Panasonic

Ultra-Low Temperature Chest Freezers

Preservation
sub-zero

ULT Chest Freezers

Panasonic Ultra-Low Temperature Chest Freezer lineups for ultra-low temperature storage needs to support the forefront of life science researches.

MDF-1156

MDF-193

MDF-594AT

The Ideal −152℃, −86℃ Freezing Environment in Capacities from 86 L to 701 L

Ideal for long term preservation of biologicals, blood components and various cell line, Panasonic 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℃ Ultra-Low Temperature Chest Freezer
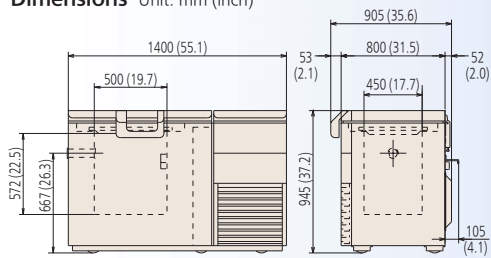
For stable long-term storage

MDF-1156/MDF-1156ATN

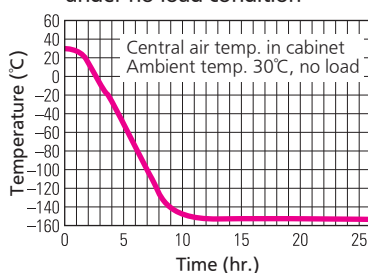TEMPERATURE **−152℃** EFFECTIVE CAPACITY **128 L (4.5cu.ft.)**
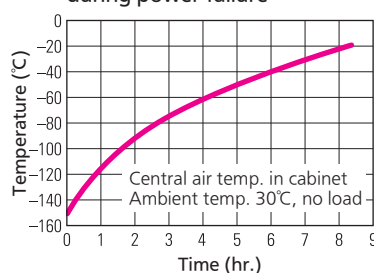
Dimensions Unit: mm (inch)

1400 (55.1)
500 (19.7)
572 (22.5)
667 (26.3)
53 (2.1)
905 (35.6)
800 (31.5)
450 (17.7)
945 (37.2)
52 (2.0)
105 (4.1)

MDF-1156

Performance Data

Pull-down characteristics under no-load condition

Temperature (℃)

Central air temp. in cabinet
Ambient temp. 30℃, no load

Time (hr.)

Pull-up characteristics during power failure

Temperature (℃)

Central air temp. in cabinet
Ambient temp. 30℃, no load

Time (hr.)

Effect of ambient temp. on holding time of liquefied gas

Time (hr.)

LN₂ injection at −135℃

SV of backup system −135℃
LN₂ 50L

Ambient temperature (℃)
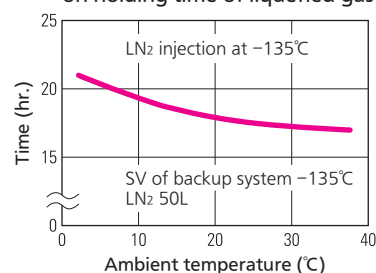
Why Freeze to −152℃?
Recrystallization Mechanism (Artist's Concept)

| −80℃ | Hexagonal crystal |
| Cubic crystal |
| −130℃ Recrystallization point | Amorphous ice crystal |
| −152℃ | |
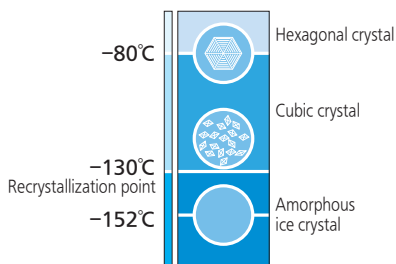
World's lowest −152℃ freezer ensures stable cell and tissue preservation

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℃ which is far lower than the recrystallization point (−130℃ 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.
Panasonic's MDF-1156 and MDF-1156ATN make long-term storage below the recrystallization point easier and more stable than ever before.

Specially designed compressor and cascade refrigeration system

Specially designed for rugged ultra-low temperature applications in a laboratory environment (HFC refrigerants only).

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.

Integrated Cabinet Design

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

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.

— Hot line
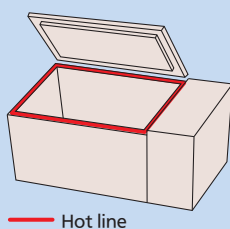
Self-diagnostic function

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.

