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## DFO Development Control Chamber

Catalog No. DFC100A, DFC100A220, DFC200A, DFC200A220

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### **Background and Purpose**

These chambers are specifically designed for the development of DFO treated latent prints. DFO is a fluorescent agent that attaches to fingerprint residues on paper and other porous surfaces, causing them to emit light when viewed under blue light. It develops up to two and a half times the number of prints as Ninhydrin and can be repeated several times to enhance development.

DFO treated prints will slowly develop unaided, but research shows that they can be accelerated safely and significantly by the judicious application of heat. Sirchie's DFO development chambers conform to the findings of current research by independent forensic investigators and laboratories to provide an optimum acceleration environment.

The DFO development chambers feature a solid-state, single set point temperature controller with a digital readout. Temperature is pre-set for optimum DFO development and can be easily adjusted to individual needs. Efficient, high-temperature insulation surrounds the oven chamber.

For efficiency, the chamber is designed to allow for the hanging of multiple documents and removable shelves are provided for the development of items not easily hung. Optically clear, double-pane, tempered glass door allows monitoring of development without disturbing the chamber's controlled atmosphere.

The most accurate judgment of DFO development is accomplished using fluorescence techniques. Its broad excitation band requires that DFO treated prints be excited with blue light such as a BLUEMAXX™ system and can be viewed through its barrier filter.

## **Safety Precautions**

Before using this unit, consult the appropriate (DFO, Ninhydrin) Material Safety Data Sheets (MSDS) found on our website at [www.sirchie.com/support](http://www.sirchie.com/support).

Temperatures in excess of 200°F (93°C) can be reached inside the chamber. DO NOT touch the support rods, document clips, shelf or other interior parts, as serious burns may result.

DO NOT spray Ninhydrin / DFO onto documents inside the chamber.

DO NOT perform iodine or cyanoacrylate fuming inside the chamber.

Allow treated items to thoroughly air dry before placing them into the chamber.

DFO formulations utilize flammable mixtures whose flash points and auto-ignition temperatures are often below temperatures that are reached within the chamber. Loss of evidence may occur in such circumstances. To avoid this, DO NOT spray items within the oven chamber, and allow all items treated with DFO to thoroughly air dry before placing them within the oven chamber.

## **Controls / Operation**

**Note:** Evidence treated with DFO or Ninhydrin may be processed in this unit. DO NOT process iodine or cyanoacrylate in this chamber.

1. If you will be processing more than one document in the chamber, remove the support rods and document clips and set them aside. Remove the shelf if documents are to be suspended from document clips. Be certain to include control prints along with the evidence to be processed.
2. Turn the oven chamber ON and allow it to preheat to at least 200°F (93°C). This typically takes about twenty (20) minutes.
3. Spray the documents and items to be examined in an approved development chamber, fuming hood or forensic workstation. After air drying the documents, attach the document clips.
4. Assure that the oven temperature is at least 200°F (93°C), and then open the oven door by lifting and then turning the door latch clockwise. Close and latch the oven door. Be careful not to touch any of the interior surfaces, as burns may result.
5. Opening the chamber door may cause a dip in temperature. If this happens, allow the temperature to return to 200°F (93°C).

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- Documents should remain in the heated chamber for 10-15 minutes. You may check for the state of development by directing the beam of an alternate light source through the glass door.
- After 10-15 minutes of heating, turn the power OFF and open the chamber door to permit cooling of the interior.
- After the chamber has cooled, remove and examine the evidence.

**Special Note:** The addition of moisture to treated documents will often accelerate development to a greater degree than if heat alone is used. At the time that documents are placed in the chamber, place two cups (16 oz. / 473 mL) of warm water on the bottom of the chamber. DO NOT use Styrofoam cups as they will melt.

## CHAMBER CONTROLS

The chamber controls are located on the instrument's front panel. They consist of an on/off switch and a temperature controller. The temperature controller has been set to optimum at the factory, and should not need adjustment. Should you wish to adjust these settings, follow the instructions below.

- Temperature Controller:** The controller displays the measured temperature (left-hand digits) and the set-point temperature (right-hand digits). The front panel has four (4) switches: raise temp (Λ), lower temp (V), Index, and Enter. These switches are active only when oven power is ON. When first powered up, the display momentarily shows "6190 rr" and then displays the measured temperature & the set-point values. The left-hand number group is the measured temperature in degrees Fahrenheit (which can be displayed as Celsius if desired). Temperature changes within the chamber can be monitored by watching the display. When the chamber reaches a temperature of 200°F (93°C), it is ready to process treated evidence samples. This typically takes about twenty (20) minutes from "cold (room temperature) start".

