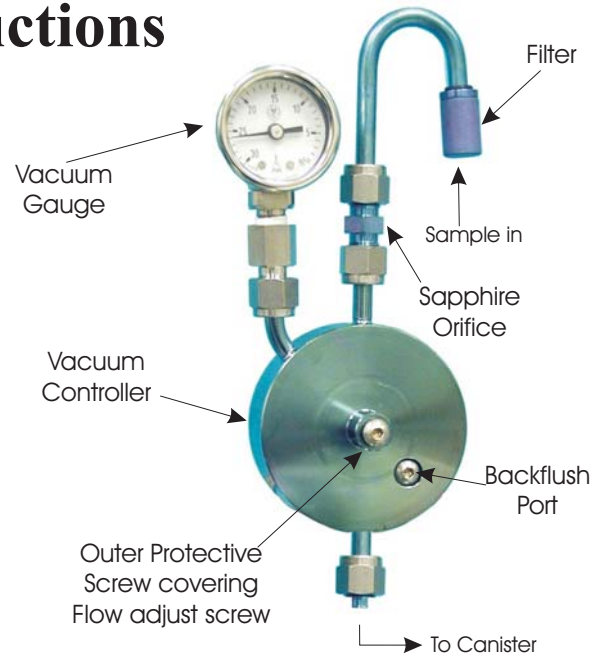


CS1200 Operating Instructions

Principle of Operation

The CS1200 is a high purity flow regulation system used to fill canisters at a constant rate from vacuum to within 1 psi of atmospheric pressure without requiring power. The CS1200 consists of 2 main parts; the vacuum controller body and the restrictor. The vacuum controller maintains a -0.3 to -1 psi pressure differential relative to atmospheric pressure no matter what the vacuum is on the outlet. By changing the value of the restrictor on the inlet, different flow rates, or canister fill rates can be achieved. For any given restrictor, the flow rate can only be changed by a factor of 2-3x. This is done by adjusting the 1/8" hex set screw on the vacuum controller body. The following table gives the appropriate restrictor for different applications (target pressure is 0.9 atmospheres).



Restrictor PN	Stamp Code	MC400	Fill Times(min)		Target Flow Rate(ccm)*
			Mc1000	6L Canister(Hrs)	
39-23010	1	3	8	1	80
39-23030	2	10	25	3	27
39-23080	3	30	75	8	10
39-23240	4	2 hr	5 hr	24	3.4
39-14010	5	8 hr	16-24 hr	1 week	0.5

* - Multiply this value by Pa/Po where Pa is local atmospheric pressure and Po is std Pressure (760 torr). This will prevent premature filling of the canister during higher elevation sampling (example - Denver Co.)

"No Flow Meter" Calibration Procedure for CS1200E and CS1200P Samplers

1. Connect sampler to evacuated canister (evacuated below 20" Hg).
2. Open then close valve on canister (CS1200E), or disconnect canister with Quick Connect (CS1200P).
3. Measure the time it takes for pressure to rise from 20" Hg to 10" Hg.
4. Use the chart below to determine the flow rate.
5. Adjust setscrew to increase or decrease flow and retest pressure rise time.

Time from 20" to 10"

on gauge (Seconds)	CS1200E Flow	2.7L	3.2L	6L
156	0.5	75 hr 36m	89 hr 36m	1 week
23	3.3	6 hr 48m	12 hr 48m	24 hr
8	10	3 hr 36m	4 hr 16m	8 hr
2.5	25	1 hr 21m	1hr 36m	3 hr

Time from 20" to 10"

on gauge (seconds)	CS1200E Flow	MC400	Mc1000
184	0.5	8 hr	20 hr
47	2	2 hr	5 hr
12	8	30 min	75 min
4	24	10 min	25 min

Calibrating Flow with Flowmeters

Calibration requires attachment of the Entech Flow Calibrator (PN 39-20020 10 ccm, or 39-20035 100ccm) to the inlet while the outlet is connected to a canister under vacuum. Follow the procedure below:

1. Connect the correct restrictor to the inlet side of the CS1200 flow controller as per Table I above.
2. Connect the outlet to a canister that is at a vacuum of 5 - 30"Hg.
3. Connect the Entech flow calibrator (not shown) to the inlet.