Easy Maintenance

(MDF-193/193AT have no filters)

Filter check lamp notifys the user of a clogged condenser filter. The condenser filter is situated at the front panel to make filter removing and cleaning easier.

Note: The position of the filter check lamp is shown on the control panel (see photo shown at the bottom of this page).

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.

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 CO_2 or N_2 which is selfactivated 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.

Control panel
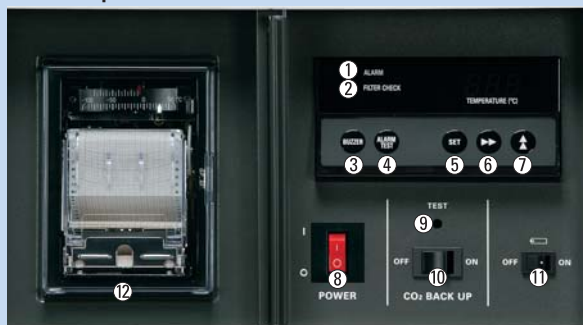
① Alarm lamp and buzzer
② Filter check lamp
③ Buzzer key
④ Alarm test key
⑤ Mode setting key
⑥ Digit shift key
⑦ Numerical value shift key
⑧ Power switch
⑨ CO_2 back-up test swich (AT type only)
⑩ CO_2 back-up swich (AT type only)
⑪ Battery switch
⑫ Temperature recorder
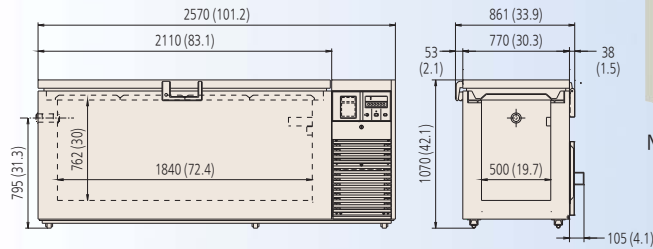
MDF-394AT

−86℃ Ultra-Low Temperature Chest Freezers

Ideal for large-capacity preservation
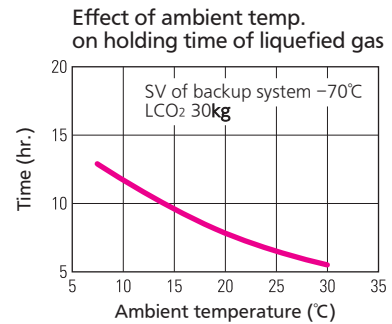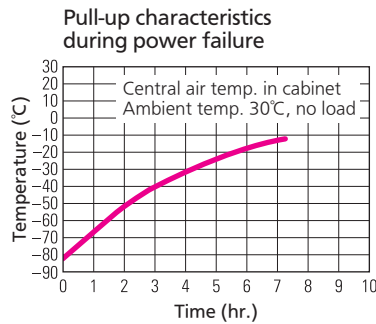## MDF-794/MDF-794AT

TEMPERATURE　　**EFFECTIVE CAPACITY**

−86℃　701 L (24.8cu.ft.)

Dimensions Unit: mm (inch)

2570 (101.2)
2110 (83.1)
795 (31.3)
762 (30)
1840 (72.4)

861 (33.9)
770 (30.3)
53 (2.1)
38 (1.5)
1070 (42.1)
500 (19.7)
105 (4.1)

MDF-794AT

Performance Data

Pull-down characteristics under no-load condition

Central air temp. in cabinet
Ambient temp. 30℃, no load

Temperature (℃) vs Time (hr.)

Pull-up characteristics during power failure

Central air temp. in cabinet
Ambient temp. 30℃, no load

Temperature (℃) vs Time (hr.)

Effect of ambient temp. on holding time of liquefied gas

SV of backup system −70℃
LCO$_2$ 30**kg**

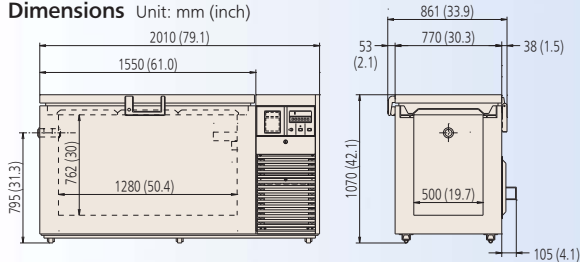Time (hr.) vs Ambient temperature (℃)

Ideal for middle-sized installation space
MDF-594/MDF-594AT

TEMPERATURE　　**EFFECTIVE CAPACITY**

−86℃　487 L (17.2cu.ft.)