### Adjusting the Set Point (SV)

The Up arrow (Raise Temp) and Down arrow (Lower Temp) keys allow adjustment of the controller's set point. The set point is the temperature at which power to the heating element is shut OFF. The set point is factory programmed at 200°F (93°C). The Set Point is also referred to as SV (set value). The Measured Value is also referred to as the PV (Process Value).

- Programming Sequence:** To adjust the set point precisely, press and release the UP or DOWN arrow key. Each press changes the set point by 0.1 degree. To change the set point a large amount, press and hold the UP or DOWN arrow key. After a couple of seconds, the rate of change increases, making large value changes easier than repeated key presses. Release the key to stop the change. When done with your changes, press the Enter key.
- IMPORTANT:** If the Enter key is not pressed within 15 seconds after changing the set point temp, the value will revert to its former setting, ignoring any changes that have been made.

- As a precaution, the controller limits the maximum temperature (tP-H) to 210°F (99°C), to reduce the possibility of excessive temperature damaging evidence samples. Even after the heating elements are shut off by the controller, the temperature may temporarily rise several degrees. This is normal.

## **Controller Mode**

- **ON/OFF mode:** The controller is factory-set to operate in “ON/OFF mode”. In this mode, the heater is turned on until the set point temperature is achieved, at which time it is turned off. The heater will come on again when the internal temperature drops below the set point. Due to “thermal inertia” of the heater element and air mass in the chamber, temperature swings of about  $\pm 20^{\circ}\text{F}$  ( $\pm 11^{\circ}\text{C}$ ) around the desired (set point) temperature can be expected. This is normal.

## **Computer Control**

Single or multiple chambers may be operated and monitored remotely via software and hardware supplied with the chamber. A USB to Serial converter device that runs on either Windows 32-bit or Windows 64-bit operating system, implements a two-wire RS485 serial connection to the chamber(s). Multiple chambers may be “daisy-chained” together and controlled from a single computer having the USB device plugged into it. **IMPORTANT:** *Each chamber must have a unique controller address. Also **DATA+** from one chamber must be connected to **DATA+** of daisy-chained chamber(s). Likewise the **DATA-** connections must be connected together.*

The DFC100A-DFC200A User’s Manual contains complete instructions regarding setting up and using the hardware and software for remotely controlling the chamber(s).

## **Cleaning and Maintenance**

Sirchie has designed the DFO chambers to require no periodic maintenance other than cleaning. Do not disassemble the chamber or remove panels, as there are no user-serviceable parts within.

Wipe down the exterior and interior of the chamber on a regular basis. Use only a water-damped cloth. **DO NOT use any commercial cleaning materials.**

## Technical Specifications

Weight (unloaded)	DFC100A: 42.5 lbs (19.3 Kg),	DFC200A: 73.0 lbs (33.1 Kg)
(max load)	DFC100A: 15.0 lbs ( 6.8 Kg),	DFC200A: 25.0 lbs (11.3 Kg)
(weight w/max load)	DFC100A: 57.5 lbs (26.1 Kg),	DFC200A: 98.0 lbs (44.4 Kg)
Dimensions	DFC100A: SAE: 13.0 in W x 25.8 in H x 16.4 in D SI: 32.0 cm W x 64.4 cm H x 41.6 cm D	
	DFC200A: SAE: 26.0 in W x 26.0 in H x 16.4 in D SI: 66.0 cm W x 66.0 cm H x 41.6 cm D	
AC Power	DFC100A (120 VAC ±10%), 5.8A, 50-60 Hz, 690 watts	
(nominal conditions)	DFC100A220 (220 VAC ±10%), 3.1A, 50-60 Hz, 690 watts	
	DFC200A (120 VAC ±10%), 11.5A, 50-60 Hz, 1380 watts	
	DFC200A220 (220 VAC ±10%), 6.3A, 50-60 Hz, 1380 watts	
Voltage Fluctuation	Tolerance of up to ±10% of specified nominal operating voltage	
Transient Overvoltage	Tolerance of up to “Overvoltage Category II”	
	DFC100A, DFC200A: 110/120v mains 1500v	
	DFC100A220, DFC200A220: 220/240v mains 2500v	
Power cord, 120V	13A/125V, 5-15P Plug/IEC320-C13 Receptacle, 16AWG, 6'-7" (2M)	
Power cord, 220V	10A/250V, CEE7/7(M) Plug/IEC320-C13 Receptacle, 14AWG, 8' (2.4M)	
AC Receptacle	IEC320 15A, 250V receptacle w/integrated fuse holder (tool required for fuse access)	
Fusing	DFC100A 6.3A, 250V Slo-Blo, 5mmX20mm cartridge	
	DFC100A220 3.15A, 250V Slo-Blo, 5mmX20mm cartridge	
	DFC200A 12.8A, 250V Slo-Blo, 5mmX20mm cartridge	
	DFC200A220 6.3A, 250V Slo-Blo, 5mmX20mm cartridge	
Heaters	DFC100A: One 600 watt (nominal) metallic tubular heater	
	DFC200A: Two 600 watt (nominal) metallic tubular heaters	
	Heater operation via programmable electronic controller	
Control	Programmable electronic controller: ON/OFF, PID or Manual modes	
	PID Control: capable of controlling temp within ±1°F / ±1°C of set-point temp	
	On/Off: approx. ±20°F (11.2°C) of set-point - hysteresis of heater(s) & air volume	
Ports	Data+ (red wire) & Data- (green wire), quick connect terminal blocks	
	Alarm+ & Alarm-, dry relay contacts, 3A max current, quick connect terminal blocks	
Internal Volume	DFC100A: 1.18 ft3 (0.042 m3), DFC200A: 2.72ft3 (0.077 m3)	
Construction	Aluminum sheet, cold-rolled steel sheet, glass, steel screw fasteners	
Supplies included	DFC100A: 3 - Document Support Rods DFC200A: 5 - Document Support Rods	
	1 - Spare fuse (unit-specific; see “Fuses”, above)	
Environmental	Indoor use only	
	Operating temperature range: 41°F (5°C) – 104°F (40°C)	
	Operating relative humidity range: 20% - 80%, non-condensing	
	Altitude range: “Sea level”: 0 ft (0 M) to 6,562 ft (2,000 M)	
	Pollution Degree 2: only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is expected.	

