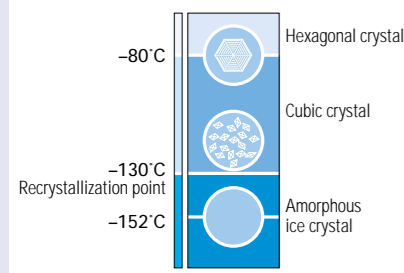


For MDF-1156/1156ATN

Advanced Features

Why Freeze to -152°C?

Recrystallization Mechanism (Artist's Concept)

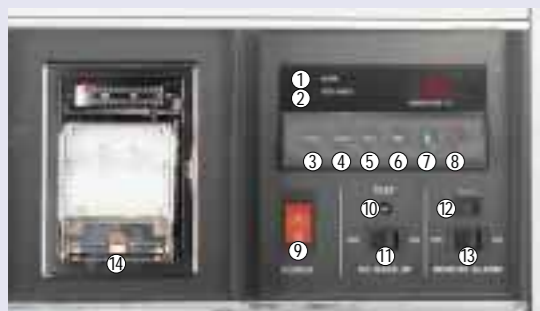


World's lowest -152°C freezer ensures stable cell and tissue preservation

An important factor to consider when preserving cells or tissue at ultra-low temperatures is to prevent amorphous ice crystals from recrystallizing within and outside the cells. Samples that are maintained in an ultra-low temperature freezer at -152°C which is far lower than the recrystallization point (-130°C for pure water) can be preserved semi-permanently. Preservation at ultra-low temperatures maintains vitrification without crystallization occurring inside and outside cells.

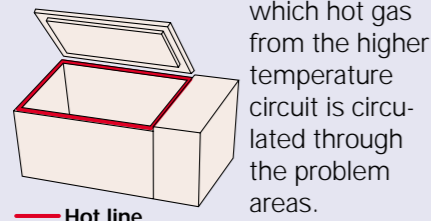
In contrast to conventional liquid nitrogen preservation containers, freezer preservation has numerous advantages: no sample contamination, no sudden liquid eruptions, as well as low operational costs. SANYO's MDF-1156 and 1156ATN make long-term storage below the recrystallization point easier and more stable than ever before.

Control panel



MDF-393AT

- ① Alarm lamp and buzzer
- ② Filter check lamp
- ③ Buzzer key
- ④ Alarm test key
- ⑤ Mode setting key
- ⑥ Digit shift key
- ⑦ Numerical value shift key
- ⑧ Enter key
- ⑨ Power switch
- ⑩ CO₂ Back-up test switch (AT type only)
- ⑪ CO₂ Back-up switch (AT type only)
- ⑫ Battery switch
- ⑬ Remote alarm switch
- ⑭ Temperature recorder



Hot line

Hot line for secure sealing

Moisture condensation at the top edges of the cabinet due to differences in temperature inside and out causes frost and icing problems that may reduce heat insulation efficiency and obstruct door movements. These problems are prevented by the "hot line" by means of which hot gas from the higher temperature circuit is circulated through the problem areas.

Integrated Cabinet Design

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

Micro-processor Temperature Control with LED Digital Display

Extremely accurate, easy-to-read display. The temperature inside the freezer can be set and monitored easily by means of a microprocessor temperature control with an LED digital display. The thermostat incorporates a platinum resistor (Pt. 100Ω), precision and durability.

Specially designed compressor and cascade refrigeration system

Designed by SANYO specifically for rugged ultra-low temperature applications in a laboratory environment (HFC refrigerants only).



Self-diagnostic function

The temperature sensor, filter sensor and cascade sensor monitor operation conditions continuously. Should abnormality be picked up, an error code and the current temperature will be displayed in turn.

Ring back function

The alarm buzzer can be silenced by pressing the BUZZER key on the control panel. (The remote alarm signal is not cancelled.) Should the alarm condition continue after a certain suspension, the alarm buzzer sound will resume.

Filter check lamp and easy-to-clean, front-accessible air filter (Except MDF-192)



Note: The position of the filter check lamp is shown on the control panel (see photo below).

