STANDARD OPERATING PROCEDURES
FOR
XONTECK MODEL 901 & 910PC
CANISTER SAMPLERS

AQSB SOP 805

Second Edition

MONITORING AND LABORATORY DIVISION

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CALIFORNIA AIR RESOURCES BOARD

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REVISION HISTORY

Edition	Release Data	Changes
First	April 2015	New Document
Second	October 2020	ADA Remediation Added Sampler Back Pressure Measurement Instruction Added Make-up Sampling Sub-section Added Post Sampling Procedure Added Clarifications to Routine Service Checks and Maintenance Procedures Sections Added References Section Added Appendix D (Canister Data Sheet)

LIST OF ACRONYMS

AQSB	Air Quality Surveillance Branch
ATP	Acceptance Test Procedure
CARB	California Air Resources Board
ccm	cubic centimeters per minute
CFR	Code of Federal Regulations
LPM	Liters per Minute
MFC	Mass Flow Controller
MLD	Monitoring and Laboratory Division
NLB	Northern Laboratory Branch
ODSS	Operations and Data Support Section
OLS	Organics Laboratory Section
O_3	Ozone
ppb	parts per billion
psi	pounds per square inch
PST	Pacific Standard Time
QA	Quality Assurance
QC	Quality Control
sccm	standard cubic centimeters per minute
SOP	Standard Operating Procedure
U.S. EPA	United States Environmental Protection Agency

1.0 GENERAL INFORMATION

1.1 Introduction:

This standard operating procedure (SOP) describes procedures used by the California Air Resources Board (CARB) Air Quality Surveillance Branch (AQSB) to operate the Xonteck Model 901 and Model 910PC canister samplers to collect ambient air toxics samples. The two instruments will be collectively referred to as the "instrument" or "sampler" unless otherwise required. This SOP is designed to supplement the manufacturer's manual by describing hardware or operating procedures as implemented by CARB. It is not the intent of this SOP to duplicate or replace the manufacturer's manual.

1.2 Principle of Operation:

The Xonteck Model 901 and Model 910PC canister samplers are based on the field proven Model 910A canister sampler that has been widely used by local, state, and federal agencies. The 901/910PC sampler is a computer-controlled, programmable sampler that is designed to collect volatile organic compounds in ambient air. The method is based on collection of whole air samples into evacuated 6-liter SUMMA electro-polished canisters as outlined in U.S. Environmental Protection Agency (U.S. EPA) T0-14A/TO-15 Methods.

A diaphragm pump is used to pressurize the sample canister up to 15 pounds per square inch (psi) over a 24-hour sample period to meet CARB requirements. A mass flow controller (MFC) maintains a constant flow into the canister over the sampling period. When sampling is not taking place, the sample canister is isolated from the rest of the sampling system by a pulsed, magnetically latched solenoid valve. The use of a pulsed solenoid valve eliminates the temperature rise and out-gassing of organic compounds from the valve seat materials that might occur in a normally energized valve. All materials (e.g. stainless steel, Teflon, and Viton) used in the sample path are non-reactive.

The instrument can be used with a Xonteck Model 912 Multi-Canister Sampling Adapter to route air samples into up to sixteen canisters. This SOP will only focus on the operation of a single canister sampler.

The user can manually initiate actions from the front panel for manual sampling, troubleshooting, or to perform a "leak check" when connecting new canisters.

The sampler allows onboard scheduling; the user can edit the sample schedules through the front panel keypad/touchscreen, or via a remote computer using

modem, RS-232, or UDP. [1] A "Reschedule" function allows a sampling schedule to repeat later without re-entering the scheduling information.

Sample run information, such as time, date, pre-purge delay, flow set point and rate, average flow, pump and canister pressure, beginning and end pressure for all samples, elapsed time, sampling schedule, and power failure errors will display on the front panel or on a remote computer. At the end of each sampling period the user can request a printout of the schedule or sampling report via the front panel-mounted printer.

System recovery from a power failure is automatic. The sampler will resume operation as scheduled when power is restored.

1.3 Instrument Specification & Comparison:

Note: The Xonteck Model 901 Sampler replaces the previous Model 910PC that is no longer in production. However, CARB still owns and operates several 910PC samplers in the air toxics network.

The Model 901 and Model 910PC are essentially equivalent in all principle of operation. However, the Model 901 has a color touch screen on the front and has Ethernet and RS-232 ports on the back, while the Model 910PC has an LCD display w/ keypad on the front and a modem port only on the back. Therefore, the way of navigation is different for each model. The manufacturer no longer supports firmware or updates for the Model 910PC.

[1] Front panel touchscreen, RS-232 and UDP ports, are features exclusive to Model 901 sampler only.

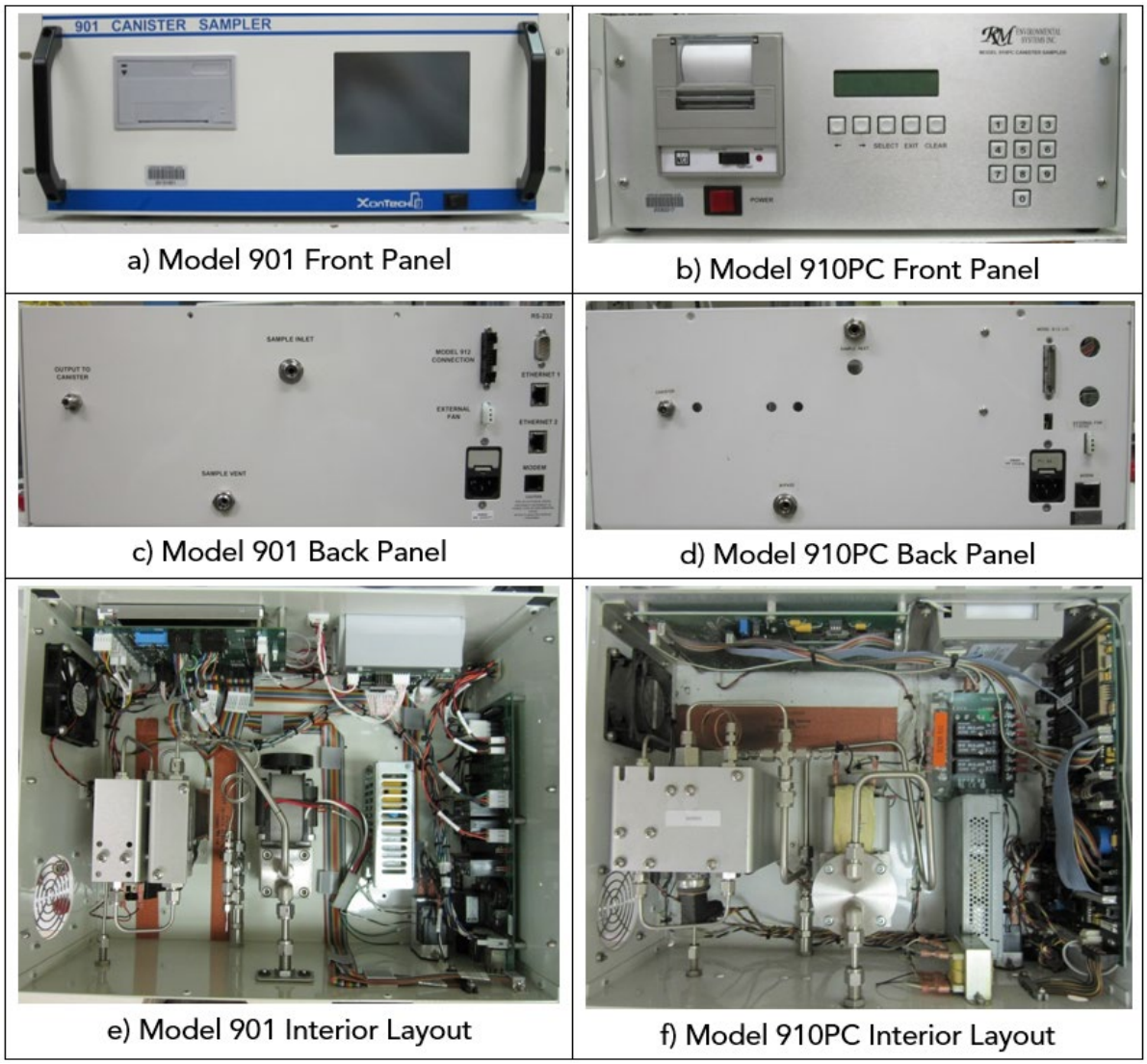


Figure 1.1. Model 901 & 910PC Sampler Comparison

Table 1.1. Physical Specification for the Instrument

	Model 901	Model 910PC
Sample Flow Control	Porter model 201 mass flow controller, customer specified, available with capacity of 0-20, 0-50, or 0-100 sccm [2]	
Display & Control	TFT color graphics, white LED backlighted, 5.7" diagonal touch screen	LCD, backlighted, 2 lines by 20 characters; numeric keypad and five function keys
Internal Sample Pump	Air Dimensions B161 diaphragm pump, SS single head, max vacuum 23.0" Hg, max pressure 29.2 psig, max flow 7.6 lpm	
Pressure Transducer	Stainless steel construction	
Canister Pressure	0-30 psig, 0.1 psig resolution	
Pump Pressure	0-30 psig range, 0.1 psig resolution	
Pressure Adjustment	Swagelok SS poppet check valve, 1/4" end connection, cracking pressure 3-50 psig, typically set to 25 psig	
Temperature Control	Honeywell RTD sensor near 100W silicone rubber heater (-40° to 150°C, 1°C resolution)	Integrated into PC circuit
Temperature Display	Enclosure temperature display on front panel display	
Connections	Inlet – 1/4" tube fitting Outlet – 1/8" tube fitting Bypass – 1/4" tube fitting	
Power	115VAC ±10%, 60Hz ±3 Hz, single phase, 3A max	
Dimension	7"(H) x 19"(W) x 13"(D)	7"(H) x 19"(W) x 15"(D)
Weight	~20 lbs	
Communication	RS-232, Ethernet, and 2400 baud internal modem	2400 baud internal modem
Printer	Panel mounted impact dot matrix, RS-232 interface	Panel mounted impact dot matrix, RS-485 interface

[2] The instrument is normally equipped with a 0-20 sccm range mass flow controller (MFC)

Table 1.2. Performance Specification for the Instrument

	Model 901	Model 910PC
Flow Controller Control Range	2% to 100% full scale, operation of the controller within 10% of the end points is not recommended	
Flow Rate Drift	Less than ±2% from the set point while the ambient temperature is held constant within ±1% in a temperature range between 20° to 30°C	
Flow Controller Accuracy & Linearity	±2% full scale.	
Flow Controller Repeatability	±0.5% full scale.	
Real Time Clock Accuracy	±1 minute per month.	
Flow Display Accuracy	±0.25% full scale.	
Pressure Transducer Accuracy	±1% full scale.	

