

Think GAIA  
For Life and the Earth

**SANYO**

# Biomedical Equipment Product Guide

Advanced Products and Technologies for Life Science, Pharmaceutical,  
Biotechnology, Clinical and Industrial Laboratories



[www.sanyobiomedical.com](http://www.sanyobiomedical.com)

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## Core Technologies

SANYO core technologies, patents and intellectual properties are represented in every product line. Core technologies apply to critical components and processes such as refrigeration compressors, microprocessor electronics and patented V.I.P.<sup>™</sup> vacuum insulation panels engineered to exact specifications for important applications in the life science, pharmaceutical, biotechnology, clinical and industrial laboratories. As a result, SANYO products operate with dependability, safety, energy efficiency and ergonomic sensitivity. Look for these and other proprietary technologies and patents on SANYO Biomedical laboratory products.



Patented V.I.P.<sup>™</sup> Vacuum Insulation Panel Freezers, U.S. Patent No. 6260377



Patented SafeCell<sup>™</sup> ultraviolet contamination control, U.S. Patent No. 6255103



inCu saFe<sup>™</sup> germicidal effective copper-enriched stainless steel incubator interior



P.I.D./R<sup>™</sup> infrared CO<sub>2</sub> system with rapid recovery

Patented Direct Heat and Air Jacket<sup>™</sup> (DHA) incubator heating technology, U.S. Patent No. 5519188

Active Background Contamination Control<sup>™</sup> cell culture environment

FDA clearance for In Vitro fertilization, FDA K013703, October 30, 2001

SANYO-brand application specific laboratory refrigeration compressors

SANYO-brand battery technology

SANYO-built electronic components

## Vertical Component Integration<sup>™</sup>

As a leader in consumer electronics, refrigeration, energy and environmental products, SANYO offers a robust source of proven technologies deployed throughout a range of biomedical and medical research products.

Pioneering developments in consumer and industrial products are applied to all SANYO products through the development model of Vertical Component Integration<sup>™</sup>. Because many of our key component parts are designed and built by SANYO, we offer only the very best, accurately matched components in each SANYO product.

As SANYO draws on vast corporate resources to develop laboratory products to meet the needs of contemporary medical and scientific research, the SANYO philosophy of Vertical Component Integration<sup>™</sup> is expressed in human-oriented, easy-to-use, ergonomic products.



## Environmentally Friendly Technology

Always a leader in environmentally friendly technology, SANYO refrigerated products use commercially available CFC-free refrigerants and CFC-free insulation.



Compliance of RoHS, Restriction of Hazardous Substance, on all units.

# SANYO Biomedical Product Guide

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Total Lab Solutions







# Thinking Green, Thinking GAIA

## The road of GAIA to SANYO Biomedical Equipment Development

SANYO Biomedical, a division of SANYO Commercial Solutions, manages sales and technical service of SANYO laboratory products throughout the United States, Latin America and Canada. Headquartered in suburban Chicago, the SANYO Biomedical staff oversees marketing, sales, administration and service for customers, sales representatives, service companies and others throughout North, Central, and South America.

For over thirty years, SANYO has established a reputation as a premier manufacturer of precision biomedical and laboratory equipment. Known throughout the world for leadership in consumer electronics and appliances, SANYO addresses global needs such as energy, food, housing, health and information technology.

The complete line of SANYO Biomedical products

includes an array of laboratory equipment with the most advanced technology, controls, construction and performance attributes in the industry. Today we apply the most sophisticated refrigeration compressor design and state-of-the-art electronics to ultra-low and cryogenic freezers, refrigerators, incubators, and environmental chambers marketed to life science, pharmaceutical, biotechnology, healthcare and industrial laboratory markets.

As a result, SANYO Biomedical products incorporate the latest in refrigeration compressors, electronic components, robotic manufacturing and economies-of-scale that directly benefit our customers. Furthermore, SANYO Biomedical products are extensively tested to meet the toughest quality standards in the world. Through the vigorous application of our unique Vertical Component Integration™, SANYO Biomedical products offer tangible benefits - from performance and reliability to ergonomics and convenience - that no other manufacturer can provide.

### Thinking GAIA

SANYO has established a corporate-wide initiative 'Think GAIA' to emphasize the company's commitment to energy conservation and environmental integration. In

practice, GAIA is a threefold approach consisting of action on environmental, energy and lifestyle fronts. In each of these areas, SANYO is redefining conventional ideas and taking advantage of unique technological resources to propose global solutions for the Earth and all living things.

#### How is SANYO conscious of the need to protect our environment and conserve energy ?

This commitment was demonstrated when SANYO took the initiative to revamp and redesign newer refrigeration systems that would employ new, environmentally-friendly refrigerants throughout the laboratory without compromising performance.

- SANYO was the first ultra-low freezer manufacturer to employ non-CFC R508 low-stage refrigerant, now recognized as today's industry standard and widely available. This non-proprietary refrigerant is available to refrigeration service professionals on the open market.
- The high stage refrigeration system is a mixture of R134a and R410a (Puron®), available to refrigeration professionals on the open market as well.
- Positioning itself aggressively as a leader in environmentally friendly technology, SANYO refrigeration

products use commercially available CFC refrigerants and CFC-free insulation.