Standard casters and levelling feet

Standard-equipped heavy duty casters make it easy to move a freezer when necessary. The levelling feet keep a freezer level and firm on the floor.

Safety Device

Built-In Temperature & Power Failure Alarms (Lamp/Buzzer)

In case of power failure or an irregular rise in temperature, a rechargeable battery-operated indicator lamp and alarm will be activated. A compact recording unit which automatically records the inside temperature, and a backup system with liquefied CO₂ or N₂ which is self-activated when a power outage occurs are also available separately. This equipment helps insure that the contents will be protected in the event of any power failure or mechanical trouble.

HCFC-Free Ultra-Low Temperature Chest Freezers

Specifications

Model No.	MDF-1156/1156ATN	MDF-793/793AT	MDF-593/593AT	MDF-393/393AT	MDF-192/192AT
Temperature Range	-125°C to -152°C				
Exterior Dimensions [W x D x H] mm (inch)	1,400 x 800 x 945 (55.1 x 31.5 x 37.2)	2,570 x 770 x 1,070 (101.2 x 30.3 x 42.1)	2,010 x 770 x 1,070 (79.1 x 30.3 x 42.1)	1,860 x 800 x 945 (73.2 x 31.5 x 37.2)	750 x 700 x 945 (29.5 x 27.6 x 37.2)
Interior Dimensions [W x D x H] mm (inch)	500 x 450 x 572 (19.7 x 17.7 x 22.5)	1,840 x 500 x 762 (72.4 x 19.7 x 30)	1,280 x 500 x 762 (50.3 x 19.7 x 30)	1,120 x 520 x 530 (44.1 x 20.5 x 20.9)	480 x 430 x 420 (18.9 x 16.9 x 16.5)
Effective Capacity	128 liters (4.5 cu.ft.)	701 liters (24.7 cu.ft.)	487 liters (17.1 cu.ft.)	309 liters (10.9 cu.ft.)	86 liters (3.0 cu.ft.)
Exterior Cabinet	Painted steel				
Interior Cabinet	Aluminum plate				
Inner Lid	1	4	3	3	1
Insulation	Rigid polyurethane foamed-in place				
Compressor	High stage side: Hermetic type, 1,100 W Low stage side: Hermetic type, 1,100 W	Hermetic type, 1,100 W	Hermetic type, 750 W Hermetic type, 750 W	Hermetic type, 400 W Hermetic type, 400 W	Hermetic reciprocated type, 400 W
Evaporator	High stage side: Cascade condenser Low stage side: Tube on sheet (shared with interior)	Tube on sheet (shared with interior)			Tube-on-sheet type
Condenser	High stage side: Fin and tube type Low stage side: Cascade condenser	Fin and tube type	Shell and tube type	Fin and tube type	
Temperature Control	Microprocessor: Keypad input Temp. input range: -20°C to -95°C (1°C increment) Set value memory: non-volatile memory				
Temperature Display	Digital display				
Sensor	Platinum resistance (Pt. 100 Ω)				
Alarm system	Selectable high temp. alarm (+10°C & +15°C from set point), Power failure alarm, Filter check lamp, Remote alarm contact				
Net Weight (Approx.)	265 kg (584 lbs.) —1156 272 kg (600 lbs.) —1156ATN	365 kg (805 lbs.) —793 375 kg (827 lbs.) —793AT	305 kg (672 lbs.) —593 315 kg (694 lbs.) —593AT	248 kg (547 lbs.) —393 255 kg (562 lbs.) —393AT	121 kg (267 lbs.) —192 127 kg (280 lbs.) —192AT

ATN: LN₂ backup system, temperature recorder
AT: LCO₂ backup system, temperature recorder

Optional Accessories

Storage Racks (Aluminium)

