SENSIT® CVC

CANISTER VALVE CONTROLLER

OPERATION & CONFIGURATION GUIDE

READ AND UNDERSTAND INSTRUCTIONS BEFORE USE.

SENSIT

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CVC INSTALLATION

The Canister Valve Controller (CVC) allows the independent or concurrent actuation of up to 4 latching solenoid valves. This product can be used with the SENSIT SPOD, RAMP, and FMD. **NOTE**: Main circuit board revision restrictions may apply.
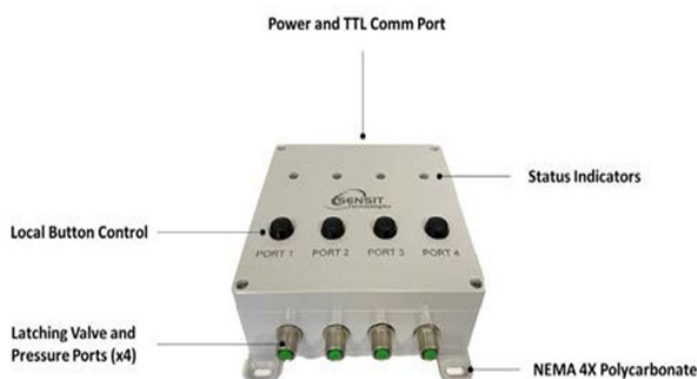
1. To use the canister valve controller, hook the valve controller power and TTL comm port up to the auxiliary port of the unit.

Canister Valve Controller

2. Hook any valves and pressure sensors up to the valve/pressure ports. NOTE: If desired, you may use a T-Coupler to input a pressure sensor and isolatch valve into the same port (pictured below).

3. Power on unit and configure sampler as described in the USB configuration settings. Please note that when enabling sampling for the first time, the user must power cycle before attempting to configure the sampler parameters.
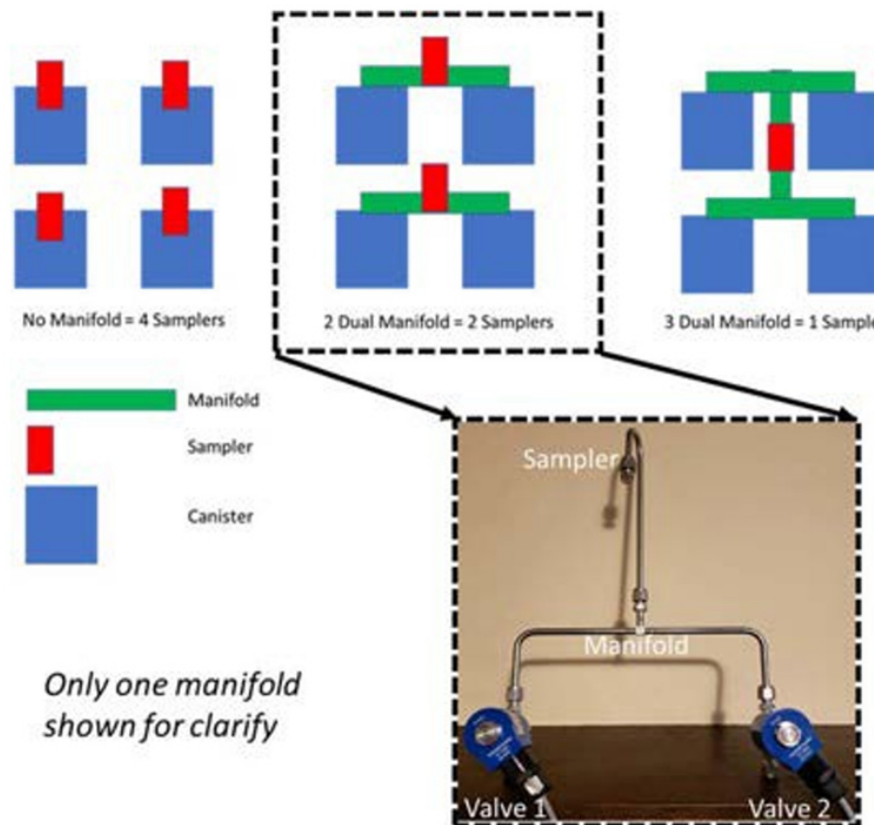