- The cost per cu.ft. (or liter) of interior storage space is significantly lower in a SANYO ultra-low freezer. VIP® vacuum insulation panel cabinet, SANYO can offer more usable storage volume within the same sq.ft. of floor space than competitive models

**1966** Pharmaceutical refrigerator

**1969** Incubator

**1973** Medical autoclave

**1974** -40°C freezer MDF-400

**1975** Pharmaceutical refrigerators MPR-110/210

Cooled incubator MIR-150/250/550

**1977** -86°C ULT freezer MDF-230

-30°C medical freezer MDF-390

**1978** Upright medical freezer MDF-300

**1979** -86°C ULT freezer MDF-290

Blood Bank Refrigerator MBR-390

**1980** -86°C upright ULT Freezer MDF-380

Prefab refrigerator MCU-1000

Cooling unit MCU-5020

**1981** -30°C medical freezer MDF-130

Compact blood bank refrigerator MBR-105T

**1982** PI controlled oven MOV-102/202

Large pharmaceutical refrigerators MPR-510/1010

Pharmaceutical refrigerator with -30°C freezer MPR-211F

**1983** Compact -86°C ULT freezer MDF-190

P.I.D. controlled heated incubators MIR160/260

**1984** Water jacketed CO<sub>2</sub> incubator MCO-165

**1985** Dry heat sterilizer MOV-102S/202S

**1986** HEPA-filter unit MBCR-717

Cleanroom unit MBCR-2220C

Air jacketed CO<sub>2</sub> incubator MCO-95

**1987** -135°C ULT freezer MDF-2135

Pharmaceutical refrigerators MPR-161D/311D

**1988** Bio-clean bench MCV-9/13/16

**1989** Programmable cooled incubators MIR-152/252/552

-86°C double-door upright ULT freezer MDF-U581

Establishment of own SANYO bio-soft laboratory at the Tokyo plant

**1990** Plant growth cabinet MLR-350

**1991** Multi-gas Incubator MCO-175M

World's lowest temperature freezer produced (-152°C), MDF-1155(ATN)

Bench-top clean bench MCV-711ATS

**1992** Programmable high-temperature oven MOV-313P

Plasma blast freezer MDF-U460B

**1993** Four door pharmaceutical refrigerator with -30°C freezer MPR-411F/411FR

**1994** ISO 9002 recognition

**1995** CFC free refrigerants recognized by ASHRAE, EPA Stratospheric Ozone Protection Award

**1996** ISO 9001

**1997** World's first vacuum insulated -86°C freezer MDF-U70V introduced

**1998** Pharmaceutical refrigerator MPR-512/1012

ISO 14001 (environmental recognition)

**2000** Introduction of inCu saFe active background contamination control in CO<sub>2</sub> incubators

**2002** Introduction of SafeCell revolutionary UV sterilization in CO<sub>2</sub> incubators

**2003** -86°C VIP freezers MDF-U32V/U52VC

Multi-gas incubator MCO-18M

**2006** Introduction of -150°C freezer MDF-C2156VANC

**2008** Introduction of Large Capacity Reach-in Incubator MCO-80IC



# Incubation



# SANYO CO<sub>2</sub> and Multigas Incubators

## Relative Humidity

A removable water pan combined with an independent heater at the base of the incubator provides an efficient, cost effective method for maintaining elevated humidity levels. The humidifying pan can be easily removed and a water level sensor provides an easy maintenance system.

## Preventative Contamination Control

SANYO's inCu saFe® and SafeCell™ UV work in a combination to provide the most effective protection against contamination during culturing without downtime or affecting cultures.



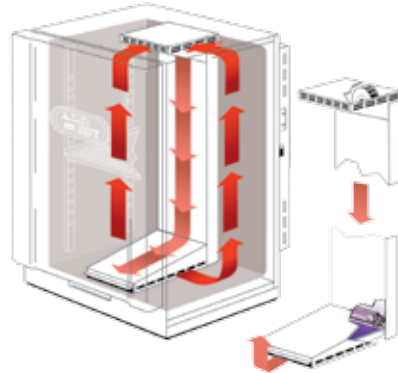
## InCu saFe® Copper Stainless Steel Alloy

inCu saFe® copper-stainless steel alloy combines the corrosion resistance and durability of stainless steel with the germicidal properties of copper. The InCu saFe® walls and shelves significantly reduce the risk of contamination developing on internal surfaces.



## SafeCell™ UV (U.S. Patent 6255103)

SANYO's SafeCell™ UV system with programmable, ozone free UV lamp sterilizes the chamber air and water in the humidifying pan.



The UV lamp is completely isolated from the cell cultures and unlike other methods, the SafeCell™ UV system does not trap contaminants inside the incubator or require the temporary removal of critical components.

## World Class Design

SANYO designs and manufactures a range of CO<sub>2</sub> and Multigas incubators to meet a variety of application and user needs.

### • CO<sub>2</sub> Laboratory Incubators

MCO-80IC, MCO-20AIC, MCO-40AIC, MCO-18AIC(UV), MCO-18AIC, MCO-36AIC(UV), MCO-36AIC, MCO-17AC, MCO-34AC, MCO-5AC

### • CO<sub>2</sub>/O<sub>2</sub> Laboratory Incubators

MCO-5M, MCO-18M, MCO-36M

# CO<sub>2</sub> Laboratory Incubators

All SANYO CO<sub>2</sub> incubators feature patented Direct heat, Air Jacket™ temperature control for accurate, uniform temperature control and inCu saFe™ for continuous contamination control. SANYO laboratory CO<sub>2</sub> incubators feature on selected SafeCell™ UV with exclusive, patented Active Background Contamination Control™.

## inCu saFe™ Interior

Copper alloy stainless steel plenums, shelves, and brackets extend contamination control to the chamber interior (all are easily removed for cleaning). Superior contamination control with an anti-bacterial copper alloy stainless steel interior that provides germicidal protection and eliminates molds, spores, and other contaminating spills, kills mycoplasma and provides a noncorrosive environment.