Model No.	MDF-19SC	MDF-39SC	MDF-49SC	MDF-59SC
Case Dimensions (W x D x H)	207 x 144 x 413mm 8.1" x 5.7" x 16.3"	155 x 155 x 515mm 6.1" x 6.1" x 20.3"	207 x 144 x 539mm 8.1" x 5.7" x 21.2"	207 x 144 x 665mm 8.1" x 5.7" x 26.2"
Number of Drawers	3	4	4	5
Applicable Model (Rack capacity)	MDF-192/192AT (6)	MDF-393/393AT (20)	MDF-1156/1156ATN (6)	MDF-593/593AT (18) MDF-793/793AT (24)

Inventory Racks (Stainless steel)

Model No.	Box Type (Capacity)	External Dimensions (mm)			Freezer Model (Rack capacity)
		Width	Depth	Height	
IR-207C	2" (7)	144	142	405	MDF-192 (6)
IR-209C	2" (9)	144	142	518	MDF-393 (21), 1156 (9)
IR-213C	2" (13)	144	142	592	MDF-593 (24), 793 (36)
IR-305C	3" (5)	144	142	405	MDF-192 (6)
IR-306C	3" (6)	144	142	518	MDF-393 (21), 1156 (9)
IR-309C	3" (9)	144	142	747	MDF-593 (24), 793 (36)



Temperature Recorder

Model No.	MTR-85H	MTR-155H
Recording Range	-100 to +50°C	-170 to +30°C
Freezer Model	MDF-192 MDF-393 MDF-593 MDF-793	MDF-1156

ULT-Freezer Backup Kits

- CVK-UB2/UB2(I): LCO₂ Backup Kit for MDF-793/593/393
- CVK-UBN2/UBN2(I): LN₂ Backup Kit for MDF-793/593/393
- CVK-A: Built-in LCO₂ Backup Kit for MDF-793/593/393/192
- CVK-AT2: LCO₂ Backup Kit for MDF-1156
- CVK-ATN2: LN₂ Backup Kit for MDF-1156 (I) version for North America only

* Appearance and specifications are subject to change without notice.
* Cooling performance is indicated by the temperature reached at the center of the freezer (at ambient temperature of 30°C with no load). In order to use the freezer at a stable temperature for a long time, it is recommended that the temperature be set to at least 5°C higher than the indicated lowest temperature.
In addition, depending on the usage conditions, it may not be possible to reach the indicated lowest temperature.

We design and manufacture products in accordance with ISO9001 & 14001 requirements.

Distributed by:



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HCFC-Free Ultra-Low Temperature Chest Freezers



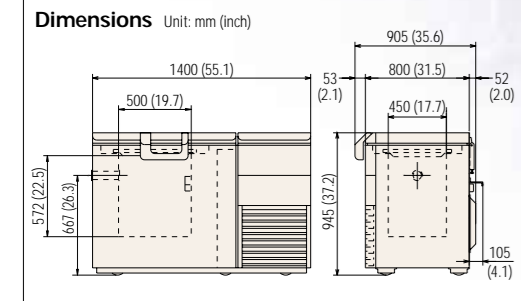
The Ideal -152°C , -86°C Freezing Environment in Capacities from 86 L to 701 L

Ideal for long term preservation of biologicals, blood components and various cell line, SANYO preservation systems employ microprocessor control to maintain a high-precision temperature environment. They are not affected by ambient temperature, minimizing uneven temperature distribution within the chamber, and a temperature rise during door opening.

-152°C Ultra-Low Temperature Chest Freezer

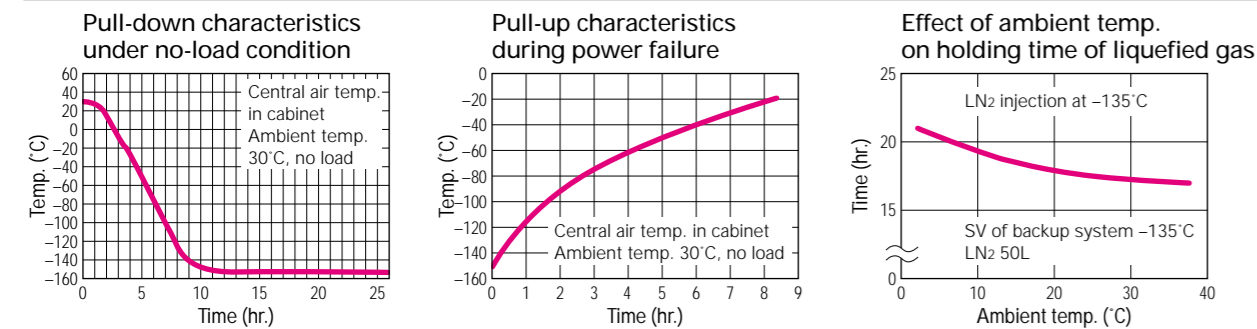
For stable long-term storage
MDF-1156/1156ATN

