



Service Manual

Ultra-Low Temperature Freezer

MDF-C2156VAN MDF-C2156VANC

PHC Corporation
Biomedical Div.

Effective models

This service manual is effective following models.

Model name	Product code	Voltage and Frequency	
MDF-C2156VAN	823 189 82	220V	50Hz
	823 189 83	220V	60Hz
	823 189 84	230/240V	50Hz
	823 189 87	220V	60Hz
MDF-C2156VANC	823 189 86	220V	60Hz

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Features

- The chest type -150°C VIP series freezer has large effective capacity, 231L.

- Safety storage and security
 - New double door gasket to prevent heat leakage.
 - New VIP+ is adopted for insulation makes reduction of power consumption.
 - Notice of failure prediction by additional new status function.
 - Recording of chamber temperature and outer door open.

- Environmental friendly
 - 2-stage mixed refrigerant system with NON-HCFC refrigerant.

- Optional component
 - Automatic temperature recorder + Mounting kit: MTR-155H+MDF-S30150
 - Interface board: MTR-480
 - Liquid N2 gas container: MDF-135N

Specifications

■Structural specifications

Item	MDF-C2156VAN	MDF-C2156VANC
Name	Ultra-Low Temperature Freezer	
External dimensions	W1730 × D765 × H1010 (mm)	
Internal dimensions	W760 × D495 × H615 (mm)	
Effective capacity	231 L	
Exterior	Painted steel	
Interior	Aluminum plate	
Outer lid	Painted steel	
Insulation	Vacuum insulation panel + Rigid polyurethane foamed-in place	
Access port	φ 40mm, 1 place in the side table	
Cooling circuit	2-stage cooling circuit and Low stage Auto cascade system	
Compressor	High stage side; Hermetic type, Output; 1100W Low stage side; Hermetic type, Output; 1100W	
Evaporator	High stage side; Cascade condenser type Low stage side; Tube on sheet type	
Condenser	High stage side; Fin and tube type Low stage side; Shell and tube type, and Wire tube type	
Refrigerant	H stage side; R-407D L stage side; HFC mixed refrigerant	
Refrigerating oil	Ze-NIUS32SA	
Power supply	Local voltage	
Battery	Lead storage battery, 6VDC, 7.2Ah x 4pcs, Auto-recharge	
Weight	318 kg	325kg
Voltage booster	None	Built-in
Accessories	1 set of key for outer door latch, 1 set of key for panel door, 6 recording chart rolls, 1 dry cell 1 set connect tube for back-up system	
Optional component	Automatic temperature recorder + Mounting kit (MTR-155H+MDF-S30150) Liquid nitrogen gas container (MDF-135N) Interface board (MTR-480)	

■Control specifications

Item		MDF-C2156VAN	MDF-C2156VANC
Cooling performance		Center of the chamber; -150°C (AT30°C, No load)	
Temp. controller		Micro-processor control system Setting range; -125°C~-155°C (Unit;1°C) Non-volatile memory	
Temp. sensor		Platinum resistance; Pt.1000Ω	
Temp. display		Digital display	
Alarm	High temp.	Setting range: +5°C~+20°C (Initial; +10°C) ALARM lamp and LCD display flashes, intermittent buzzer tone with 15min. delay Remote alarm contact: Normal Open, Rating; DC30V, 2A Remote alarm contact activates with 15min delay	
	Low temp.	Setting range: -5°C~-20°C (Initial; -10°C) ALARM lamp and LCD display flashes, intermittent buzzer tone with 15min. delay Remote alarm contact: Normal Open, Rating; DC30V, 2A Remote alarm contact activates with 15min delay	
	Door	When outer door is open, indication of 'Door Open' is shown. ALARM lamp blinks and buzzer beeps intermittently after delay time is passed.	
	Filter	ALARM lamp flashes, message indication and intermittent buzzer tone emitted	
	Power failure	When the power to the unit is not connected or power failure, ALARM lamp flashes and intermittent buzzer tone emitted Remote alarm contact activates.	
	Remote alarm	3P remote alarm terminal: DC30V, 2A, NC-COM, NO-COM Temperature alarm turns on during power failure.	
Display		LCD panel Temperature display; Digital display (1°C increment) Internal temperature is displayed by graphics, 24hours record can be displayed per screen.	
Control panel		Lamp: BATTERY, ALARM, STANDBY Buzzer key: BUZZER Menu key: MENU Clear key: CE Entry key: ENT Figure input key LCD contrast adjusting knob: CONT Shift key:▲▼◀▶	

Item		MDF-C2156VAN	MDF-C2156VANC
Status monitor function		When ambient temperature is higher than approx. 35°C or lower than approx. 0°C, 'Ambient temp is abnormal ' is displayed on LCD. When power supply voltage is lower than approx.170V, 'The power supply is abnormal' is displayed on LCD.	
Data log function		<ul style="list-style-type: none"> ● Recordable for approx. 4weeks in 12min. intervals. ● Door delay time (more than 2min.) is recordable. ● Temperature for cascade sensor, filter sensor and AT sensor are recordable. ● Log data is transmittable to PC with interface, MTR-480.(Option) 	
Self diagnosis function		<p>In the event of any failure among temp. sensor, filter sensor and cascade sensor;</p> <ul style="list-style-type: none"> ● Error code and message are emitted. ● ALARM lamp flashed, remote alarm contact turns over and intermittent buzzer emit. 	
Key lock function		<p>Key lock '0': Key lock is released.</p> <p>Key lock '1': Key locks</p>	
Compressor protection	L stage	<p>When the temperature in cascade sensor is -34°C or lower, compressor (L) turns on.</p> <p>When the temperature in cascade sensor is -12°C or higher, compressor (L) turns off.</p> <p>Overload relay and High pressure switch (L) are controlled.</p>	
	H stage	<p>When the temperature in filter sensor is +60 °C or higher, compressor (H) turns off.</p> <p>When the temperature in filter sensor is 10°C lower than ambient temperature, compressor (H) turns on.</p>	
Back-up systems		<ul style="list-style-type: none"> ● Automatic liquid N₂ injection device ● Temp. setting range; ● Indication: BACK-UP (Green) ● Back-up test switch; 8R2021 ● Power switch; Locker switch ● Back-up systems can be available for 48 hours by full charged lead storage battery. 	

Visiškai įkrautu švino akumuliatoriumi atsarginės sistemos gali veikti 48 valandas.