## Direct Heat & Air Jacket™ Control

Patented, radiant wall heating microprocessor controlled in three zones to maintain uniformity and optimum humidity. Unlike traditional water jacket units, the sealed air jacket and foam insulation maintains a uniform temperature and quick temperature recovery after door openings. Air jacket technology requires little maintenance and provides a lightweight unit for easier relocation or repositioning for cleaning.

## SafeCell™ UV Contamination Control

Narrow bandwidth ultraviolet sterilization *in situ* to eliminate air and water pan contamination without downtime. SANYO SafeCell™ UV system continues to protect against contamination during normal operation by combining the passive resistance of copper-enriched stainless steel with UV decontamination of circulated, humidified air. Independent testing confirms that exposure to ultraviolet light at 253.7nm and heat sterilization at +90°C and +140°C are equally effective in decontaminating an incubator interior chamber against organisms selected for testing.

## CO<sub>2</sub> Control Options

Available with high precision, quick recovery infrared or thermal CO<sub>2</sub> sensor.

## P.I.D./R™ Control Sophistication

Proportional, integral and derivative infrared CO<sub>2</sub> control accelerates recovery, prevents overshoot.



Combination SafeCell™ UV Technology and inCu saFe™ interior construction for contamination control and no culturing downtime.

Model Number	Volume	Exterior Dimensions	Contamination Control	CO <sub>2</sub> Control	Chamber	Voltage, Power Connection
MCO-20AIC	7.6 cu.ft.	30.3"W x 27.9"F-B x 35.4"H	SafeCell UV with ultra violet light, inCu saFe copper-enriched stainless steel interior	infrared	single	115V NEMA 5-15
MCO-40AIC	15.2 cu.ft.	30.3"W x 27.9"F-B x 70.8"H			dual	
MCO-18AIC(UV)	6.0 cu.ft.	24.4"W x 28"F-B x 35.4"H	SafeCell UV with ultra violet light, inCu saFe copper-enriched stainless steel interior	infrared with P.I.D./R recovery	single	
MCO-36AIC(UV)	12.0 cu.ft.	24.4"W x 28"F-B x 70.8"H			dual	
MCO-18AIC	6.0 cu.ft.	24.4"W x 28"F-B x 35.4"H	inCu saFe copper-enriched stainless steel interior	infrared with P.I.D./R recovery	single	
MCO-36AIC	12.0 cu.ft.	24.4"W x 28"F-B x 70.8"H			dual	
MCO-17AC	5.8 cu.ft.	24.4"W x 27.0"F-B x 35.4"H			single	
MCO-34AC	11.6 cu.ft.	24.4"W x 27.0"F-B x 70.8"H			dual	
MCO-5AC	1.7 cu.ft.	18.9"W x 21.6"F-B x 22.6"H	Optional SafeCell UV with ultraviolet light, inCu saFe copper-enriched stainless steel interior	thermal conductivity	single	
MCO-80IC	30.1 cu.ft.	38.8"W x 33.6"F-B x 80.3"H	SafeCell UV with ultra violet light, inCu saFe copper-enriched stainless steel interior	infrared with P.I.D./R recovery	single	



# CO<sub>2</sub>/O<sub>2</sub> Laboratory Incubators

SANYO Models MCO-5M/18M/36M series CO<sub>2</sub>/O<sub>2</sub> incubators employ multiple sensor technologies to achieve in vitro simulation of the in vivo environment. MCO Series CO<sub>2</sub> and CO<sub>2</sub>/O<sub>2</sub> incubators have received U.S. Food and Drug Administration 510(k) clearance for in vitro fertilization applications in accordance with the FDA Safe Medical Devices Act of 1990 and the Medical Device Amendments of 1992.

Reference: Number K013703. Regulation Number: 21 CFR 884-6120, Assisted Reproduction Accessories, Regulatory Class II, Product Code 85MOG, October 30, 2001.

## Infrared CO<sub>2</sub> Sensor

Precise CO<sub>2</sub> control, fast response to door openings. The SANYO CO<sub>2</sub> IR sensor monitors and controls CO<sub>2</sub> level over a range of 0% to 20%, with control of ±0.15%.

## Zirconia O<sub>2</sub> Control

Non-depleting design for precise O<sub>2</sub> control with fast response to door openings. The maintenance-free zirconia solid-state electrolyte sensor has a high degree of precision, a long service life, and does not require fine adjustment. Through accurate determination of the chamber O<sub>2</sub> level the microprocessor injects either nitrogen gas or oxygen as required.

## Inner Doors

Multiple chamber inner doors minimize loss of balanced interior atmosphere during routine door openings (available on selected models).

## P.I.D./R™ Control Sophistication

Proportional, integral and derivative infrared CO<sub>2</sub> control accelerates recovery and prevents overshoot.

Model Number	Volume	Exterior Dimensions	Contamination Control	CO <sub>2</sub> Control	O <sub>2</sub> Control	Voltage, Power Connection
MCO-5M	1.7 cu.ft.	18.9"W x 21.6"F-B x 22.6"H	inCu saFe copper enriched stainless steel interior, optional copper SafeCell UV with ultraviolet light	thermal conductivity	Zirconia sensor with P.I.D./R recovery	115V NEMA 5-15
MCO-18M	6.0 cu.ft.	24.4"W x 28"F-B x 35.4"H		infrared with P.I.D./R recovery		
MCO-36M	12.0 cu.ft.	24.4"D x 28"F-B x 70.8"H				

For below ambient or enriched (above ambient) oxygen levels in addition to CO<sub>2</sub> control.



# Heated & Refrigerated Incubators

SANYO MIR Series Incubators are designed for general laboratory applications requiring fixed setpoint or cycling temperature control. A selection of five cabinet sizes offers programmed operation and integrated alarms for a wide temperature range.

## Programmable

Multiple setpoints and cycling of refrigerated incubators for a variety of laboratory functions.