TEMPERATURE EFFECTIVE CAPACITY
 -152°C 128L (4.5cu.ft.)



MDF-1156

Performance Data

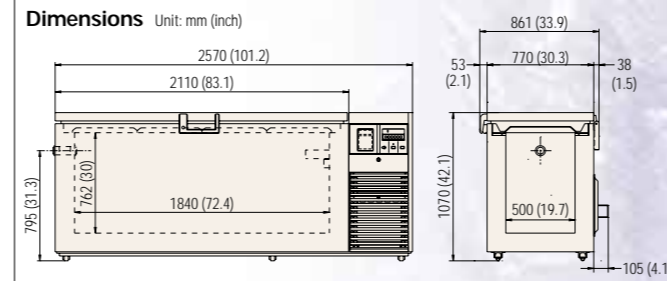


Ideal for large-capacity preservation

MDF-793/793AT

TEMPERATURE EFFECTIVE CAPACITY

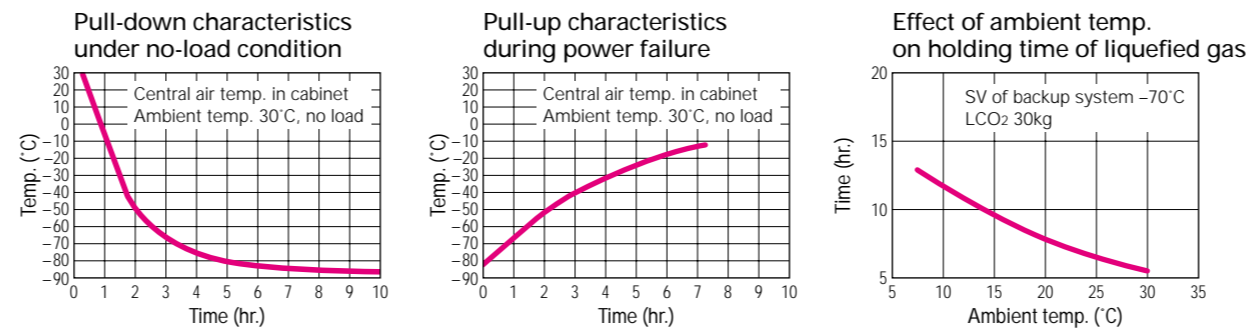
-86°C 701L (24.7cu.ft.)