4. The canister valve controller features 4 status indicators for the ports. The color indicates the status.

LED COLOR	DESCRIPTION
BLUE	Not Enabled
GREEN	Enabled and Not Collected
RED	Enabled and collected
RED-GREEN-BLUE	Currently Collecting Sample

5. The canister valve controller features 4 local buttons for control and testing. The button behavior will depend on the status of port. When the button is pushed, the LED begins to flash RED-GREEN-RED- GREEN. Continue to hold the button until the status LED shows BLUE. Release button and change will occur.

CANISTER STATUS	ACTION
(B) NOT ENABLED	No Action
(G) ENABLED AND NOT COLLECTED	Open Valve
(R) ENABLED AND COLLECTED	Reset Collection Status (Swap Canister)
(RGB) CURRENTLY COLLECTING	Close Valve

6. The configuration of the canister valve hardware is up to the operator. Example setups are discussed here. The CVC can be used with up to 4 cans. The canisters can be connected with manifolds to share a single sampler. This is especially useful when using expensive time integrated samplers. The manifold dead space is negligible when using a 6L can and larger but becomes significant for smaller can sizes.

No Manifold = 4 Samplers   2 Dual Manifold = 2 Samplers   3 Dual Manifold = 1 Sample

Manifold

Sampler

Canister

Only one manifold
shown for clarify

Sampler

Manifold

Valve 1   Valve 2

7. The connection to the canister is shown here both with and without a pressure sensor and no manifold. The inlet of the valve should be the high pressure (atmosphere) side and the outlet of the valve should be the low pressure (vacuum) side of the valve.

Without Pressure Sensor
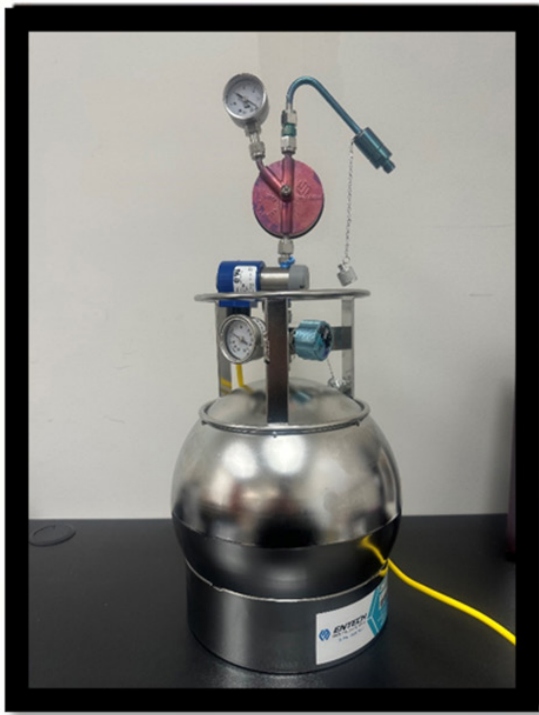
With Pressure Sensor

8. After hooking everything up, test the valves and pressure sensors described in the USB configuration guide. After testing is complete, be sure to close all the valves and open the manual canister valve. The valves have been leak tested at the factory, but final leak testing is the responsibility of the customer. An example setup is shown below. NOTE: Not every deployment will look the same depending on needs and desires for sampling.

DETAILED SAMPLE MENU INFORMATION

MENU ITEM	DESCRIPTION	LOCATION
SAMPCONFIG	Configure Sampler	Sample Menu
SAMPDELAY	Sample Delay Time	Sample Menu
SAMPRESET	Reset Sampler Status	Sample Menu
SAMPTEST	Manually Test Sampler	Sample Menu
SAMPTIME	Sample Acquisition Time	Sample Menu
SAMETYPE	Type of Sampler	Sample Menu
EXIT	Exit Sample Menu	Sample Menu

SAMPCONFIG: WARNING, this will erase sample configuration and will need to go through programming the following steps. The system will prompt for all canister locations. (e.g. 123 or 1,2,3 or Port 1 Port 2 Port 3, it doesn't matter). It will show the ports that have been selected and will next prompt the user to define sampling events up to the number of canisters present. Please note a single event could be to trigger a single canister or it could be to trigger multiple canisters. Type the canister(s) you want to trigger first and continue until all canisters have been accounted for. **NOTE**: You must program events, or no sampling can take place.