- Open the canister valve to start flow. Plug the inlet to the calibrator until the flow stops. Close the canister valve and wait 5 minutes. Open the inlet of the calibrator and verify that flow restarts (no leaks).
- Remove the tamper proof screw centered on the CS1200 body using a 1/8" hex key.
- Adjust the set screw found under the tamper proof nut so that the flows agree with Table I. Note that very little adjust should be necessary and flows should never be more than 2-3x lower or higher than the desired setpoint if the correct restrictor is installed.

NOTE: IF 2-3 TURNS DOES NOT RESULT IN A FLOW OR FLOW CHANGE, STOP AND CHECK THE FLOW CALIBRATOR FOR PROPER OPERATION. THE INTERNAL DIAPHRAGM MAY BE DAMAGED BY OVERTIGHTENING!

Cleaning the CS1200

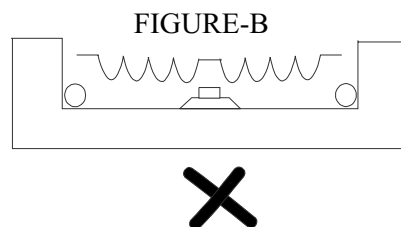
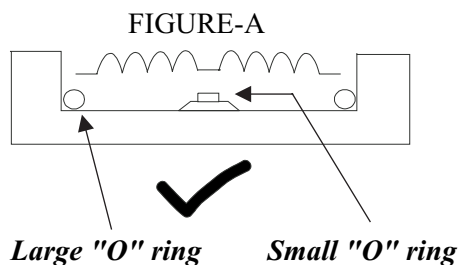
The CS1200 can be cleaned up rapidly by removing the screw covering the backflush port and connecting N2 or zero air at 2-3 psig at the outlet for backflushing. For ambient applications, 1-2 minutes of flushing will be sufficient. If the CS1200 was used to sample VOCs at high concentrations (10 ppm or higher), then it may be necessary to mount the CS1200 inside an oven while heating to 70 deg. C. Several CS1200s can be cleaned simultaneously by constructing a manifold using 1/4" stainless steel fittings.

Replacing Diaphragm in CS1200E

- Damaged during flow adjustment / due to over-tightening of adjustment screw.
- No control of flow rate / stuck at a particular flow rate / can not be adjusted.

Tools Needed: Safety Glasses, Forceps, Retaining Ring Pliers (56R...Fits 1 13/16" --3" size internal rings.)

- Turn the adjustment screw counter clockwise until it stops.
- Place flow controller body on table with adjustment screw on bottom. Insert the retaining ring pliers into the retaining ring holes and squeeze pliers to compress ring, when adequately compressed the ring should pop out of the flow controller body.
- Holding the flow controller body cover in place flip the flow controller body over.
- The cover plate, cross & metal ring will fall out when the cover plate is allowed to drop out and the inside chamber will be exposed.
- Examine the diaphragm (which looks like a thin ribbed flat metallic disk). A damaged diaphragm surface will appear deformed or creased or wrinkled. If it does not appear damaged, proceed to step 9.
- Gently pry the edges of the diaphragm up with forceps and invert the flow controller body to remove the diaphragm.
- Inspect and make certain that the large "O" ring is in place in the groove inside flow controller body and the tiny "O" ring is in the center of the adjustment screw.
- Insert a new diaphragm into the flow controller body as shown in the figure A. (The ridges will be higher than the edge of the diaphragm).



- Replace metal disc on top of diaphragm with the flat side facing up, replace cross on top of the metal disc with the concave side down, replace cover on top with the flat side facing up. Replace retaining ring by compressing it with the pliers. Make sure that the ring expands into the inside groove & snaps tight.
- Recalibrate the flow controller. Remember to avoid turning the adjustment screw more than 5 turns clockwise.