

HI-Q Environmental
Products Co.

Division of La Jolla Scientific Co., Inc.

7386 Trade Street
San Diego, California 92121-2422

Phone: 858-549-2820
Fax: 858-549-9657
www.HI-Q.net

CF-900 Series  **US LISTED**

Portable Air Particle Sampler

MANUAL FLOW CONTROL



(S.A.O. 10/05)

Table of Contents

<u>DESCRIPTION</u>	<u>PAGE</u>
General Description	3
Unpacking	3
Filter Holders (Selection)	3
Input Power	4
Fuse	4
Environmental Conditions	4
Operation	5
Calibration	5
Maintenance	5-6
SCR Controller	6
Timer	6
Cleaning	6
Parts List	7
Equipment Outline Drawing	8-10
Wiring Diagram	11
<u>DETAILED VENDOR SPECIFICATION SHEETS</u>	
Vendor By-Pass Vacuum Motor Specification Sheet	12-13
Vendor Programmable Timer Specification Sheet	14-15
Vendor Flowmeter Specification Sheet	16-17
Variable Voltage Control Assembly	18
Instrument Calibration Certification	19
Calibration Instructions	20
Correction Factor Look-Up Table	21-22

GENERAL DESCRIPTION:

The CF-900 series high volume air sampling pumps are designed for the sampling air borne particulate and radioiodine in the environment.

The CF-901, comes standard with a 1½" female straight pipe threaded intake which accepts all HI-Q CF-Series holders (excluding 8 x 10). The models CF-902 and CF-903 have a 4" threaded ring installed on the air intake to allow for 4" diameter paper only sampling. From the 4" diameter ring an operator has the option of either adapting up to an 8" X 10" paper only holder (CFPH-810), or adapting down to a 47mm or 2" diameter combination/paper only holder (CFPH-XX Holders). Upon ordering the CFPH-810 it is recommended that an additional CF-900 Series base plate adapter (used to balance the unit) be purchased as well. Adapting down to any of the CF-Series paper holders requires the use of an FHA-4CF, 4" diameter ring to 1½" FSPT Adapter.

<http://www.cncmagazine.com/archive01/v2i05/v2i05c-precisn.htm>

Each unit has a label indicating the designed power requirements. Either 115VAC, 60Hz, or the European version 230VAC, 50Hz.

The main components of the CF-900 Series Air Sampling Pumps are: A two stage vacuum blower, an SCR motor speed controller, a 3 wire grounded power cord, motor fuse protection, an electronic, elapsed, resettable hour timer (minutes & tenths upon request) and a precision rotometer. All, of which are housed in a 2-component, polyurethane painted aluminum cabinet housing.

UNPACKING:

Each unit is cushion packed to reduce any possibility of damage in transit. If the carton or unit shows any damage, report it immediately to the shipping carrier and file a damage claim. Each unit is tested and is fully operative when it leaves the factory. If there is a problem call the factory immediately.

SELECTION OF FILTER HEAD:

A wide variety of filter heads from various manufacturers will fit the CF-900 series units. The CF-901, comes standard with a 1½" female straight pipe threaded intake which accepts all HI-Q CF-Series holders (excluding 8 x 10). Models CF-902 and CF-903 come standard with a 4" diameter threaded ring, which can be used immediately as a 4" diameter paper only holder, or adapted down with HI-Q's FHA-4CF to fit CF-Series type holders. From the standard 4" diameter ring an operator can also adapt up to an 8" x 10" paper only holder, using HI-Q's CFPH-810. For operation of this unit with the 8" X 10" paper only holder, a base plate extender is required (supplied with CFH-810 kit). See: High volume particulate section of this manual for instructions.

INPUT POWER:

The CF-900 series are available in two different voltage ranges: 115 VAC and 230 VAC.

The electrical disconnect for this unit is the power cord. Always unplug the power cord from the electrical outlet before performing any service to the unit.

For 115 VAC units, the power requirements are as follows:

Voltage:	115 V~, 50/60 Hz
Current:	15 A
Power:	1550 W

For 230 VAC units, the power requirements are as follows:

Voltage:	230 V~, 50/60 Hz
Current:	8 A
Power:	1000 W

Explanation of Electrical Symbols:

V~:	Volts Alternating Current (VAC)
Hz:	Hertz
A:	Amps
W:	Watts
Ⓢ:	Protective Earth Ground
⊕:	Shock Hazard

FUSE:

The CF-900 series are available in two different voltage ranges: 115 VAC and 230 VAC. Fuses used are as follows:

For 115 VAC operation: 15 A, T, 250V

For 230 VAC operation: 8 A, T, 250V

ENVIRONMENTAL CONDITIONS:

Operating Temperature Range:	0 to 50°C
Storage Temperature Range:	-40 to 60°C
Operating and Storage Humidity:	0 to 85% maximum non-condensing

OPERATION:

After affixing the appropriate filter head, plug unit into a 3 wire grounded outlet. Note the timer's starting number, or reset the timer to zero by pushing the timer's reset button. Start the unit and adjust the rotometer reading with the motor speed control pot to the desired flow rate. This high volume pump is intended for use as an intermittent grab sampling pump. The motor manufacturer states that the original motor brush life is between 900-1200 hours. Replacement brushes, after being seated, generally last between 600-800 hours. HI-Q has found that operating at less than maximum flow extends the brush life.

NOTE: Like all devices designed to move a high volume of air, the CF-900 series is rather loud. Operators should use hearing protection when using the CF-900 series air samplers.