SAMPDELAY: This option is used to program a delay after startup where events are ignored. This is helpful if the sensor has been shut down or was exposed to high VOC concentrations. This will let the sensor stabilize before triggering any samples. This will also allow bump tests after powering up and will avoid unintentional sample acquisition.

SAMPRESET: This option is used to reset a canister status after changing the canister. The user will be prompted to type the port number that requires a reset. (e.g. 123 or 1,2,3 or Port 1 Port 2 Port 3, it doesn't matter).

SAMPTEST: This option is used to verify communication with the valve controller and test valves opening and closing. Recommended prior to any deployment. The system will prompt the user to type "'P#:1' to Open Valve 'P#:0' to Close Valve 'TEST#:1' for Pressure On 'TEST#:0' for Pressure Off (#=1,2,3,4) or EXIT" For example to manually open Port 1 the user would type "P1:1" and to manually close Port 1, the user would type "P1:0". If a pressure sensor is installed the user can test using the "TEST" command to output the pressure in PSI like the port test command.

SAMPTIME: Sets the duration of the sample grab. Adjustable between 1-100,000 seconds. This is adjustable for every single port location. This could be due to different canister sizes or sample flow rates.

SAMPTYPE: This option defines the type of sampling, "DIRECT, NONE, PRESSURE, or TIME". "DIRECT" would be a non-latching valve hooked directly up to the auxiliary port. This requires a 12V valve and is switched with a 3.3V digital output. Valve must be isolated from SPOD. "NONE" is no sampler hooked up. This should be selected if not using a sampler to avoid initialization error upon startup. "PRESSURE" is configured to allow the valve controller to hook up a pressure sensor to monitor canister pressure and stop sampling at a predefined threshold (-2.5 PSI) and is only relevant for deployments with pressure sensors. For pressure sampling, the SAMPTIME setting becomes a timeout value and the sampling will cease if the timeout is reached. "TIME" is sampling for a given amount of time as defined by SAMPTIME.

EXIT: Leave the sample configuration menu and enter the root menu.

DETAILED TRIGGER MENU INFORMATION

MENU ITEM	DESCRIPTION	LOCATION
TRIGCONFIG	Configure Trigger Settings	Trigger Menu
TRIGTYPE	Set Trigger Type	Trigger Menu
THRESHTYPE	Set Threshold Behavior	Trigger Menu
EXIT	Exit Trigger Menu	Trigger Menu

TRIGTYPE: This option allows the user to define the type of trigger that is used to initiate a sampling event. The most basic trigger is the "THRESHOLD" option which will trigger on a set PPB level for a set time. The "WIND" option triggers using wind direction and wind speed only. The "COMBO" option uses both Wind Direction/Speed and PPB level. Lastly the QUADRANT option (Must have 4 independent canisters. Samples designated canister for North, East, South, and West).

TRIGCONFIG: Settings for the given "TRIGTYPE". For the THRESHOLD it is ppb value and the time above the threshold. For WIND it is the minimum windspeed and direction range. For COMBO there are 3 Ranges for the combination trigger "LOW", "MED", "HIGH". Every windspeed range can have different direction ranges and concentration thresholds and all ranges must be programmed. Carefully follow the prompts.

THRESHTYPE: This menu will first prompt user to enable average array. With an average array enabled, the SPOD will calculate a true average of SPOD data. With average array disabled, the SPOD will only count the amount of time the data is above the threshold. If the array is enabled, the array size can be set from 1-60. The measurement averaging time is calculated according to the array size multiplied by the output data rate. For instance, if the output data rate (ODR) is set to 60 seconds and the array size is set to 15, the measurement averaging time is 60*15 = 900 seconds.