## P.I.D. Controller

Microprocessor-based P.I.D.(proportional, integral, derivative) control with digital input, full-function alarm and monitoring.

## SANYO Brand Refrigeration

Built by SANYO for long lasting, dependable operation in demanding laboratory environments.

Model Number	Volume	Exterior Dimensions	Heated	Refrigerated	Programmable Temp.	Voltage, Power Connection
MIR-154	4.5 cu.ft.	27.6"W x 22.8"F-B x 40.1"H	yes	yes	- 10°C to 50°C	115V NEMA 5-15
MIR-254	9.0 cu.ft.	27.6"W x 22.8"F-B x 63.7"H	yes	yes	- 10°C to 50°C	
MIR-553	14.3 cu.ft.	31.5"W x 32.8"F-B x 71.3"H	yes	yes	- 10°C to 50°C	
MIR-162	3.3 cu.ft.	22.8"W x 23.4"F-B x 32.3"H	yes		5°C above ambient to 80°C	
MIR-262	5.4 cu.ft.	28.7"W x 25.4"F-B x 34.3"H	yes		5°C above ambient to 80°C	



Programmable for multifunction laboratory applications.

# Plant Growth Chamber

The Model MLR Series humidified plant growth chamber has a temperature range of 0°C to 50°C, with programmable lighting for diurnal protocols in plant and insect cell culture applications.

## Microprocessor P.I.D. Control

Allows accurate, reproducible and flexible programming of all performance parameters with optimal energy management; comprehensive security monitoring and alarm functions are standard. The temperature inside the incubator can be set and monitored easily by means of precise microprocessor temperature control with an LCD graphic display.

## Forced Air Circulation

Maximizes temperature uniformity at all shelf levels.

## Programmable

Nine user programmable steps allow simulation of environmental conditions; fifteen variable intensity fluorescent lamps create uniform lighting.

## Ergonomic Design

Slim-profile cabinet offers sophisticated performance in minimal space.

<b>Model Number</b>	<b>MLR-351H</b>
<b>Effective Capacity</b>	10.4 cu.ft.
<b>Exterior Dimensions</b>	29.9"W x 27.6"F-B x 72.2"H
<b>Temp. Range Lamp OFF</b>	5°C to 50°C
<b>Temp. Range Lamp ON</b>	10°C to 50°C
<b>Humidity Control Range</b>	55% to 90%RH
<b>Lighting Range</b>	0 to 20,000 lux
<b>Voltage</b>	115V
<b>Power Connection</b>	NEMA 5-20



For simulation of cyclical environment conditions.



# Preservation



# SANYO Ultra-low Temperature Freezers

Everyday, laboratories around the world depend on SANYO freezers for their ultra-low temperature storage, reassured by an industry-leading reputation for performance and reliability.

## Innovation

This reputation is built upon world-class design and refrigeration systems developed specifically for ultra-low temperature applications. SANYO has pioneered the development of new technologies for ultra-low temperature storage from the world's lowest temperature -152°C freezer, the introduction of application specific CFC-free refrigerants and the first -86°C freezer with Vacuum Insulation (V.I.P.).

In 2006, SANYO introduced the next generation of compressors for ultra-low freezers. Application specific compressors provide new levels of durability with significantly reduced power consumption, heat output and noise.

## Vacuum Insulation (V.I.P.)

SANYO was the first company to introduce vacuum insulation panels to ultra-low temperature freezers. The SANYO range of VIP freezers provide typically 25% more storage capacity for a given floor area saving valuable laboratory space.

## Quality to Rely on

SANYO's Quality Management System is certified to ISO9001 and every SANYO freezer undergoes at least 100 checks throughout production to ensure the highest quality standards are maintained.

## World Class Design

SANYO refrigeration systems offer superior performance and reliability, even in higher ambient temperatures and in response to frequent door openings. The cooling system also maintains uniform temperatures throughout the freezer, which is especially important when validation is required.

- **V.I.P.® Series Space Saving -80°C to -86°C Ultra-low Freezers**  
MDF-U33V, MDF-U53VA, MDF-U53VC, MDF-U73VC, MDF-C8V
- **-150°C Cryogenic Freezer**  
MDF-C2156VANC
- **MDF Series -86°C Ultra-low Freezers (Upright)**  
MDF-U5386SC, MDF-U7386SC
- **MDF Series -86°C Ultra-low Freezers (Chest)**  
MDF-594C, MDF-794C
- **-30°C Biomedical Freezers**  
MDF-436, MDF-U333, MDF-U537, MDF-U730, MDF-U730M
- **Laboratory Refrigerators**  
MPR-720, MPR-720R, MPR-1410, MPR-1410R
- **Pharmacy Refrigerators**  
MPR-311D(H), MPR-513, MPR-513R, MPR-1013, MPR-1013R
- **Blood Bank Refrigerators**  
MBR-107D(H), MBR-304GR, MBR-704GR, MBR-1404GR
- **Biomedical Refrigerator with Freezer Combination**  
MPR-214F, MPR-414F
- **General Purpose Refrigerators**  
SRR-23GD-MED, SRR-49GD-MED, SRR-72GD-MED
- **Undercounter Refrigerators and Freezers**  
SR-L6111W, SR-L4110W, SR-L4110WSEC, SF-L6111W, HF-5017W, HF-5017WSEC

# V.I.P.® Series Space Saving -86°C Ultra Low Freezer

SANYO V.I.P.® ultra-low temperature freezers offer the most advanced combination of low-temperature refrigeration, cabinet and control technology in the clinical and life science industry. Space-saving, high-density V.I.P.® vacuum insulation panel construction allows up to 25% more storage volume in the same or less floor space than conventional freezers.