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## Trouble Shooting Guidelines

Symptom	Possible Causes	Solution
Controller does not come on, heater does not heat.	Unit not plugged in.	Check both ends of power cable, plug in unit.
	AC cord defective.	Replace with identically-rated cord. (see Specifications)
	Power failure.	Check AC mains circuit breaker.
	Main power switch not ON.	Push switch to ON.
	Blown fuse.	Check fuse (inside fuse holder, rear of cabinet). Tool required for fuse removal. Unplug cord, replace fuse with unit rated for the cabinet. (see Specifications)
	Internal wiring defect.	Contact Sirchie to arrange repairs.
Controller powers up but chamber does not heat to set temp.	Controller not set up or is programmed incorrectly.	Consult the Love Controls 32B User Manual for detailed programming instructions.
Controller powers up but chamber does not heat at all.	Heater defective.	Contact Sirchie to arrange repairs.
	Controller defective.	
Fumes leak out thru door when it is closed and latched.	Door Gasket defective.	
	Door Latch defective.	
Support rod does not remain in place.	Rod defective or hardware damaged/missing.	
Cabinet tends to tip over when evidence is loaded into it.	Maximum load rating exceeded.	
	Heavy items too high in cabinet.	Rearrange items. Heaviest items should be lowest in the cabinet.
	Cabinet feet broken, missing or defective.	Contact Sirchie to arrange repairs.
	Support surface not level.	Place cabinet only on level surface.

<b>Chamber connected to a computer running LoveLink3 software via MN-1 USB-RS485 Serial Converter</b>		
Zero instruments found (no communication PC–chamber)	MN-1 drivers not installed on host PC	Install MN-1 drivers for your PC’s O/S, following instructions in DFC100-DFC200 User’s Manual
	LoveLink GUI configured for wrong virtual COM port	LoveLink GUI defaults to COM 1, which is rarely ever the actual virtual COM port for this USB device. Check Control Panel, System, Hardware tab, Device Manager for “Silicon Labs CP210x” for the installed COM port number. Configure the actual COM port number in the LoveLink GUI.
	Serial cable disconnected	Check for proper insertion of the RJ-11 serial cable in the MN-1 USB converter device and the DATA+/DATA- blocks on back of the chamber.
	MN-1 Serial cable connected with wrong polarity on chamber	The RED wire goes into the DATA+ block. The GREEN wire goes into the DATA- block. The device will not communicate with the chamber if these are reversed.
	MN-1 Serial cable inserted into wrong blocks on chamber	The serial cable must be inserted into the DATA+/DATA- blocks on back of the chamber. Do not insert it into the ALARM+/ALARM- blocks.
	MN-1 Serial cable broken/defective	Check ohmic continuity from RJ-11 pins to corresponding ends of wire. Contact Sirchie to arrange replacement of defective serial cable.
	MN-1 USB-Serial Converter defective	Contact Sirchie to arrange replacement.
	<b>SPECIAL NOTE</b>	<b><i>No field repairs are recommended for this unit. If the troubleshooting solutions above do not rectify the issues with your unit, please contact Sirchie Customer Service at 800-356-7311 or 919-554-2244. Returned units must have a Sirchie RMA number. Retain all records of your transactions.</i></b>

## DFC Front Panel



## Rear Panel