1.4 Safety Precautions:

Note: Field operators should read the manufacturer's manual and this SOP completely before operating the instrument.

Only properly trained personnel should perform the instrument installation, operation, calibration, testing, and maintenance.

To avoid electrical shock, turn the power switch to OFF and unplug the instrument when performing maintenance or cleaning.

Always use a three-prong, grounded plug on this analyzer.

Avoid the use of chemical agents that might damage instrument components.

Adhere to general safety precautions when using compressed gas cylinders (e.g., secure cylinders, vent exhaust flows).

1.5 Interferences:

This instrument must be clean and decontaminated from a variety of chemicals since it is used to collect a representative ambient sample for analysis of chemical components that are in the parts per billion (ppb) or sub-ppb concentration range.

When the sampler is not running or not in use, every effort must be made to keep it clean and, if possible, in a clean environment. Cap the sample outlet line when the instrument is not in use or connect the outlet line to a clean canister.

Before field deployment, the Operations and Data Support Section (ODSS) shall perform a purity test on the sampler using a "clean" canister that is certified by the CARB Organics Laboratory Section of the Northern Laboratory Branch (NLB).

The sampled canister shall be sent back to the laboratory promptly for analysis of any aromatic and halogenated hydrocarbons. A list of these compounds and their limits of detection is provided in Appendix A.

1.6 Personnel Qualifications:

Only properly trained personnel may perform installation, operation, maintenance, repair, or calibration of the canister sampler. Respective staff should meet all minimum requirements and qualifications commensurate with their position or title. Qualifications for their functions are initially established through the successful completion of a probationary period with supervisorial oversight. Successive levels of responsibility are achieved via internal and external training classes, experience, and a demonstrated display of abilities until a "journey level" is attained.

2.0 INSTALLATION PROCEDURE

2.1 General Information:

The instrument should be installed in an environmentally controlled shelter and be mounted in a standard 19" instrument rack.

Before installation, please read the manufacturer's manual to familiarize with the theory of operation, hardware, software, and basic assembly of the instrument.

2.2 Physical Inspection:

Upon receiving the instrument, confirm that the instrument is in good working order with no damaged components. Refer to the following list:

1. Verify no apparent shipping damage.
2. Check the unit for any scratched surfaces (new unit only) and broken buttons or connectors.
3. Check for any loose connectors.
4. Check that all mechanical connections are tight.
5. Remove the top cover of the unit; visually check the interior for loose or damaged components.

If any damage or issue is found, please contact your immediate supervisor.

2.3 Instrument Siting:

The instrument has no special siting requirements specified by U.S. EPA. However, general ambient air monitoring instrument siting requirements in the U.S. EPA Title 40, Code of Federal Regulations Part 58 (40 CFR. 58) Subpart G should still be applicable.

2.4 Remote Control Connection:

The instrument can be operated remotely using its internal modem and a personal computer. At the computer end, any modem capable of 2400 baud rate communications can be used.

Both models have an internal modem with Telco interface via rear panel-mounted RJ-11 jack. The 901 has an additional RS-232 port and Ethernet RJ-45 interface for communication. However, the instrument is intended to be used in a standalone mode by CARB, thus details relating to this remote computer connection will not be covered in this SOP.

For assistance in configuring the instrument for remote connection, please refer to the manufacturer's manual.

2.5 Operation Verification:

Prior to operating the instrument, ensure that all connections have been made properly. In summary, at most CARB monitoring locations this involves the following connections:

- Connect the 1/4" Teflon sample inlet line from the probe to the inlet port on the rear panel.
- Connect the sample output from the output port on the rear panel using a 1/16" Teflon line to the sample canister.
- Connect the power cord to an appropriate power outlet.
- Uncap the sampler's exhaust vent.

After checking these connections, turn on the power switch.

For Model 901:

After powering on the unit, the 901 sampler will display the startup screen (figure 2.1a) for a few seconds. The startup screen will show the instrument model and the version of the software.

After displaying the startup screen, the sampler (figure 2.1b) will automatically display the main screen. The main screen displays the current date, pump pressure, sample pressure, system temperature, start delay (purge delay), and control ID of the sampler. In addition, the information line at the bottom of the screen will display current time, current state of channel and sub-channels.

A clean main screen, one without any error messages, indicates the instrument is stabilized and ready for sampling.

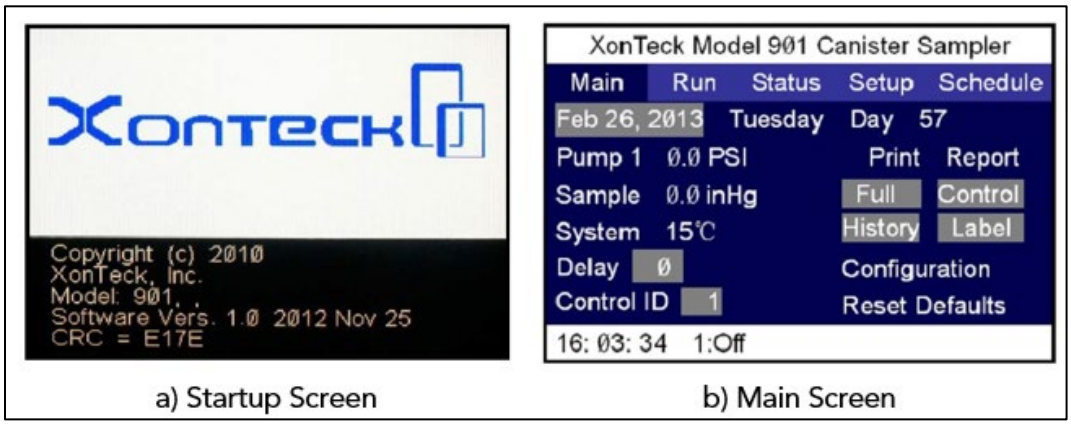


Figure 2.1. Screens for Model 901 Sampler while Operational

For Model 910PC:

After powering on, the 910PC sampler will display the startup screen (figure 2.2a) for a few seconds. The startup screen will show the instrument model and the version of the software.

After the startup screen, the main screen (figure 2.2b) will display and show the current date (in both Gregorian and Julian calendars), current time, and system status. If the system encounters any error messages (e.g. power fail and flow error), it will display on this screen as well. A clean main screen without any error messages indicates the instrument is stabilized and ready for sampling.

Figure 2.2. Screens for Model 910PC Sampler while Operational

Quick Navigation and System Checks:

Use the front panel display or keys to navigate through all screens. Verify that all the system settings and parameters are configured properly. If available, print out a current control settings report via the front panel printer. For navigation and printing assistances, please refer to Section 3.2 of this SOP.

3.0 CONFIGURATION

3.1 General Information:

Both models of canister sampler are essentially equivalent in all functions, with the same underlying technologies and principles of operation. However, the 901 is a newer design with an upgrade of a touchscreen display, whereas the 910PC has an LCD display w/ keypad and buttons, so the navigation controls are slightly different. To avoid confusion, a brief instrument basic operating guide is provided below for each model.

3.2 Instrument Basics:

Note: For details of any specific features not covered in this SOP, please refer to the manufacturer's instruction manual.

For Model 901

The 901 utilizes a touchscreen to accept operation commands and variables, and display system information. After system startup, the main screen is displayed with current system status, e.g. current time, date, system pressures and temperature, and purge delay setting, etc. If a parameter or variable is selectable on the screen, it will be highlighted from the background. Navigation is made easy with touchscreen, as touching a button on the screen would typically display another selection screen or keypad that is used for selecting or entering values.

The default home screen is the main screen, which can also be accessed by selecting the main tab at the top of the screen, along with tabs for the run, status, setup, and schedule screens. A brief description for each screen (Table 3.1) is provided in the following page.

