
High temperature		V-B-R	
Low temperature		V-B-R	
Filter		Filterless design	
Door open		V-B	
<b>Construction</b>			
Exterior material		Painted steel	
Interior material		Painted steel	
Inner door	qty	2 (Insulated)	
Outer door lock		Yes	
Shelves	qty	3	
Max. load - per shelf	kg	50	
Max. load - total	kg	150	
Access port	qty	3	
- position		Back/Bottom x 2	
- diameter	Ø mm	17	
Casters	qty	4 (2 leveling feet)	
<b>Electrical and Noise Level</b>			
Power supply		230V 50Hz Single phase	
Noise level <sup>3)</sup>	dB	53	
<b>Options</b>			
See page 9 for Inventory Racks			
Drawers	qty	MDF-50R (Max 1)	
Small inner door kit	Set of 2	MDF-5ID (Max 2)	MDF-7ID (Max 2)
<b>Temperature recorders</b>			
- Circular type		MTR-G85	
- Continuous strip type		MTR-85H	
- Recorder housing (for MTR-85H)		MDF-S3085	
RS485 interface module		MTR-480	
Liquid CO <sub>2</sub> Back-up		CVK-UB2	
Liquid N <sub>2</sub> Back-up		CVK-UBN2	



The MDF-U700VX is certified as a Class IIa Medical Device (93/42/EEC and 2007/47/EC) for medical purposes of storing cells, DNA and/or frozen plasma. (For EU countries only)



notes:

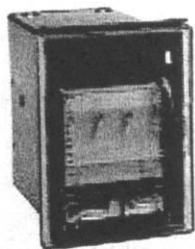
- 1) Exterior dimensions of main cabinet only - see dimension drawings showing handles and other external projections
- 2) Air temperature measured at freezer centre, ambient temperature +30°C, no load
- 3) Nominal value

\*Appearance and specification are subject to change without notice.

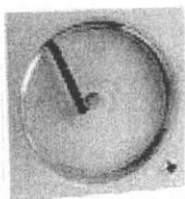
## Options



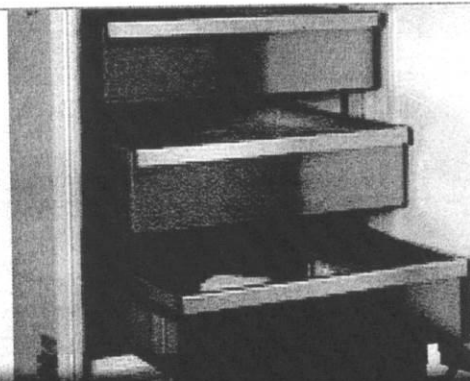
CVK-UB2



MTR-85H



MTR-G85



MDF-50R

### Options

Liquid CO<sub>2</sub> back-up system  
 Liquid N<sub>2</sub> back-up system  
 Circular temperature chart recorder  
 (-100°C to +40°C)  
 Chart paper  
 Ink pen  
 Strip temperature chart recorder  
 (-100°C to +50°C)  
 Chart paper  
 Ink pen  
 Recorder housing (for MTR-85H)

CVK-UB2  
 CVK-UBN2  
 MTR-G85  
 RP-G85  
 PG-R  
 MTR-85H  
 RP-85  
 DF-38FP  
 MDF-S3085

Communications Interface

Drawers  
 3 drawer set for MDF-U500VX

Small inner door kit  
 1 set of 2 inner doors for MDF-U500VX  
 1 set of 2 inner doors for MDF-U700VX

MTR-480

MDF-50R

MDF-51D

MDF-71D

There are times when extra back-up is essential

# Panasonic

#### UK Office

9 The Office Village  
 North Road, Loughborough  
 Leicestershire LE11 1QJ  
 United Kingdom  
 Tel. +44(0)1509 265265  
 Fax. +44(0)1509 269770  
[biomedical.uk@eu.panasonic.com](mailto:biomedical.uk@eu.panasonic.com)  
[www.panasonic-biomedical.co.uk](http://www.panasonic-biomedical.co.uk)

#### Head Office

Nijverheidsweg 120  
 4879 AZ Etten Leur  
 The Netherlands  
 Tel: +31 (0)76 543 38 33  
 Fax: +31 (0)76 541 37 32  
[biomedical.export@eu.panasonic.com](mailto:biomedical.export@eu.panasonic.com)  
[www.panasonic.eu/biomedical](http://www.panasonic.eu/biomedical)

#### France Office

44, avenue de Valvins, BP 44  
 F-77212 Avon Cedex  
 France  
 Tel. +33 1 60719911  
 Fax. +33 1 60711693  
[biomedical.fr@eu.panasonic.com](mailto:biomedical.fr@eu.panasonic.com)