After the average array behavior is set, the SPOD will prompt triggering based on RAW or PPB readings. If RAW readings are used the threshold will be in mV and if PPB readings are used the threshold will be in ppb.

Finally, the SPOD will prompt the user to select a STATIC or DYNAMIC threshold. If a STATIC threshold is selected, the trigger level is absolute with respect to zero. If DYNAMIC threshold is selected, the trigger threshold is with respect to the background concentration over a user selectable period ranging from 10 – 3600 seconds. This threshold setting allows triggering on small, fast-moving signals while subtracting out slower moving diurnal trends. If DYNAMIC is selected, the user is prompted to set a "Static Limit". The static limit is an absolute limit that disregards background subtraction.

EXIT: Leave the trigger menu and enter the main menu.

ACCESSORY UNIT UPGRADE

Required Materials:

- Blue USB 6 pin Programmer
- Laptop with Firmware Tools

1. Follow the hardware installation guide at the end of this document if using the Blue 6 pin programmer for the first time. The programmer should show 2 lights (generally green and red as pictured but this is not always the color the first time plugging in)

2. Unscrew cover of canister valve controller or sorption tube pump. Do not unplug any cables inside.

3. Hook up accessory to an SPOD that is powered off. Turn on the SPOD. It is recommended to have the SPOD with the USB cable hooked up and enter the Menu when starting up. The accessory should show lights (flashing or steady) to indicate power is received.

4. Plug in the 6-pin programmer to the 6-pin connector on the PCB inside the enclosure. Gently lift the lid edge by the single external male connector enough to plug into the board as shown. The PCB may look slightly different versus photo, but 6 pin connectors should be in same/similar place.

5. Both LEDs on programmer should be green. If the top LED flashing orange than the orientation of the 6-pin connector on programmer needs to be flipped 180 degrees. If the top LED is still red, ensure the accessory has power and should light on the front panel. If power is verified and led remains red proceed with remaining steps to attempt upload.

6. Find the upload folder for canister valve controller (CVC) or sorption tube pump (STP) sent by Sensit. Verify that proper version of firmware is in the folder.

Name	Date modified	Type	Size
Tools and Info	5/27/2020 10:52 PM	File folder	
avrdude.conf	1/17/2017 4:00 AM	CONF File	471 KB
avrdude.exe	1/17/2017 4:00 AM	Application	513 KB
AVRUPLOAD.bat	3/20/2018 4:14 PM	Windows Batch File	1 KB
Canv1.5.hex	5/22/2020 11:28 AM	HEX File	43 KB
libusb0.dll	10/3/2018 1:44 PM	Application exten...	43 KB

7. Double click the "AVRUPLOAD.BAT" file and the tool will start to program immediately. The program should be completed without errors. Any warning about fuse setting is normal and not cause for concern. Any errors or flashing red lights on programmer indicates a problem. Please unplug programmer from computer and plug back in and try upload process again. Please send screenshot if errors are found

8. Return to SPOD, enter MENU ↓ SAMPLE ↓ SAMPTEST. During the beginning of SAMPTEST the accessory should report the firmware version. Verify this is the correct firmware version. Disregard any gibberish char- acters as this can occur during the firmware upgrade process and is not cause for concern.

9. After new firmware version is verified, close cover and screw securely. Make sure no wires are pinched in.

NOTES

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WARRANTY

Your **SENSIT® CVC** is warranted to be free from defects in materials and workmanship for a period of one year after purchase. If within the warranty period, the instrument should become inoperative from such defects the instrument will be repaired or replaced at our option. This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect, or improper maintenance. Proof of purchase may be required before the warranty is rendered. Units out of warranty will be repaired for a service charge. Internal repair or maintenance must be performed by a Sensit Technologies authorized technician. Violation will void the warranty. Units must be returned postpaid, insured and to the attention of the service department for warranty or repair. This warranty gives you specific legal rights and you may have other rights which vary from state to state.

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