CALIBRATION:

Before being shipped out, each CF-900 series Air Sampler is individually calibrated against a NIST traceable standard at sea level and ambient temperature. It is a good practice however, to occasionally check the rotometer calibration against a secondary source such as a calibrated AFC-XX-Series (HFC-SIDE-XX for CF-902 & CF-903) air flow calibrator. Upon ordering choose the correct "AFC-XX or HFC-SIDE-XX" unit for your flow range and flow measurement units.

With a small flat head screwdriver and the correct flow range AFC-XX or HFC-SIDE-XX unit, fine adjustments to incorrect flow rate readings can be made in the field by tightening or loosening the brass needle valve in the back of the rotometer. For "quick-fix" changes stick a piece of masking tape over the rotometer scale and mark according to in-line Air Flow Calibrator unit.

MAINTENANCE:

The motor in the CF-900 series is a 2 stage, non-lubricated motor-blower which has ball bearings. All of the other components should be maintenance free.

CHANGING THE MOTOR BRUSHES:

1. **Unplug the unit from the power supply.**
2. Remove screws from the blower cover.
3. Remove the two spring clip motor cover holders.
4. Remove the cover.
5. Remove the two brush screws, freeing the brush (both sides).
6. Slip the wire out of the old brush assembly and into the new, CAT# CF-900-003 brushes.
7. Re-assemble in reverse order.

REPLACING THE MOTOR:

1. **Unplug the unit from the power supply.**
2. Remove the screws from front cover.
3. Disconnect rotometer tubing, wire connectors and ground lead.
4. Remove internal screws from pressure chamber plate.
5. Remove motor and pressure chamber plate (leaving motor mount screws in place).
6. Remove the four motor mount screws.
7. Replace the motor and re-assemble in reverse order.

SCR CONTROLLER:

On rare occasions, the SCR controller can malfunction. The symptoms are a fluctuating or stuttering speed. If this happens, the controller must be replaced with #SCR-15 (115V) or #SCR-23 (230V).

TIMER:

The timer is maintenance free. The 115 VAC & 230 VAC CF-900 Series Air samplers all use the same minute or hour timers. Timers will actuate with a constant voltage between 10 v and 300 v (AC 50/60 Hz or DC). Input current 0.5 mA max. The timer operates from 3 Volts supplied by a non-replaceable lithium battery. Nominal battery life is 5 years. Battery life is dependent upon usage. Signal and reset contacts that remain closed for long periods of time reduce battery life.

CLEANING:

If the CF-900 series high volume air sampler requires cleaning, clean only with a clean, damp cloth. Do not spray with cleaners or water as this may create a shock hazard.

NOTE: If the CF-900 series high volume air sampler is used in a manner inconsistent with this manual, the protection features provided with this equipment may be impaired.

SPARE/REPLACEMENT PARTS LIST FOR CF-900 SERIES AIR SAMPLERS

Part #	Description
CF901-000	115 VAC REPLACEMENT BLOWER FOR THE CF-901 SERIES AIR SAMPLER. INCLUDES HARD MOUNTED 1½" FEMALE STRAIGHT PIPE THREADS.
CF901-000/230	230 VAC REPLACEMENT BLOWER FOR THE CF-901 SERIES AIR SAMPLER. INCLUDES HARD MOUNTED 1½" FEMALE STRAIGHT PIPE THREADS.
CF900-001	BLOWER/MOTOR, 115VAC 50/60
CF900-002	BLOWER/MOTOR, 230 VAC 50/60
CF900-003	REPLACEMENT MOTOR BRUSHES (2/SET)
CF900-004	4" THREADED RING
CF900-005	4" PAPER RETAINER RING
CF901-006	O-RING TO SUPPORT 1 ½" FEMALE SPT (CF-901 ONLY)
CF900-006	"O" RING FOR 4" THREAD RING
CF900-007	SUPPORT SCREEN FOR 4" PAPER
CF900-008	MOTOR SUPPORT RING
CF900-009	MOTOR MOUNT GASKET (3 NEEDED PER ASSEMBLY)
CF900-009F	FRONT (INLET SIDE) MOTOR MOUNT GASKET
CF900-009B	BACK (DOWNSTREAM SIDE) MOTOR MOUNT GASKET
CF900-010	MOTOR SPEED CONTROL ASSEMBLY 115VAC
CF900-011	MOTOR SPEED CONTROL ASSEMBLY 230VAC
CF900-012	KNOB NUT FOR SPEED CONTROL
CF900-013	FUSE HOLDER
CF900-014	SLO-BLO FUSE 115 VAC Units
CF900-015	TOGGLE SWITCH W/ON/OFF PLATE
CF900-016	SWITCH GUARD
CF900-017	ELECTRONIC TIMER IN MINUTES & TENTHS
CF900-018	RESET PUSH BUTTON ASSEMBLY FOR TIMER (6/1998 & UP)
CF900-019	POWER CORD, 16/3, 8 FEET
CF900-020	IN-LINE AIR FILTER
CF900-021	UN-CALIBRATED ROTOMETER
CF900-022	BLANK SCALE FOR ROTOMETER
CF900-023	RUBBER FOOT (4 NEEDED)
CF900-024	HANDLE
CF900-025	SLO-BLO FUSE 230 VAC UNITS
CF900-026	ELECTRONIC TIMER IN HOURS & TENTHS
CF900-027	"O" RING FOR SUPPORT 1 ½" FEMALE STRAIGHT PIPE THREAD
CF900-028	REPLACEMENT CABINET MOUNTED 1 ½" FEMALE STRAIGHT PIPE THREAD KIT FOR THE CF-901 SERIES AIR SAMPLER TO CONVERT OLD STYLE CF-901 WITH MOTOR MOUNTED 1 ½" FEMALE STRAIGHT PIPE THREAD. INCLUDES SHEET METAL MOUNTING RING, GASKETS AND SCREWS.