



INSTRUMENTS

SDM-2012 Docking Station PC Controlled Configuration Operator's Manual

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Product Warranty

RKI Instruments, Inc. warrants gas alarm equipment sold by us to be free from defects in materials, workmanship, and performance for a period of one year from the date of shipment from RKI Instruments, Inc. Any parts found defective within that period will be repaired or replaced, at our option, free of charge. Parts must be returned to RKI Instruments, Inc. for repair or replacement. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired or replaced on a routine basis. Examples of such items are:

- Absorbent cartridges
- Fuses
- Pump diaphragms and valves
- Batteries
- Filter elements

Warranty is voided by abuse including mechanical damage, alteration, rough handling, or repair procedures not in accordance with instruction manual. This warranty indicates the full extend of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation costs, or contingent expenses incurred without our prior approval.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF RKI INSTRUMENTS, INC. INCLUDING BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL RKI INSTRUMENTS, INC. BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCTS TO FUNCTION OR OPERATE PROPERLY.

This warranty covers instruments and parts sold to users only by authorized distributors, dealers and representatives as appointed by RKI Instruments, Inc.

We do not assume indemnification for any accident or damage caused by the operation of this gas monitor and our warranty is limited to the replacement of parts or our complete goods. Warranty covers parts and labor performed at RKI Instruments, Inc. only, and does not cover field labor or shipment of parts back to RKI.

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CAUTION: *Read and understand this manual before using the SDM-2012. Also read and understand the GX-2012 Operator's Manual and/or Gas Tracer Operator's Manual.*

Chapter 1: Introduction

Overview

This section briefly describes the SDM-2012 Docking Station, the Single Module Data Viewer Program, and the SDM-GX Docking Station PC Controller Program. This section also describes the *SDM-2012 Docking Station PC Controlled Configuration Operator's Manual* (this document). Table 1 at the end of this section lists the SDM-2012's specifications.

The SDM-2012 Docking Station is an advanced, reliable system that provides charging, calibration, bump testing, and calibration and bump test records for the GX-2012 and Gas Tracer portable gas monitors. It is designed to save the calibration and bump test records to a USB flash drive (standalone functionality) or to be connected directly to a computer (PC controlled functionality). If calibration and bump test records are stored to a USB flash drive while operating in the standalone configuration, the Single Module Data Viewer Program can then be used with a Windows-based personal computer to retrieve calibration and bump test data files from the USB flash drive or from the computer's hard drive if the files have been transferred to the hard drive from the flash drive. If you are using the PC Controller Program while operating in the PC controlled configuration, you may retrieve instrument data, bump test, and calibrate up to 10 units at once. Instrument information and data for each instrument can be viewed directly using the PC Controller Program and can be printed from the PC Controller Program. For instructions to use the SDM-2012 in the Standalone configuration, see the *SDM-2012 Docking Station Standalone Configuration Operator's Manual*.

The purpose of this manual is to explain how to set up and use the SDM-2012 in PC Controlled configuration. It also explains how to use the SDM-GX Docking Station PC Controller Program. You will learn how to:

- install and launch the SDM-GX Docking Station PC Controller Program
- setup the SDM-GX Docking Station PC Controller Program for use with the SDM-2012
- prepare the SDM-2012 for use
- bump test and calibrate up to 10 units using the PC controlled configuration
- use the SDM-2012 to charge a GX-2012 or Gas Tracer
- view, print, and export calibration and bump test records
- view instrument information and data using the PC Controller Program
- update instrument parameters using the PC Controller Program

CAUTION: *The GX-2012 and Gas Tracer detect oxygen deficiency and elevated levels of oxygen, combustible gases, carbon monoxide, and hydrogen sulfide (GX-2012 only), all of which can be dangerous or life threatening. When using the GX-2012 or Gas Tracer, you must follow the instructions and warnings in the GX-2012 Operator's Manual or Gas Tracer Operator's Manual to assure proper and safe operation of the unit and to minimize the risk of personal injury.*

CAUTION: *The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.*

System Requirements

To use the SDM-GX Docking Station PC Controller Software, your personal computer must meet the following requirements:

- **Operating Systems:** Windows® XP, Windows® Vista, Windows® 7, Windows® 8, or Windows® 10.
- **Processor:** IBM® compatible PC running Pentium® 2 processor or equivalent minimum
- **Memory:** 32 MB RAM minimum
- **Hard Disk Space:** 32 MB minimum
- **Additional Hardware Requirements:** One (for 4 or less SDM-2012s) or two (for 5 or more SDM-2012s) available USB port(s)

NOTE: One or two USB hubs may also be needed depending on the number of SDM-2012s in your system. See “Chapter 3: Mechanical Setup” on page 18.

Specifications

Table 1: SDM-2012 Specifications

Input Power	12 VDC <i>NOTE: AC Adapter with 100 - 240 VAC, 50/60 Hz, 0.6A input and 12 VDC, 1.2A output provided as standard.</i>
Environmental Conditions	For Indoor Use Only -10° C to 40° C, below 80% Relative Humidity, Non-Condensing
Applicable Instruments	GX-2012 and Gas Tracer
Memory Capacity	64 KB (Standalone configuration only)
Maximum Record Size	256 bytes (Standalone configuration only)
Maximum Number of Records Saved	200 (Standalone configuration only)
Number of Calibration Gas Cylinders	Up to two calibration gas cylinders per bump test or calibration at a time
Standard Accessories	<ul style="list-style-type: none"> • AC Adapter • USB Flash Drive • Single Module Data Viewer Software* • SDM-GX Docking Station PC Controller Software* • Inlet Air Filter • Operator's Manual • 10 Foot Long 5/16 Inch Exhaust Tube • Two 3 Foot Long 3/16 Inch Tubes for GAS 1 and GAS 2 Fittings • 10 Foot Long 3/16 Inch Tube for GAS 1 and GAS 2 Manifolding • 3 T-Fittings • Check Valve • USB Cable, Type A to Type B
* Not sent with SDM-2012. Download from www.rkiinstruments.com/sdm2012 .	

About this Manual

The *SDM-2012 Docking Station PC Controlled Configuration Operator's Manual* uses the following conventions for notes, cautions, and warnings.

NOTE: Describes additional or critical information.

CAUTION: *Describes potential damage to equipment.*

WARNING: *Describes potential danger that can result in injury or death.*

Cautions & Safety Information

- Use only polyurethane sample tubing with the SDM-2012. Consult RKI Instruments, Inc. for other materials.
- Do not subject the SDM-2012 to infrared or intense light. This may cause communication errors.
- Do not expose the SDM-2012 to water.
- Do not subject the SDM-2012 to any hard impact.

WARNING: *Do not use an exhaust tube that is longer than 10 feet. The increased flow restriction caused by a longer tube may affect gas response and cause inaccurate calibration and bump test results.*

Chapter 2: Description

SDM-2012 Components

Instrument Panel

The instrument panel is on the top of the SDM-2012 and includes the instrument cradle, the IR port, the charging contacts, the exhaust line connection fitting, and the gas out to instrument line. The instrument cradle consists of two recessed areas and is designed to accept the instrument. The recess at the front of the instrument panel is for instruments that have a Li-ion battery pack installed. Charging contacts are located at the back of this recess. The recess behind the Li-ion battery pack cradle is for instruments that have an alkaline battery pack installed. A plastic flap covers the recess that is not in use. Insert the instrument into the appropriate instrument cradle recess when you perform a bump test, calibrate, or charge an instrument. An infrared (IR) port in the front recess lines up with the instrument's IR port when it is inserted in either recess and is used to communicate with the instrument. The exhaust line connection fitting is in the upper left corner of the instrument panel. The exhaust line is not factory installed and must be installed by the user. An exhaust line storage fitting is located along the right side of the instrument panel and accepts the fitting at the end of the exhaust line for storage. The gas out to instrument line is coiled and stored in a recess in the upper middle portion of the instrument panel.

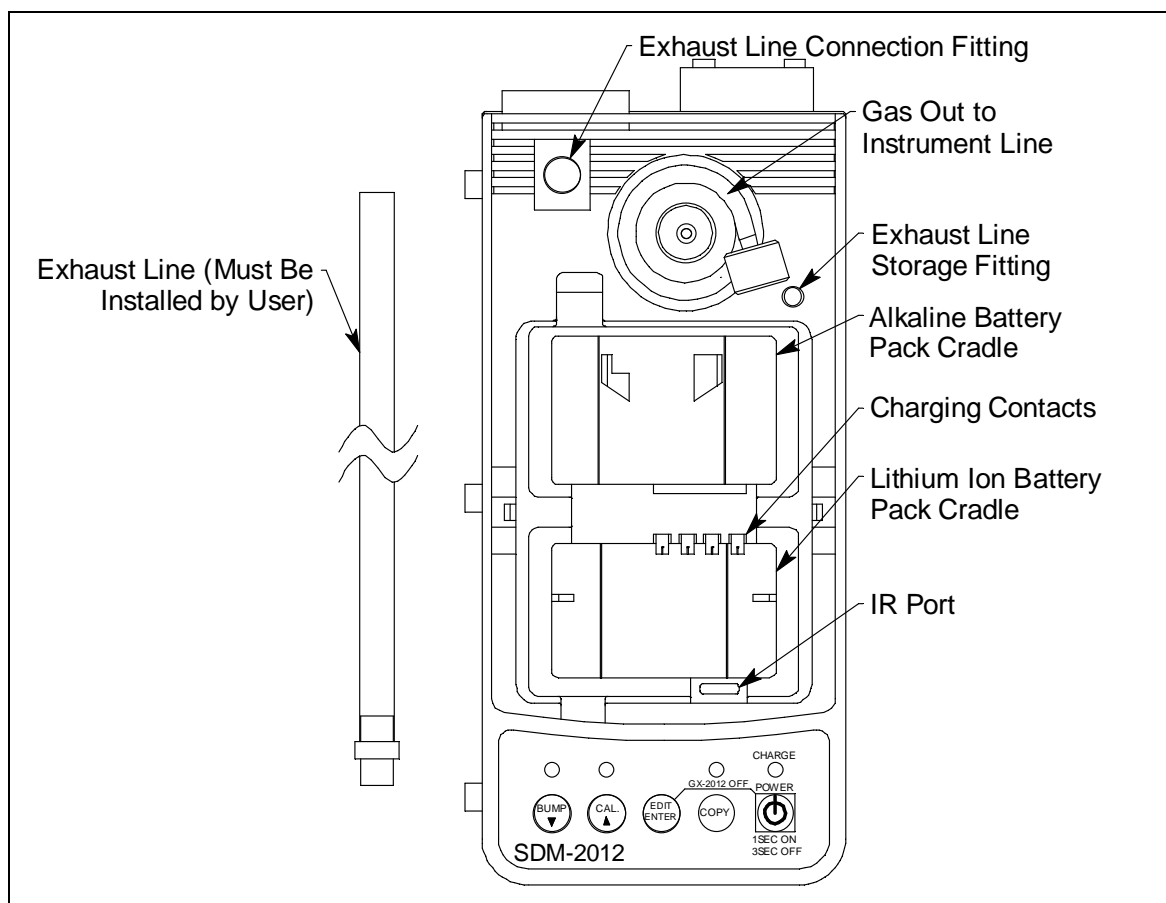


Figure 1: Instrument Panel (Shown Without Recess Cover Flap)

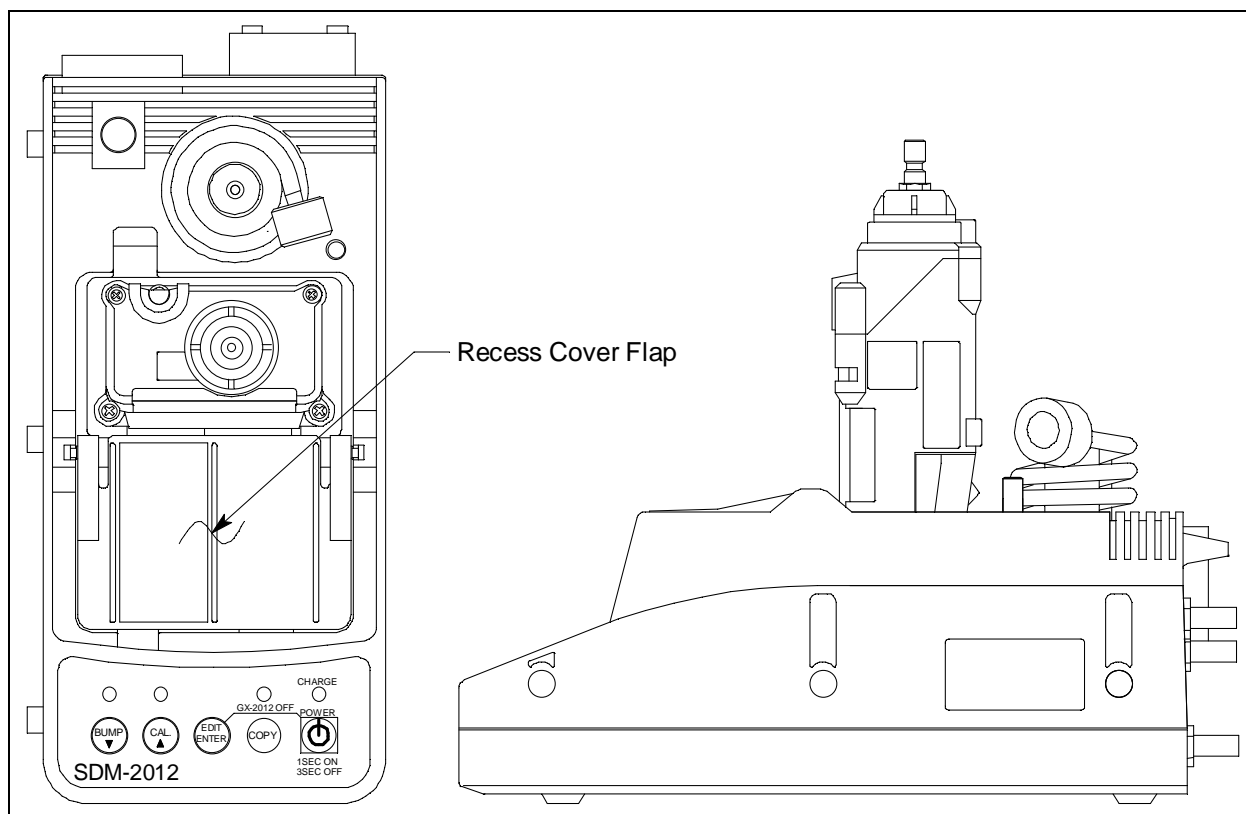


Figure 2: Instrument Panel with Alkaline Instrument Installed

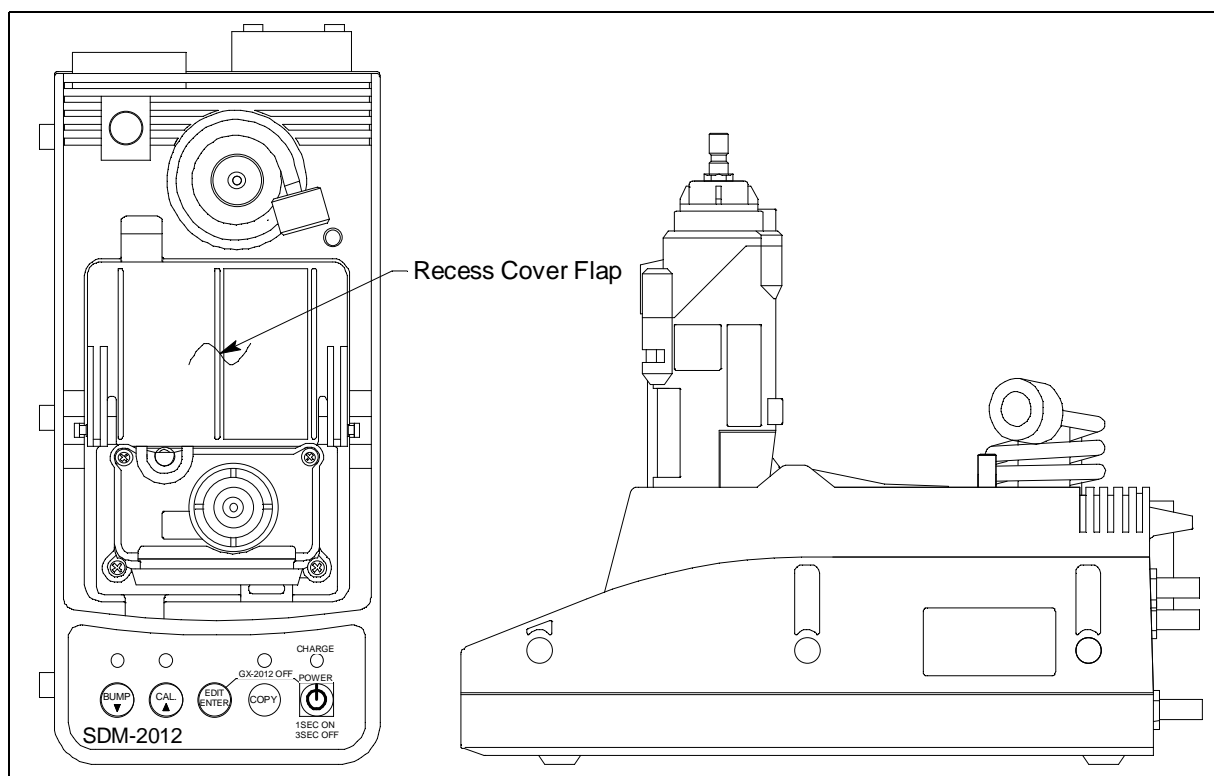


Figure 3: Instrument Panel with Lithium Ion Instrument Installed

Back Panel

The back panel includes the power jack, sample fittings, and a USB PC connector.

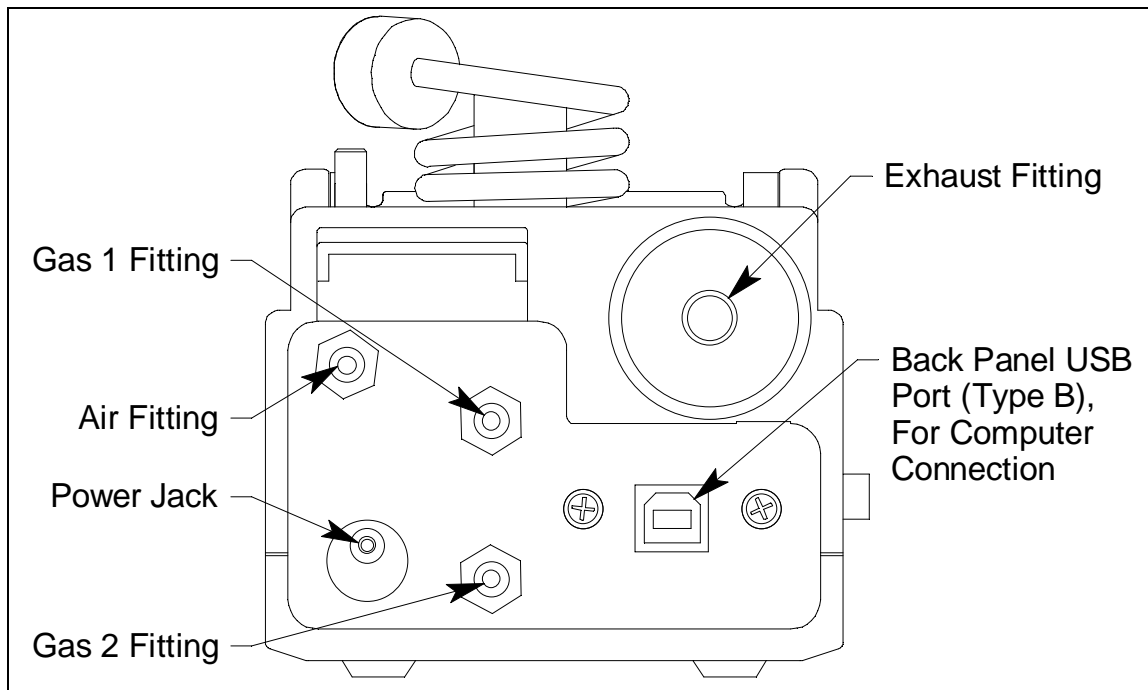


Figure 4: Back Panel

Power Jack

The power jack is located in the bottom left corner of the back panel. The plug on the end of the AC adapter cable mates to it.

Sample Fittings

Four sample fittings are located on the back of the SDM-2012. The AIR fitting is in the upper left corner and draws air into the SDM-2012. The two GAS fittings are in the center of the back panel and are used to connect the SDM-2012 to calibration gas cylinders. The GAS 1 fitting is above the GAS 2 fitting. All three fittings accept 3/16 inch ID tubing.

An exhaust fitting is located in the upper right corner. It allows routing of the exhausted calibration gas to a convenient location. This fitting accepts 5/16 inch ID tubing. Even though the exhaust gas can be routed to an area to be safely dispersed, the docking station should still be installed in a well ventilated area.

PC Connection

A type B USB connection is located beneath the exhaust fitting on the SDM-2012's back panel. It is used to connect the SDM-2012 to a PC.

Control Panel

The control panel is used to setup and operate the docking station in the Standalone configuration. It is located at the front of the docking station. It includes the control buttons, the control button LEDs, and the CHARGE status LED.