Dimensions Unit: mm (inch)

2010 (79.1)
1550 (61.0)
795 (31.3)
762 (30)
1280 (50.4)

861 (33.9)
770 (30.3)
53 (2.1)
38 (1.5)
1070 (42.1)
500 (19.7)
105 (4.1)

MDF-594AT

Performance Data

Pull-down characteristics under no-load condition

Central air temp. in cabinet
Ambient temp. 30℃, no load

Temperature (℃) vs Time (hr.)

Pull-up characteristics during power failure

Central air temp. in cabinet
Ambient temp. 30℃, no load

Temperature (℃) vs Time (hr.)

Effect of ambient temp. on holding time of liquefied gas

SV of backup system −70℃
LCO$_2$ 30**kg**

Time (hr.) vs Ambient temperature (℃)

Low-profile design for easy access to stored materials

MDF-394/MDF-394AT

TEMPERATURE **EFFECTIVE CAPACITY**

−86℃ 309 L (10.9cu.ft.)

Dimensions Unit: mm (inch)
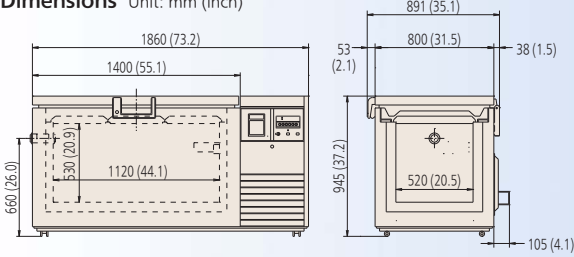
1860 (73.2)
1400 (55.1)
530 (20.9)
1120 (44.1)
660 (26.0)

891 (35.1)
800 (31.5)
53 (2.1)
38 (1.5)
945 (37.2)
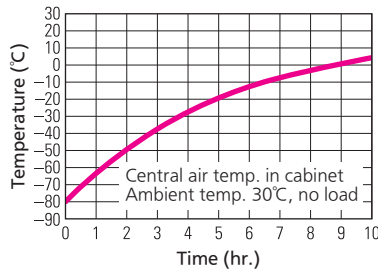520 (20.5)
105 (4.1)

MDF-394

Performance Data

Pull-down characteristics under no-load condition

Temperature (℃) / Time (hr.)
Central air temp. in cabinet
Ambient temp. 30℃, no load

Pull-up characteristics during power failure

Temperature (℃) / Time (hr.)
Central air temp. in cabinet
Ambient temp. 30℃, no load
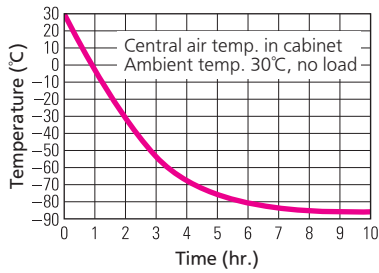
Effect of ambient temp. on holding time of liquefied gas

Time (hr.) / Ambient temperature (℃)
SV of backup system −70℃
LCO_2 30kg
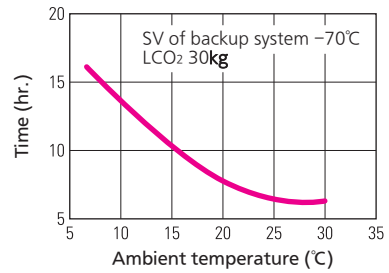
Compact, space-saving unit optimized for private use

MDF-193/MDF-193AT

TEMPERATURE **EFFECTIVE CAPACITY**

−86℃ 86 L (3.0cu.ft.)