## Patented V.I.P.® Vacuum Panel Insulation

Combination of multiple high-performance vacuum panels with high-density foam insulation achieves thin-wall profile for maximum interior volume in a compact footprint. Increased cooling capacity improves temperature recovery after door openings.

## Inner Doors Improve Uniformity

Easy-In / Easy-Out™ SANYO Eagle™ inner door latches feature ergonomic design to seal firmly against the cabinet with one hand. High strength, insulated inner doors help minimize change in interior temperatures during routine door openings.

## Microprocessor

Comprehensive setpoint, alarm, monitoring and diagnostic functions supervised by SANYO built microprocessor controller with digital display of all input/output function.

## SANYO Designed Compressors

SANYO's ultra low temperature compressor employs a unique orientation of conventional components to reduce discharge temperatures and compressor heat.

## Smart Refrigeration Monitoring System

Status alert function uses predictive intelligence to determine if freezer is operating within specifications under existing environmental conditions.

Model Number	MDF-U33V	MDF-U53VA	MDF-U53VC	MDF-U73VC
Volume	11.8 cu.ft.	18.3 cu.ft.	18.3 cu.ft.	26 cu.ft.
Voltage	115V	115V	208/230V	208/230V
Exterior Dimensions	26.4"W x 34.1"F-B x 73.2"H	30.3"W x 34.4"F-B x 78.3"H	30.3"W x 34.4"F-B x 78.3"H	39.8"W x 34.4"F-B x 79.1"H
Power Connection	NEMA 5-15	NEMA 5-20	NEMA 6-15	NEMA 6-15
2" Boxes	216	352	352	576
3" Boxes	168	224	224	384
2ml Vials in Boxes	21,600	35,200	35,200	57,600



V.I.P. units offer lower operational costs than conventionally insulated models. These units also offer high-density ultra-low storage solutions for the laboratory.



# -150°C Cryogenic Freezer

SANYO MDF Series cryogenic freezers maintain uniform temperature of -150°C for stable, long-term preservation of cells and tissue. SANYO V.I.P.® PLUS Cryogenic Series -150°C ultra-low temperature freezers achieves up to 25% more storage capacity than a conventionally insulated freezer without increasing footprint.

## Uniform Cryogenic Temperatures

Mechanically refrigerated design promotes better top-to-bottom uniformity than liquid nitrogen vapor-phase storage.

## V.I.P.® Plus Design

Patented revolutionary vacuum insulation cabinet construction that reduces the wall thickness and achieves up to 25% more storage capacity than a conventionally insulated freezer without increasing the footprint.

## Mechanical Refrigeration

Lowers LN<sub>2</sub> consumption and mitigates safety concerns, reduces cost of ownership, minimizes chance of cross-contamination among stored samples due to vial breakage at extreme temperatures.

## SANYO Designed Refrigeration

Designed by SANYO specifically for rugged cryogenic temperature applications in a laboratory environment; CFC-free refrigerants only.

## Microprocessor Temperature Control With Digital Design

Precise setting and temperature control. The temperature inside the freezer can be set and monitored easily by means of precise microprocessor temperature control with an LCD graphic display. Adjustable High/Low temperature alarm; Power failure alarm; Filter check alarm; Door ajar alarm; Part replacement time notification.

## Built-In LN<sub>2</sub> Back-up System

Automatically injects LN<sub>2</sub> to maintain temperature during prolonged power outage. (LN<sub>2</sub> tank not included).

## Ideal Alternative to LN<sub>2</sub> Storage - Mechanical Preservation

Freezer preservation provides users with numerous advantages; uniform cryogenic storage temperatures; no worries about sample contamination, no liquid supply problems, no danger of sudden liquid eruptions, and low operational costs.

## LCD Control Panel

LCD microprocessor controller features a full alarm package with a Status Alert monitoring system. The monitoring system records internal temperature up to one month and history of door openings and closings.

The newly developed refrigeration system and freezer structure offers a quiet experimental environment.



<b>Model Number</b>	<b>MDF-C2156VANC</b>
<b>Temperature</b>	-150°C
<b>Volume</b>	8.2 cu.ft.
<b>Exterior Dimensions</b>	68.1"W x 30.1"F-B x 39.8"H
<b>Voltage</b>	208/230V
<b>Power Connection</b>	NEMA 6-15
<b>2" Boxes</b>	150
<b>3" Boxes</b>	105
<b>2ml Vials in Boxes</b>	15,000

# MDF Series -86°C Ultra-Low Freezers (Upright)

SANYO MDF series ultra-low temperature freezers maintain internal temperatures as low as -86°C. All models use SANYO designed compressors for ultra-low temperature applications. Manufactured with foam-in-place insulation to maximize interior temperature uniformity, they are ideally suited for use in hospitals and laboratories for long-term preservation and storage of blood, specimens and components, as well as material testing.

## Microprocessor Controls

Comprehensive setpoint, alarm, monitoring and diagnostic functions based on SANYO-built microprocessor controller with digital display of all input/output functions.

## SANYO-Designed Refrigeration

Designed by SANYO specifically for rugged ultra-low temperature applications in a laboratory environment; CFC-free refrigerants only. SANYO refrigeration system delivers uniform temperatures with increased cooling capacity. Smart refrigeration monitoring system is included with a Status Alert function. High performance refrigeration system with foam-in-place cabinet insulation maximizes interior temperature uniformity and protects against fluctuating ambient temperatures.

## SANYO Designed Compressors

SANYO's ultra low temperature compressor employs a unique orientation of conventional components to reduce discharge temperatures and compressor heat.

## Inner Doors Improve Uniformity

Double insulation polyurethane walls and easy open, easy close hinged outer door latch. Two independent and insulated inner doors ensure maximum interior chamber uniformity.