Table 3.1. Model 901 Screen Descriptions

Screen	Description
Main screen:	Displays current date, time, pump pressure, sample pressure, system temperature, start delay (purge delay), control ID, and channel status (on/off). Sets date and time, start delay, and control ID. Provides access to configuration screen (for system settings and connection setup) and reset factory defaults. Prints reports and labels. (See figure 2.1b)
Run screen:	Displays basic operating information, i.e. current run state, channel flow rate, flow set point, etc. Provides access to flow settings, manual start, leak check, calibration and temperature settings. (See figure 3.1a)
Status screen:	Displays status of the sampling run. Allows the user to view data, such as sampling elapsed duration, sampling volume, flow rate average, and canister initial and final pressures for the last completed sampling event. Clears sampling data records. Provides access to see details of errors (e.g. flow error/power error) which occurred during sampling event. (See figure 3.1b)
Setup screen:	Displays and allows the user to enter information such as, unit ID number, sample label, user name, and comment for sample identity. (See figure 3.1c)
Schedule screen:	Displays and allows the user to schedule/set sampling event information such as, date, time, duration, and group number. Provides the user access to the Re-Schedule screen to re-schedule sampling events. (See figure 3.1d)

Shown below are some screenshots for the Model 901 sampler menu system.

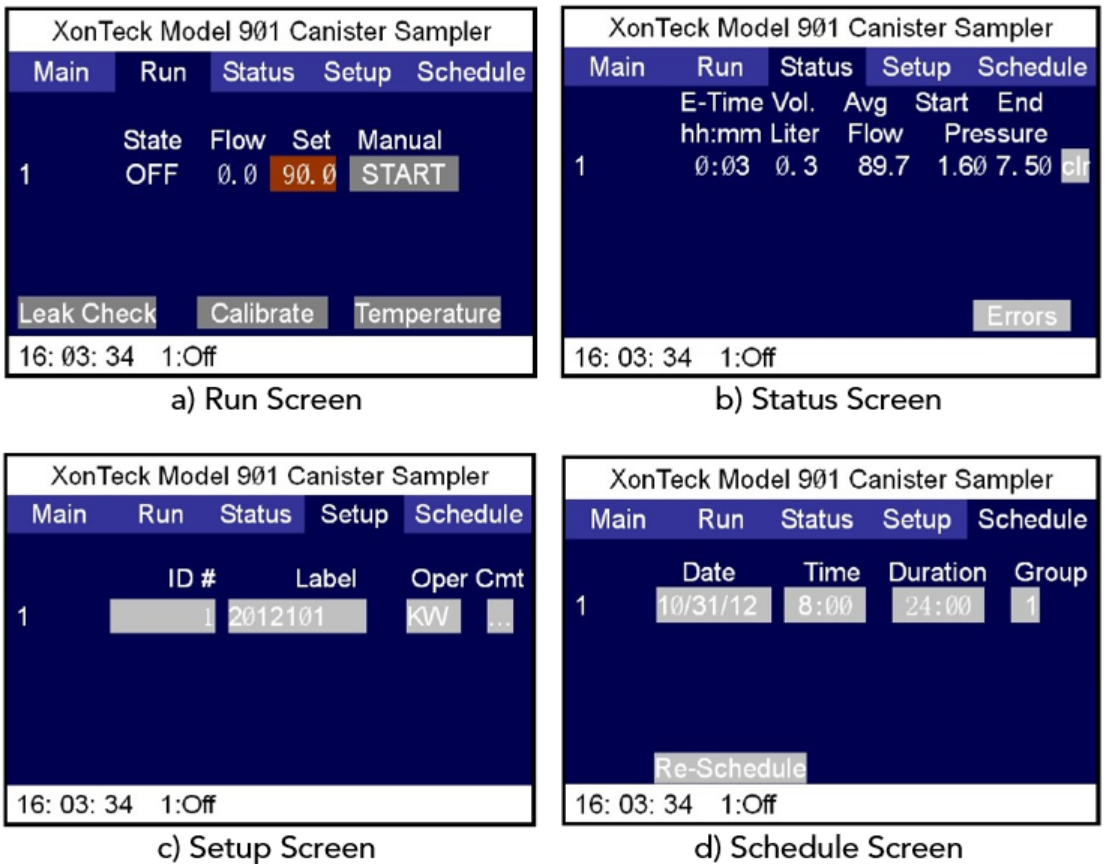


Figure 3.1. Model 901 Sampler Menu System

For Model 910PC

The 910PC utilizes menu-driven software to accept operating parameters and display system information. System commands and variables are entered through the front panel keypad. System information is shown on the front panel display. Five "Function" keys are used to navigate through the system menu, increment or decrement numeric variables, branch to sub-menus, enter commands, and clear error messages; they are two "Arrow" keys, a "Select" key, an "Exit" key, and a "Clear" key, respectively. The numeric keypad is used to input numeric information. Please refer to figure 1.1b for details of the front panel interface.

A brief description for the functions of each key are listed below.

[ARROW]: To navigate thru different screens, to scroll thru different selection options, or to change a selected numeric item on unit at a time or the answer to a (Y/N) query.

[SELECT]: To enter the display screens, or to select the chosen item for modification.

[EXIT]: To exit a screen, equivalent to setting/entering the modified values when leaving the screen.

[CLEAR]: To clear an incorrect entry, to reset some error messages, or to restore the previous value.

For the 910PC, there are total of eight different states in the menu. An overview of the 910PC menu (Table 3.2) is shown in the following page.

Table 3.2. Model 910PC Screen Descriptions

Screen	Description
Default screen:	Displays time, date, power fail and flow error messages*. Sets time, date and unit ID. Resets to Factory Defaults. Prints reports. *Selects the displayed error message to forward the user to a special screen where the affected channel and power fail (or flow error) duration are displayed.
Pressure screen:	Displays actual pump and current canister pressure.
Flow/Pre-Purge Delay screen:	Displays actual flow and pre-purge delay. Sets flow set point and pre-purge delay time.
Temperature screen:	Displays actual system temperature.
Elapsed Time screen:	Displays actual sample time, flow average and total volume for each channel. Resets elapsed times, flow averages and total volumes.
Schedule screen:	Inputs channel sampling period date, start time and sampling duration.
Leak Check/ Manual Run screen:	Initiates manually timed sample run for manual sampling, troubleshooting, or for leak checking* (for the sampler and/or the connected canister). *Leak check or manual run cannot be started during a sampling period.
Reschedule screen:	Allows existing schedule to be repeated later without re-entering the schedule.

3.3 Instrument Configuration:

The nominal setting values shown below are used to configure the instrument by default. However, ambient conditions vary significantly depending on site location, therefore, it is required that field operators verify, and re-configure instrument settings, if necessary, before using it for any sampling events.

Table 3.3. Standard AQSB 901/910PC Instrument Configuration

Parameter	Nominal Value	Range
Date	Current Date	N/A
Time	Current PST time	± 1 min
Canister Number	1	1 – 16 (default 1)
Canister Initial Vacuum	27 inHg	± 2 inHg
Canister Final Pressure	13 psi	± 3 psi
Flow Rate Set Point	8 sccm	± 1 sccm
Flow Range Max Scale	20 sccm	Available 20/50/100 sccm
Purge Delay	30 min	Fixed
Sampling Duration	24 hrs	Fixed
Group Number	1	1 – 9 (default 1)
Rescheduling	6 days	6 – 12
Sample Temp (°C)	Ambient Temp	Ambient ± 10°
Slope *	1.0	0.9 to 1.1
Offset *	0.0	-1.0 to 1.0

* Instrument specific. Please refer to the calibration section of the appropriate user manual.

4.0 SAMPLING PROCEDURE

4.1 General Information:

The canister sampler is typically operated on a twelve-day sampling schedule as specified by the CARB's air toxics program. For special projects, the sampling frequency may vary. The typical sampling duration is 24 hours, from 0000 to 0000 hours PST, after a 30-minute purge delay. Special sampling may require varied time schedules and other than the 0000 hour starting time.

Upon completion of sampling, field operators should complete the required entries on the Monthly Quality Control Maintenance Check Sheet and Canister Sample Data/Sample Tracking Form. Include the site name, station number, technician name, agency, scheduled sampling date, and sampler property number. Monitor and record all the sampling flow status, i.e. flow rate, canister pressure (before & after), sampling time, etc. Verify required maintenance items are scheduled and completed.

4.2 Pre-sampling Configuration:

Note: It is important that the sampling date, time, and duration be set up and activated correctly to ensure a good sampling run.

For Model 901

1. **Turn on** the power switch. The front panel will flash the manufacturer's name, equipment model number, and the system version number. The Main screen will appear.

2. From the main screen, **touch** the [Date] button to display the date screen, then select the current month. To change the [Day], [Year] and [Time] of sampler, **touch** their buttons accordingly to display a keypad on the same screen.

3. From the main screen, **touch** the [Delay] button to set the "Purge Delay Time". Valid entries are 0 to 60 minutes. Set delay time to 30 minutes.

4. From the main screen, **touch** the [Control ID] button to set the "Control ID". The Control ID number is for remote access and instrument identification on report sheet. Valid entries are 1 to 99. Set Control ID to 1.

5. From the main screen, **touch** the [Configuration] button to enter the settings screen. The settings screen allows the user to view the instrument's operational status and fault conditions, and to set RS-232 and Ethernet

parameters. If there is no change to these settings, leave them at default.

6. **Select** the [Run] tab on top to get to the run screen. **Touch** the [Set] button to update the flow rate set point to 8 sccm.

7. At this point, the user may choose to do a manual run by selecting the [Start] button on the run screen, or go to the schedule screen to schedule a sampling event. For scheduling a sampling event, refer to Section 4.3.

For Model 910PC

1. **Turn on** the power switch. The front panel will flash the manufacturer's name, equipment model number, and the system version number. The default screen will appear.

2. From the default screen, **press** the [SELECT] key, the system date will be underlined. If the date is correctly shown, **press** the [⇨] key to move forward, otherwise, **press** the [SELECT] key to change the date. The date on display will begin flashing. Enter the correct date (MM/DD/YY), and then **press** the [EXIT] key to save the value.