Dimensions Unit: mm (inch)
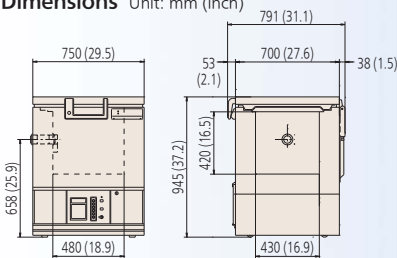
750 (29.5)
658 (25.9)
480 (18.9)

791 (31.1)
700 (27.6)
53 (2.1)
38 (1.5)
945 (37.2)
420 (16.5)
430 (16.9)

MDF-193

Performance Data

Pull-down characteristics under no-load condition

Temperature (℃) / Time (hr.)
Central air temp. in cabinet
Ambient temp. 30℃, no load

Pull-up characteristics during power failure

Temperature (℃) / Time (hr.)
Central air temp. in cabinet
Ambient temp. 30℃, no load

Effect of ambient temp. on holding time of liquefied gas

Time (hr.) / Ambient temperature (℃)
SV of backup system −70℃
LCO_2 30kg
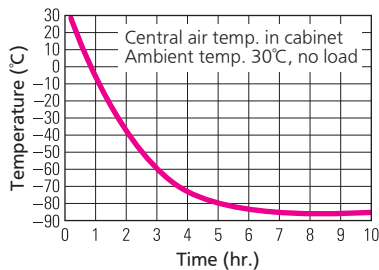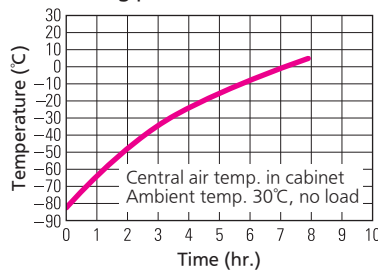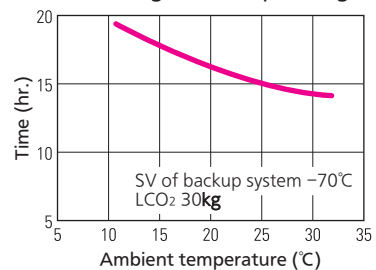
Specifications

		Model No.				
220V, 50Hz		MDF-1156-PB MDF-1156ATN-PB	MDF-794-PB	MDF-594-PB MDF-594AT-PB	MDF-394-PB MDF-394AT-PB	—
220V, 60Hz		MDF-1156-PK MDF-1156ATN-PA MDF-1156ATN-PK	MDF-794-PA MDF-794-PK MDF-794AT-PK	MDF-594-PA MDF-594-PK	—	MDF-193-PK MDF-193AT-PK
230V/240V, 50Hz (CE)		MDF-1156-PE MDF-1156ATN-PE	MDF-794-PE	MDF-594-PE MDF-594AT-PE	MDF-394-PE MDF-394AT-PE	—
220V/230V/240V, 50Hz (CE)		—	—	—	—	MDF-193-PE MDF-193AT-PE
Temperature Range		−130℃ to −152℃	−20℃ to −86℃		−50℃ to −86℃	
External Dimensions (W x D x H)*1		1400 x 800 x 945 (mm) 55.1 x 31.5 x 37.2 (inch)	2570 x 770 x 1070 (mm) 101.2 x 30.3 x 42.1 (inch)	2010 x 770 x 1070 (mm) 79.1 x 30.3 x 42.1 (inch)	1860 x 800 x 945 (mm) 73.2 x 31.5 x 37.2 (inch)	750 x 700 x 945 (mm) 29.5 x 27.6 x 37.2 (inch)
Internal Dimensions (W x D x H)		500 x 450 x 572 (mm) 19.7 x 17.7 x 22.5 (inch)	1840 x 500 x 762 (mm) 72.4 x 19.7 x 30.0 (inch)	1,280 x 500 x 762 (mm) 50.4 x 19.7 x 30.0 (inch)	1120 x 520 x 530 (mm) 44.1 x 20.5 x 20.9 (inch)	480 x 430 x 420 (mm) 18.9 x 16.9 x 16.5 (inch)
Effective Capacity		128 liters (4.5 cu.ft.)	701 liters (24.8 cu.ft.)	487 liters (17.2 cu.ft.)	309 liters (10.9 cu.ft.)	86 liters (3.0 cu.ft.)
Exterior Cabinet		Galvanised steel with baked on finish				
Interior Cabinet		Aluminum plate	Stainless steel			
Inner Lid		1	4	3		1
Insulation		Foamed-in-place rigid polyurethane				
Compressor	High stage side	Hermetic type, 1,100 W			Rotary type, 450 W	Rotary type, 450 W
	Low stage side	Hermetic type, 1,100 W			Hermetic type, 750 W	
Evaporator	High stage side	Cascade condenser				Tube-on-sheet type
	Low stage side	Tube on sheet (shared with interior)				
Condenser	High stage side	Fin and tube type	Fin and tube type			Finless tube type
	Low stage side	Cascade condenser	Shell and tube type	Cascade condenser		
Temperature Control		Microprocessor control system, Non-volatile memory	Microprocessor: Keypad input Set value memory: non-volatile memory			
Temperature Display		Digital display				
Sensor		Platinum resistance (Pt. 100 Ω)			Platinum resistance (Pt. 1000 Ω)	Platinum resistance (Pt. 100 Ω)
Safety		Cylinder key on the lid handle				
Alarm system		Selectable high temp. alarm (+10℃ & +15℃ from set point)			Adjustable high and low temp. alarm (±5℃ to ±20℃ from set point)	
		Power failure alarm, Filter check lamp (Except MDF-193/193AT which have no filters), Remote alarm contact				
Net Weight (Approx.)		265 kg (584 lbs.) —1156 272 kg (600 lbs.) —1156ATN	335 kg (739 lbs.) —794 345 kg (761 lbs.) —794AT	291 kg (642 lbs.) —594 301 kg (664 lbs.) —594AT	219 kg (483 lbs.)	103 kg (227 lbs.) —193 109 kg (240 lbs.) —193AT