MDF-793AT



Performance Data

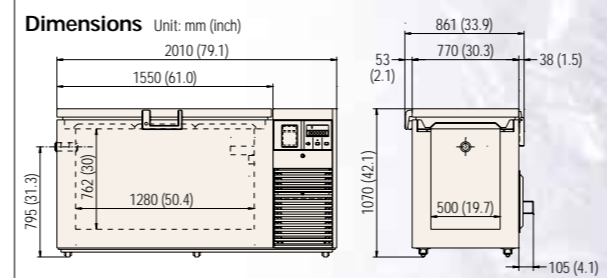


Ideal for middle-sized installation space

MDF-593/593AT

TEMPERATURE EFFECTIVE CAPACITY

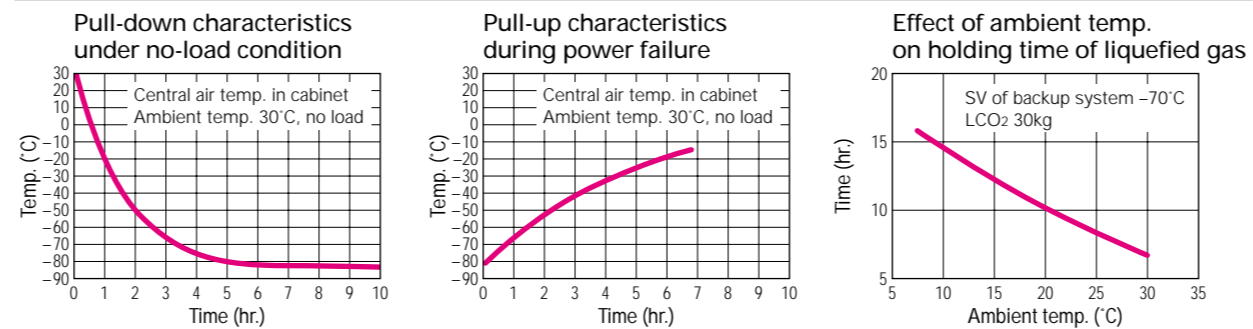
-86°C 487L (17.1cu.ft.)



MDF-593AT



Performance Data



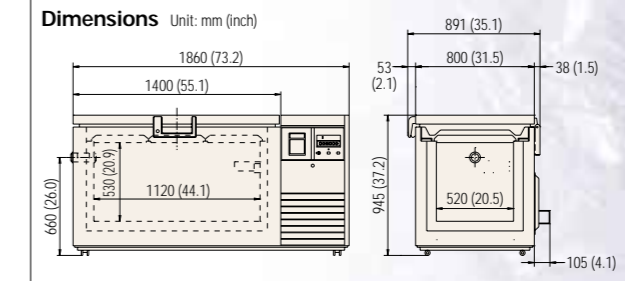
-86°C Ultra-Low Temperature Chest Freezers

Low-profile design for easy access to stored materials

MDF-393/393AT

TEMPERATURE EFFECTIVE CAPACITY

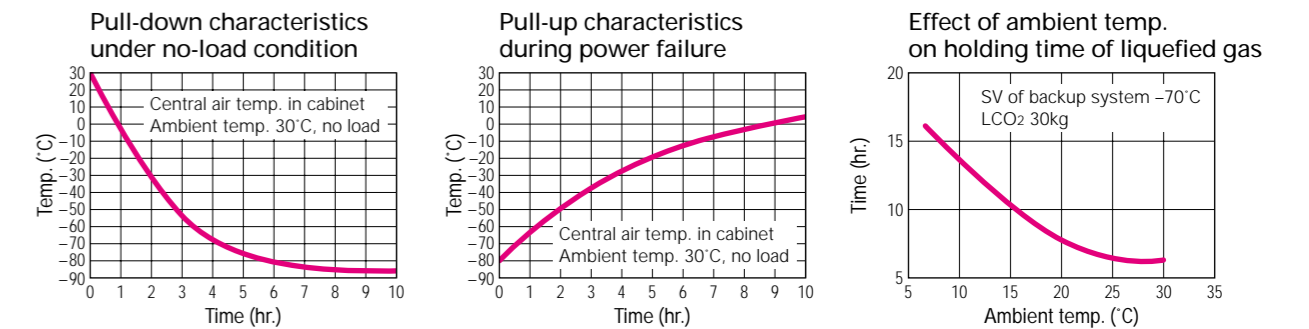
-86°C 309L (10.9cu.ft.)



MDF-393



Performance Data

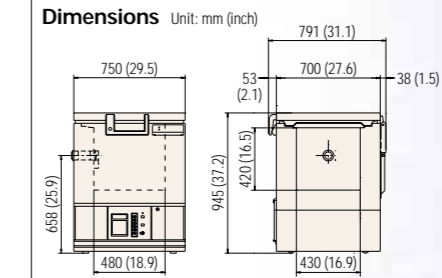


Compact, space-saving unit optimized for private use

MDF-192/192AT

TEMPERATURE EFFECTIVE CAPACITY

-86°C 86L (3.0cu.ft.)



MDF-192



Performance Data