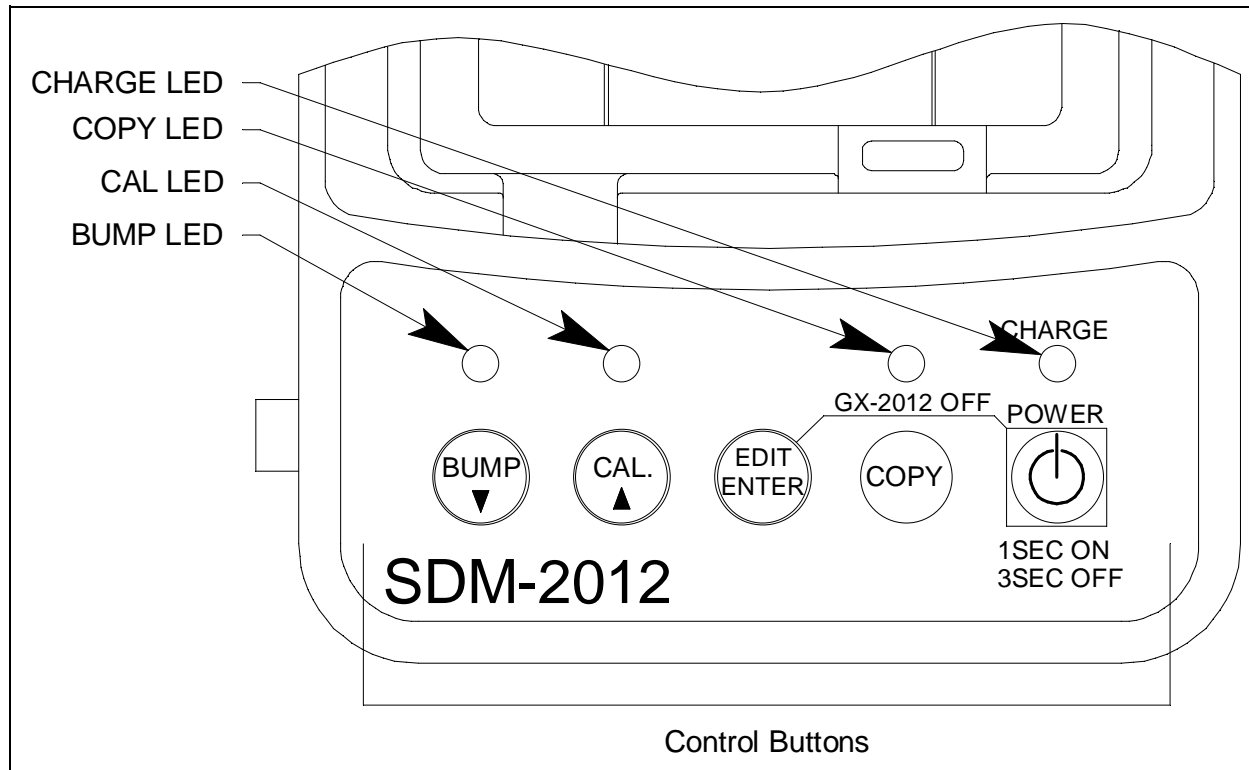


Figure 5: Control Panel

Five control buttons are located on the control panel. From left to right they are BUMP ▼ , CAL ▲ , EDIT ENTER, COPY, and POWER. The BUMP ▼ , CAL ▲ , EDIT ENTER, and COPY control buttons are not used in the PC Controlled configuration of the SDM-2012. The BUMP ▼ LED and CAL ▲ LEDs indicate the results of bump tests and calibrations, respectively. The COPY LED does not indicate anything in the PC Controlled configuration but will be on if the SDM-2012 was used in the Standalone configuration and calibration and bump test records are still stored in the SDM-2012's memory. The CHARGE LED is located above the POWER button and functions as a pilot LED, a system failure LED, and a charge indication LED.

The POWER button turns the SDM-2012 on and off.

Front Panel

A type A USB port is located on the front of the docking station. This port can be used to save calibration and bump test data to a USB flash drive. This USB port is for use only in the Standalone configuration of the SDM-2012 and is not used in the PC Controlled configuration.

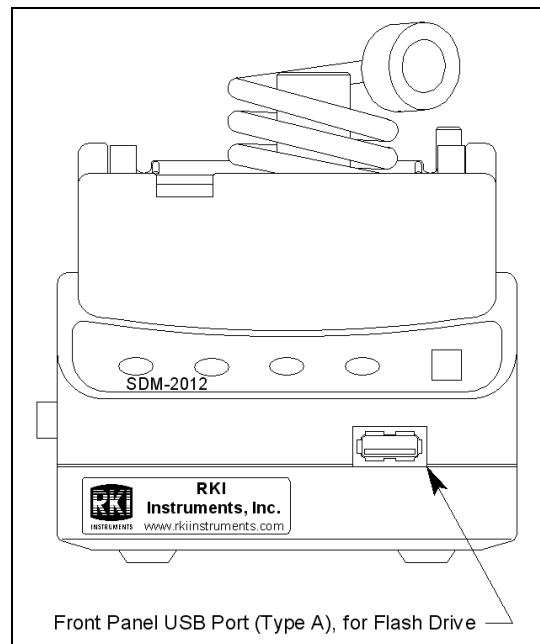


Figure 6: Front Panel

NOTE: The SDM-2012 does not support connection of a computer to the front USB port, only a USB flash drive.

Accessories

AC Adapter

Single-Port AC Adapter

The single-port AC adapter is a wall plug style adapter with a 5 foot cable. The end of the cable has a plug that connects to the power jack on the SDM-2012's back panel. The AC adapter is rated 100 - 240 VAC input, 12 VDC 1.2 A output.

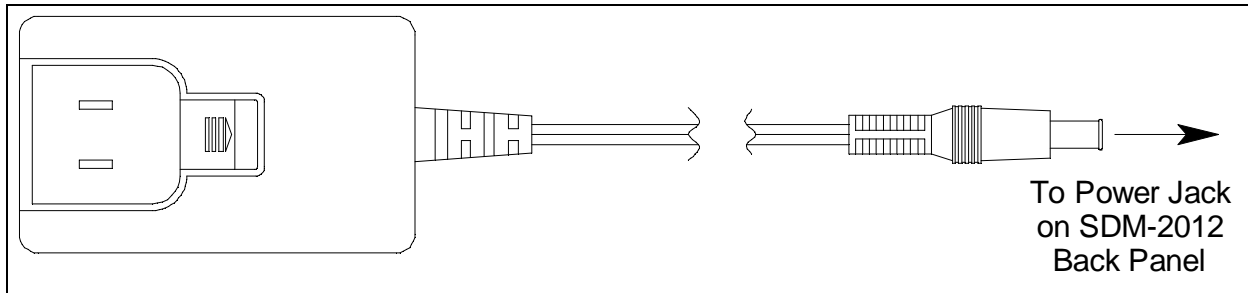


Figure 7: Single-Port AC Adapter

3-Port AC Adapter

The 3-port AC adapter is a wall plug style adapter with three 5-foot cables. The end of each cable has a plug that connects to the power jack on the SDM-2012's back panel. The AC adapter is rated 100 - 240 VAC input, 12 VDC 2.0 A output.

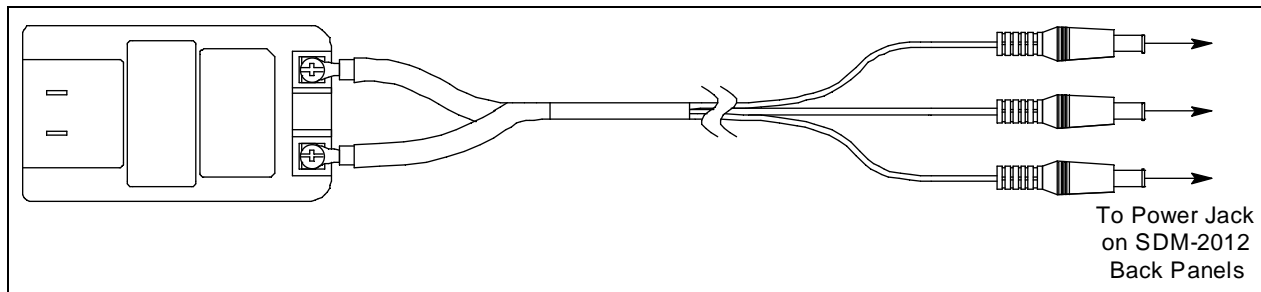


Figure 8: 3-Port AC Adapter

USB Cable

A Type A to Type B USB cable is provided with the docking station. It is used to connect the USB port on the back of the SDM-2012 to a computer.

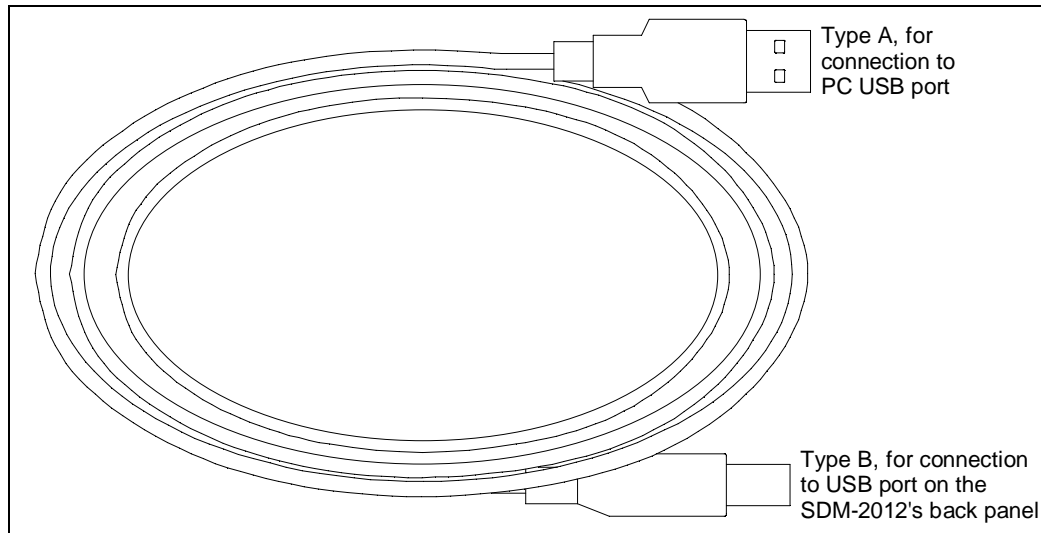


Figure 9: USB Cable

Air Filter, Sample Tubing, and Check Valve

A cylindrical particle filter with a short length of tubing is supplied with the SDM-2012 for installation to the AIR fitting on the back panel. The filter keeps particulate contamination out of the docking station.

Three types of sample tubes are included with the docking station. Two 3 foot lengths of 3/16 inch ID polyurethane tubing are provided to connect the regulator on a calibration cylinder to the GAS 1 and GAS 2 fittings on the back panel. One 10 foot length of 3/16 inch ID polyurethane tubing is provided for GAS 1 and GAS 2 manifold construction (if desired). In addition, a 10 foot length of 5/16 inch ID polyurethane tubing is provided for connection to the exhaust fitting on the back panel to allow routing of the exhaust to a location such as an open window where the exhaust can disperse.

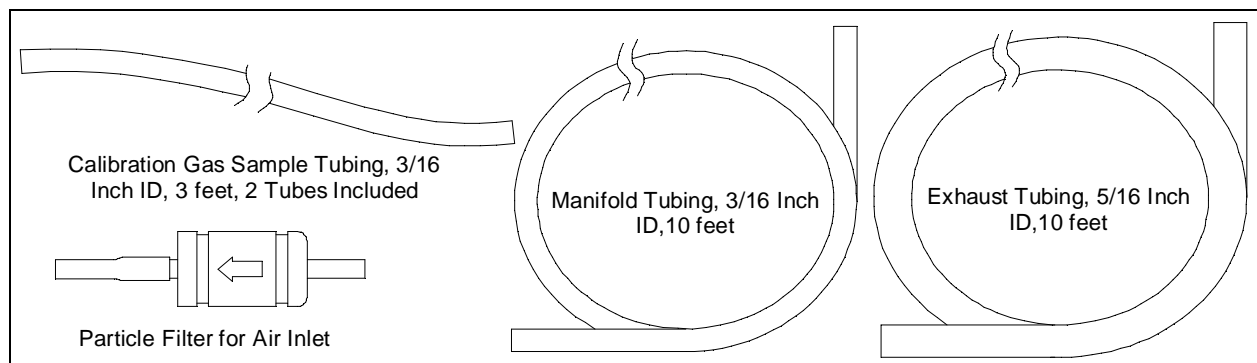


Figure 10: Air Filter & Sample Tubing

WARNING: Do not use an exhaust tube that is longer than 10 feet. The increased flow restriction caused by a longer tube may affect gas response and cause inaccurate calibration and bump test results.

A check valve is included with the SDM-2012. It is intended for use on the exhaust fitting when manifolding multiple docking stations together. See “Assembling a Manifold for Multiple SDM-2012 Units” on page 20 for manifolding instructions.

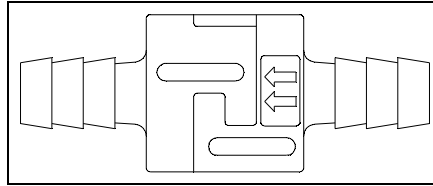


Figure 11: Check Valve

Three T-fittings are included with the SDM-2012. The larger fitting is for the exhaust tubing manifold construction. The two smaller fittings are for GAS 1 and GAS 2 tubing manifold construction.

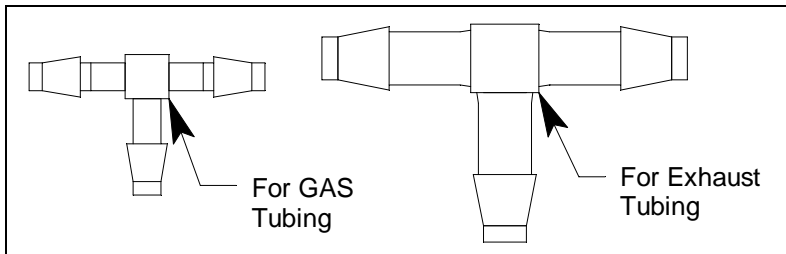


Figure 12: T-Fittings

Chapter 3: Mechanical Setup

USB Hub Requirements for Multiple Station Systems

If you have more docking stations than you have available USB ports, you will need a USB hub. RKI provides both a 4-port hub and a 7-port hub. If you have more than 7 docking stations, you will need to purchase one of each hub. Do not connect one hub to the other. Make sure that each USB hub has its own USB port on your computer. You may also purchase your own USB hub of any port number from your local electronics store but it must meet the following requirements:

- USB 2.0
- compatible with your Windows[®] operating system

If your USB hub has an AC adapter, it does not need to be plugged in for SDM-2012 operation.

Hardware Assembly

The hardware assembly consists of connecting the AC adapter(s), installing the air filter(s), installing the check valve(s), connecting the sample tubing and connecting the USB cable(s). The SDM-GX Docking Station PC Controller software can support 1-10 SDM-2012 docking stations connected at the same time. Perform the following steps to complete the hardware assembly for each SDM-2012:

1. Place the SDM-2012(s) on a convenient table top near an AC wall socket or power strip in a well ventilated area. A location near a window that can be opened is best so that the exhaust can be routed to the window.
2. If you have more than one SDM-2012, arrange them side by side as shown in Figure 13 below. Each docking station has three connection tabs on the left side near the bottom of the station and three connection recesses on the right side near the bottom of the station. The tabs from one docking station can be pushed into the recesses on another station to mechanically connect the docking stations.

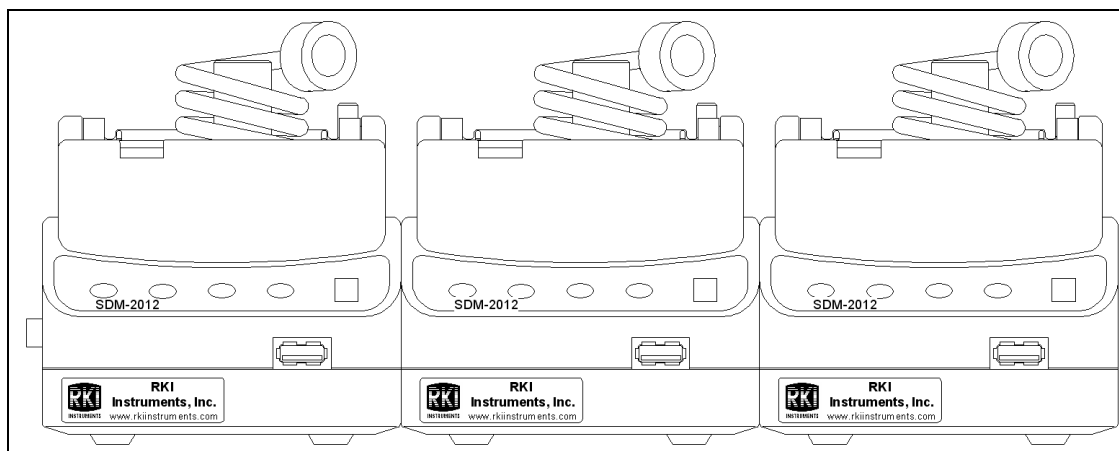


Figure 13: SDM-2012 Arrangement

3. Insert the round plug on the end of each AC adapter's cable into the power jack on the back of each SDM-2012.

NOTE: If you have multiple SDM-2012s and are using a 3-port AC adapter, plug each of the round plugs on the end of the AC adapter into the power jack on the back of 3 separate SDM-2012s.

4. Connect the AC adapter's wall plug into a wall AC socket or power strip.
5. Install the exhaust line, a clear 12 inch long tube with a black plastic push-on fitting, by pushing the open end of the exhaust tube onto the exhaust line connection fitting located in the upper left corner of the instrument panel. You may then push the black push on fitting of the exhaust line onto the exhaust line storage fitting on the other side of the instrument panel.

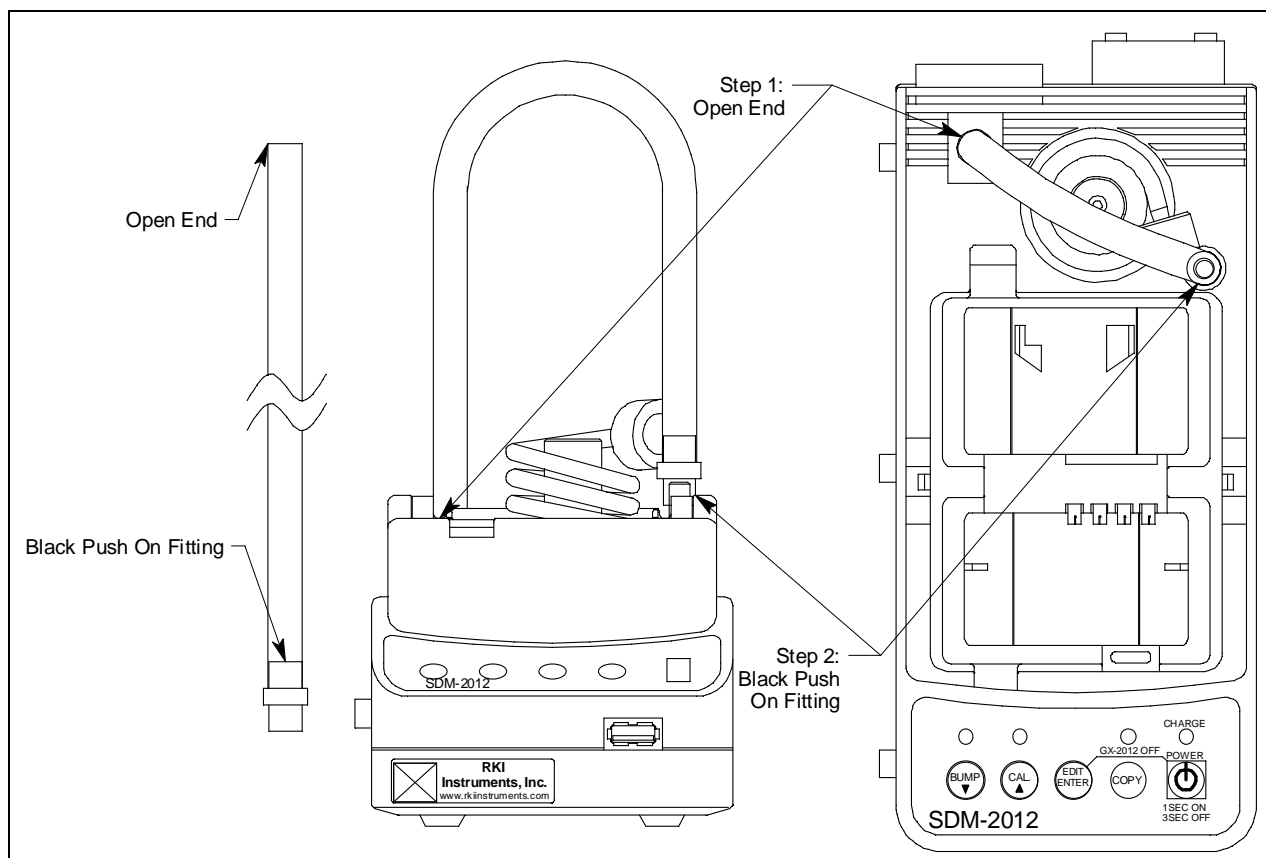


Figure 14: Installing the Exhaust Line

6. Install the air filter to the AIR fitting of each SDM-2012 so that the arrow on the filter that indicates direction of flow is pointing towards the AIR fitting. Push the open end of the flexible tube that is on one end of the filter onto the AIR fitting on the back of the SDM-2012.

7. Install the 10 foot long 5/16 inch ID flexible tube that is included with each SDM-2012 on the exhaust fitting of each SDM-2012. Route the tube to an area where the exhaust can be safely dispersed, such as an open window. Exhaust tubing from multiple units can be daisy chained together in a manifold for more convenient operation. In this case, the check valves that are provided with the docking stations need to be used. See Assembling a Manifold for Multiple SDM-2012 Units below for instructions.

CAUTION: *The maximum recommended length for the exhaust tube is 10 feet. Do not use more than 10 feet of tubing or tubing with an ID of less than 5/16 inch for the exhaust tube or the bump test and calibration accuracy will be adversely affected. The exhaust tube that is shipped with the SDM-2012 has an ID of 5/16 inch and is 10 feet long.*

8. Install the 3 foot long 3/16 inch ID tubes that are included with the SDM-2012 on the GAS 1 and GAS 2 fittings. GAS 1 and GAS 2 tubing from multiple units can be daisy chained together in a manifold for more convenient operation. See Assembling a Manifold for Multiple SDM-2012 Units below for instructions.
9. Connect the provided USB cord from the type B USB port on the back of the SDM-2012 to an available USB port on your computer or to a USB hub that is connected to your computer. See page 18 for more information about USB hubs.

Assembling a Manifold for Multiple SDM-2012 Units

Up to 10 SDM-2012s can be manifolded together and draw from one gas cylinder. If you only have GX-2012s with 1 - 4 of the standard 4 sensors (LEL, O₂, CO, and H₂S), you only need to create a manifold for the GAS 1 fitting. If you have any GX-2012s that have a %volume sensor in addition to 1 - 4 of the standard 4 sensors, you will need to create one manifold for the GAS 1 fitting and another manifold for the GAS 2 fitting. If you have a Gas Tracer of any configuration, you will need to create one manifold for the GAS 1 fitting and another manifold for the GAS 2 fitting. The exhaust lines can also be manifolded together and be routed away from the docking stations with only one 10 foot long 5/16 inch piece of tubing.

Each SDM-2012 is shipped with exhaust tubing, GAS 1 and GAS 2 tubing, T-fittings in two different sizes, and a check valve.

Exhaust Tubing

Reference Figure 15 for the instructions below.

1. Cut a 1-2" piece of 5/16 inch tubing for each SDM-2012 and connect it to each unit's exhaust fitting.
2. Connect the provided check valves to the short pieces of tubing already installed at the exhaust fittings. Be sure that the arrows that appear on the check valve are pointing **away** from the exhaust fitting.
3. Cut a 2-3" piece of 5/16 inch tubing for every SDM-2012 except the first one and connect it to the other end of the check valve.