Model Number	MDF-U5386SC	MDF-U7386SC
Volume	17.1 cu.ft.	23.5 cu.ft.
Exterior Dimensions	35.0"W x 34.4"F-B x 78.3"H	44.5"W x 34.4"F-B x 78.3"H
Voltage	208/230V	208/230V
Power Connection	NEMA 6-15	NEMA 6-15
2" Boxes	320	480
3" Boxes	192	366
2ml Vials in Boxes	32,000	48,000



Think Green, Think GAIA  
Environmentally friendly refrigerants, RoHS  
compliant and low noise operation.

# MDF Series -80°C to -86°C Ultra-Low Freezers (Chest)

SANYO MDF Series ultra-low temperature freezers maintain internal temperatures as low as -86°C (-123°F). All models use SANYO designed compressors for ultra-low temperature applications. Manufactured with foamed-in-place insulation, they are ideally suited for use in hospitals and laboratories for long-term preservation and storage of blood, specimens and components, as well as materials testing.

## Microprocessor Controls

Comprehensive setpoint, alarm, monitoring and diagnostic functions based on SANYO-built microprocessor controller with digital display of all input/output functions.

## SANYO-Designed Refrigeration

Designed by SANYO specifically for rugged ultra-low temperature applications in a laboratory environment; CFC-free refrigerants only.

## SANYO Designed Compressors

High performance refrigeration system with foam-in-place cabinet insulation maximizes interior temperature uniformity and protects against fluctuating ambient temperatures.

Model Number	MDF-C8V	MDF-594C	MDF-794C
Volume	3.0 cu.ft.	17.2 cu.ft.	24.8 cu.ft.
Exterior Dimensions	21.6"W x 27.0"F-B x 37.2"H	79.1"W x 30.3"F-B x 42.1"H	101.2"W x 30.3"F-B x 42.1"H
Voltage	115V	208/230V	208/230V
Power Connection	NEMA 5-15	NEMA 6-15	NEMA 6-15
2" Boxes	42	351	507
3" Boxes	30	243	351
2ml Vials in Boxes	4,200	35,100	50,700



Think Green, Think GAIA  
V.I.P. offers lower operational costs  
than conventionally insulated models.



# -30°C Biomedical Freezers

SANYO MDF Series Biomedical Freezers include chest and upright models designed for short or intermediate term storage at temperatures as low as -35°C. Constructed with high-performance laboratory and clinical grade refrigeration systems, these freezers are used in medical, biotechnology and industrial labs for short to intermediate storage of blood components, enzymes, culture media, reagents, specimens and vaccines.

## SANYO-Designed Refrigeration

Designed by SANYO with compressors specifically for storage applications in a laboratory environment.

## Microprocessor Controls

Comprehensive setpoint, alarm, monitoring and diagnostic functions supervised by SANYO built microprocessor controller with digital display of all input/output function.

## High Performance Refrigeration

Laboratory quality refrigeration assures stable, uniform temperatures throughout the chamber

## General Purpose Storage Maintenance Free (Auto defrost models)

Storage at -30°C with auto-defrost and consistent temperature control below -20°C during defrost cycle. Maintenance free storage with no end user intervention to defrost unit and clean-up condensate. Precision temperature uniformity throughout chamber due to forced air circulation with dual fans.

## Enzyme & Biologics Preservation (Manual Defrost models)

Storage at -30°C and -20°C easily with constant stable control. Uniform temperatures are maintained throughout the chamber using full cold wall construction.

Model Number	Exterior Dimensions	Chest, -35°C	Upright, -30°C	Defrost	Voltage, Power Connection
MDF-436	49.8"W x 31.8"F-B x 35.6"H	15.0 cu.ft.	-	Manual	115V NEMA 5-15
MDF-U333	24.2"W x 28.9"F-B x 63.8"H	-	9.7 cu.ft. single door, single chamber	Manual	
MDF-U537	31.5"W x 30.4"F-B x 70.9"H	-	17.0 cu.ft. double door, single chamber	Manual	
MDF-U730	30.3"W x 32.7"F-B x 77"H	-	22.3 cu.ft. single door, single chamber	Auto	
MDF-U730M	30.3"W x 32.7"F-B x 77"H	-	24.4 cu.ft. single door, single chamber	Manual	



Designed for high-performance laboratory and clinical applications.

# Laboratory Refrigerators

Large Capacity laboratory refrigerators offer stable and reliable refrigerated environments for exacting laboratory requirements in clinical, research, pharmaceutical and industrial applications.

## Forced Air Circulation

Interior blower fans quickly restore temperature uniformity following routine door openings.

## Adjustable Temperature Control

SANYO-built microprocessor controller, temperature range 2°C to 23°C, with comprehensive setpoint, alarm, monitoring and diagnostic functions with digital display of all input/output functions.

## SANYO Cycle Defrost

Unique cycle defrost initiates only as required; maintains internal temperature uniformity during process.

## SANYO Designed Compressors

Designed by SANYO specifically for demanding laboratory applications.

## Inventory Control

Choice of stainless steel roll-out drawers or adjustable wire shelves.

Model Number	MPR-720	MPR-720R	MPR-1410	MPR-1410R
Volume	24.2 cu.ft.	23.7 cu.ft.	48.4 cu.ft.	48.2 cu.ft.
Exterior Dimensions	30.3"W x 32.7"F-B x 77"H	30.3"W x 32.7"F-B x 77"H	56.7"W x 32.7"F-B x 76.8"H	56.7"W x 32.7"F-B x 76.8"H
Adjustable Wire Shelves	4	-	8	-
Solid Roll-out Drawers	-	5	-	10
Glass Door	single, swinging	single, swinging	double swinging	double swinging
Voltage	115V			
Power Connection	NEMA 5-15			



Lab-ready with microprocessor control, alarm and monitoring, casters, access ports and interior lights.