3. The time on display will be underlined. If the time is correct, **press** the [⇨] key to move forward, otherwise, **press** the [SELECT] key to change the time. The time on display will begin flashing. Enter the correct local Pacific Standard Time (PST) (hh:mm), when done entering **press** the [EXIT] key. All instruments operated in CARB air monitoring operate on PST all year.

4. Next, the display will prompt for "Reset to Default?" Select N as a "NO" to the prompt, since a "YES" response will clear and reset all schedules and functions to their default value. Alternatively, to reset all schedules and functions to the default value, **press** the [SELECT] key and the [⇨] key to change the response from N to Y, and then **press** the [EXIT] key.

5. The prompt "Control Unit ID #" will display on screen. This is the sampler number that will show on the reports. If it is correct, **press** the [⇨] key to move on, otherwise **press** the [SELECT] key to correct the value. Enter the correct ID number and **press** the [EXIT] key to save the change.

6. The prompt "Print Full Report? N" will display on screen. Requesting a full report, the sampler will print out a report with all of its control settings, event schedule, and the completed run information at the end of a sampling event. If a full report is not desired, **press** the [⇨] key to move forward. Otherwise, **press** the [SELECT] key and change the response from N to Y, then **press** the [EXIT] key.

7. The prompt "Print Control Report? N" will display. This is like the previous prompt, except this one will print only the control settings and the event schedule information. Choose accordingly, and **press** the [EXIT] key when done with this prompt.

8. Navigate to the "Flow & Purge Delay Set" screen, **press** the [SELECT] key to enter and change the flow rate set point. Enter 8 sccm as the flow rate using the front panel keypad. When done, **press** the [EXIT] key to save the value.

9. The "Set Purge Delay Time" will also appear on the screen. If the purge delay time is correct, **press** the [⇨] key to move on, otherwise, **press** the [SELECT] key to change the time. Enter the correct delay time (30 minutes), and then **press** the [EXIT] key to move forward.

10. At this point, the user may choose to manually operate the sampler by navigating to the "Leak Check & Manual Run" screen to initiate a manual run, or go to the Schedule screen to schedule a sampling event. Refer to Section 4.3 for the scheduling details.

For Canister Connection & Handling

1. Obtain a certified clean and evacuated 6-Liter SUMMA canister from the laboratory and connect the canister to the sampler's outlet port using 1/8" Teflon tube. Leave the canister valve closed and tighten up all the connection fittings.

2. Check the canister setup stability. Prior to sampling, open the canister valve completely (by turning it counterclockwise until the "grip" is completely loosened), and record the initial canister pressure from both the canister pressure gauge and the sampler screen on the Monthly QC Maintenance Check Sheet. Ensure the canister and sampler pressure readings remain stable for at least 10 minutes. Alternatively, changing pressure readings indicate a potential leak. Locate and repair the leak, otherwise, replace the sampler if leak cannot be repaired.

3. Initiate a manual run or wait for the scheduled run. When sampling is complete, close the canister valve. Review the sampler screen for any errors. Record the starting canister pressure from the canister gauge and the sampler on the Monthly QC Check Sheet.

For Sampler Back Pressure Measurement

Under different context, back pressure could have a different meaning. For the

canister sampler, back pressure is essentially the sampler pump pressure. Back pressure reading needs to be higher than the desired canister pressure for air to flow into the can. The idea is that when the canister pressure reaches the back pressure setting, the flow rate stops.

After checking the canister setup stability, open the valve on the sample canister, and initiate a manual run at the desired sample flow rate. Record the initial sampler's pump pressure reading, which in this case is the back pressure reading we are looking for, from the sampler screen. Then stop the manual run and schedule the actual run.

Back pressure measurements can be used to track the sampler's pump efficiency. The pressure reading should be over 20 psi.

4.3 Programing Sampling Event:

Note: The instrument can operate under only one channel or sub-channel at a given time. If a new sampling event is entered that conflicts with another scheduled event, a warning message will appear, and the new event will not be saved.

For Model 901

To schedule a sampling event:

1. Go to the schedule screen by selecting the "Schedule" tab from the main screen.

2. To set a date for a sampling event, **select** the [Date] button on the screen to display the "Schedule Date" screen. Enter the month, day, and year values using the displayed keypad.

3. To set a time to begin the sampling event, **select** the [Time] button on the screen to display the "Start Time" screen. Enter the time (in 24-hr format 00:00) using the displayed keypad.

4. To set a duration for the sampling event, **select** the [Duration] button on the screen to display the "Duration Schedule" screen. Enter the duration (in 24-hr format hh:mm) using the displayed keypad.

5. The default group number is set to "1". This group number is used during re-scheduling to re-schedule a selection of channels or sub-channels for sampling events based on their group.

6. After a sampling event is successfully scheduled, a green [Set] button will show up on the same screen. **Press** the [Set] button to activate the event schedule. A new window will prompt the user to clear the data record from the last sampling event. **Select** "Yes" to clear the previous record.

To re-schedule sampling events:

Note: Ensure there are scheduled sampling events on the screen and pick the group of sampling events for re-scheduling. Refer to previous steps on how to schedule an event.

1. From the schedule screen, **select** the [Re-Schedule] button,

2. A new "Re-Schedule" screen will display. **Set** the group number in the "Re-Schedule" screen to the group of interest or leave the default setting.

3. **Set** a specific number of days later or select a specified day of every week to re-start the sampling event.

4. **Select** the [Go] button to save and activate the new schedule.

5. **Select** the [Done] button to cancel or exit the "Re-Schedule" screen.

For Model 910PC

To schedule a sampling event:

1. **Use** the [ARROW] key to navigate to the schedule screen. The schedule screen should display the current scheduled canister number and the scheduled start date. **Press** the [SELECT] key to enter the setting mode. Any active item will be underlined.

2. In the setting mode, the screen will prompt the user to choose a canister number for the sampling event. If the default value is channel "1", leave it as-is and **press** the [⇨] key to continue. Otherwise, change it to "1".

3. Next, it will ask the user to set the sampling start date. **Press** the [SELECT] key, and then enter the month, date, and year values using the front panel keypad. Press the [EXIT] key to save the entry. When done, **press** the [⇨] key to move on.

4. Next, it will ask the user to set the sampling start time. **Press** the [SELECT] key and enter the time (in 24-hr format hh:mm). **Press** the [EXIT] key to save the entry.

5. The screen will then ask the user to set the sampling duration time. **Press** the [SELECT] key and enter the duration (in 24-hr format hh:mm). **Press** [EXIT] to save the entry.

6. Next, it will ask the user to choose a canister group number for this sampling event. This number is used during re-scheduling for re-scheduling a selection of channels or sub-channels based on their group. The default value is group number "1". Leave it as-is and **press** the [⇨] key to continue. Otherwise, change it to "1".

7. When all sampling schedule information is updated, **press** the [EXIT] key to leave the Schedule screen to record the new schedule.

To re-schedule sampling events:

Note: Ensure there are scheduled sampling events on the screen and select the correct group of sampling events for re-scheduling.

1. **Use** the [ARROW] key to navigate to the "Reschedule" screen. The "Reschedule" screen should display the options of "N Days Later" or "Day of the Week". **Press** the [SELECT] key to enter the setting mode. Any active item will be underlined.

2. Select "N Days Later" using the [ARROW] key, **press** the [SELECT] key, and enter the number of days you want the sampler to run again. The default setting for CARB sampling schedule is 12 days later. If not correct, change it using the front keypad. **Press** the [EXIT] key to save the entry.

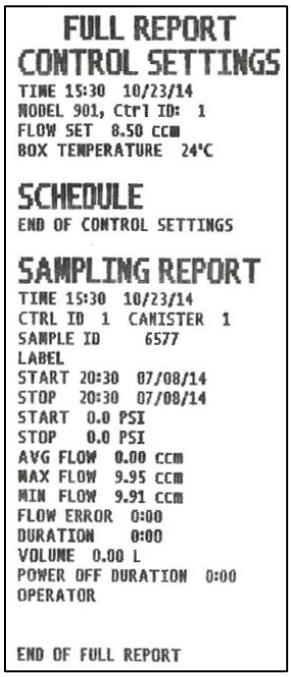
   Note: For the "Day of the Week" option, instead of specifying the number of days, one might decide to re-run the sampling on a specific day of the week. However, this option is rarely used by CARB.

3. When all the re-scheduling information is updated, **press** the [EXIT] key to leave the reschedule screen to record the new schedule.

4.4 Retrieving Sampling Report:

Field operators are responsible for retrieving and recording sample run information. Sampling information is displayed on the sample printout. The sample printout should be returned with the sampled canister. See figure 4.1 below.

The front panel of each sampler should have a panel printer for report printing.


FULL REPORT
CONTROL SETTINGS
TIME 15:30 10/23/14
MODEL 901, Ctrl ID: 1
FLOW SET 8.50 ccm
BOX TEMPERATURE 24°C

SCHEDULE
END OF CONTROL SETTINGS

SAMPLING REPORT
TIME 15:30 10/23/14
CTRL ID 1 CANISTER 1
SAMPLE ID 6577
LABEL
START 20:30 07/08/14
STOP 20:30 07/08/14
START 0.0 PSI
STOP 0.0 PSI
AVG FLOW 0.00 ccm
MAX FLOW 9.95 ccm
MIN FLOW 9.91 ccm
FLOW ERROR 0:00
DURATION 0:00
VOLUME 0.00 L
POWER OFF DURATION 0:00
OPERATOR

END OF FULL REPORT

Figure 4.1. Sample Run Printout.