4. Insert the larger T-fittings into the tubing so that the remaining two ports on the T-fitting are perpendicular to the exhaust tube and check valve.
5. For the first SDM-2012, cut a 9-10" piece of 5/16 inch tubing and connect it from the check valve on the first SDM-2012 to the closest port on the second SDM-2012's exhaust T-fitting.
6. Use one of the provided 10 foot lengths of tubing and connect it to the T-fitting on the last SDM-2012. The maximum recommended exhaust tube length is 10 feet.
7. For the remaining SDM-2012s, cut 6-7" pieces of 5/16 inch tubing and connect the remaining T-fittings.

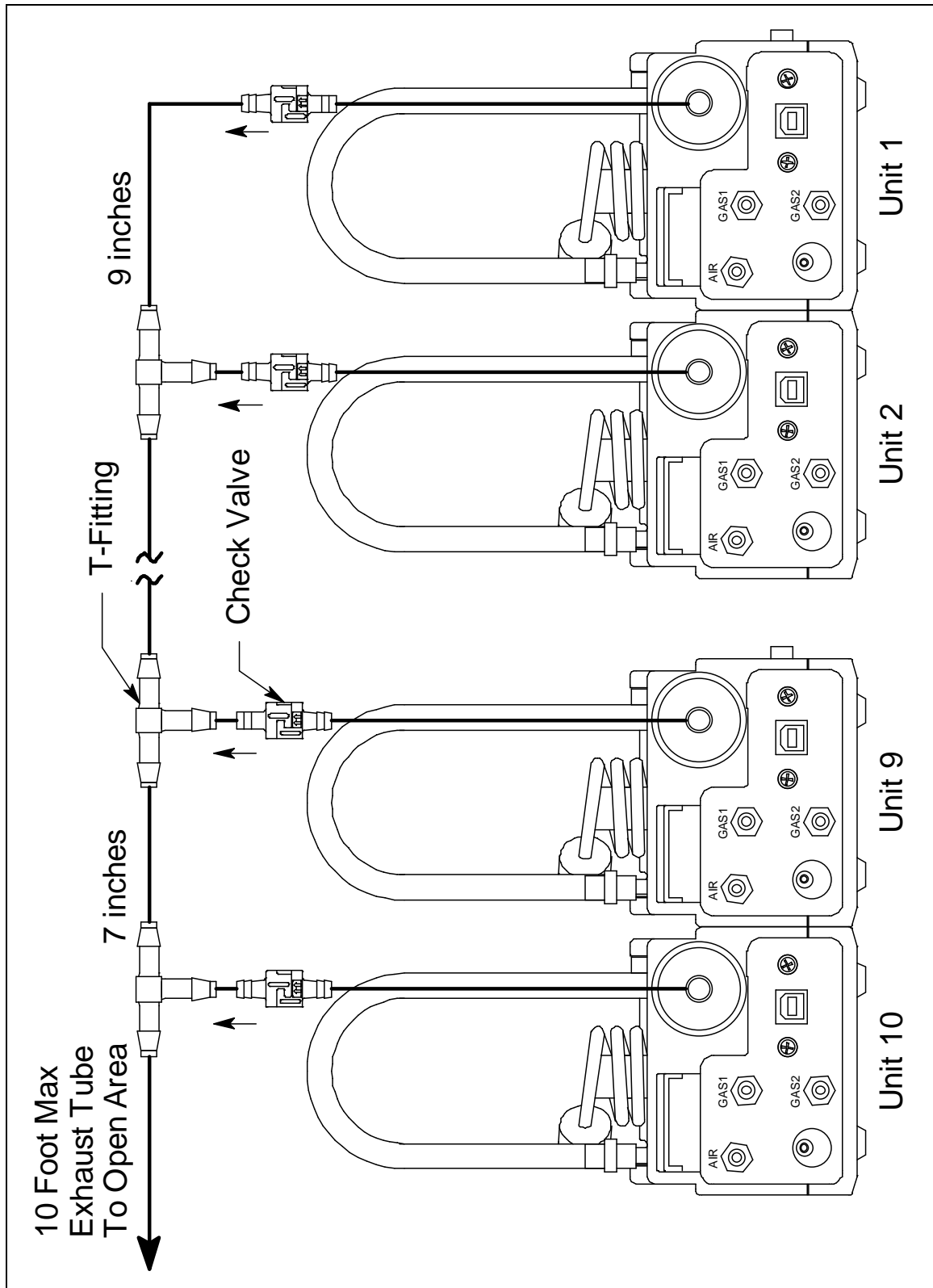


Figure 15: Exhaust Tubing Connections

GAS 1 and GAS 2 Tubing

NOTE: If you have only GX-2012s with 1 - 4 of the standard 4 sensors (LEL, O₂, CO, H₂S), you do not need to assemble a GAS 2 manifold. If you have GX-2012s with %volume sensors in addition to 1 - 4 of the standard 4 sensors or if you have Gas Tracers, a GAS 2 manifold **does** need to be assembled.

NOTE: If you are planning to bump test or calibrate GX-2012s and Gas Tracers at the same time, create one manifold for the SDM-2012s that will test the GX-2012s and a separate manifold for the SDM-2012s that will test the Gas Tracers. See page 184 for instructions to bump test or calibrate GX-2012s and Gas Tracers at once.

GX-2012 GAS 1, GX-2012 GAS 2, and Gas Tracer GAS 1 Tubing

Reference Figure 16 and Figure 17 for the instructions below.

1. Cut a 3-4 inch piece of 3/16 inch tubing for each GAS 1 and GAS 2 fitting on every SDM-2012 except the last one.
2. Connect the tubing to the GAS 1 and GAS 2 fittings on every SDM-2012 except the last one.
3. Insert the smaller T-fittings into the tubing so that the remaining two ports on the T-fitting are perpendicular to the GAS fitting.
4. Cut 6-7 inch pieces of 3/16 inch tubing and connect the T-fittings.
5. Cut two more 6-7 inch pieces of 3/16 inch tubing and connect the GAS 1 and GAS 2 fittings of the last SDM-2012 to the appropriate T-fittings from the second to last SDM-2012.
6. Cut 2 pieces of 3/16 inch tubing long enough for easy access to the calibration cylinders and connect them to the T-fittings on the first SDM-2012.

Gas Tracer GAS 2 Tubing

You must use a 24 inch humidifier during calibration of the ppm combustible gas sensor. There are 3 options for calibration:

- use one calibration cylinder, one demand flow regulator, and one 24 inch humidifier per SDM-2012
- have one calibration cylinder, one demand flow regulator, and one 24 inch humidifier and calibrate all Gas Tracers one at a time using one SDM-2012
- use one calibration cylinder, one demand flow regulator, and a manifold of up to ten, 24 inch humidifiers

If you choose to manifold the humidifiers together, complete the following manifold assembly instructions, and reference Figure 18.

NOTE: The following instructions can also be applied to the AIR fitting if you are using a zero air cylinder and a humidifier tube to perform an air adjustment.

1. Connect a 24 inch humidifier tube to the GAS 2 fitting on the back of each SDM-2012.
2. Insert the smaller T-fittings into the open end of every humidifier tube except the last one so that the remaining two ports on the T-fitting are perpendicular to the GAS fitting.
3. Connect the last humidifier tube directly to the last T-fitting.
4. Cut 6-7 inch pieces of 3/16 inch tubing and connect the remaining T-fittings.
5. Cut a piece of 3/16 inch tubing long enough for easy access to the calibration cylinders and connect them to the T-fitting on the first SDM-2012.



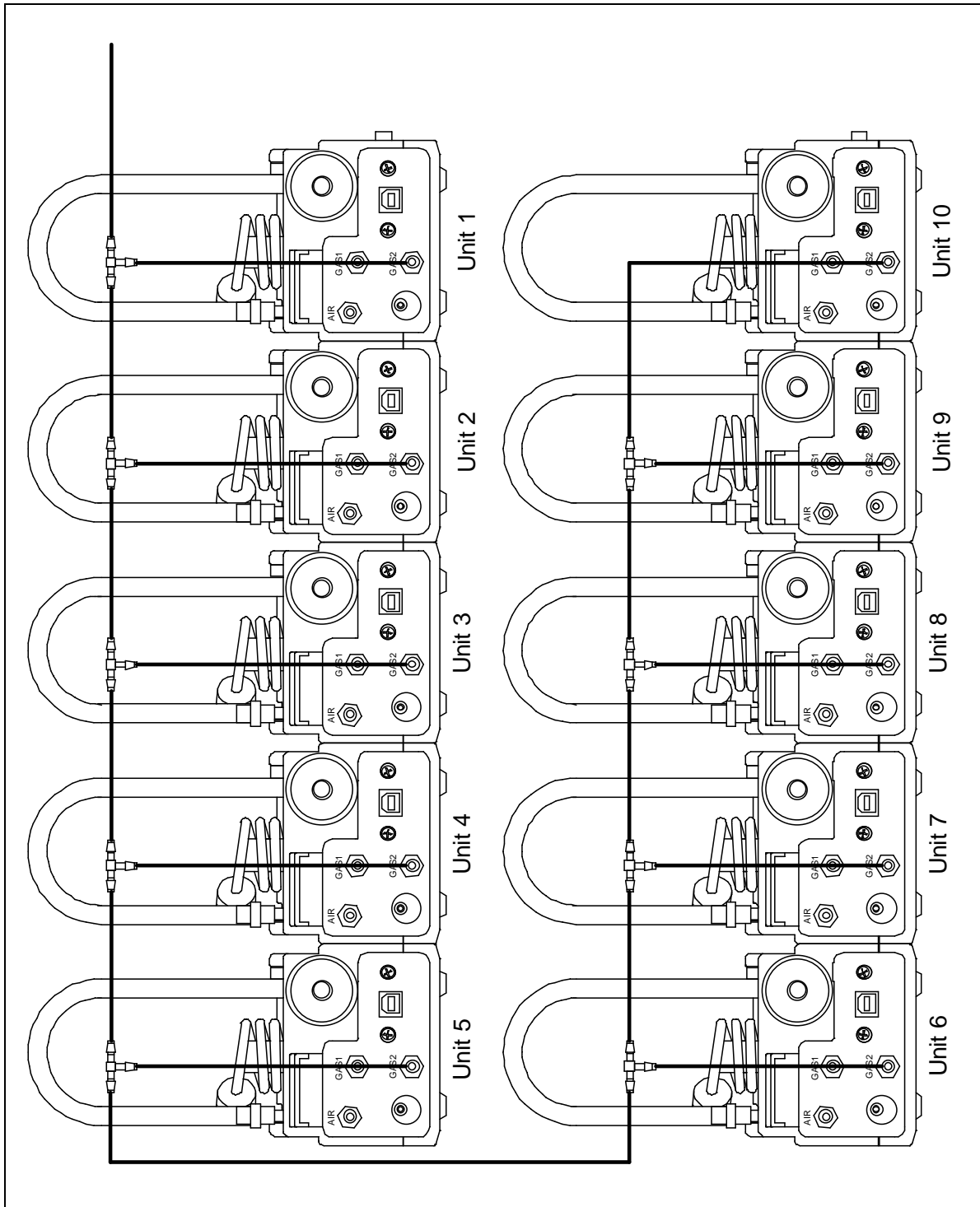


Figure 17: Gas 2 Manifold Connections

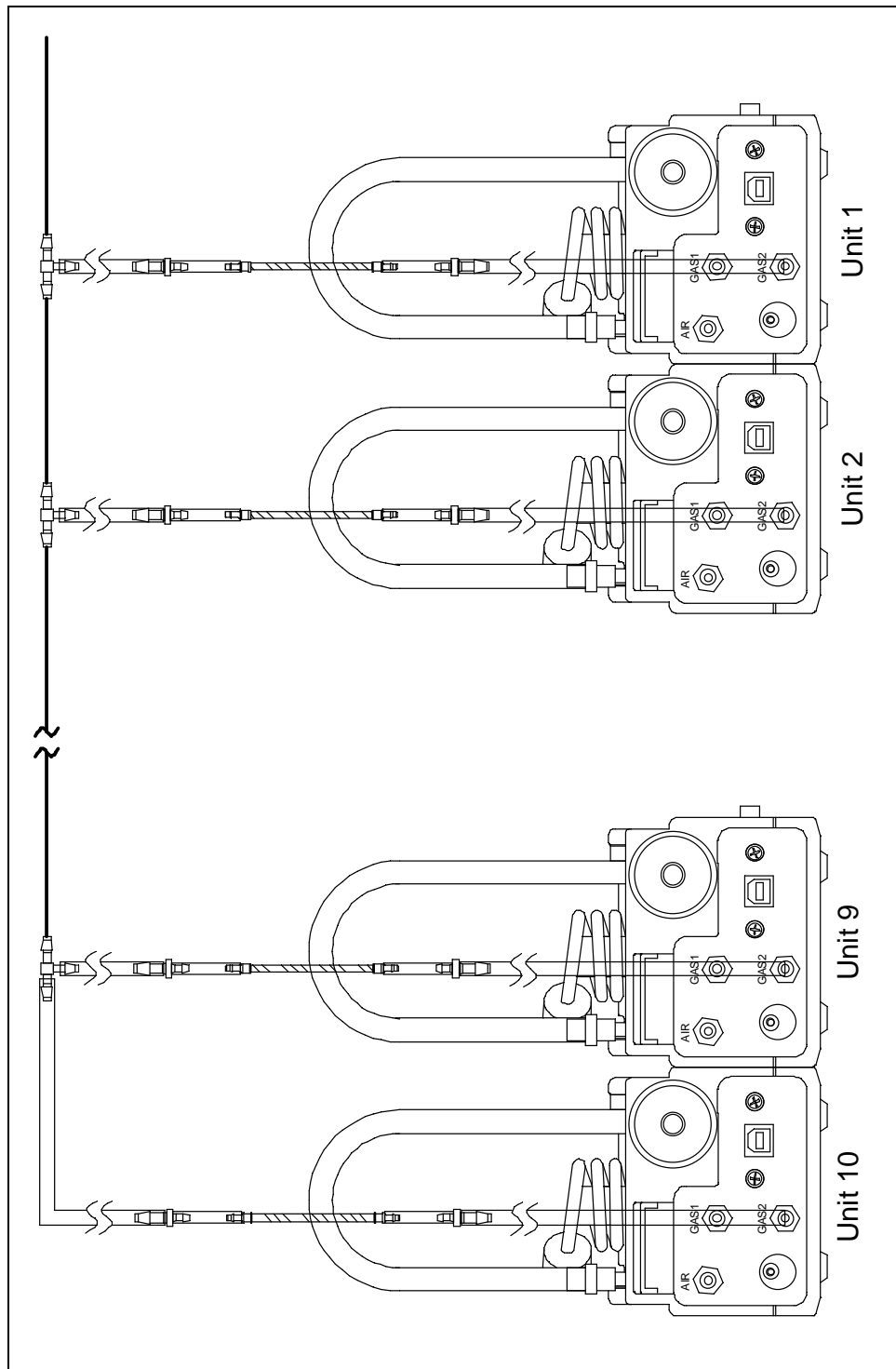


Figure 18: Gas Tracer Humidifier Manifold

Connecting Calibration Gas

The GAS 1 and GAS 2 fittings on the back of the docking station are designed to be used with a calibration gas cylinder that is fitted with a demand flow regulator. The AIR fitting may be used with a demand flow regulator and a cylinder of zero emissions air, but this is not normally necessary since the docking station will generally be in a fresh air area.

The type of calibration gas cylinder used depends on the gas sensors installed in the instrument being used with the calibration station. Typically a 4-gas mix will be used if the instrument being used with the calibration station is a 4-gas GX-2012. If a 5-sensor GX-2012 is being used, a 100% volume methane cylinder will also be needed.

If a Gas Tracer is being used, a 500 ppm methane cylinder and a 3-gas cylinder are needed. If a Gas Tracer with a %volume sensor is being used, a 500 ppm methane cylinder, a 3-gas cylinder, and a 100% volume methane cylinder are needed. The 500 ppm methane cylinder should be connected to the GAS 2 fitting first. The docking station will begin every bump test or calibration with the ppm sensor. The user will need to change the GAS 2 cylinder to the 100% volume methane cylinder (if %volume sensor installed) when prompted to do so by the PC Controller Program during bump testing and calibration.

Use Table 2 below as a guide in determining which and how many calibration gas cylinders are appropriate for your system.

NOTE: Do not use a 4-gas cylinder or any cylinder that includes H₂S when bump testing or calibrating a Gas Tracer. H₂S adversely affects the ppm combustible sensor.

Table 2: Recommended Gas Cylinders

Typical Instrument Types	Recommended Calibration Gas Cylinder(s)
LEL/Oxy/H ₂ S/CO (GX-2012)	4-gas mix with CH ₄ /Oxy/H ₂ S/CO
LEL/Oxy/CO (GX-2012)	3-gas mix with CH ₄ /Oxy/CO
LEL/Oxy/H ₂ S (GX-2012)	4-gas mix with CH ₄ /Oxy/H ₂ S/CO
%Vol CH ₄ /LEL CH ₄ /Oxy/H ₂ S/CO (GX-2012)	<ul style="list-style-type: none">• 4-gas mix with CH₄/Oxy/H₂S/CO• 100% Volume CH₄
%Vol CH ₄ /LEL CH ₄ /Oxy/CO (GX-2012)	<ul style="list-style-type: none">• 3-gas mix with CH₄/Oxy/CO• 100% Volume CH₄
ppm CH ₄ /LEL CH ₄ /Oxy/CO (Gas Tracer)	<ul style="list-style-type: none">• 3-gas mix with CH₄/Oxy/CO• 500 ppm CH₄
ppm CH ₄ /LEL CH ₄ /%vol CH ₄ /Oxy/CO (Gas Tracer)	<ul style="list-style-type: none">• 3-gas mix with CH₄/Oxy/CO• 500 ppm CH₄• 100% volume CH₄

To connect calibration gas to the SDM-2012, do the following:

1. If the area around the docking station is not considered a fresh air area (an area free of combustible and toxic gases and of normal oxygen content, 20.9%) install a tube not longer than 10 feet on the filter attached to the AIR fitting on the back of the docking station and route it to a fresh air area or connect a cylinder of zero air with a demand flow regulator to the AIR fitting.
2. Install the demand flow regulator on the calibration gas cylinder(s).
3. Connect the demand flow regulator to the GAS 1 or GAS 2 inlet fitting using the 3 foot length of 3/16 inch ID sample tubing provided with the docking station.

For a 3- or 4-gas mix, connect the regulator to the GAS 1 inlet.

For a special calibration cylinder (ppm or %volume), connect the regulator to the GAS 2 inlet.

NOTE: If you have set up a manifold for calibrating instruments, the regulators can be connected to tubing leading to the manifold inlet instead of connected directly to the GAS 1 or GAS 2 inlet fitting.

EAGLE 2 and GX Type Instrument Connection

There are 2 different versions of the Docking Station PC Controller program. The SDM-E2 Docking Station PC Controller program is intended for use with SDM-E2 docking stations and EAGLE 2 instruments. The SDM-GX Docking Station PC Controller program is intended for use with GX type docking stations and GX type instruments.

Bump tests and calibrations can be performed on multiple EAGLE 2s and GX type instruments at the same time. The SDM-E2 Docking Station PC Controller program controls the EAGLE 2 functions while the SDM-GX Docking Station PC Controller program controls the GX type instrument functions. Both programs can be used simultaneously on your PC. Follow all instructions in the SDM-E2 Docking Station PC Controlled Configuration Operator's Manual as well as the instructions in this manual.

Chapter 4: Computer Setup

Installing the SDM-GX Docking Station PC Controller Software

1. Launch Windows®.
2. Exit from all applications and open windows.
3. Go to www.rkiinstruments.com/sdm2012.
4. Click on the **Download** tab.
5. Click the **PC Controlled Software** link.
6. A .zip file will begin to download. Select whether you want to open or save the .zip file.
7. Extract the contents of the .zip file.
8. Double click the setup.exe file.
9. The SDM-GX Docking Station PC Controller InstallShield Wizard comes up to guide you through installation. Click **Next** to proceed to the License Agreement window.
10. Read the license agreement and click the agreement acceptance selection box, then click **Next** to proceed to the Customer Information window.
11. Enter a user name and organization and select if you want to install the program for all users on the computer or just for your user account, then click **Next** to proceed to the Destination Folder window.
12. The default installation folder (C:\Program Files\SDM-GX\) is displayed. If you want to install the software in the default folder continue with step 13. If you want to install the software in a different location, click **Change** and choose a new installation folder and then continue with step 13.
13. Click **Next** to proceed to the Ready to Install the Program window.
14. Review the installation settings. If they are OK, click **Install** and the installation process will begin. If you want to change installation settings, click **Back** and change them to the desired settings.
15. During software installation, the installation program may find newer versions of Windows files on your computer than those in the downloaded .zip file. If this happens, the installation software will ask you if you want to keep these newer files. Click **Yes** to do so.

16. A Device Driver Window will appear prompting you to install necessary drivers. You cannot continue the installation without installing the drivers.

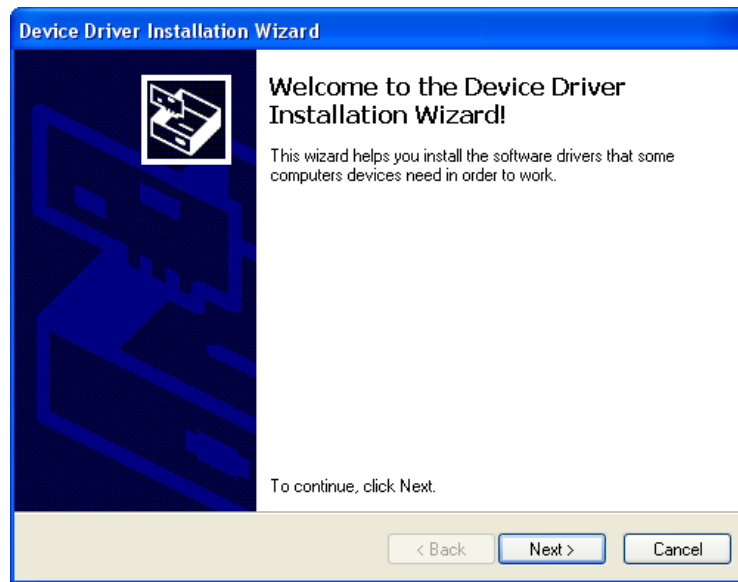


Figure 19: Device Driver Installation

17. Click **Next** to install the drivers. The Wizard will find the appropriate drivers.
18. If this is the first time you are installing a PC Controller Program, a window will appear saying that the file did not pass Windows logo testing. Click Continue Anyway.