ATN: LN2 backup system, temperature recorder
AT: LCO2 backup system, temperature recorder
*1 External dimensions of main cabinet only - see dimension drawings showing handles and other external projections.

Optional Accessories

Storage Racks (Aluminium)

Model No.	MDF-19SC-PW	MDF-39SC-PW	MDF-49SC-PW	MDF-59SC-PW
Case Dimensions (W x D x H)	207 x 144 x 413 (mm) 8.1 x 5.7 x 16.3 (inch)	155 x 155 x 515 (mm) 6.1 x 6.1 x 20.3 (inch)	207 x 144 x 539 (mm) 8.1 x 5.7 x 21.2 (inch)	207 x 144 x 665 (mm) 8.1 x 5.7 x 26.2 (inch)
Number of Drawers	3	4	4	5
Applicable Model (Rack capacity)	MDF-193/193AT (6)	MDF-394 (20)	MDF-1156/1156ATN (6)	MDF-594/594AT (18) MDF-794/794AT (24)

Temperature Recorder

Model No.	MTR-85H-PW	MTR-155H-PW
Recording Range	−100 to +50℃	−170 to +30℃
Freezer Model	MDF-193 MDF-394 MDF-594 MDF-794	MDF-1156

Inventory Racks (Stainless steel)

Model No.	Box Type (Capacity)	External Dimensions (mm) Width	Depth	Height	Freezer Model (Rack capacity)
IR-207C-PW	2" (7)	144	142	405	MDF-193 (6)
IR-209C-PW	2" (9)	144	142	518	MDF-394 (21), 1156 (9)
IR-213C-PW	2" (13)	144	142	592	MDF-594 (24), 794 (36)
IR-305C-PW	3" (5)	144	142	405	MDF-193 (6)
IR-306C-PW	3" (6)	144	142	518	MDF-394 (21), 1156 (9)
IR-309C-PW	3" (9)	144	142	747	MDF-594 (24), 794 (36)

IR-209C-PW   IR-306C-PW   MDF-39SC-PW   MDF-59SC-PW

ULT-Freezer Backup Kits

CVK-UB2-PW/UB2I-PW:
LCO2 Backup Kit for MDF-794/594/394

CVK-UBN2-PW/UBN2I-PW:
LN2 Backup Kit for MDF-794/594/394

CVK-AT2-PW:
LCO2 Backup Kit for MDF-1156

CVK-ATN2-PW:
LN2 Backup Kit for MDF-1156

I : version for North America only

*Cooling performance is indicated by the temperature reached at the center of the freezer (at ambient temperature of 30℃ 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℃ higher than the indicated lowest temperature.
In addition, depending on the usage conditions, it may not be possible to reach the indicated lowest temperature.

Caution: Panasonic guarantees the product under certain warranty conditions. Panasonic in no way shall be responsible for any loss of content or damage to content.
• Appearance and specifications are subject to change without notice.

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Quality management system: ISO9001
Medical devices quality management system: ISO13485

Panasonic Healthcare Co., Ltd., Biomedical Business Unit is certified for:
Environmental management system: ISO14001

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