For Model 901

To print the sampling report, first go to the main screen. On the main screen, there are four buttons or options for printing. They are:

- [Full] – Allow the user to print the current system control setting and sampling report for the last sampling event.
- [Control] – Allow the user to print the current system control setting only.
- [History] – Allow the user to select and print historic sampling reports.
- [Label] – Allow the user to print label sticker on an optional label printer.

Select the report type and **touch** the corresponding button to print the chosen report.

For Model 910PC

To print the sampling report, **use** the [ARROW] key to navigate to the default screen and **press** the [SELECT] key to enter. **Use** the [ARROW] key again to navigate to the "Print Full Report" or "Print Control Report" option depending on what you want. **Press** the [SELECT] key to print the chosen report. When done, **press** the [EXIT] key to leave.

4.5 Post Sampling:

Review the sampler screen for any errors. Record the ending canister pressure from the canister gauge and the sampler on the Monthly QC Check Sheet (Appendix B). Complete the canister data sheet/sample tracking form (Appendix D). Close summa canister and disconnect from sampler. Return sampled canister, sample printout and canister data sheet to laboratory within one week of sampling.

4.6 Make-up Sampling:

Canister sampling for the air toxics program follows a 1-in-12 sample schedule. If a scheduled sample is not valid, site operators should make every effort to collect a make-up sample. The make-up sample must be collected within the same sampling month as the missed scheduled sample and before the next scheduled sampling date. Best practice for collecting a make-up sample is six days after the scheduled sampling date.

4.7 Canister Sample Validation:

Samples collected in the field are verified utilizing the criteria listed below. If a collected sample does not meet these criteria, field operators must appropriately document the sample report form with this information and invalidate the sample.

1. Canister samples must start and stop within 30 minutes of midnight.
2. Final canister pressure must be 13.0 psi $\pm$ 3.0 psig (10.0 to 16.0 psig).

Remove the sampled canisters as soon as possible following the sample collection date. Ensure the sample report form is complete and accurate.

Return sample report with the sample to the laboratory.

5.0 CALIBRATION INFORMATION

5.1 General Information:

A calibration is a procedure for aligning, checking, or adjusting the output of an instrument to a known "true" standard. To ensure the quality of the data provided by the canister sampler, the sampler must be calibrated prior to use, after any new installation, after any major maintenance, after every six months of use, or if the initial flow meter reading falls outside the tolerance limits of average initial flow meter reading.

This section of SOP provides a list of the necessary equipment and the calibration procedure to calibrate canister samplers. The 901 sampler has a built-in calibration feature that makes flow rate correction straightforward. However, the 910PC sampler does not provide any built-in calibration function, and requires manual adjustment to correct the final flow rate.

The sampler's mass flow controller (MFC) can be calibrated independently from the instrument. This is done during troubleshooting an MFC by ODSS shop personnel and will not be covered in this SOP. If interested, refer to the Porter Instrument Co., Inc. Tech & User's Manual, Section 6 – Calibration. This manual should be included within the sampler documentation. If not, it can be requested from the manufacturer.

Note: This section is intended to detail calibration procedures used by CARB and does not significantly deviate from the manufacturer's manual. Please read all the procedures outlined in both this SOP and the manufacturer's manual before attempting to perform a calibration.

5.2 Calibration Overview:

Note: Always perform the instrument auto leak and pump maximum pressure checks before any calibration. Refer to the procedures in Section 7 of this SOP.

The overall calibration process involves using a certified reference mass flow meter to perform a multi-point flow measurement for the sampler.

Prior to calibration, the user should check the displayed flow rate with the flow set point by performing a flow audit. If the flow is not at the set point, the user is required to adjust the flow controller and record the calibration results on the instrument monthly check sheet and the instrument calibration report (see appendices).

5.3 Calibration Apparatus:

1. Certified/Reference mass flow meter or flow transfer standard
2. Certified zero air generator or Grade 5 Nitrogen (clean air source)
3. 1/4" and 1/8" Teflon tubing for air flow connections
4. Calibration report form (Appendix C)

5.4 Calibration Procedure:

For Model 901

Model 901 has a built-in calibration feature for easy flow calibration. To begin calibration, **touch** the "Run" tab to display the run screen (see figure 3.1a). Then **touch** the [Calibrate] button on the run screen to display the "Audit & Calibration" screen. The "Audit & Calibration" screen allows the user to audit/calibrate the channel flow rates. Flow auditing is performed to observe any flow drift, while calibration is performed to correct the flow drift.

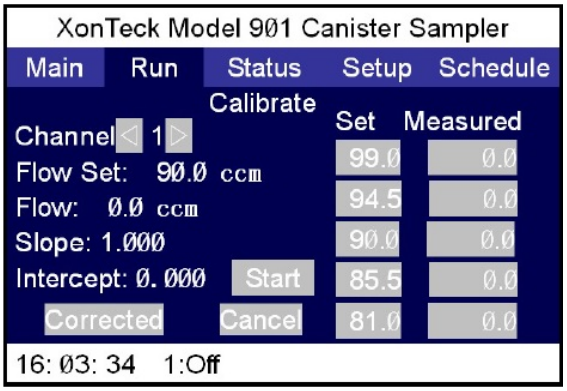


Figure 5.1. Audit and Calibration screen

Audit the channel flow rates

The user can audit the channel flow rates to verify whether flow controller has drifted from its previous calibration. If drift has occurred, the flow controller must be calibrated. To audit the channel flow rate, a previous successful flow calibration must be available for comparison.

To audit the channel flow rates, follow the procedure below:

1. Attach a reference flow meter to the "Output" fitting on the back panel.

2. Set the sampling flow rate (default Channel 1, 8 sccm) to be audited in the flow set screen.

3. **Select** the [Start] button to run the pump and open the channel valve.

4. Go to the run screen and **select** the [Calibrate] button on the screen to bring up the "Audit and Calibration" screen.

5. **Turn ON** the [Corrected] button, as its color will turn green, to enter the flow audit mode.

6. Under the flow audit mode, the screen will display five flow set points to audit. To change the flow set points, select each set point to display the number keypad.

7. Start with a midpoint value of 8 sccm as the flow set point, this is the typical flow rate used in normal sampling. Select four additional flow set points, ideally two above 8 sccm and two below 8 sccm at 1 sccm intervals. Typical calibration set points are 6, 7, 8, 9, and 10 sccm, respectively.

8. Record the Slope and Intercept calculated from last calibration.

9. **Select** the [Start] button to begin the audit. The sampler will start flowing.

10. When the flow stabilizes, **select** the [Next] button and enter the flow reading observed from the reference flow meter to the first set point.

11. When ready to measure the second set point, **select** the [Next] button and wait for the flow to stabilize.

12. When the flow stabilizes, **select** the [Next] button and enter the flow reading observed from the reference flow meter to the second set point.

13. Repeat the above operation to measure the third, fourth, and fifth set points.

14. After the five set points are measured, the sampler will calculate and display a new Slope and Intercept.

15. Compare the new Slope and Intercept with the values from last calibration to determine whether the 901 sampler needs to be calibrated again. (A drift less than 5% is acceptable, and a new calibration is not necessary.)

16. Document all these values in the sampler's calibration report.

17. **Select** the [Exit] button to exit the flow audit screen.

Calibrate the channel flow rates

Note: If any mistake occurs during the audit/calibration process, **select** the [Abort] button to stop the procedure and start over.

If the channel flow rates audit (described previously) results in a drift more than 5%, a new calibration is required. To perform a new calibration for the channel flow rates, follow the procedure below.

1. Attach a reference flow meter to the "Output" fitting on the back panel.

2. Set the sampling flow rate (8 sccm) to be calibrated in the "Flow Set" screen.

3. **Select** the [Start] button to run the pump and open the channel valve.

4. **Select** the [Calibrate] button on the run screen to display the "Audit & Calibration" screen.

5. **Turn OFF** the [Corrected] button, as its color will turn gray, to enter the flow calibration mode.

6. Under the flow calibration mode, the screen will display five flow set points to calibrate. To change these flow set points, select each set point to display the number keypad.

7. **Select** the [Start] button to initiate the flow calibration.

8. When the flow is stable, **select** the [Next] button and enter the flow reading observed from the reference flow meter to the first set point.

9. Then calibrate the second set point. When the flow is stable again, **select** the [Next] button and enter the flow reading observed from the reference flow meter to the second set point.

10. Repeat the above operation to calibrate the third, fourth and fifth set points.

11. After the five set points are calibrated, the 901 sampler will calculate and display a new Slope and Intercept for the new calibration.

12. **Select** the [Save] button to save the new calibration data. Record the new values.

13. **Select** the [Exit] button to exit the flow calibration screen.

For Model 910PC

The 910PC does not have a built-in calibration function like the 901 does, but the user can perform a flow rate audit for the sampler with a reference transfer standard, and then determine whether they should manually adjust the sampling flow rate, i.e. by adding an offset to the flow set point, in order to achieve the desired flow rate.

Flow rate audit and adjustment

The flow rate audit and adjustment process are relatively simple.

1. Attach a reference flow meter to the "Output" fitting on the back panel.

2. Start with a midpoint value of 8 sccm as the flow set point, this is the typical flow rate used in normal sampling. Select four additional flow set points, ideally two above 8 sccm and two below 8 sccm at 1 sccm intervals. Typical calibration set points are 6, 7, 8, 9, and 10 sccm, respectively.

3. Set the sampling flow rate to the midpoint value in the "Flow & Purge Delay Set" screen.

4. Move to the "Leak Check & Manual Run" screen to initiate a manual run to activate the pump and open the channel valve. The sampler will start flowing.

5. When the flow is stable, record the flow reading observed from the reference flow meter for this set point to the sampler's calibration report.