19. Click **Finish** once the drivers are successfully installed.

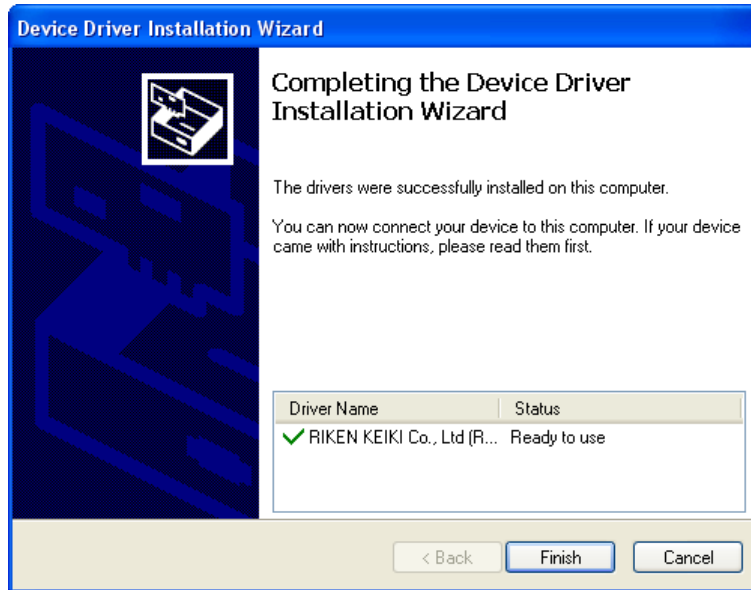


Figure 20: Finish Device Driver Installation

The installation will continue.

20. Follow the on-screen instructions to complete software installation.

21. To complete the driver installation, ensure that all of your docking stations are connected to your computer.

22. Turn on a docking station by pressing and holding the POWER button for at least 1 second.

23. The first time an SDM-2012 is turned on after being connected to the computer, a Found New Hardware window will appear.

NOTE: The following instructions apply only to computers running Windows XP. If you have a newer operating system, the hardware driver will automatically install and you will be notified that the USB device is ready for use.

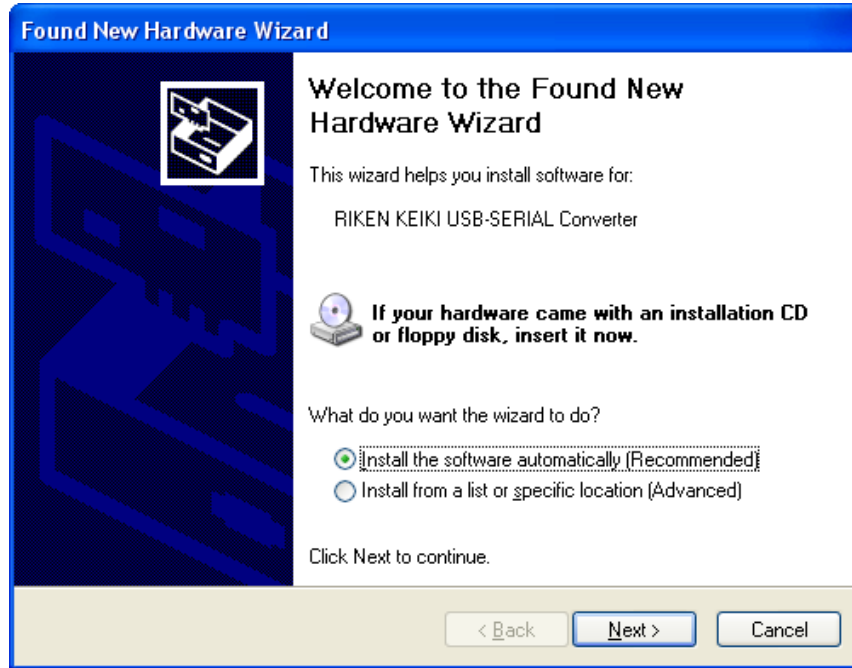


Figure 21: Found New Hardware Wizard

24. Select the “Install the software automatically” option and click **Next**.
25. The wizard will search for the driver files.

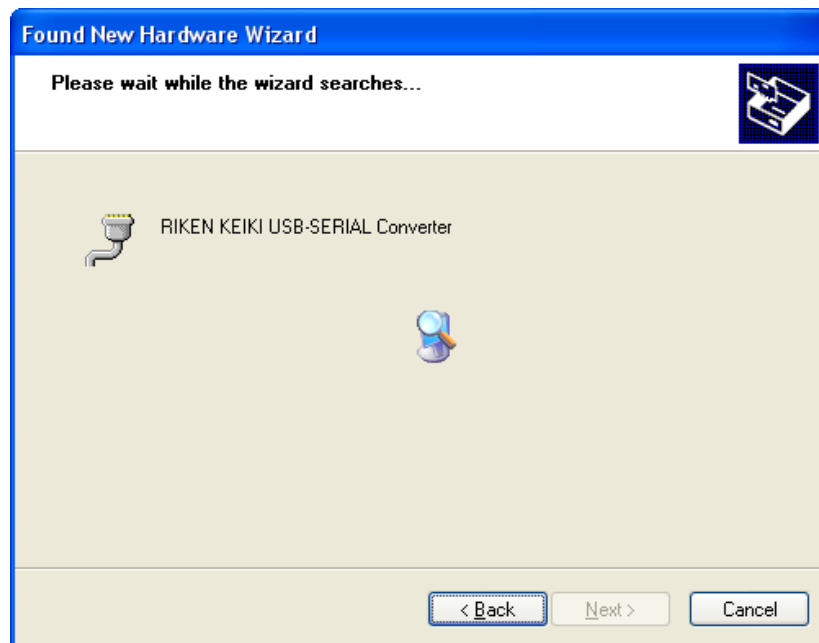


Figure 22: Searching

26. Once the files have been found, a window will appear saying that the file did not pass Windows logo testing. Click Continue Anyway.



Figure 23: Windows Logo Error

27. The installation will continue. Click Finish when the installation has completed.
28. Repeat steps 22 through 27 for every docking station in your system.

Launching the SDM-GX Docking Station PC Controller Program

1. Click **Start** on the Windows Icon Tray, then select **Programs/SDM-GX Docking Station PC Controller**. You may also double click the shortcut created on your desktop. The SDM-GX Docking Station PC Controller Program is launched and the main program window appears.

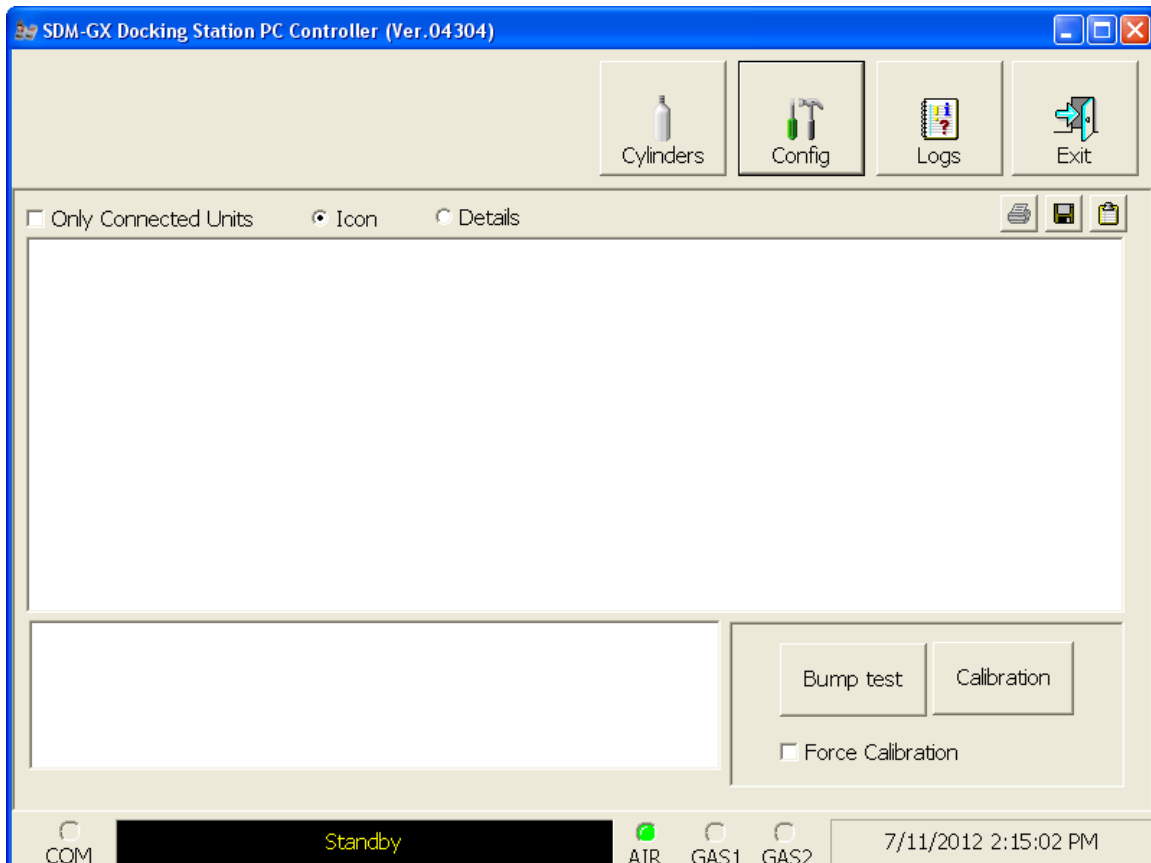


Figure 24: Main Program Window

2. If you are starting the software for the first time, a message window appears informing you that a database has been created. Click **OK** in that window.

Setting Parameters in the Configuration Window

Once the program is installed, you must set up the program for your system. Setting up the PC Controller Program consists of the following tasks:

- setting up the parameter configuration
- setting up the SDM-2012 display order
- defining which calibration gas cylinders will be used

Parameter Tab

1. Launch the program as described on page 35.

NOTE: It is not necessary to turn on the SDM-2012 docking stations if you are only performing configuration setup.

2. The configuration parameters are located in the Configuration Window of the SDM-GX Docking Station PC Controller program. To access the Configuration Window, click the Config button along the top of the main program window.



3. You will be prompted to enter a password. The factory-set, case-sensitive password is ABCDE. Enter the password and click OK. See page 43 for instructions to change the password.
4. The Parameter Tab of the Configuration Window will be displayed.

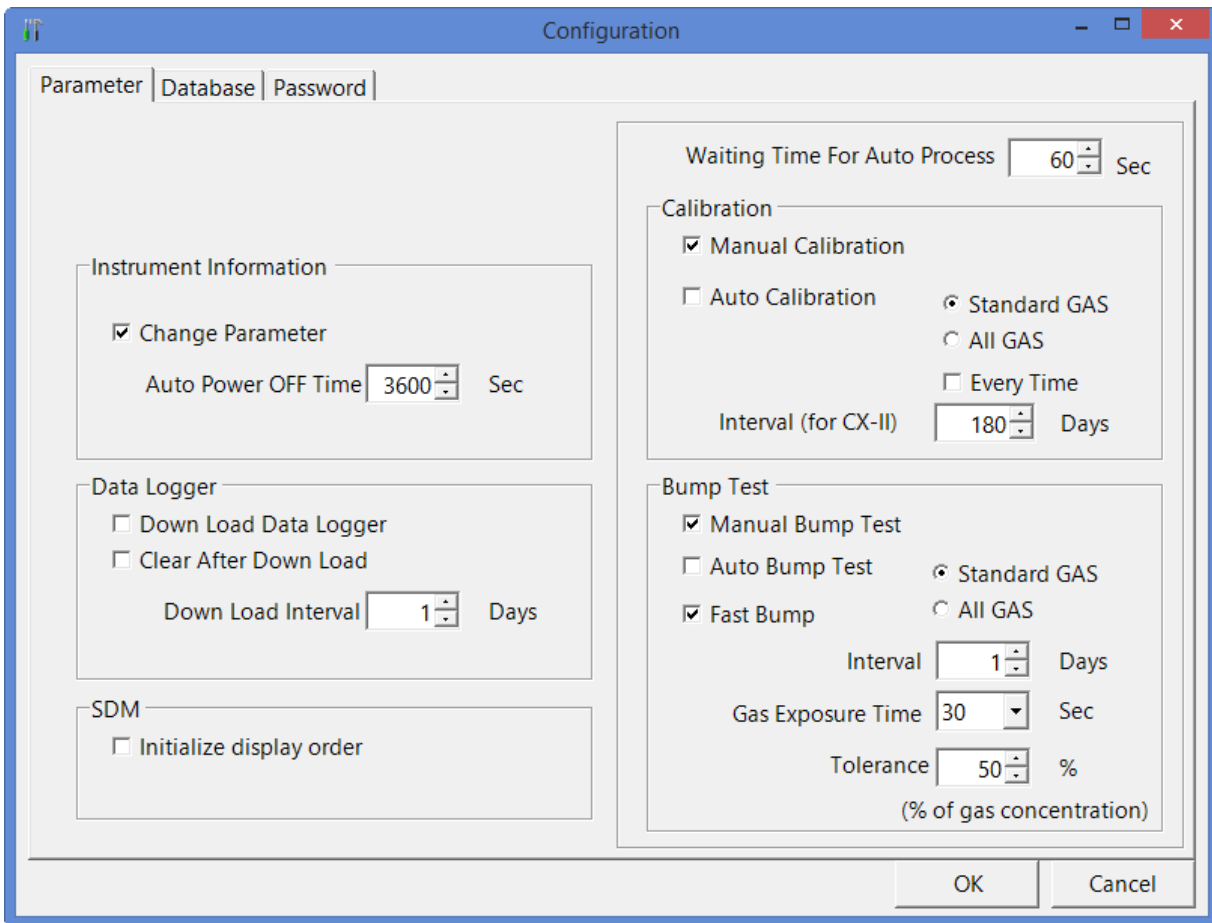


Figure 25: Config Window Parameter Tab

Instrument Information Section

- **Change Parameter**

Selected (factory setting): The Edit function is active in the Instrument Function Menu allowing you to change various parameters in connected instruments. See page 164 for a complete description of the Edit function.

Deselected: The Edit function is not active.

- **Auto Power OFF Time**

This is the length of time that will pass after the last operation is finished before the program will automatically shut off the instrument. If a successful bump test or calibration is performed, the program will automatically shut off the instrument in 20 seconds regardless of the Auto Power OFF Time setting. It is defined in seconds with a maximum setting of 3600 seconds (1 hour). The factory setting is 3600 seconds.

Data Logger Section

- **Down Load Data Logger**

Selected: The PC Program will automatically download logged data from connected instruments based on the frequency set in Down Load Interval.

Deselected (factory setting): Logged data is not automatically downloaded from connected instruments.

- **Clear After Down Load**

If Down Load Data Logger is not selected, selecting Clear After Down Load has no effect.

Selected: The PC Program automatically clears an instrument's logged data at the end of an automatic data download.

Deselected (factory setting): The instrument's logged data is not automatically cleared.

- **Down Load Interval**

The Down Load Interval is the length of time, in days, that will pass before the PC Controller program will automatically download data from an instrument if Down Load Data Logger is selected. If the instrument is connected to the program before the interval has passed, a data download will not automatically occur. The Down Load Interval can be set anywhere from 1 to 60 days. The factory setting is 1 day.

SDM Selection Section

If you select the Initialize Display Order selection box, the PC Controller program will reset the numbers it has assigned to specific docking stations and reassign them as you turn SDM-2012 docking stations on and connect them to the program. See page 44 for instructions to use this feature.

Waiting Time for Auto Process

The Waiting Time for Auto Process parameter defines the time delay of an automatic calibration or automatic bump test after an instrument is connected to the SDM-2012. You can set the delay from 0 seconds to 3600 seconds.

Calibration Section

If neither **Manual Calibration** nor **Auto Calibration** is selected, you will not be able to perform a calibration. Select the box for the desired operation.

- **Manual Calibration**

Selected (factory setting): A manual calibration can be performed by selecting an instrument or instruments in the main program window and clicking **Calibration** in the lower right corner of the window.

Deselected: A manual calibration cannot be performed.

- **Auto Calibration**

Auto Calibration selected and **Every Time** deselected (factory setting): An automatic calibration is performed only if the instrument is due for calibration. Only instruments with one or more of the standard 4 sensors and 1 special sensor can be fully calibrated using Auto Calibration. If you have a Gas Tracer with a %volume combustible gas sensor installed, only the standard 3 sensors (catalytic LEL, O₂, and CO) will be calibrated. You must perform a manual calibration in order to perform a complete calibration that includes the ppm combustible sensor and the %volume sensor.

Auto Calibration selected and **Every Time** selected: An automatic calibration is performed every time an instrument is connected to the PC program regardless of whether a calibration is due or not. Only instruments with one or more of the standard 4 sensors and 1 special sensor can be fully calibrated using Auto Calibration. If you have a Gas Tracer with a %volume combustible gas sensor installed, only the standard 3 sensors (catalytic LEL, O₂, and CO) will be calibrated. You must perform a manual calibration in order to perform a complete calibration that includes the ppm combustible sensor and the %volume sensor.

Auto Calibration deselected (factory setting): A calibration is not automatically performed.

- **Standard GAS/All GAS**

Standard GAS (factory setting): Only the standard sensors (catalytic LEL, O₂, CO, and H₂S [GX-2012 only]) will be calibrated during an automatic calibration.

All GAS: All installed sensors will be calibrated during an automatic calibration for every instrument configuration except for a Gas Tracer with a %volume sensor installed. Only the standard 3 sensors (catalytic LEL, O₂, and CO) will be calibrated in a Gas Tracer with a %volume sensor installed.

- **Interval (for CX-II)**

The Interval (for CX-II) parameter sets the calibration interval but is only used for CX-II instruments. It does not have any effect on the SDM-GX program when used with GX-2012 or Gas Tracer instruments.

Bump Test Section

If neither **Manual Bump Test** nor **Auto Bump Test** is selected, you will not be able to perform a bump test. Select the box for the desired operation.

- **Manual Bump Test**

Selected (factory setting): A manual bump test can be performed by selecting an instrument or instruments in the main program window and clicking **Bump Test** in the lower right corner of the window.

Deselected: A manual bump test cannot be performed.

- **Auto Bump Test**

Selected: An automatic bump test is performed only if the instrument is due for bump testing. Only instruments with one or more of the standard 4 sensors and 1 special sensor can be fully bump tested using Auto Bump Test. If you have a Gas Tracer with a %volume combustible sensor installed, only the standard 3 sensors (catalytic LEL, O₂, and CO) will be bump tested. You must perform a manual bump test in order to perform a complete bump test that includes the ppm combustible sensor and the %volume sensor.

NOTE: If the instrument's Bump Test Function is set to On, the instrument's information is used to determine if a bump test is needed.

If the instrument's Bump Test Function is set to Off, the SDM-GX PC Program's Bump Test Interval parameter and last successful bump test date are used to determine if a bump test is needed. If a bump test has never been done using the SDM-GX Program, an auto bump will be initiated.

Deselected (factory setting): A bump test is not automatically performed.

- **Standard GAS/All GAS**

Standard GAS (factory setting): Only the standard sensors (catalytic LEL, O₂, CO, and H₂S [GX-2012 only]) will be bump tested during an automatic bump test.

All GAS: All installed sensors will be bump tested during an automatic bump test for every instrument configuration except for a Gas Tracer with a %volume sensor installed. Only the standard 3 sensors (catalytic LEL, O₂, and CO) will be bump tested in a Gas Tracer with a %volume sensor installed.

- **Fast Bump**

Deselected: The gas application during a bump test will continue for the time period defined by the Gas Exposure Time bump test parameter regardless of the sensor reading(s).

Selected (factory setting): If the gas reading for the sensor(s) being tested is above the lower tolerance and below the upper tolerance within 10 seconds, the sensor(s) pass bump testing, the gas application will be stopped, and the test will move on to the next sensor(s) or to the fresh air purge. If the gas reading on any of the tested channels is below the lower tolerance or above the upper tolerance within 10 seconds, the gas application will continue for the time period defined by the Gas Exposure Time bump test parameter, and the pass/fail status of the sensor(s) will be determined at that point. Turning Fast Bump on allows calibration gas to be saved when the tested sensors respond quickly and accurately.

Consider the following scenario as an example:

- 50% LEL methane used for bump testing the combustible gas channel
- **GAS** bump test parameter set to 20 seconds
- **Tolerance** set to $\pm 50\%$ LEL, which means that the acceptable reading range is 25% LEL - 75% LEL
- **Fast** selected

The table below shows possible readings at 10 seconds and the effect on the gas application.

Table 3: Example Fast Bump Scenarios

Gas Reading 10 Seconds Into Fast Bump	Outcome
15% LEL (-70% of 50% LEL)	<ul style="list-style-type: none"> • Gas application continues for the full 20 seconds • Pass/fail determined at end of 20 seconds
30% LEL (-40% of 50% LEL)	<ul style="list-style-type: none"> • Gas application stops • Sensor passes bump testing
60% LEL (+20% of 50% LEL)	<ul style="list-style-type: none"> • Gas application stops • Sensor passes bump testing
80% LEL (+60% of 50% LEL)	<ul style="list-style-type: none"> • Gas application continues for the full 20 seconds • Pass/fail determined at end of 20 seconds

- **Interval**

The Interval can be set anywhere between 1 and 30 days and is the length of time that can pass before the program will prompt you to perform a bump test. The factory setting is 30 days.

This parameter only affects the operation of the SDM-GX PC Program when used with GX-2012s and Gas Tracers whose Bump Test Function is set to Off. If the GX-2012 or Gas Tracer's Bump Test Function is set to On, the instrument's bump test interval is used to determine if a bump test is due.

- **Gas Exposure Time**

The Gas Exposure Time can be set to 30 (factory setting), 45, 60, 90, 120 seconds or Auto and is the length of time that gas is applied to the instrument. If you select Auto, the PC Controller program will apply gas for the appropriate amount of time based on your instrument sensor configurations.

- **Tolerance**

The Tolerance can be set between 10% and 50%. The factory setting is 50%. It determines how close the instrument gas reading must be to the calibration gas concentration for each channel during a bump test in order to pass the bump test. It is defined as a percentage of the calibration gas concentration. The amount that the instrument gas reading differs from the calibration gas concentration must be equal to or less than this percentage of the calibration gas concentration. For example, if the tolerance is set to 50%, and the %LEL calibration gas concentration is 50% LEL, then the bump test gas reading for the LEL channel on the instrument must be $50\% \text{ LEL} \pm 25\% \text{ LEL}$.

Database Tab

The Database Tab allows you to view or change where the data from your SDM-2012 docking stations is saved. It also allows you to create a brand new database, import data from another database, or export saved data.