# Pharmacy Refrigerators

SANYO's MPR Series Pharmaceutical Refrigerators offer a complete and integrated solution for the growing requirements for strict and exact storage temperatures for pharmaceuticals, medicines, and temperature sensitive biologicals. The slim design and optional sliding shelves allows for an ergonomic easy-reach retrieval of your product.

## Forced Air Circulation

Quickly restores uniformity following routine door openings.

## Microprocessor Controls

Comprehensive setpoint, alarm, monitoring and diagnostic functions based on SANYO built microprocessor controller with digital display of all input/output functions, adjustable temperature range 2°C to 14°C.

## SANYO Cycle Defrost

Unique cycle defrost initiates only as required; maintains internal temperature uniformity during process.

## SANYO Designed Compressors

Designed by SANYO specifically for rugged ultra-low temperature applications in a laboratory environment; CFC-free refrigerants only.

## Inventory Control

Stainless steel interior construction with roll-out or adjustable wire shelves.

Model Number	MPR-311D(H)	MPR-513	MPR-513R	MPR-1013	MPR-1013R
Exterior Dimensions	31.4"W x 17.7"F-B x 70.8"H	35.4"W x 23.6"F-B x 70.5"H	35.4"W x 23.6"F-B x 70.5"H	70"W x 23.6"F-B x 70.5"H	70"W x 23.6"F-B x 70.5"H
Volume	12.0 cu.ft.	17.2 cu.ft.	17.2 cu.ft.	36.5 cu.ft.	36.5 cu.ft.
Door	dual, sliding glass	dual, sliding	dual, sliding	dual, sliding glass	dual, sliding glass
Wire Shelves	adjustable	adjustable	½ adjustable, ½ roll-out	adjustable	½ adjustable, ½ roll-out
Voltage	115V				
Power Connection	NEMA 5-15				



Ergonomic design offers temperature stability with safe, secure and easy inventory management.

# Blood Bank Refrigerators

SANYO Blood Bank refrigerators are designed to create stable, reliable temperature control pre-set to 4°C with precise top-to-bottom temperature uniformity.

## Inner Doors

Plexiglass inner doors offer additional interior chamber temperature protection during door openings.

## Forced Air Circulation

Interior blower fans quickly restore temperature uniformity following routine door openings.

## Temperature Recorder

Built-in recorder provides a permanent record of cabinet pressure.

## Microprocessor Temperature Control

SANYO-built microprocessor controller with comprehensive alarm, monitoring and diagnostic functions with digital display.

## SANYO Designed Refrigeration

Designed by SANYO with compressors specifically designed for blood bank storage.

## SANYO Cycle Defrost

Unique cycle defrost initiates only as required; maintains internal temperature uniformity during process.

Model Number	MBR-107D(H)	MBR-304GR	MBR-704GR	MBR-1404GR
450ml Bag Capacity	32	120	360	720
Exterior Dimensions	15.7"W x 19.5"F-B x 59.6"H	23.6"W x 26.8"F-B x 72.2"H	30."W x 32.7"F-B x 77"H	56.7"W x 32.7"F-B x 76.8"H
Volume	2.8 cu.ft.	10.6 cu.ft.	21.8 cu.ft.	45.4 cu.ft.
Stainless Steel Roll-out Drawers	n/a	5	6	12
Shelves	4	-	-	-
Swinging Glass Doors, Dual Pane, With Lock	1	1	1	2
Inner Doors	2	2	3	6
Voltage	115V			
Power Connection	NEMA 5-15			



Designed to meet AABB and ANRC criteria for safety and performance.



# Biomedical Refrigerator with Freezer Combination

When space is at a premium, SANYO refrigerator with freezer combination offers convenience and performance in an attractive, space-saving design.

## SANYO Cycle Defrost

Unique cycle defrost (refrigerator only) initiates only as required; maintains internal temperature uniformity during cycle defrost.

## SANYO Designed Refrigeration

SANYO designed compressors allow differential control of individual refrigerator and freezer compartments.

## Microprocessor Controls

Comprehensive setpoint, alarm, monitoring and diagnostic functions based on SANYO built microprocessor controller with digital display of all input/output functions.

## Validatable Storage

Laboratory grade, integrated systems are designed to assure stored product safety.

Model Number	MPR-214F	MPR-414F
Exterior Dimensions	21.3"W x 21.9"F-B x 70.5"H	31.5"W x 23.6"F-B x 71.1"H
Refrigerator Volume	6.2 cu.ft.	12.0 cu.ft.
Freezer Volume	1.4 cu.ft.	2.9 cu.ft.
Temp. Range Refrigerator (Forced Air)	2°C to 14°C	2°C to 14°C
Temp. Range Freezer (Cold Wall)	-20°C to -30°C	-20°C to -30°C
Voltage, Power Connection	115V NEMA 5-15	



Designed for storage of vaccines and pharmaceuticals in the hospital, laboratory or medical office.

# General Purpose Refrigerators

SANYO General Purpose Refrigerators are designed for general purpose storage applications in clinical, life science, pharmaceutical, biotechnology, and industrial laboratories. Feature reliable heavy duty refrigeration systems for frequent door openings with optional duplex power outlet for chromatography applications.