6. Stop the sampler flow and repeat the above operation to measure the remaining flow set points. Record the observed values from the reference flow meter.

7. After the five set points are measured, use the CARB calibration report (Appendix C) to calculate the linear regression against these points in order to obtain the new regression Slope and Intercept.

8. Compare the new Slope and Intercept with the values from the last flow rate audit in order to determine if the flow set point needs to be adjusted. (A drift less than 5% is acceptable, and adjustment is not required).

9. If adjustment is needed, back calculate the required flow set point in order to achieve the desired true flow, using the newly calculated regression Slope and Intercept.

6.0 ROUTINE SERVICE CHECKS

6.1 General Information:

Field operators shall perform the following routine service checks minimally at the prescribed intervals and more if necessary.

Field operators should complete the Monthly Quality Control Check Sheet (Appendix B) and submit the completed document to their supervisor each month. Field operators must also keep a copy of the Monthly Quality Control Check Sheet in the air monitoring station.

Leak check and mass flow meter calibration check (for model 901 only) may be performed more frequently but should be performed at least at the prescribed intervals.

If the operating efficiency of the instrument decreases or a malfunction occurs, the instrument shall be returned to the Instrument Shop for repair.

6.2 Field Maintenance Schedule:

Table 6.1. Maintenance Schedule for the Instrument

	Each Run	Semi-Annual	Annual	As-Required
Verify Sampler Operation	X			
Verify Canister Setup Stability	X			
Perform Auto Leak Check		X		
Check Sampler Pump Max Pressure		X		
Perform Flow Calibration Check		X		
Replace Probe and Canister Line			X	
Check Residence Time			X	
Return Sampler to Instrument Shop				X

6.3 Each Run:

Verify instrument operation. Check for any signs of problem. Check instrument's front panel display for any error message/status. Refer to operation verification in Section 2.5.

Purge the sampling lines if cleanliness is suspect.

Verify canister setup stability. Connect canister to the sampler. Open canister valve, wait for vacuum pressure to establish, and then compare the sampler and canister gauge readings. Wait and check readings again 10 minutes later to confirm no leak in the setup.

6.4 Semi-Annual Checks:

Perform automated system leak check. Refer to procedure in Section 7.2.

Check sampler pump maximum pressure. Refer to procedure in Section 7.3.

For model 901 sampler only, perform the mass flow calibration check. Refer to procedure in Section 7.4.

6.5 Annual Checks:

Replace the 1/4" Teflon sampling probe and 1/8" Teflon canister lines.

Check the sampler residence time. Residence time can be calculated using the instrument calibration report (Appendix C) during the semi-annual flow rate calibration. There should not be any significant change in the residence time from the previous records. If there is a significant change, investigate the cause of change.

6.6 As Required:

Should contamination be suspected at any site, field operators should troubleshoot the sampler, sampler apparatus, or site configuration to identify potential issues. If problems persist, replace the sampler. Return replaced sampler to ODSS instrument repair shop for inspection and repair.

The Organics Laboratory Section via the corrective action notification process (CAN) should initiate notification indicating contamination issues. Upon receipt of a CAN for suspected sampler contamination, field operators should return the suspected sampler to ODSS for evaluation.

7.0 MAINTENANCE PROCEDURES

7.1 General Information:

The canister sampler is designed to operate unattended for long periods. Other than routine checks required in Section 6 of this SOP, the instrument requires little maintenance. However, maintenance requirements vary from instrument to instrument, thus field operators should refer to the manufacturer's manual for any additional maintenance requirements.

Corrective maintenance is any unscheduled maintenance activity that becomes necessary due to system malfunctions. Examples are pump replacement, orifice cleaning, and flow meter controller calibration.

If field operators cannot repair an instrument, using procedures stated in the instrument manual, please contact the ODSS's instrument repair shop for help.

7.2 System Auto Leak Check Procedure:

The instrument contains a built-in automatic leak check feature that can allow the user to leak check the connection between the sampler and canister before running sample events.

For Model 901

To perform a leak check (with a canister):

1. Connect a canister to the sampler "output" with a 1/8" Teflon line (as in routine sample collection).

2. Make sure that the valve on the canister is closed.

3. Verify that the sampler "inlet" and "bypass" fittings on the back are not capped/blocked.

4. Go the Run screen by selecting the "Run" tab from the main screen.

5. **Select** the [Leak Check] button on the Run screen. A "Leak Check" screen should display.

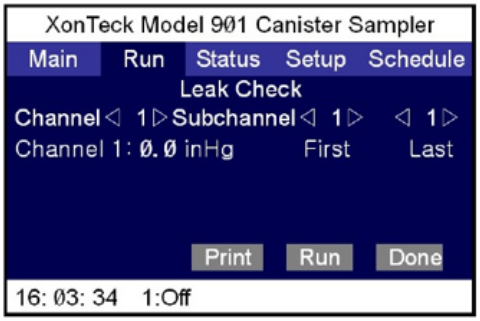
6. **Select** the [Run] button to run a leak check. The sampler might take a minute to complete the leak check.

7. When the leak check finishes, the screen might display either pass or fail for

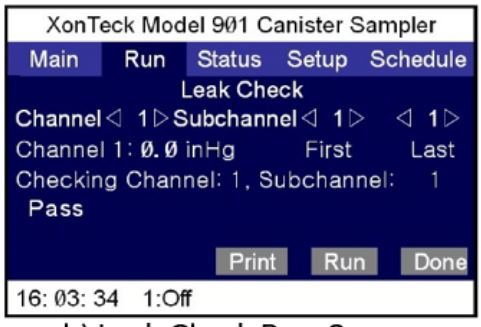
result. (Figure 7.1b or Figure 7.1c).

8. To print the leak check report, **select** the [Print] button.

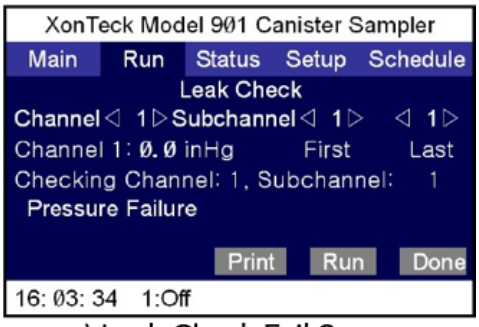
To stop the leak check in the middle of process, **select** the [Abort] button and confirm your action.



a) Leak Check Screen



b) Leak Check Pass Screen



c) Leak Check Fail Screen

Figure 7.1. Instrument Leak Check Screen and its Possible Results

For Model 910PC

To perform a leak check (with a canister):

1. Connect a canister to the sampler "output" with a 1/8" Teflon line (same as 901 above).

2. Make sure that the valve on the canister is closed.

3. Verify that the sampler "inlet" and "bypass" fittings on the back are not capped/blocked.

4. Use the [ARROW] key to navigate to the "Leak Check / Manual Run" screen.

Then **press** the [SELECT] key to enter. The active item is now underlined.

5. The default action item is the "Leak Check" mode. Please note that under this screen the "Manual Run" mode can also be accessed using the [ARROW] key.

6. **Hit** the [SELECT] key to activate the selection. The selected item will "flash" to indicate that it has been selected and changes can be made.

7. **Use** the [ARROW] key to choose Yes (Y) to confirm the action.

8. **Press** the [EXIT] key to initiate the leak check. (The selected value is only accepted/set when the [EXIT] key is pressed.)

9. The sampler might take a minute to complete the leak check. After the leak check completes, the sampler should display either pass or fail for the result.

To stop the leak check in the middle of the process, repeat steps 6 to 8 above, except in step 7 choose No (N) instead.

7.3 Sampler Pump Maximum Pressure Check Procedure:

The sampler pump maximum pressure check is essentially another system leak check. The pump maximum pressure check procedure is nearly identical to the leak check procedure described in Section 7.2. The only difference is that instead of choosing the "Leak Check" mode, select the "Manual Run" mode.

The key steps include:

1. Connect a canister with its valve closed and perform a manual run.
2. Allow the output pressure to come up to full pump pressure (approx. 25 psi).
3. Stop the manual run and confirm that the output pressure remains the same for one hour or more. The output pressure should drop no more than 0.5 psi/hour.

7.4 Mass Flow Calibration Check Procedure:

For Model 901, the sampler provides a built-in calibration function. Please refer to the calibration procedure for Model 901 sampler in Section 5.4 of this SOP.

For Model 910PC, flow rate verification and manual adjustment to the flow rate setting are performed to "tune" the sampler in order to achieve the desired sampling flow rate. Please refer to the calibration procedure for Model 910PC sampler in Section 5.4 of this SOP.

7.5 Purity Test Procedure:

Note: This procedure is performed by ODSS instrument shop personnel in the shop where testing apparatus are available.

For the purity test, the sampler is set to fill a certified "clean" 6-Liter SUMMA canister using a zero air generator or a grade 5 Nitrogen cylinder. The sampled canister will then be analyzed by the lab to determine the cleanliness of the sampler. If the purity test fails to meet the purity requirement, as specified in Appendix A, it should be removed from service and cleaned according to the cleaning procedure as described in Section 7.6.

Apparatus for Purity Testing

1. Certified zero air generator or Grade 5 Nitrogen (clean air source)
2. Flow calibration system (e.g. Environics 9100)
3. Teflon tubing, 1/4" and 1/8" O.D.
4. Connection tee
5. Air Flow Meter (Optional)
6. Hydrometer (Optional)

Purity Testing Steps

1. Obtain a certified "clean" canister from the NLB and connect the canister to the testing equipment as shown in figure 7.2.