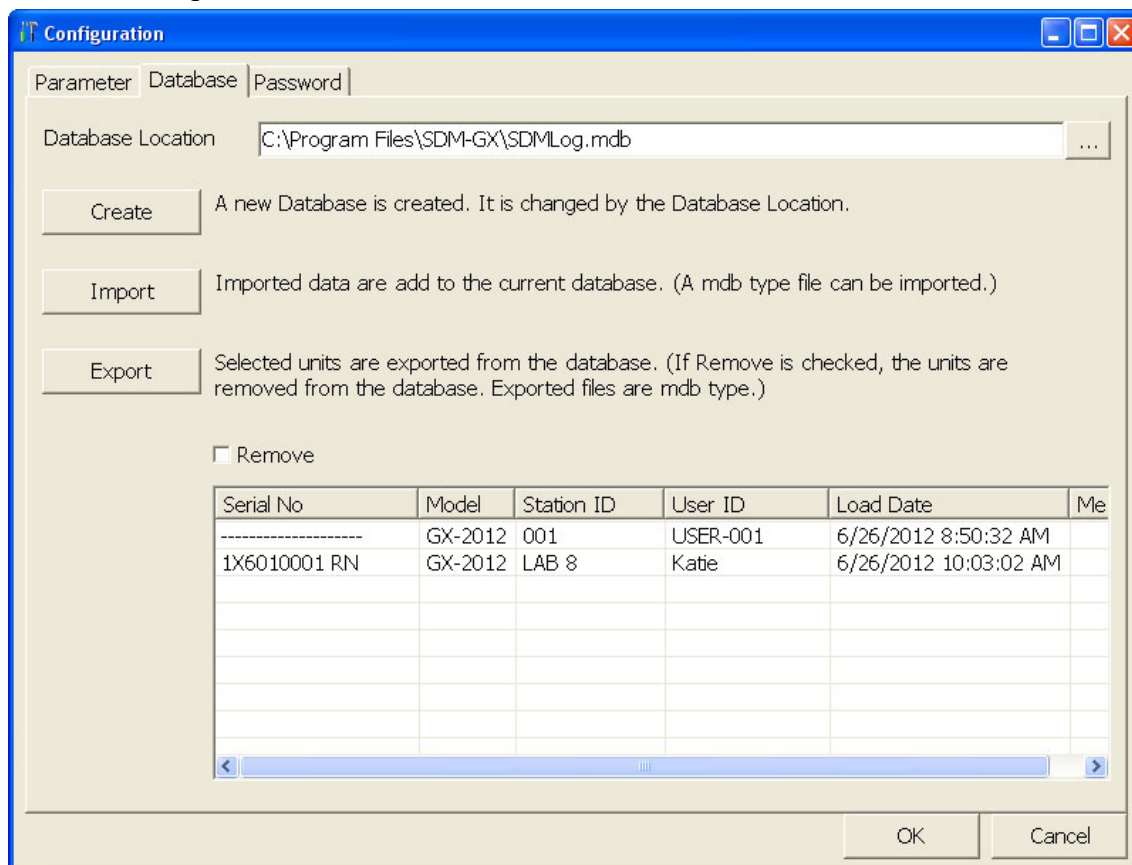


Figure 26: Config Window Database Tab

Changing the Database Location

1. Click the button to the right of the current location that has three dots on it.
2. Choose a new location where a database exists and click Open. The new database location will be displayed in the Data Location field.
3. A window will appear telling you to restart the PC Controller Program. Click OK.
4. Click OK in the Database Tab.
5. Click the Exit control button in the upper right corner of the main program window.
6. Reopen the PC Controller Program.

Creating a New Database

1. Click the Create button located along the left side of the Database Tab window.
2. Choose where you would like the new database to be stored and enter a name for it and click Save. The new database will be created but data will not be stored there until you change the file path as described above.

Importing a .mdb file into the Current Database

1. Click the Import button located along the left side of the Database Tab window.
2. Select an existing .mdb file that you wish to import. You can import a .mdb file that was created on another computer and moved to your computer, you can select a file that was generated on your computer using the Create button, or you can navigate to another network computer's .mdb file. If you navigate to another computer's files, the location for the default .mdb file is in the Program Files folder (ie. MannyPC:\Program Files\SDM-GX). It is named SDMLog.mdb. If you wish to import a different .mdb file, it will have a different name and may be in a different location.
3. Once you have selected a .mdb file, click Open. The program will indicate that the file is being imported. Once the import is finished, the data from the .mdb file will be added to your current data. New serial numbers/station IDs/user IDs will appear in the Data frame of the Logs Window. Instrument information associated with those new instruments will also be available in the Logs Window.

Exporting Data for to a .mdb File

1. Select the desired units from the list on the bottom of the Database Tab.
2. Click Export. Select where you would like to save the file, and click Save. The program will indicate that it is exporting the data and will confirm that it has finished. Click OK in the window that comes up.

If you want to remove a unit's information after it's been exported, select Remove before selecting Export. You cannot remove a unit's information while it's connected to the computer so be sure to turn off the instrument before removing data.

Password Tab

The password Tab allows you to change the Configuration Window password to something other than the factory set ABCDE. It can be up to 12 characters long and contain any letter, number, or symbol. It is case sensitive.

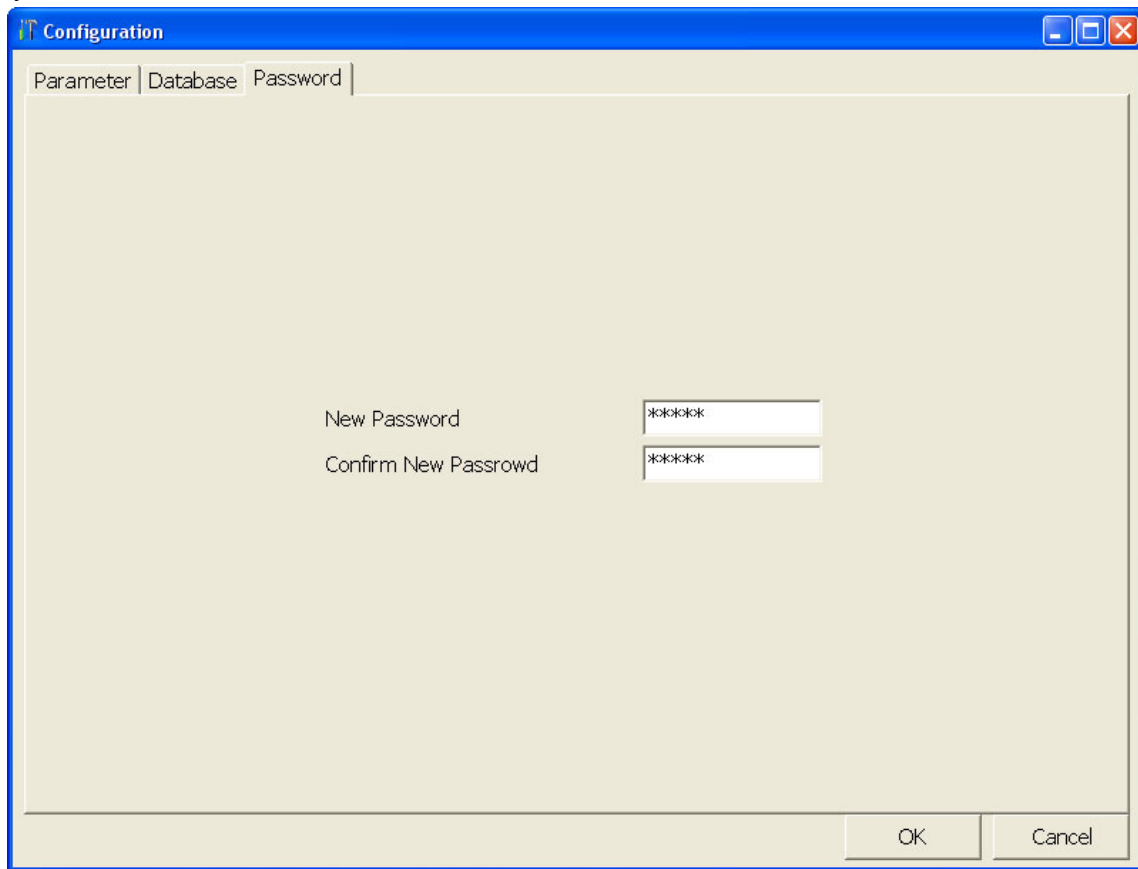
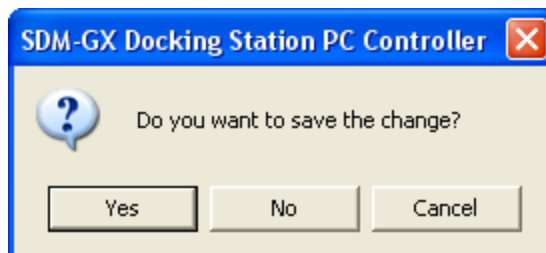


Figure 27: Config Window Password Tab

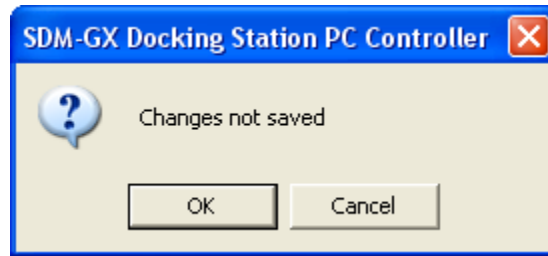
To change the password:

1. Enter the new password in the top box and confirm it in the bottom. Click OK. A window will pop up asking you to confirm the change.



- To confirm, click Yes.
- To exit out of Configuration Window without saving the changes, click No.
- To stay in the Password Tab and enter a new password, click Cancel.

2. To cancel any changes you have made at any time, click Cancel in the main Password Tab. The program will tell you that changes will not be saved. To continue to exit, click OK. To return to the Password Tab, click Cancel.



Setting Up the SDM-2012 Display Order

Setting up the display order for your SDM-2012s ensures that the docking stations will appear in the PC Controller program in the same order that they are laid out in your calibration area.

Before performing this operation, make sure your SDM-2012s are arranged on the table top or other surface as desired and that they are connected to the computer. See page 18. Also be sure that you have performed the driver installations as described on page 30.

1. Click the Config button along the top of the screen to access the Configuration Window.



2. You will be prompted to enter a password. The factory-set, case-sensitive password is ABCDE. Enter the password and click OK. See page 43 for instructions to change the password.

3. The Parameter Tab of the Configuration Window will be displayed.

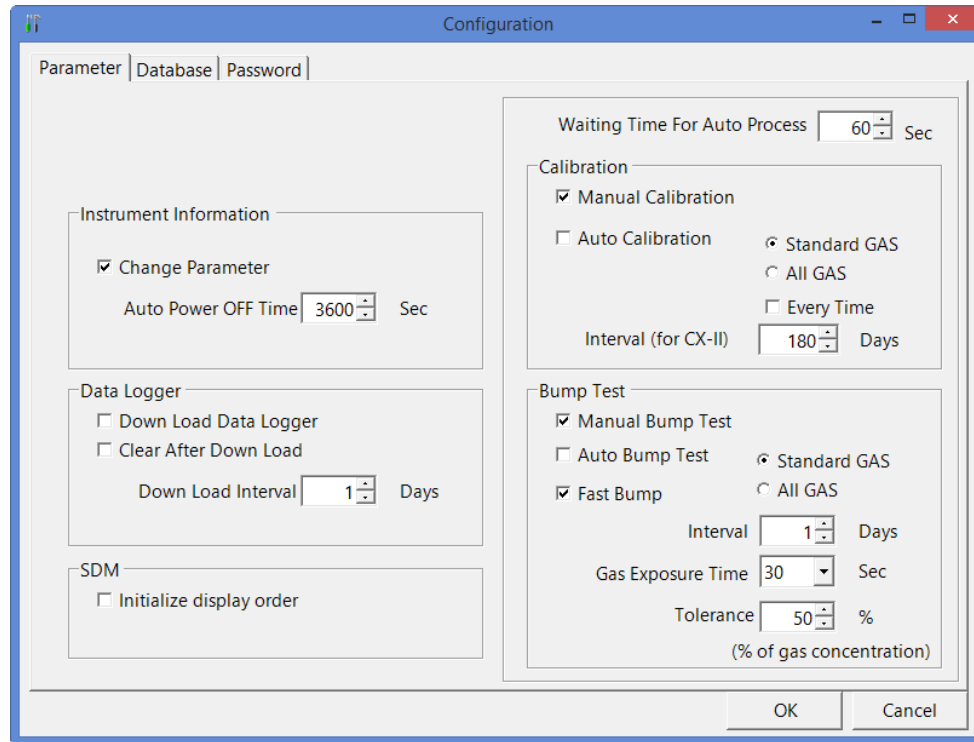


Figure 28: Config Window Parameter Tab

4. Click the box next to Initialize Display Order in the SDM portion of the Parameter tab.
5. Click OK.
6. The program will ask if you want to save the changes. Click Yes.
7. A window will appear informing you that you need to turn off all SDMs and restart the program. Click OK.
8. Click the Exit button in the upper right corner of the main program window to exit the program.
9. Turn off all of the SDM-2012s if they are on.
10. Open the SDM-GX Docking Station PC Controller program again.
11. Turn on your SDM-2012s in the order that you wish for them to appear on the main program window. Typically the order in which the docking stations appear on the screen corresponds to their left to right arrangement on the tabletop.
12. Your SDM-2012 docking stations should all appear on the screen in numerical order. The program will remember each SDM-2012's number. If fewer than all of the docking stations are turned on, the stations will still appear in numerical order on the Main Program Window, but the stations which are off will not be shown.
13. If you need to reorder the docking stations, repeat steps 1 through 12.

Cylinders Window

The Cylinders Window allows you to keep track of cylinders that are in use and the expiration date for those cylinders. If a cylinder's expiration date has passed, the PC Controller program will alert you in the message area of the main program window as soon as the program is started. The Cylinders window comes with a list of predefined cylinders that are fairly common. If a cylinder that you need to use is not on this list, it can be added at the bottom of the cylinder list. You may add as many custom cylinders as necessary.

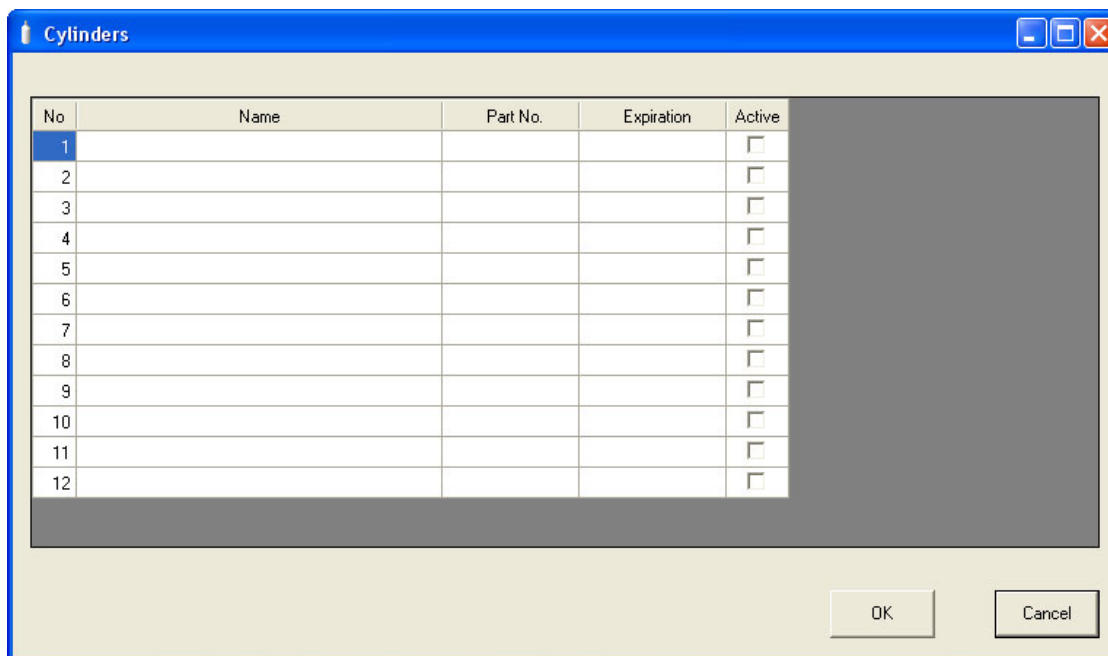


Figure 29: Cylinders Window

The Cylinders window has the cylinder list number, the cylinder name, the part number, the expiration date, and the status of the cylinder.

Selecting a Cylinder from the Predefined List

The Cylinders Window comes with several predefined cylinders that you can choose from.

1. To access the Cylinders Window, click the Cylinders button along the top of the main program window.



- Click in a Name field, click on the drop down menu that appears, and select a predefined cylinder.

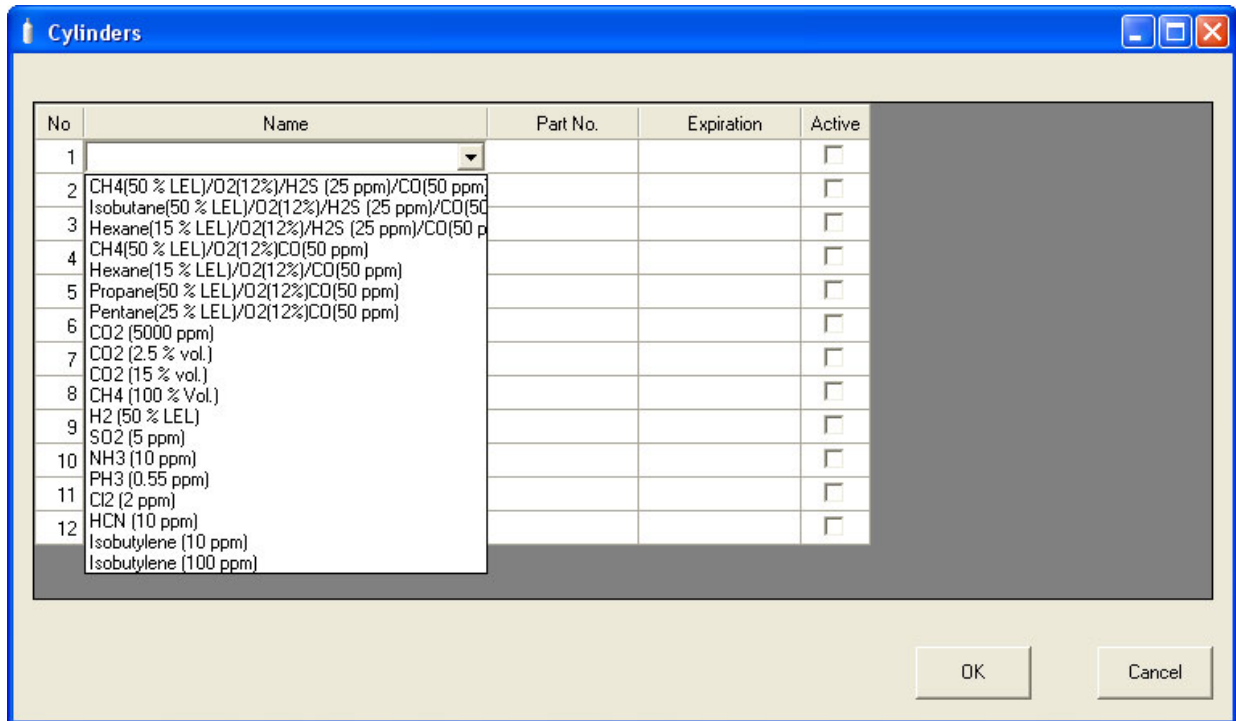


Figure 30: Predefined List of Cylinders

- Set the expiration date by clicking in the Expiration field and clicking the drop down menu that appears. Use the calendar to choose an expiration date. The expiration date box will be highlighted in orange if the expiration date of the cylinder is less than 10 days away. The expiration date box will be highlighted in red if the expiration date has passed.
- Select or deselect the Active box for each cylinder. If the cylinder is active, the PC Controller program will alert you at start up if the cylinder has passed its expiration date. If it is not active, the program will not alert you.
- To return to the main program window without saving any changes, click Cancel in the Cylinders Window. A window will appear notifying you that changes will not be saved. To continue to the main program window, click OK. To return to the Cylinders Window to save your changes, click Cancel.
- If you want to save any changes made, click OK. A window will appear asking if you want to save the changes you made. To return to the main program window and save your changes, click Yes. To return to the main program window without saving changes, click No. To return to the Cylinders Window, click Cancel.

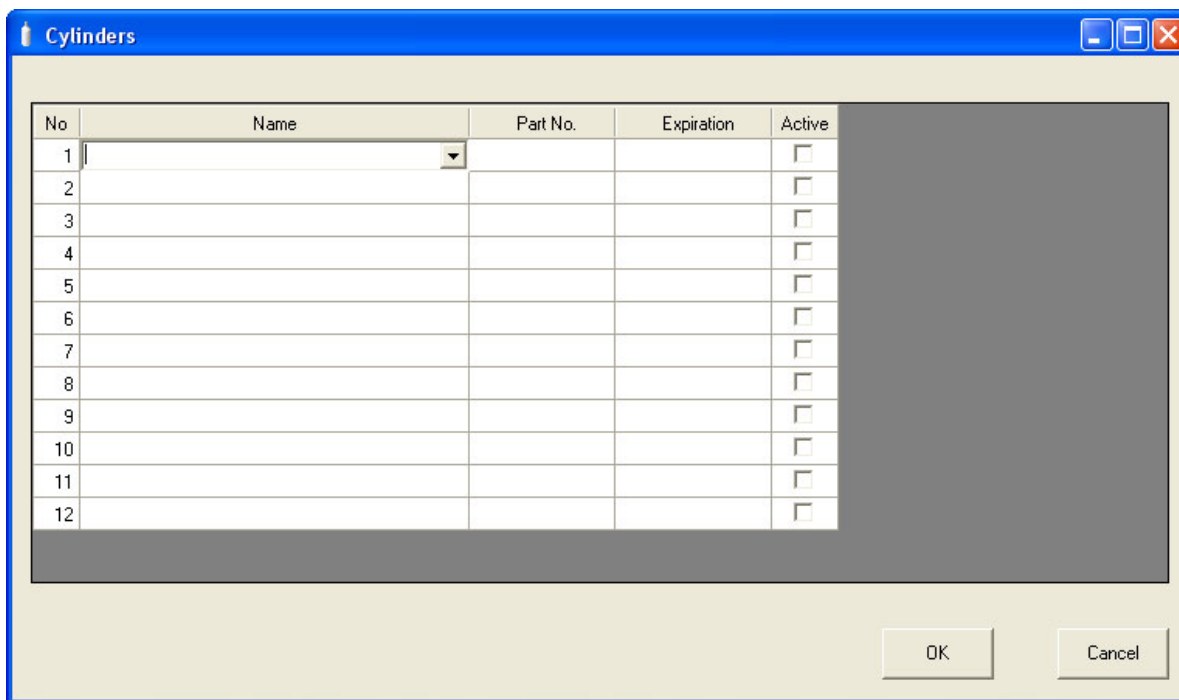
Defining New Cylinders

If your instrument configuration requires the use of a cylinder that is not in the predefined list, you can add that cylinder by either typing in the information for the cylinder or by editing the information for an existing cylinder.