## Large Interior

Greater flexibility in cold storage

## Heavy Duty Refrigeration

Designed for frequent door opening applications

## Stainless Steel Construction

Durable exterior and interior surfaces

## Adjustable Temperature Control

Microprocessor temperature control with LED readout and alarm functions

Model Number	SRR-23GD-MED	SRR-49GD-MED	SRR-72GD-MED
Exterior Dimensions	29.1"W x 31.7"F-B x 79.25"H	49.6"W x 31.7"F-B x 79.25"H	74.8"W x 31.7"F-B x 79.25"H
Volume	21 cu.ft.	40 cu.ft.	60 cu.ft.
Door	single glass, swing	double glass, swing	triple glass, swing
Wire Shelves	4 adjustable	8 adjustable	12 adjustable
Voltage, Power Connection	115V NEMA 5-15		



Designed for general purpose storage applications in the laboratory.

# Undercounter Refrigerators and Freezers

Designed for the demanding standards of clinical, life science, pharmaceutical, biotechnology, and industrial laboratories.

\*Models SR-L4110WSEC and HF-5015WSEC offer additional hasp locks to accommodate a padlock.

## Compact Design

Allows for easy installation undercounter, counter top, or within the knee-well of laboratory cabinetry.

## SANYO Refrigeration

Energy efficient, whisper quiet operation

## Convenient Storage

Door shelves and standard shelving maximize product storage capacity.

Model Number	Exterior Dimensions	Volume	Temperature	Display	Lock	Voltage, Power Connection
<b>SR-L6111W</b>	23.6"W x 22.5"F-B x 34.5"H	6.1 cu.ft.	1°C to 14°C Microprocessor	yes	yes	115V NEMA 5-15
<b>SR-L4110W</b>	21.4"W x 22.8"F-B x 33.8"H	4.9 cu.ft.	4°C	no	no	
<b>SR-L4110WSEC</b>	21.4"W x 22.8"F-B x 33.8"H	4.9 cu.ft.	4°C	no	yes	
<b>SF-L6111W</b>	23.6"W x 22.5"F-B x 34.5"H	5.4 cu.ft.	-15°C to -25C Microprocessor	yes	yes	115V NEMA 5-15
<b>HF-5017W</b>	21.4"W x 25.4"F-B x 33.4"H	5.0 cu.ft.	-20°C	no	no	
<b>HF-5017WSEC</b>	21.4"W x 25.4"F-B x 33.4"H	5.0 cu.ft.	-20°C	no	yes	



Convenient compact refrigeration in a laboratory environment.

# Sterilization

Researchers waste valuable time and energy when limited to using a centralized building autoclave. Installation and maintenance of central autoclaves are not only costly but time consuming. The MLS autoclave series is designed for individual lab use and can be conveniently moved from one lab to another.

## World Class Design

Accurate, high-temperature equipment for scientific research. SANYO has always aimed to provide research support equipment that offers complete satisfaction to its users.

- MLS-3751L, MLS-3781L





# Top-Loading, Portable Autoclaves

SANYO MLS-Series top-loading autoclaves are a popular method of sterilization for today's research laboratories. Self-contained and easy to use, these reliable, energy-saving autoclaves are ideal for a wide range of applications, including liquid culture media preparation, labware and waste sterilization. Designed to meet good laboratory practice criteria in biotechnology, pharmaceutical and clinical laboratories. SANYO MLS-Series portable autoclaves deliver high pressure steam with speed, efficiency and reliability. For research lab usage only.

## Microprocessor Controls

Assures correct temperature and is accurately maintained and easily operated with one-touch operation. Sterilizing temperature is controlled by the microprocessor within  $+2^{\circ}\text{C}$  of the set temperature in the range of  $115^{\circ}\text{C}$  to  $135^{\circ}\text{C}$ .

## Programmable

Allows maximum flexibility in ramp up, dwell, ramp down and cool-off protocols.

## Compact Design

Maximizes use of available lab floor space, stores easily when not in use.

## Low Profile and Ergonomic Design

Simplifies access, easy to load and unload

## Swing-Up Lid

Opens chamber for 100% access; eliminates side space requirement

## Process Voice Notification

The MLS series includes a voice notification of the system process. Each step of the process is notified via a pre-recorded voice message, allowing the end user to hear the process as it is happening.

## Printer

Optional process printer for batch documentation.



Easy mobile for sterilization on demand.

Model Number	MLS-3751L	MLS-3781L
Effective Capacity	50 liters	75 liters
Exterior Dimensions	23.6"W x 22"F-B x 29.7"H	23.6"W x 22"F-B x 38.5"H
Voltage	115V	208/230V
Power Connection	NEMA L5-20	NEMA L6-20
Maximum Temp.	135°C	135°C
Baskets (Included)	2	3
Flask Capacity (1L)	8	12
Cross Section	14.6" (37cm)	14.6" (37cm)

**SANYO offers a wide range of high quality validation services for all of our equipment. These services include on site validation, custom validation support packages, factory acceptance testing, critical utility qualification, and NIST traceable calibration. Choosing SANYO as an equipment supplier and validation consultant can greatly reduce the time and cost involved with new equipment.**

## Unique Services SANYO Offers:

- Specialized documentation for each individual unit
- Customized testing procedures based on personalized customer requirements
- No charge for documentation when service is purchased
- Quality documents complying with 21 CFR Part 11 traceable standards
- Free archiving of unexecuted testing protocols

## Pre-delivery & Onsite Services

Pre-delivery services include factory acceptance testing, engineering qualification, calibration, and temperature mapping. On-site services include installation qualification, operational qualification, performance qualification and calibration.

## SANYO Connect

SANYO's customer-driven biomedical service program that guarantees local attention from qualified SANYO service representatives, whenever and wherever you need it.

- New Unit Installation and Training
- Preventative Maintenance
- Warranty and Non-Warranty Repairs
- Calibration/Validation Services
- Refurbishment and Reconditioning
- Customized Service and Warranty Programs
- Loaner Units When Needed
- In-Stock Parts for Immediate Delivery

*Prices and conditions may vary by market.*





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