2. Activate the zero air generator and the gas dilution system. Set in a proper air flow rate for the dilution system. The clean air source is typically set to an output flowrate of 10 LPM.

3. A tee is connected to provide a split stream of air to a hydrometer for flow quality control (i.e. dew point check). This split can also serve as a vent for excessive air flow to minimize pressurization of the Xonteck sampler inlet. (Note: this step is OPTIONAL but recommended. If a hydrometer is used, please limit its incoming flow rate to no greater than 1 LPM.)

4. Activate the Xonteck sampler and configure the sampling rate and duration time. For details on how to initiate and configure the sampler, refer to Section 4 of this SOP.

5. Fill the canister using the sampler with the zero air source. The canister should be filled to approximately 13 psi in 24 hours with the sampling flow rate of 8 sccm.

6. Send the canister back to the lab for cleanliness analysis. If the unit passes the test, it indicates the sampler is clean and does not require any cleaning treatment. However, if it fails the purity test, please follow the sampler cleaning procedure outlined in the next section.

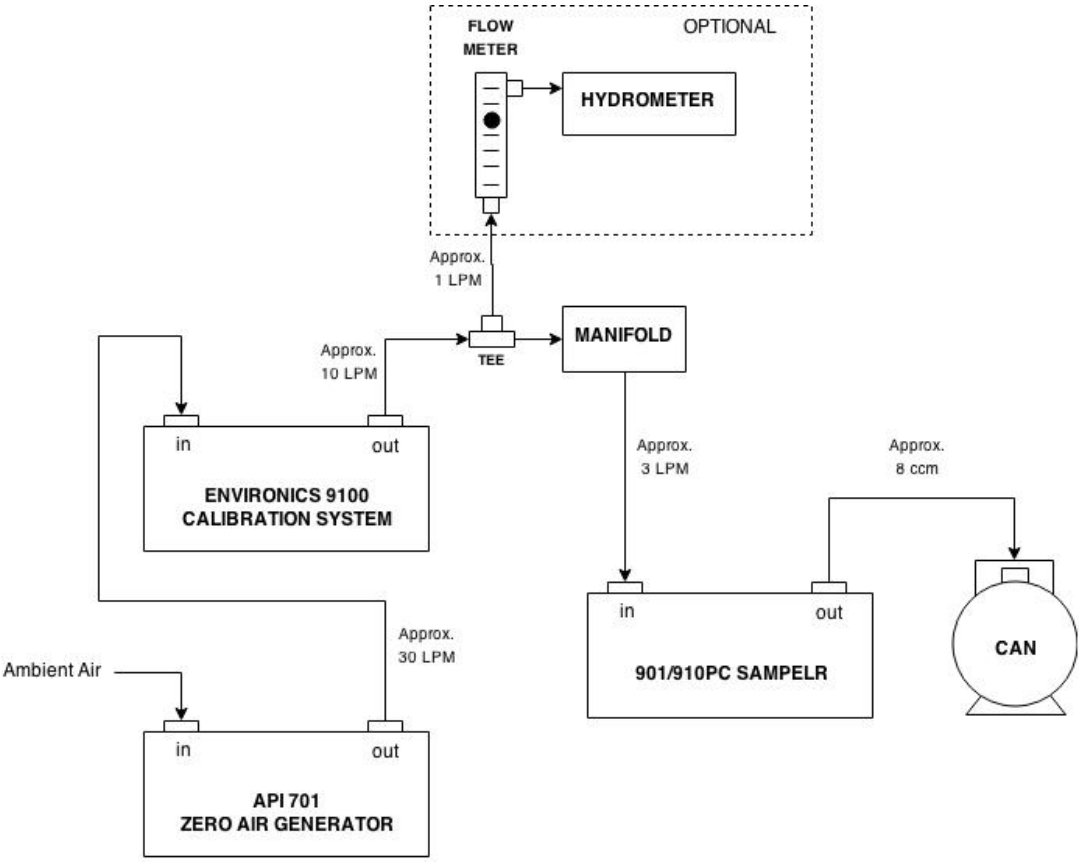


Figure 7.2. Purity Testing Equipment Setup Diagram

7.6 Instrument Cleaning Procedure:

Note: This procedure is performed by ODSS instrument shop personnel in the shop where cleaning apparatus are available.

Each sampler must be clean and decontaminated from a variety of chemicals. Throughout periodic usage of the instrument, contaminants can be trapped in and accumulated inside the sampler. When samples are collected using the contaminated instrument, analysis results can be greatly jeopardized, especially when the contaminant detection of limit is on the scale of ppb. Therefore, it is important to ensure the sampling instrument is clean and compliant with the purity requirement.

There are two ways to clean the sampler and its parts, and they are written below.

Apparatus for Sampler Cleaning

1. Certified zero air generator or Grade 5 Nitrogen (clean air source)
2. Bubbler
3. Teflon tubing, 1/4" and 1/8" O.D.
4. Bubble meter or flow indicator
5. Connection tee
6. Deionized water

Sampler Cleaning Steps

1. Follow the flow schematic diagram (figure 7.3), connect the bubbler, flow meter, connection tee and clean air source using Teflon tubing. Fill the bubbler approximately 3/4 full with deionized water and secure to instrument rack. Connect bubbler inlet (B) to the connection tee output (A); this line should end approximately 1" from the bottom of the bubbler. Then, connect bubbler output (C) to the sample input of the canister sampler. (See diagram for complete flow schematic).

2. Activate the clean air source and set to an output of approximately 6 LPM of air. Provide a vent from the clean air source to allow bypassing excessive air flow and reduce pressurization of the sampler inlet. For the clean air source setup, refer to the same setup procedure described in Section 7.5.

3. Activate the sampler to manual mode, set the sampler to a flow rate of approximately 18 ccm and operate the sampler for 72 hours continuously. This will allow humidified zero air from the bubbler to purge the sample lines inside the sampler.

4. After the 72 hours, disconnect the bubbler output (C) and connect the sampler inlet directly to the connection tee output (A).

5. Operate the sampler in manual mode again, set the sampler to a flow rate of approximately 18 ccm and run the sampler for additional 24 hours allowing dry zero air from the clean air source to purge the sample lines inside the sampler.

6. Once steps 1 through 5 are completed, repeat the purity test procedure as outlined in the previous section and check for the results.

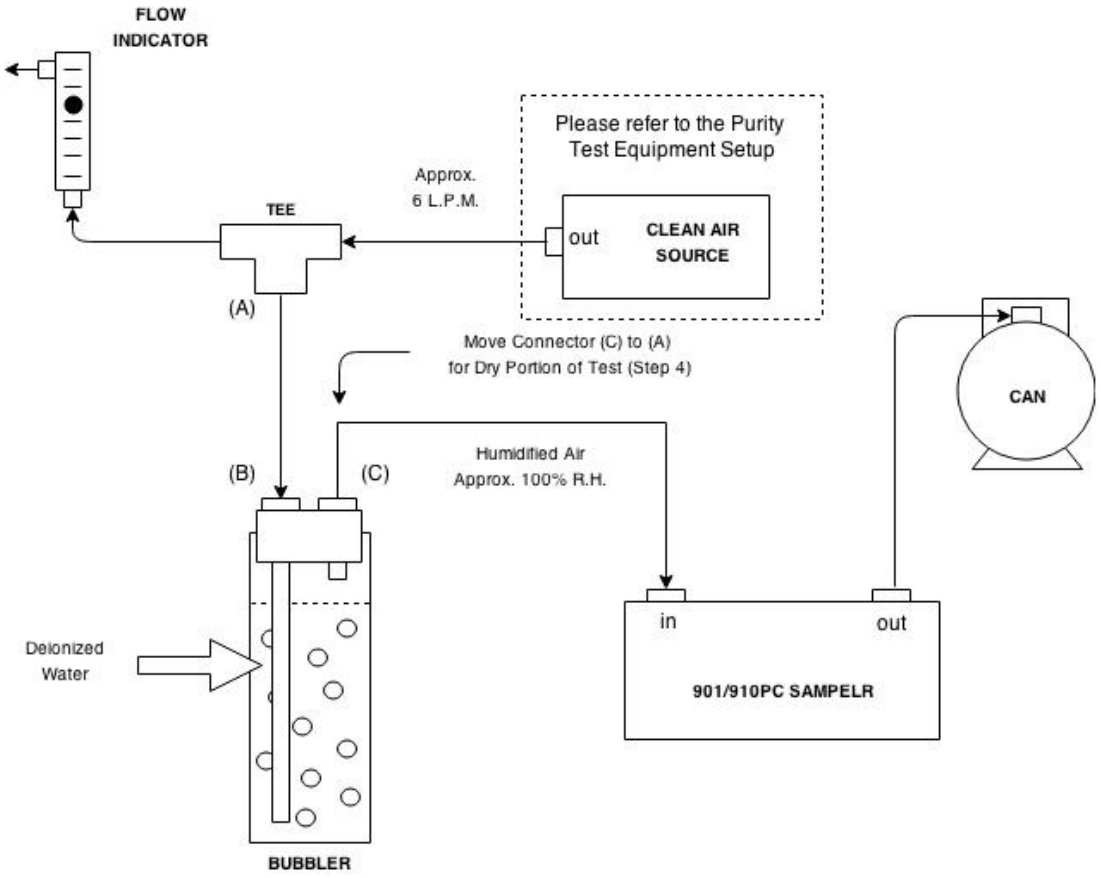


Figure 7.3. Sampler Cleaning w/ Flow Schematic Diagram

Apparatus for Parts Cleaning

1. Ultrasonic cleaner
2. Certified zero air generator or Grade 5 Nitrogen (clean air source)
3. Standard liquid detergent
4. Acetone-free absolute methanol
5. Tap water
6. Deionized water
7. Laboratory oven

Parts Cleaning Steps

For all stainless steel fittings and parts that contact with the sample, the following ultrasonic cleaning technique is found to be most effective.

a. The ultrasonic cleaning steps are listed below in the order of application:

1. Thoroughly wash parts using a standard liquid detergent.
2. Three rinses using tap water.
3. Three rinses using distilled deionized water.
4. Three rinses with acetone-free absolute methanol.
5. Bake-out in an oven at 200 °C for 12-16 hours.

b. If the sampler is equipped with a pump that has a stainless steel bellows assembly, the following procedure should be used to clean the pump parts that contact the sample:

1. Three flushes with 100 mL acetone-free absolute methanol.
2. Disassemble parts and blow dry with zero air.
3. Reassemble pump and purge pump for 4-6 hours with dry zero air.
4. If the application of the cleaning procedures outlined above does not sufficiently clean the pump, those pump parts should be cleaned in an ultrasonic cleaner using the procedure mentioned in the previous Step A.