1. To access the Cylinders Window, click the Cylinders button along the top of the main program window.



2. Click in any blank cylinder name field and click again to bring the cursor up or use the drop down menu to select a cylinder name that is close to the one you want and click the name to bring the cursor up.

A screenshot of a software window titled "Cylinders". The window has a blue title bar with standard Windows window controls (minimize, maximize, close). The main area contains a table with five columns: "No", "Name", "Part No.", "Expiration", and "Active". The "No" column lists numbers 1 through 12. The "Name" column has a dropdown arrow for each row. The "Part No.", "Expiration", and "Active" columns are empty. The "Active" column contains checkboxes. At the bottom right of the window are "OK" and "Cancel" buttons.

No	Name	Part No.	Expiration	Active
1				<input type="checkbox"/>
2				<input type="checkbox"/>
3				<input type="checkbox"/>
4				<input type="checkbox"/>
5				<input type="checkbox"/>
6				<input type="checkbox"/>
7				<input type="checkbox"/>
8				<input type="checkbox"/>
9				<input type="checkbox"/>
10				<input type="checkbox"/>
11				<input type="checkbox"/>
12				<input type="checkbox"/>

Figure 31: New Cylinder

3. Type in the name of your new cylinder (ie. gas name and concentration).
4. Click in the Part No field once to select it and once more to bring the cursor up. Type in the part number for your new cylinder (typically the RKI part number).
5. Click in the Expiration field and click on the drop down menu that appears. Use the calendar to select an expiration date. The expiration date box will be highlighted in orange if the expiration date of the cylinder is less than 10 days away. The expiration date box will be highlighted in red if the expiration date has passed.

6. Select the Active box if you want the PC Controller program to alert you when the cylinder's expiration date has passed. If you do not want the program to alert you, leave the box deselected.
7. To enter any more cylinders, repeat step 3 through step 6.
8. To return to the main program window without saving any changes, click Cancel in the Cylinders Window. A window will appear notifying you that changes will not be saved. To continue to the main program window, click OK. To return to the Cylinders Window to save your changes, click Cancel.
9. If you want to save any changes made, click OK. A window will appear asking if you want to save the changes you made. To return to the main program window and save your changes, click Yes. To return to the main program window without saving changes, click No. To return to the Cylinders Window, click Cancel.

Chapter 5: Operation

Connecting Instruments to the PC Controller Program

NOTE: Be sure to set up the display order for the SDM-2012s as described on page 44, before continuing.

Do the following to turn on the SDM-2012s and establish a connection with the instruments in your system:

1. If necessary, verify that the SDM-2012(s) are arranged on the work surface as desired, all plumbing is installed, and all hardware and cables are installed. See page 18.
2. Launch the SDM-GX Docking Station PC Controller Software as described on page 35.

3. Install an instrument in the appropriate recess of the instrument cradle. The plastic flap should be covering the recess not in use. Flip the plastic flap over if it is covering the recess you need to use.

NOTE: If you are only charging an instrument or viewing or editing parameters, you do not need to connect the gas out to instrument line or the exhaust line to the instrument.

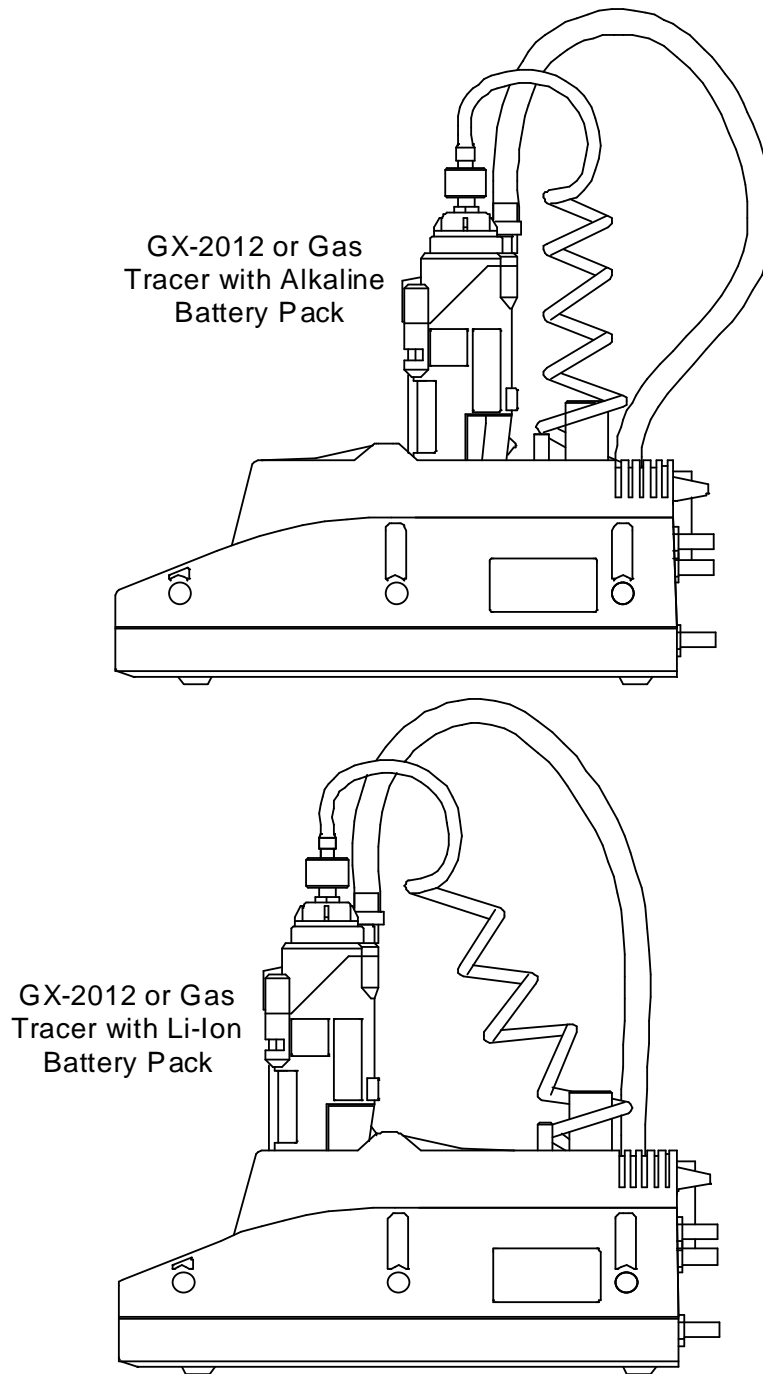


Figure 32: Inserting the Instrument

4. Turn on each SDM-2012 by pressing and holding the SDM-2012's POWER button. When the control panel LEDs turn on, release the POWER button.
5. The BUMP ▼ and CAL ▲ LEDs will turn off and the COPY LED will be steadily on or off. It will be on if the SDM-2012 was used in Standalone Configuration and calibration and bump test records are still stored in the SDM-2012's memory (see the SDM-2012 Docking Station Standalone Configuration Manual for more information). The CHARGE LED will be blinking green if the SDM-2012 is operating properly or solid red if there is a system failure.
6. When a connection has been established between the SDM-GX Docking Station PC Controller Program and all of the SDM-2012s, the main program window will appear as shown below.

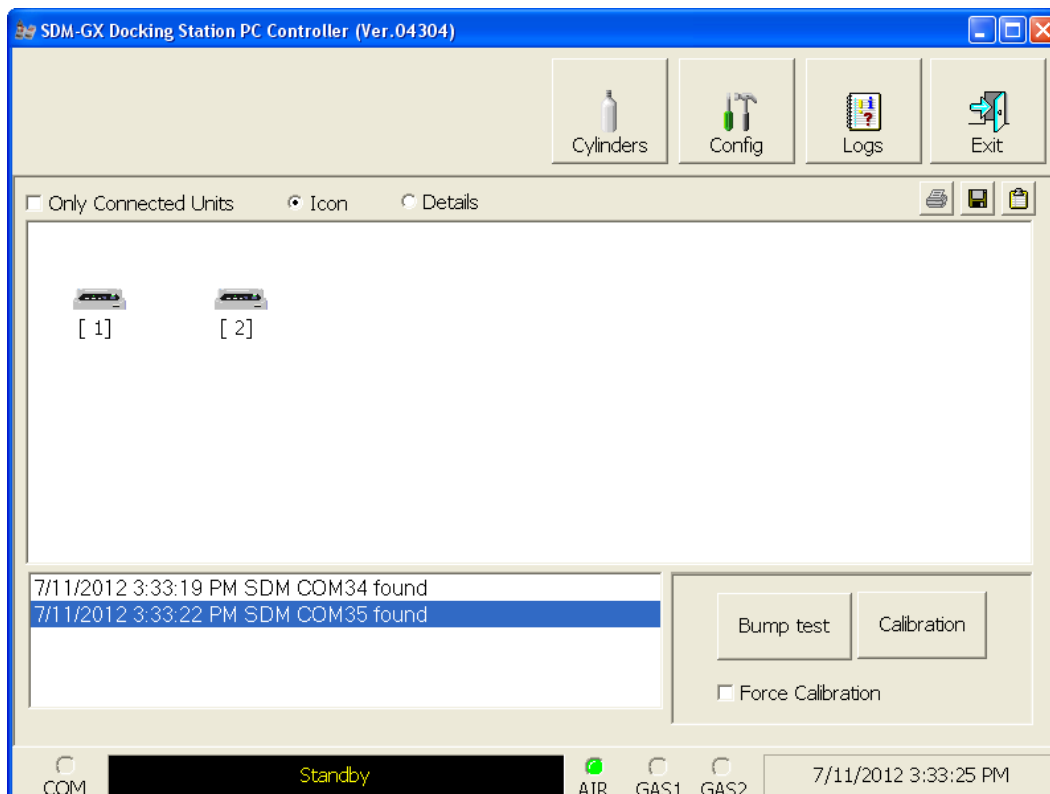
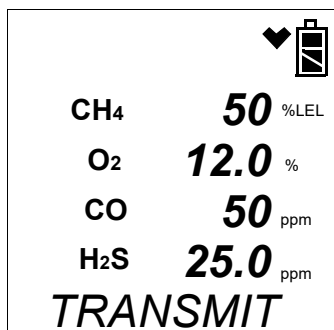


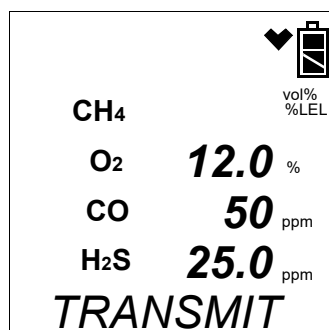
Figure 33: SDM-2012 Connection

7. Connect the gas out to instrument line of each SDM-2012 to the inlet of each instrument.

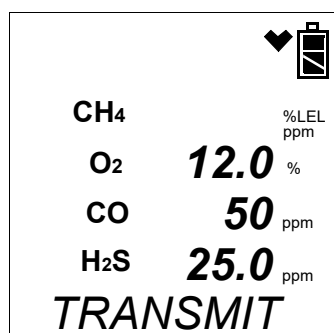
8. Turn on each instrument by pressing and holding the POWER ENTER button on each instrument until you hear a beep, then release it. The instrument will begin its power up sequence (see exceptions below in step 9). If a successful connection between the instrument and the SDM-2012 occurs, the home screen will appear on the instrument display at the end of the start up sequence. The heart symbol will be flashing and the instrument display will appear as shown below depending on the connected instrument. If the charge LED was amber, it will begin to blink green and the battery charging will stop until the instrument is turned off.



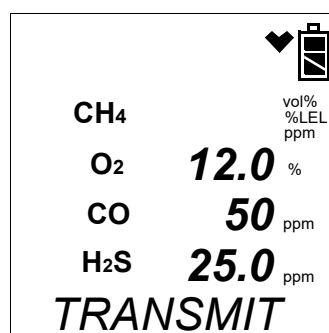
Standard 4-Gas GX-2012



%Volume GX-2012

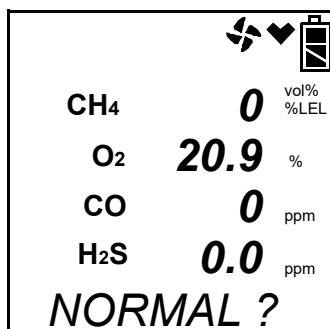


Standard Gas Tracer



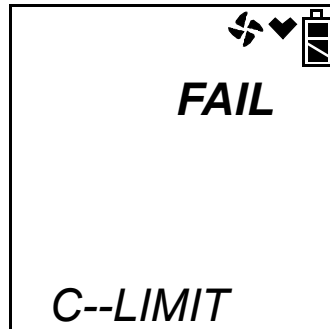
%Volume Gas Tracer

9. There are three exceptions to the sequence described above in step 8 above. See the GX-2012 Operator's Manual or the Gas Tracer Operator's Manual for a description of the **L./B. MODE**, **CL RMNDR**, and **CL EXPRD** instrument parameters.
 - When **L./B. MODE** is set to anything but **OFF**, the Normal Mode Select Screen will appear.



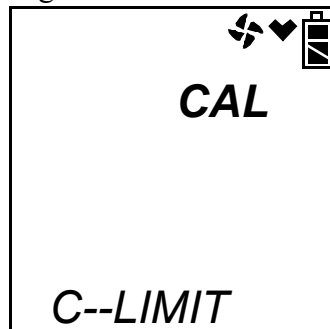
Press and release the POWER ENTER button on the instrument. If you do not press the POWER ENTER button for 20 seconds, the instrument will automatically continue its warm up sequence in Normal Mode.

- When **CL RMNDR** is set to **ON** and **CL EXPRD** is set to **NOT USE**, if the instrument is due for calibration, it will show a calibration expired failure screen and the buzzer and LED arrays will pulse.



The instrument will then connect to the PC Controller program and display the home screen shown above in step 8. The CHARGE LED will begin to blink green.

When **CL RMNDR** is set to **ON** and **CL EXPRD** is set to **CONFIRM**, if the instrument is due for calibration, it will show the following screen and beep and flash the LED arrays for a few seconds indicating that calibration is due.



When the beeping and flashing stops, press and release the RESET SILENCE button on the instrument to continue. The instrument will now connect to the PC Controller program, the home screen shown in step 8 above will be displayed, and the CHARGE LED will begin to blink green. If you do not press and release the RESET SILENCE button to continue, the instrument will continue to beep and flash the LED arrays every few seconds.

- For each instrument, the SDM-GX Docking Station PC Controller Program will indicate that an instrument was found and it will download the instrument's parameters. The BUMP ▼ and CAL ▲ LEDs will flash amber while the data is being downloaded. Once the parameter download is complete, the BUMP ▼ and CAL ▲ LEDs will be solid amber. When all instruments have been turned on, connected, and downloaded, the main program window will appear as shown below. When the instrument is connected to the PC Controller Program, the date and time of the instrument are automatically updated to the current date and time on the PC Controller Program's screen.

NOTE: Turn each instrument on 10-15 seconds after the previous instrument to minimize the possibility of the instrument not connecting to the PC Controller Program. If an instrument does not connect and the pump continues to run, use the instrument's POWER ENTER button to turn it off and turn it back on again.

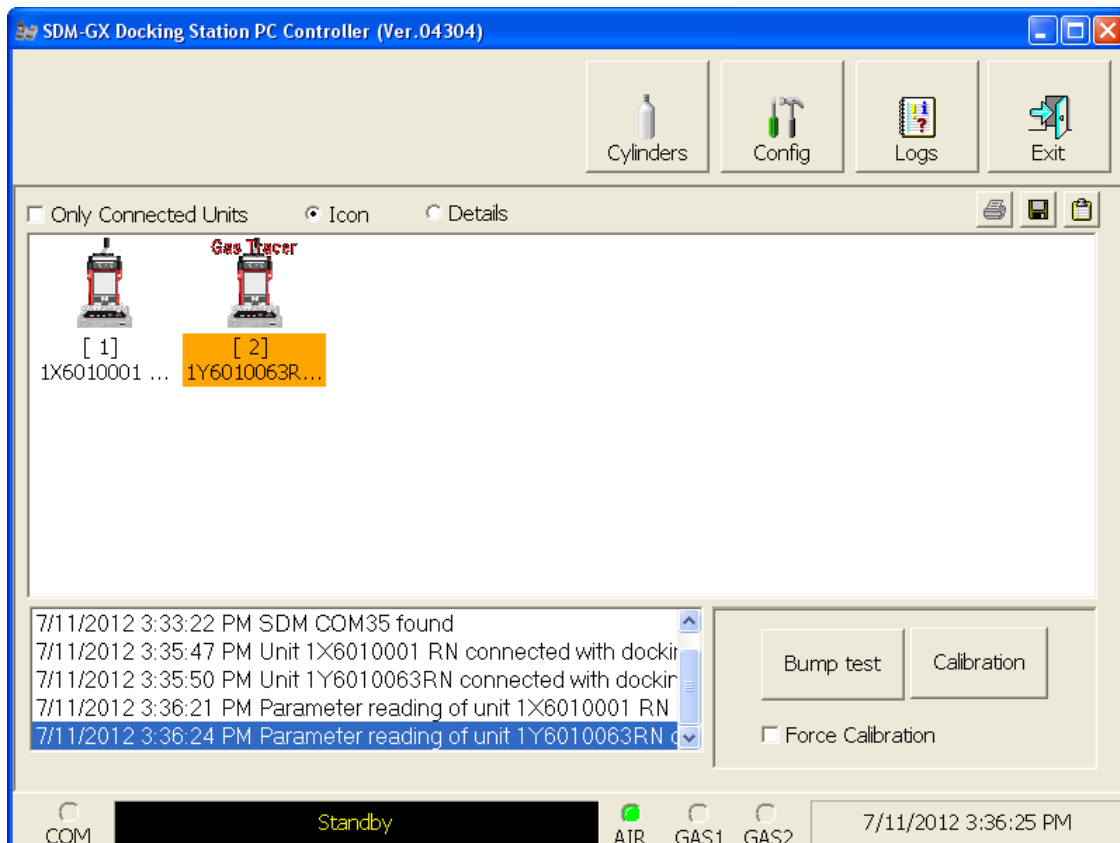


Figure 34: Instruments Connected and Downloaded

If an instrument is due for calibration, the docking station number and instrument serial number will be highlighted in red.

If an instrument is due for calibration in the next 10 days, the docking station and instrument serial number will be highlighted in orange.

If an instrument's parameters could not be downloaded properly, a red triangle will appear over the instrument and SDM-2012 picture.

Gas Tracers will have "Gas Tracer" appear above the instrument.

Icon View vs. Details View

Instruments that are currently connected or have been previously connected can be viewed in either Icon View or Details View. Choose Icon or Details View by clicking the Icon or Details radio button below the control buttons. Icon View allows you to view connected instruments and previously connected instruments in an icon configuration. Connected instruments are shown as an instrument inserted in an SDM-2012 icon. Previously connected instruments are shown as instrument icons. Right clicking an instrument causes the Instrument Function Menu to appear.

Details View allows you to view connected instruments and previously connected instruments in a table format. Scrolling to the right in Details View allows you to view existing instrument parameters. For a description of these parameters and instructions to change them, see page 164.

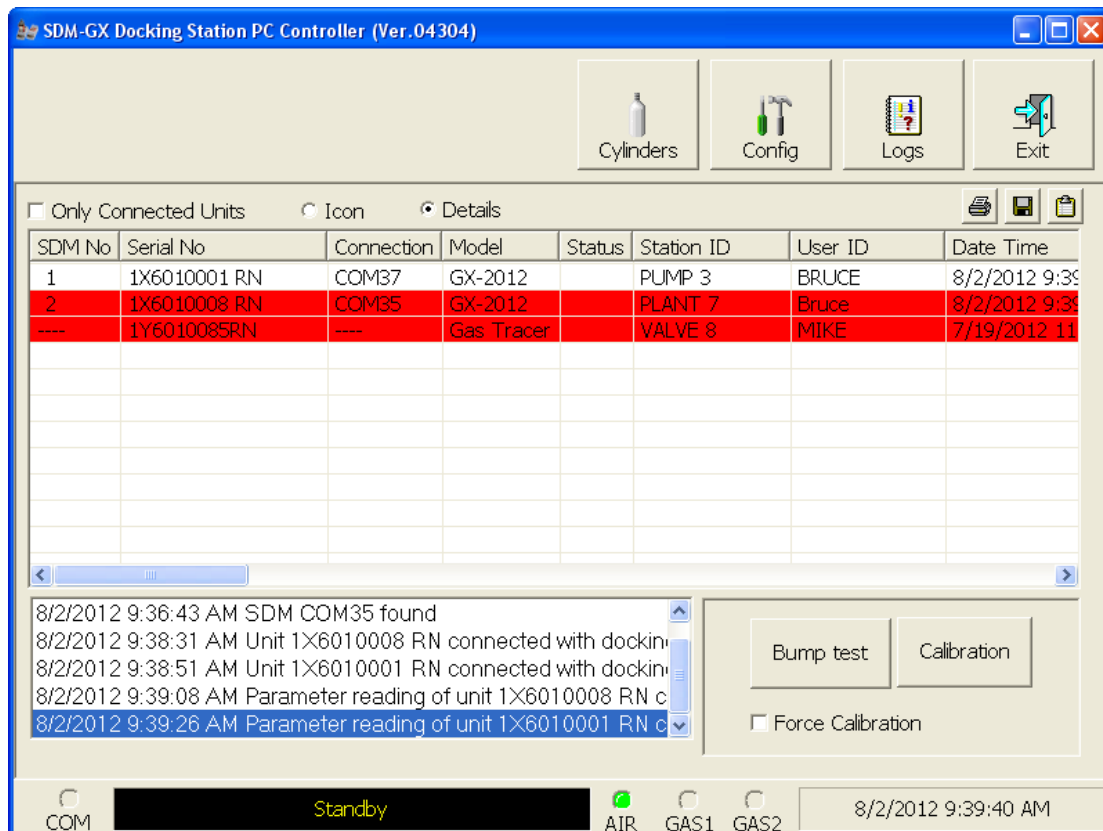


Figure 35: Main Program Window, Details View

Unless otherwise noted, all following figures that show the main program window in this manual are shown in Icon View.

Printing and Exporting an Instrument List from the Main Program Window

You can print, save, or add to clipboard the instrument list in the main program window. You can only print the list if it is viewed in Details format. The list cannot be printed when viewed in Icon format.

To print the instrument list:

1. Ensure that the main program window is being viewed in Details format.

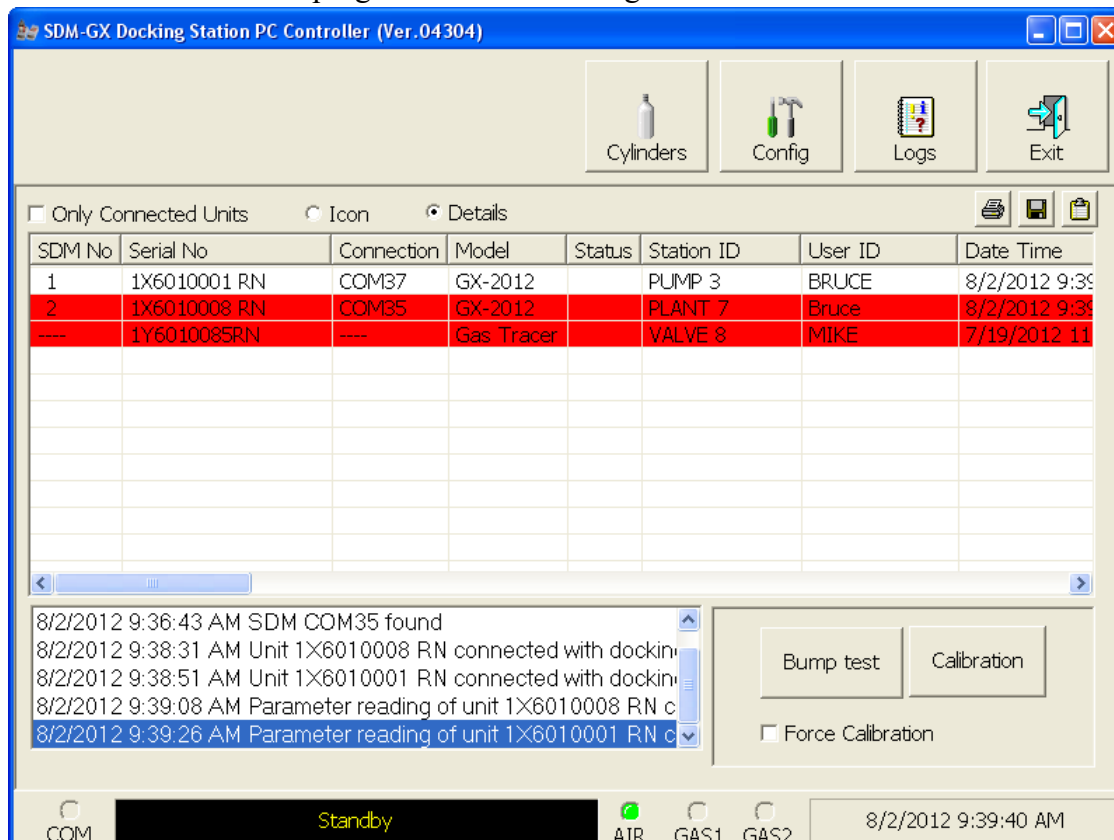
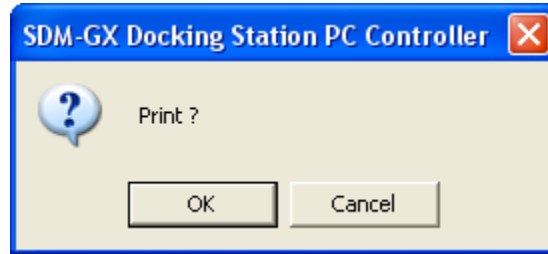


Figure 36: Main Program Window, Details View

The print icon will not be active if the main program window is viewed in Icon format.

2. Click the Print icon located just below the Exit button.

3. A print confirmation screen will appear.

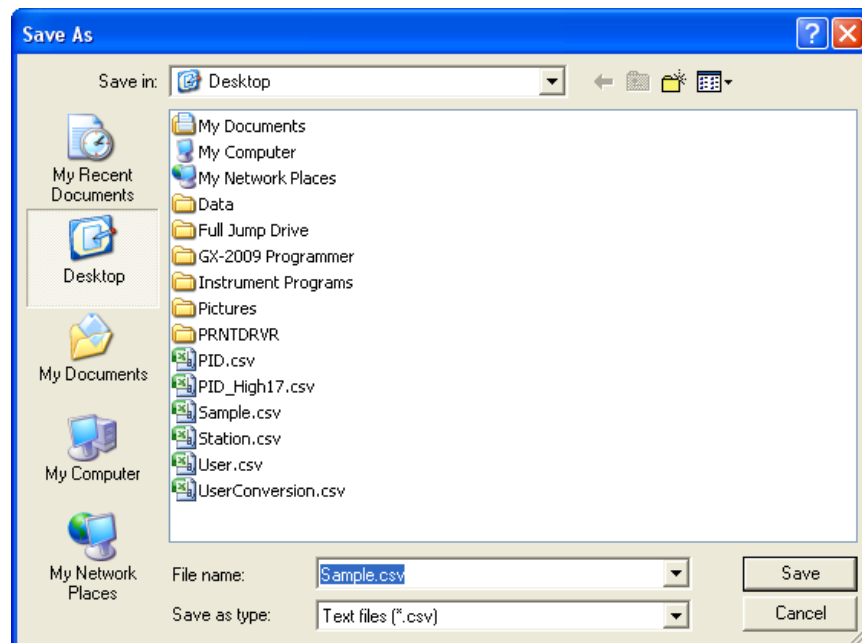


To print the instrument list, click OK.

To cancel the print job, click Cancel.

To save the instrument list as a .csv file:

1. Click the Save icon located just below the Exit button.
2. Choose a file path and enter a file name and click Save.



To save the instrument list to the clipboard:

1. Click the Clipboard button located just below the Exit button. The serial number, model, station ID, user ID, next bump test date, next calibration date, the calibration interval, and the data logging interval time for each instrument in the main program window will be saved to the clipboard in a table format.
2. Open a spreadsheet program such as Excel or a word processing program such as Word and paste the clipboard data into it.

Automatic Bump Testing and Calibration

The PC Controller Program will automatically perform a bump test or calibration on a connected instrument if Auto Bump Test or Auto Calibration is selected in the Configuration Window and if the bump test or calibration is due. The use of these features allows the user to launch the PC Controller Program, turn on the instrument(s) and walk away. No oversight of the bump test or calibration is needed. For this reason, the calibration cylinders need to already be in place and the instrument configurations must be such that the gas cylinders do not require any changing.

If Standard GAS is selected in the Configuration Window, only the standard sensors (catalytic LEL, O₂, CO, and H₂S [GX-2012 only]) will be tested. If All GAS is selected, all sensors will be tested in every instrument configuration except for a Gas Tracer with a %volume sensor installed. Gas Tracers with a %volume combustible gas sensor installed cannot be fully bump tested or calibrated automatically because they will always need a gas cylinder change during bump testing or calibration. The PC Controller Program will bump test or calibrate only the standard 3 sensors (catalytic LEL, O₂, and CO) if Auto Bump Test or Auto Calibration is selected. RKI Instruments, Inc. recommends that you manually bump test or calibrate any Gas Tracers with a %volume sensor installed using the PC Controller Program as described in “Bump Testing a Gas Tracer” on page 85 and “Calibrating a Gas Tracer” on page 101.

To automatically bump test or calibrate an instrument or instruments:

1. Be sure that Auto Bump Test or Auto Calibration are selected in the Configuration Window. See page 44 for instructions.
2. Verify that all of the bump test and/or calibration parameters are set correctly. See page 36 for instructions.
3. Verify that the appropriate calibration gas cylinder or cylinders is connected to the appropriate manifold line.
4. Ensure that the gas out to instrument line is connected to the inlet of the instrument.
5. Establish a connection between the SDM-2012, instrument, and the PC Controller program as described on page 50.
6. The bump test or calibration will begin 1 minute after the last connected instrument's instrument information download is complete.
7. During an automatic bump test, if the bump test fails, a calibration is immediately performed.
8. If Auto Bump Test and Auto Calibration are both selected, the calibration will begin 1 minute after the bump test has finished.

Bump Testing a GX-2012

The following instructions apply to GX-2012s with one or more of the standard four sensors (catalytic LEL, O₂, H₂S, and CO) when you are using only a 3-gas or 4-gas cylinder. RKI Instruments, Inc. recommends using a 3-gas or 4-gas cylinder instead of multiple cylinders for calibrating standard instruments. These instructions also apply to GX-2012s with a %volume sensor installed when you are using a 3-gas or 4-gas mix and a %volume calibration cylinder. For instructions to bump test a Gas Tracer, see “Bump Testing a Gas Tracer” on page 85.

CAUTION: *After bump testing the %volume sensor in a GX-2012, remove the instrument from the SDM-2012 and allow the readings to return to fresh air readings before performing any more gas testing on that instrument.*

The PC Controller Program is capable of performing a bump test both manually and automatically when a GX-2012 is connected to it. When a bump test is performed, the PC Controller Program performs an air adjust operation on a GX-2012 and then applies calibration gas to the instrument. The program analyzes the response results based on predefined criteria and determines if the GX-2012 passed the bump test.

The criteria that the PC Controller Program uses to determine if the GX-2012 passes a bump test, whether the Bump Test button is active, and whether or not the PC Controller Program automatically performs a bump test if it is due on a connected GX-2012 is defined in the Parameter tab of the Configuration Window. See page 39 for a description of the bump test configuration setup.

To manually bump test an instrument or instruments:

1. Establish a connection between the SDM-2012, GX-2012, and the PC Controller program as described on page 50.
2. Verify that all of the bump test parameters are set correctly. See page 36 for instructions.
3. Verify that the appropriate calibration gas cylinder or cylinders is connected to the appropriate SDM-2012 or manifold line.
4. Ensure that the gas out to GX-2012 line is connected to the inlet of the GX-2012 and that the exhaust line is connected to the exhaust fitting of the GX-2012.

5. Select the instrument or instruments you wish to bump test and click on them to highlight them as shown below. To select multiple instruments for bump testing, hold down the Control button on the keyboard as you click them.

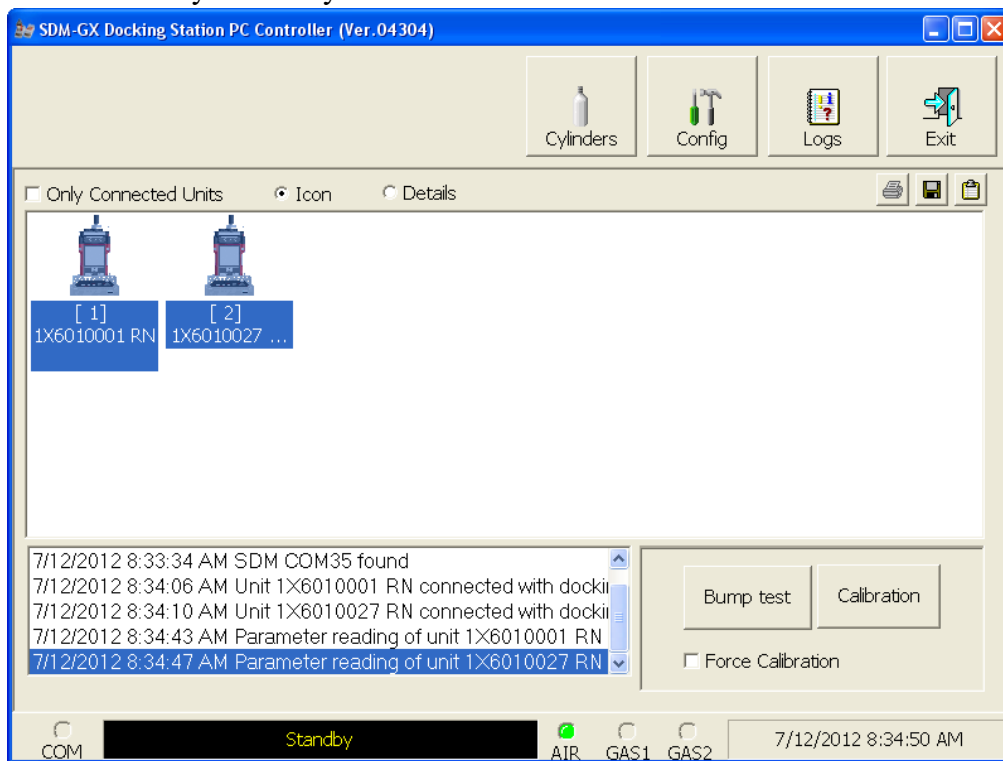


Figure 37: Instrument Selection

6. If you would like an automatic calibration to occur after a failed bump test, select the Force Calibration selection box.
7. Click the Bump test button in the lower right corner of the main program window.

8. You will be asked to confirm which GX-2012 channels will use GAS 1 for the bump test. The gas concentration shown next to each channel is the auto calibration value for that channel. If it does not match the gas concentration in the cylinder(s), change the auto calibration value for that channel. See page 174 for instructions. When using a 3-gas (no H₂S channel) or a 4-gas (H₂S channel included) cylinder, to bump test a standard instrument, select all channels. If your instrument has fewer than 4 channels, your screen will only display the active channels. If your GX-2012 has a %volume combustible gas sensor installed, you cannot select it for use with the GAS 1 inlet. The %volume combustible gas sensor must use the GAS 2 inlet.

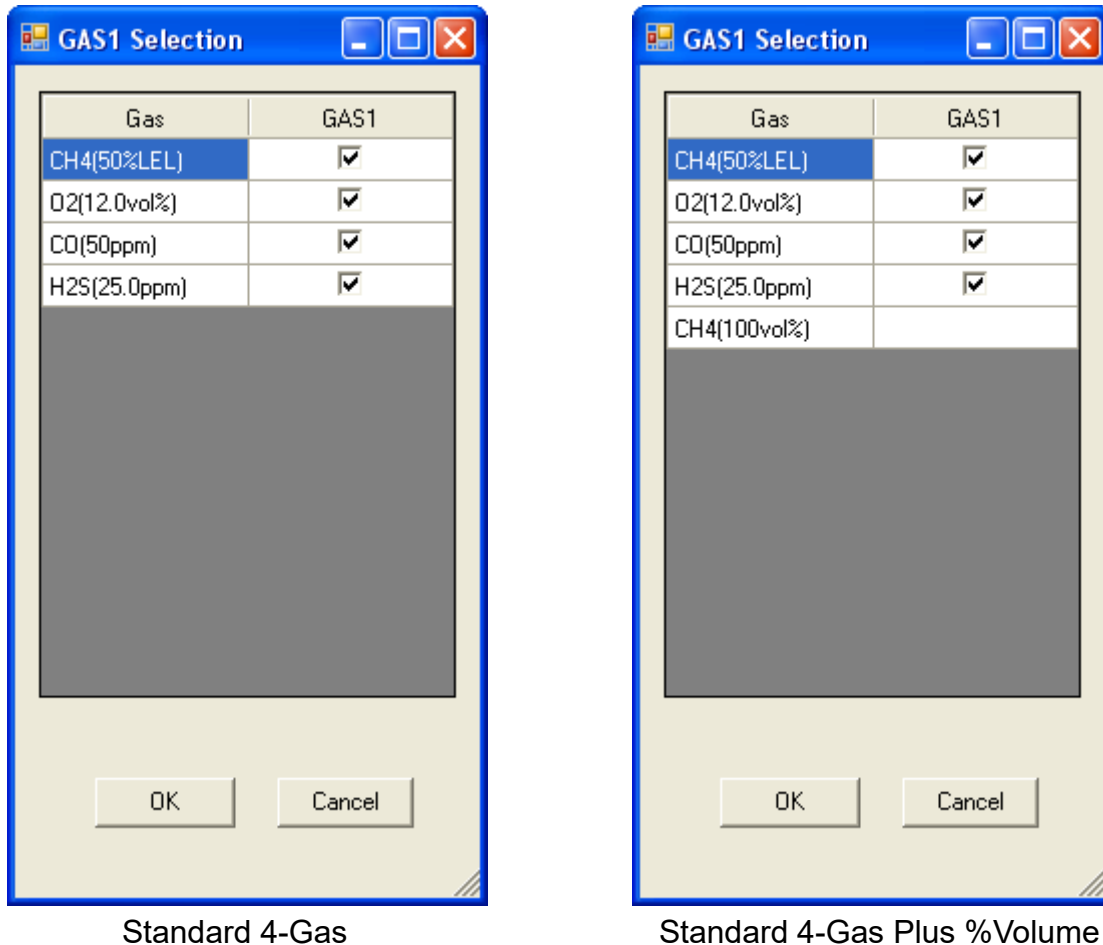


Figure 38: Gas Cylinder Confirmation Screen

When all of the desired channels are selected, click OK. If you don't want to proceed, click Cancel to abort the bump test.

9. You will then be asked to confirm the auto calibration values and the instruments that the calibration cylinder will be used for. Be sure the auto calibration values match the values listed on the calibration cylinder. The serial number and gas combination of all selected instruments will appear sequentially beneath the gas cylinder concentration. If you are bump testing a standard 4-gas GX-2012 or GX-2012s, the screen will appear as shown below. All channels will be bump tested using GAS 1.

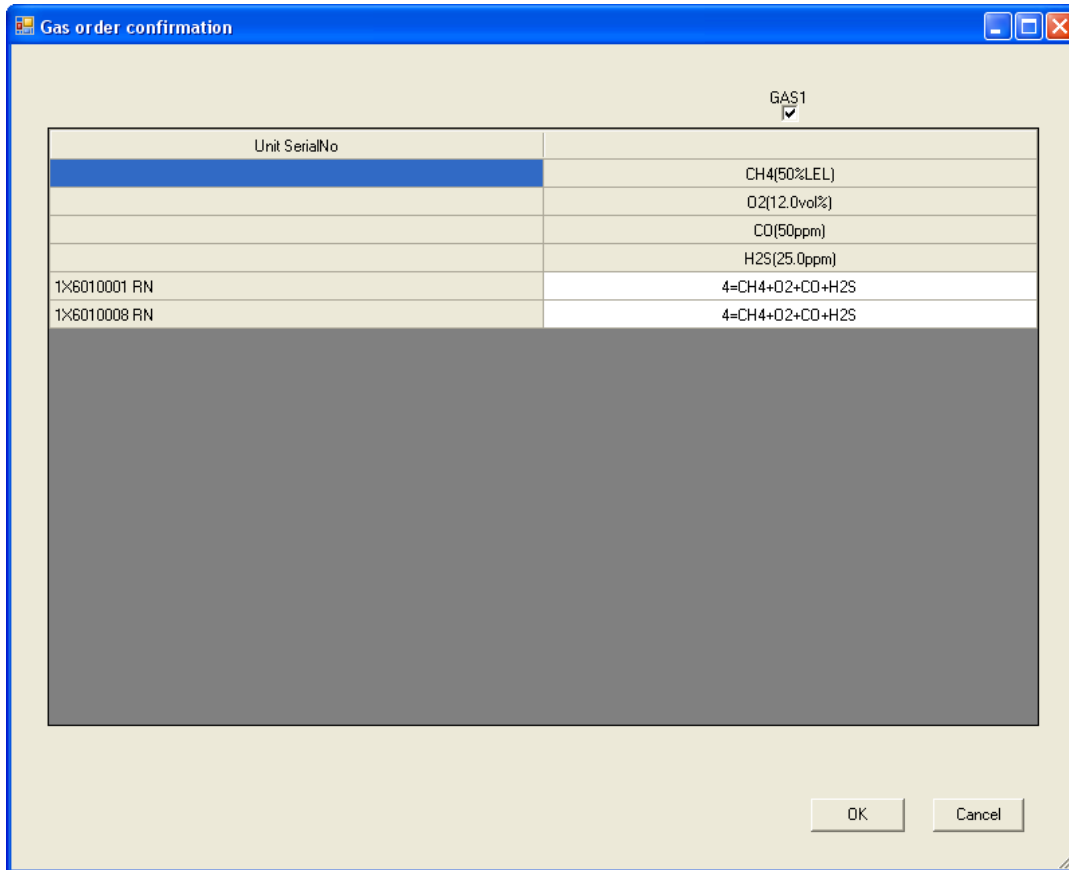


Figure 39: Gas Order Confirmation Screen, Standard 4-Gas GX-2012

If you are bump testing a standard 4-gas plus %volume GX-2012 or GX-2012s, the screen will appear as shown below. The standard 4 sensors will be bump tested using GAS 1 and the %volume sensor(s) will be bump tested using GAS 2. The GAS 2 selection box is deselected by default. You must select the GAS 2 box if you wish to bump test the %volume sensor. If you do not wish to bump test the %volume sensor, leave the GAS 2 box deselected.

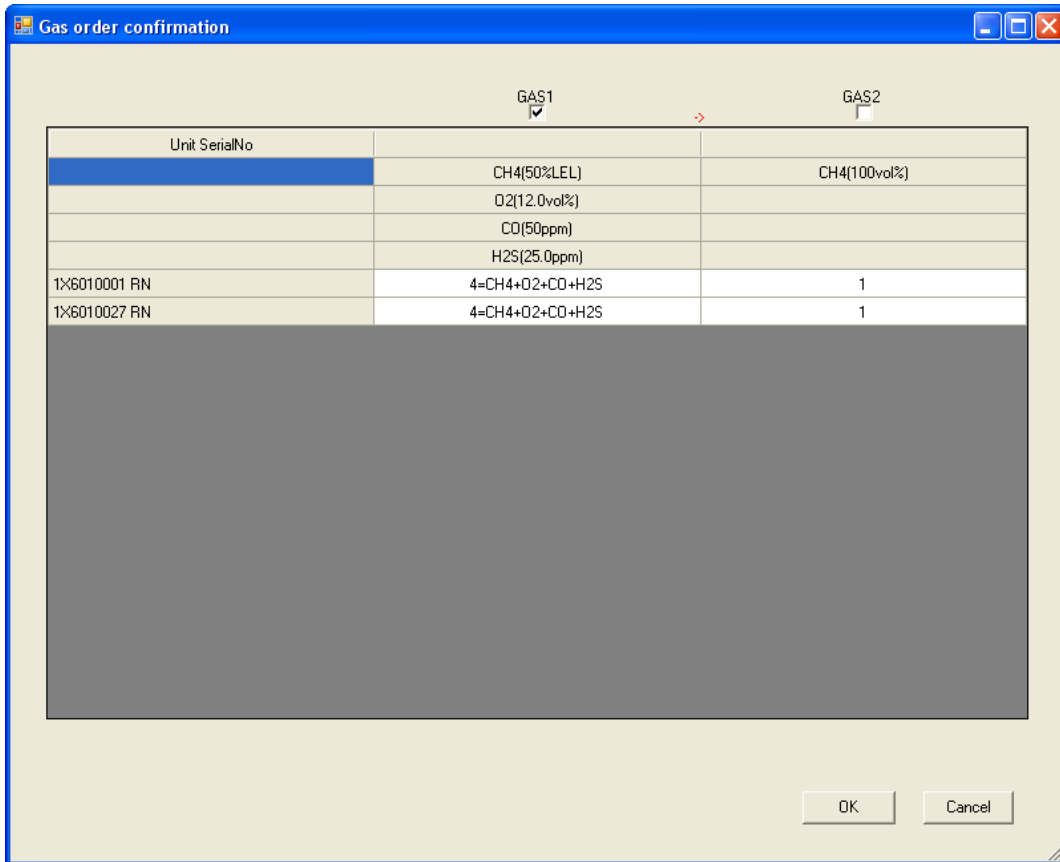
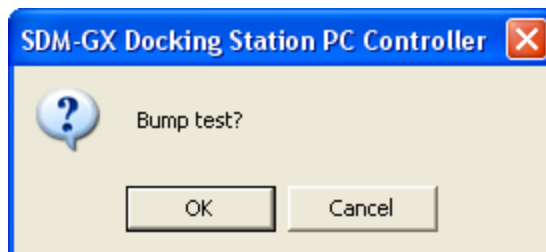


Figure 40: Gas Order Confirmation Screen, Standard 4-Gas Plus %Volume GX-2012

- Click OK. You will be asked if you want to bump test the instrument(s). Click OK to proceed. If you don't want to proceed with the bump test, click Cancel to return to the main program window.