8.0 TROUBLESHOOTING

8.1 General Information:

The manufacturer's manual contains information pertaining to troubleshooting and should be the first source of information. Should instrument malfunctions occur and troubleshooting is required to determine the problem, the user should refer to the manufacturer's manual.

Comment space is provided on the Monthly Quality Control Check Sheet for recording malfunctions, causes, fixes, and actions taken to prevent recurrence.

District personnel who operate canister samplers for the CARB's air toxics network are encouraged to contact their designated AQSB contact for assistance.

REFERENCES

Mass Flow Controller, Porter Instrument Co., Inc. Tech & User's Manual.

U.S. Environmental Protection Agency (U.S. EPA) T0-14A/TO-15 Methods, Determination of Volatile Organic Compounds (VOCs) In Ambient Air Using Specially Prepared Canisters With Subsequent Analysis By Gas Chromatography/Mass Spectrometry (GC/MS), Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air.

U.S. EPA Title 40, Code of Federal Regulations Part 58 (40 CFR. 58) Subpart G, Ambient Air Quality Surveillance (Federal Monitoring).

Xonteck 901 Canister Sampler (Automated Sampler with Integrated Computer) Instruction Manual.

Xonteck 910 Canister Sampler (Manual Sampler with New Features) Instruction Manual.

APPENDIX A -LIST OF AIR TOXICS COMPOUNDS AND LIMITS OF DETECTION

CARB Analysis Method	Compound	Limit of Detection (ppb)
MLD058 Cryogenic Trap Pre-concentration Capillary GC/MS	1,3-Butadiene	0.04
	CH3Br	0.03
	DCM	0.10
	$CHCl_3$	0.02
	TCEA	0.01
	CCl_4	0.02
	Benzene	0.05
	TCE	0.02
	c-Dclprpne	0.10
	t-Dclprpne	0.10
	Toluene	0.20
	Perc	0.01
	Et-Benzene	0.20
	m/p-Xylene	0.20
	Styrene	0.10
	o-Xylene	0.10
	p-DCBenzene	0.30
	o-DCBenzene	0.30
MLD066 Sorbent Trap Pre-concentration Capillary GC/MS	Acrolein	0.30
	Acetone	0.30
	Acetonitrile	0.30
	Acrylonitrile	0.30

Note: If compounds are detected in the canisters above detection limits, the sampler is deemed to have failed the laboratory purity check and the sampler cleaning procedure shall be used to clean the sampler per ODSS standard procedure. A repeat analysis shall be performed after the sampler is cleaned.

APPENDIX B - MONTHLY QUALITY CONTROL MAINTENANCE CHECK SHEET 805

XONTECK 901/910PC TOXICS SAMPLER

Location: _____ Month/Year: _____

Station Number: _____ Technician: _____

Property Number: _____ Agency: _____

Sample Date	Can ID Number	Elapse Time	Start		Sampler Flow		End Pressure		Back Pressure
			Canister	Sampler	Meter	Set Pt.	Canister	Sampler	

OPERATOR INSTRUCTIONS

1. Each Run: Verify system operation. Check for any signs of problem. Check for canister setup stability. Record the sampling information.

2. Semi-Annual: Instrument Auto Leak and Pump Max Pressure checks. Date Checked: _____

Calibrate mass flow meter (901 only). Last Cal. Date: _____

Meter Reading Slope: _____ Intercept: _____

3. Annual: Replace probe, can line, and determine residence time.

Replacement Date: _____ Residence Time: _____

Date	Comments or maintenance performance

Reviewed by: _____ Date: _____

AQSB QC Form 805 (07/20)

APPENDIX C - AQSB SAMPLER/INSTRUMENT CALIBRATION REPORT 805

XONTECK 901/910PC TOXICS SAMPLER

CALIBRATION REPORT:

ID Information:

Station Name:	San Jose
Site Number:	43-382
Station Address:	158 Jackson
Agency:	BAAQMD

Instrument:

Make:	Xontech
Model Number:	901/910PC
Property Number:	20005367
Serial Number:	NA
Back Pressure (psig):	22.4

Calibration:

"As Is"	X
"Final"	
Calibration Date:	04/15/15
Report Date:	04/15/15
Previous Cal. Date:	NA

Meteorology:

Temperature (degC):	32.0
Atm. Press. (mmHg):	763.0
Elevation (feet):	14

Calibration Results:

Pollutant:		Toxics
Instrument Range (ccm):		0-10
Sample Period (hours):		24
"As Is" Air Flow Set Point Display:		9.0
"As Is" Transfer Standard Display:		8.8
"As Is" True Air Flow (Sccm)		8.8
Final Canister Pressure, Calculated (psig):		16.4
Final Air Flow Set Point Display:		9.0
Final Air Flow Setting:		9.00
Final Transfer Standard Display:		8.8
Final True Air Flow (sccm):		8.8
	Slope:	0.9830
Display Best Fit Line	Intercept:	-0.1000
	Correlation:	0.9995
True Flow % Deviation from Previous Cal.:		2.4%

Previous Calibration Information:

Slope:	0.9861
Intercept:	-0.2199
Flow Rate (sccm):	8.6

Air Flow Transfer Standard:

Make & Model:	Tylan 4/1
Property Number:	20004517
Serial Number:	NA
Certification Date:	05/01/14
Expiration Date:	05/01/15

Transfer Standard Equation:

		(x)	(m)		(b)	
0 - 20 ccm MFM:	Standard Air Flow =	Display	1.0000	+/-	0.0000	SCCM
0 - 10 lpm MFM:	Standard Air Flow =	Display	0.9920	+/-	-0.0070	SLPM

CALIBRATION DATA:

Calibration Data (Transfer Standard):

Set Point (x):	Sampler Display:	Transfer Standard Display:	True Flow (y) SCCM	Graph Values
6.0	5.87	5.76	5.8	5.8
7.0	6.88	6.80	6.8	6.8
8.0	7.88	7.78	7.8	7.8
9.0	8.91	8.81	8.8	8.7
10.0	9.89	9.67	9.7	9.7

Probe Data:

Total Length (feet):	33.1
Calc. Lenth (meters):	10.1
Inside Dia. (in):	0.19
Calc. Dia. (mm):	4.76
Air Flow Display:	1.3
Air Flow (slpm):	1.3
Residence Time (s):	8.4

Leak Test:

Initial Time:	NA	Final Time:	NA
Initial Pressure (psig):	Pass	Final Pressure (psig):	Pass

Comments:	Automated leak check passed. Startup Cal, replaced leaking instrument.			
Calibrated by:			Checked by:	

AQSB Calibration Report 805 (07/20)

APPENDIX D - CANISTER DATA SHEET/SAMPLE TRACKING FORM

CALIFORNIA AIR RESOURCES BOARD
Canister Data Sheet/Sample Tracking

TOXICS

Site Name: _____ Site Number: _____

Station Operator/Agency: _____ Scheduled Sampling Date: _____

Project Name (*If Applicable*): _____

			CANISTER					SAMPLER			
	Date	Time (PST)	Vacuum ("Hg)		Pressure (PSI)			MFC Reading	Back Pressure Reading	Beginning Vacuum	Ending Pressure (PSI)
			LAB	FIELD							
Set-Up			-30								
Start											
					FIELD	LAB	LAB**				FIELD
Stop											

Type of Sample: [ ] Regular [ ] Collocated [ ] Make Up

Canister ID Number: _____ Air Sampler ID Number: _____

Observed Unusual Sampling Condition.
[ ] Wind-Blown Sand/Dust [ ] Rain [ ] Farm Operation Nearby
[ ] Construction Nearby [ ] Fire Nearby [ ] Other _____

[ ] INVALID SAMPLE INFORMATION

Reason for Sample Invalidation

[ ] Low canister pressure
[ ] High canister pressure
[ ] Sampling period out of range (<23 or >25 hours)
[ ] Sampling equipment inoperative
[ ] Damaged sampling media
[ ] Lab unable to provide sample media
[ ] Other reasons: _____

Status of Make-up Sample

[ ] Will run make-up on: _____
[ ] Sample media not available
[ ] Unable to run make-up, equipment needs repair/replacement/calibration, notified supervisor

Field Comments: _____

Chain of Custody / Sample Tracking

Action	Transfer Method (Check one)		Name & Initials	Date/Time
	Carrier	Person		
Released by Lab				
Received by Field				
Released by Field				
Received by Lab				

---FOR LABORATORY USE ONLY-----

Bar Code: _____

Lab Comments: _____

LIMS Sample ID:

** Calibrated Gauge Pressure

01/09/17