11. The pump(s) will start and the program will indicate that air is flowing. The AIR indicator on the program screen will be on and air will be applied to the instrument(s) for 15 seconds, then the PC Controller Program will perform a zero adjustment on all the channels. The BUMP ▼ LED on the SDM-2012 control panel will be flashing amber.

If at any point during the bump test you wish to cancel the bump test, click the Cancel button in the lower right corner of the screen. The bump test will be aborted and the BUMP ▼ LED will turn solid amber.

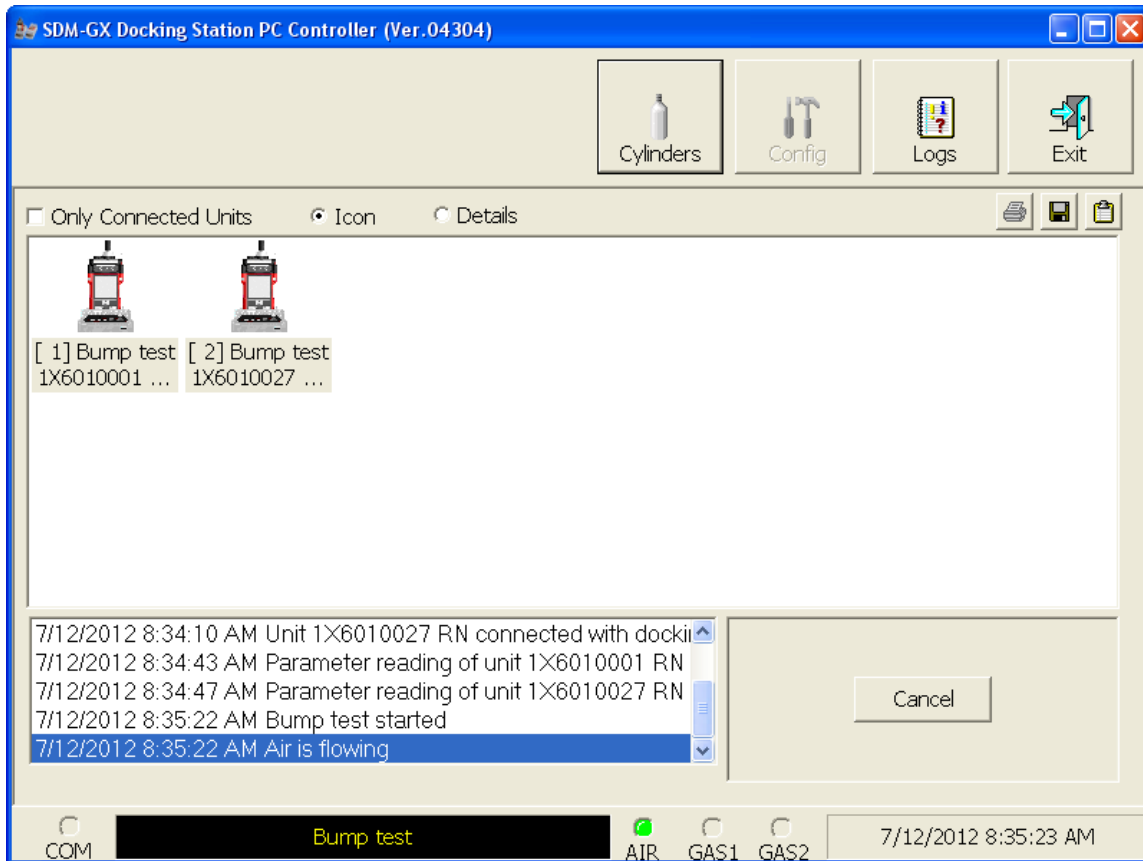


Figure 41: Air Flowing

The PC Controller Program will analyze the zero adjustment results. If any sensors failed the zero adjustment, the bump test will be aborted.

12. After air is applied, and if all the channels passed the zero adjustment, calibration gas will be applied. The GAS 1 indicator on the program screen will come on and calibration gas will be applied to the instrument(s) for the duration specified in the Gas Exposure Time parameter in the Configuration Window.

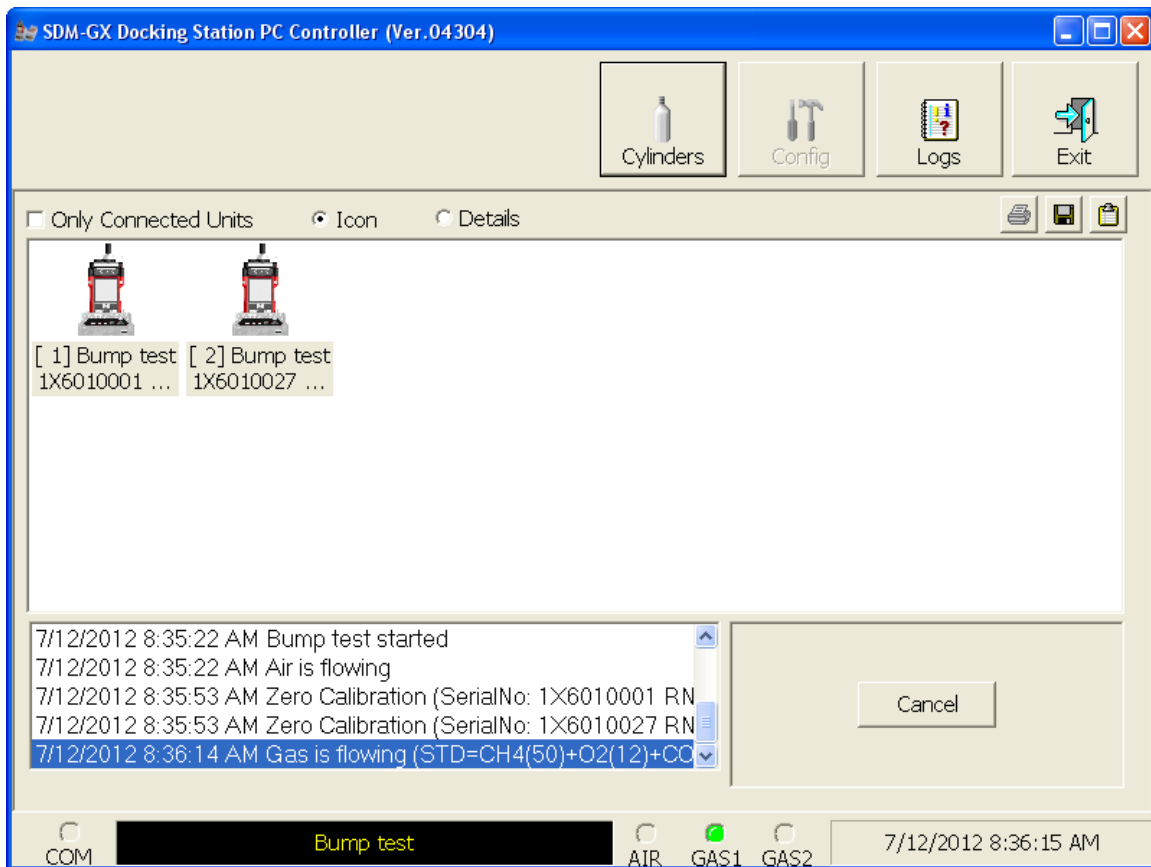


Figure 42: GAS 1 Calibration Gas Flowing

The PC Controller Program will analyze the results. If the bump test on the standard 4 sensors fails and Force Calibration is selected, a calibration will automatically begin and GAS 1 calibration gas will continue to flow.

13. If you do not have a %volume sensor installed in your GX-2012(s), continue with step 14.

If you have a %volume sensor installed, GAS 2 calibration gas will be applied to the instrument(s) for the duration specified in the Gas Exposure Time parameter in the Configuration Window.

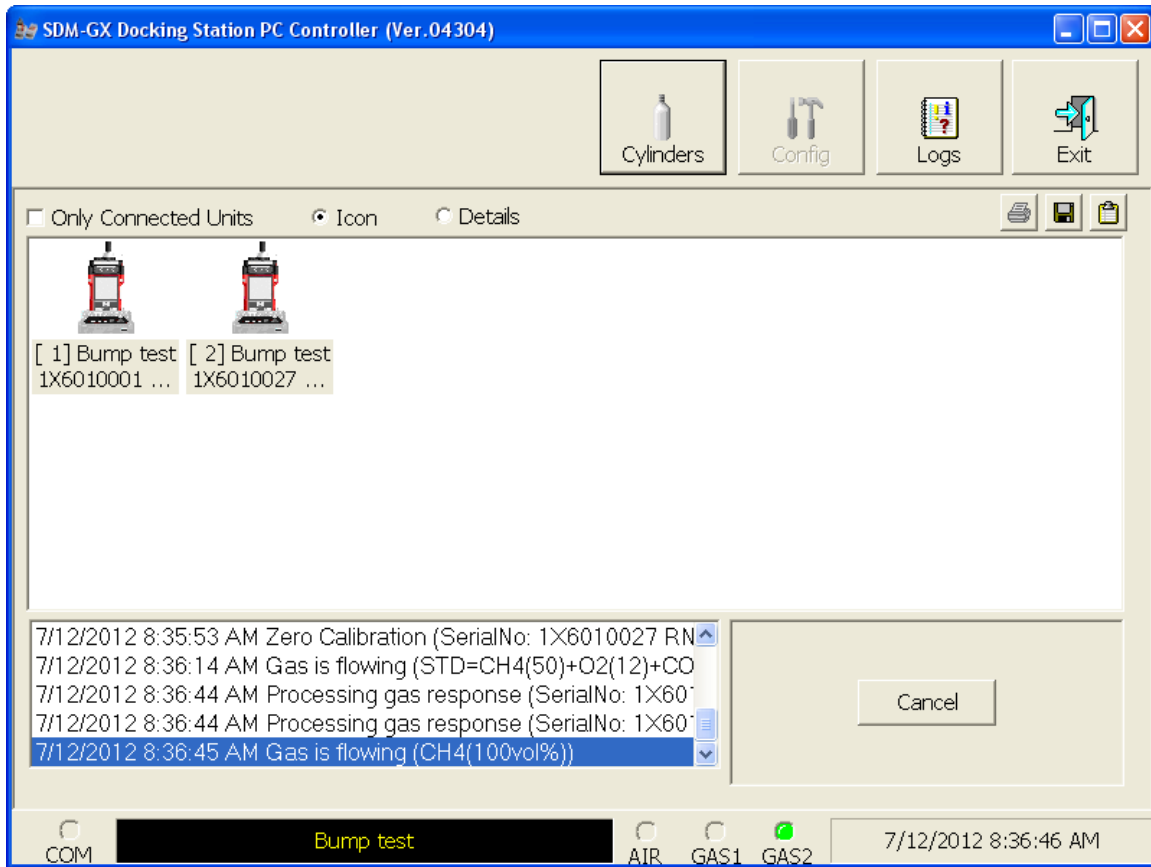


Figure 43: GAS 2 Calibration Gas Flowing

The PC Controller Program will analyze the results. If the bump test on the %volume sensor fails and Force Calibration is selected, a calibration will automatically begin and GAS 2 calibration gas will continue to flow.

14. After calibration gas is applied, the docking station will purge with fresh air for 5 seconds if no %volume sensor is installed or 30 seconds if a %volume sensor is installed.

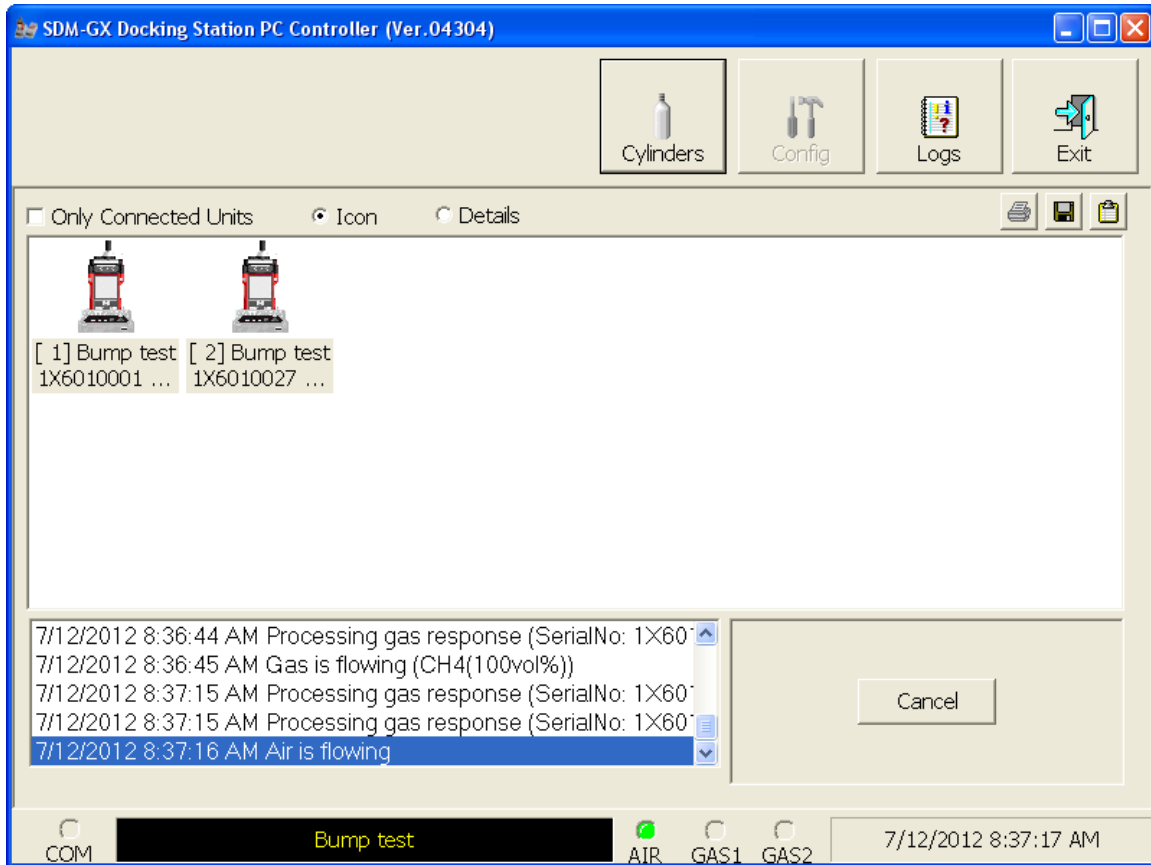


Figure 44: Fresh Air Purge

15. After the fresh air purge is complete,

- If the bump test passes, the following window will open indicating that. The BUMP ▼ LED will be solid green. Click OK to return to the main program window. The BUMP ▼ LED will turn off.

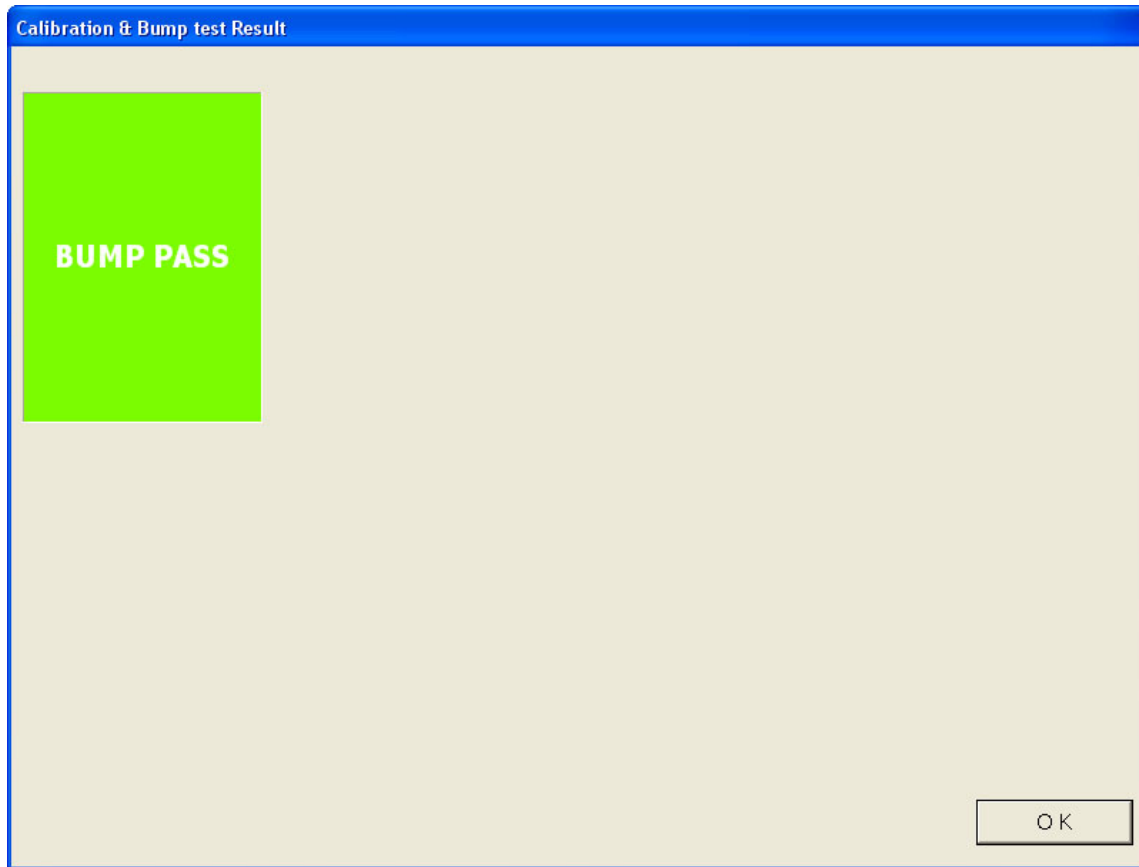


Figure 45: Bump Test Passed

- The GX-2012 will automatically be shut off 20 seconds after a successful bump test.

- If the bump test fails and the Force Calibration box was not selected, the following window will open indicating which channels failed the bump test. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the bump test results in the Logs window. The BUMP ▼ LED on the SDM-2012 control panel will turn off.

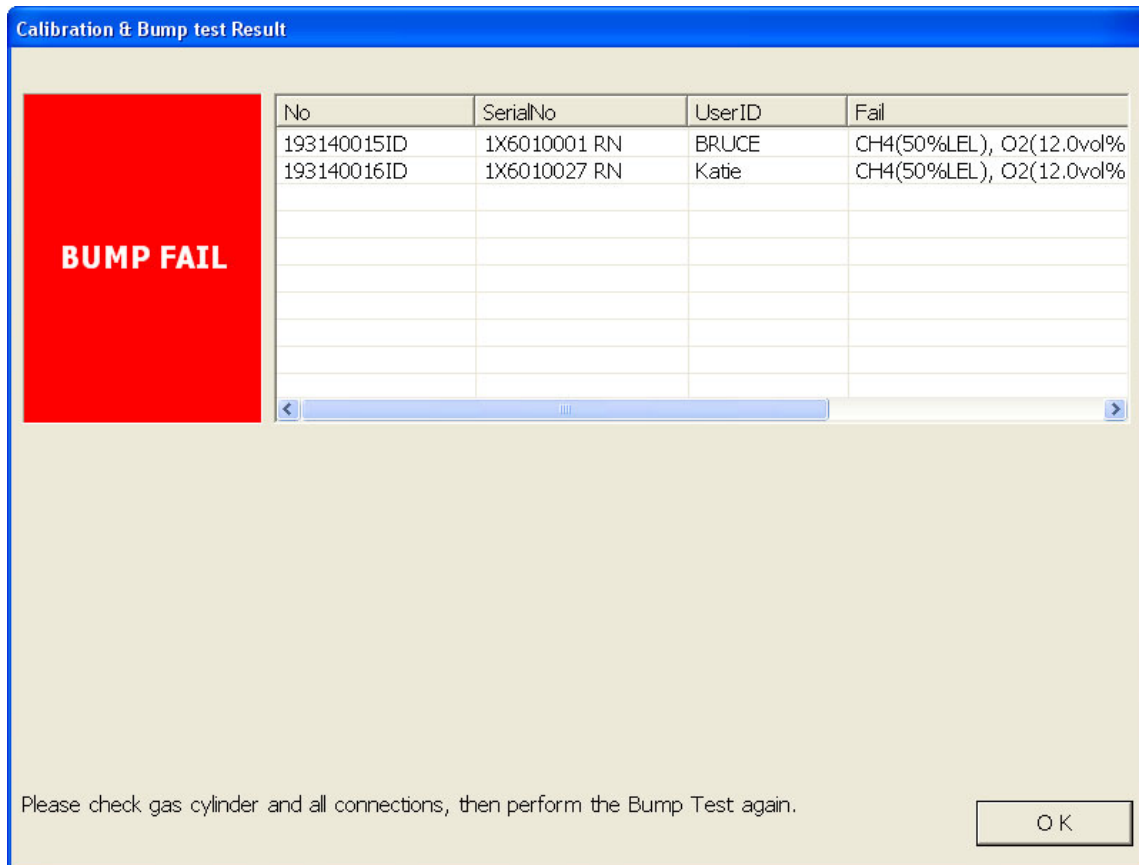


Figure 46: Bump Test Failed

- If the bump test fails and the Force Calibration box was selected, the SDM-2012 automatically performs a calibration immediately after the failed bump test. The results screen will indicate the results of both the bump test and calibration. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. The CAL ▲ LED will be solid green if the calibration passed or solid red if the calibration failed. Click OK to return to the main program window or double click an instrument information line to view the bump test or calibration results in the Logs window. The BUMP ▼ LED and CAL ▲ LED on the SDM-2012 control panel will turn off.

The screenshot shows a software window titled "Calibration & Bump test Result". It is divided into two main sections. The top section is labeled "BUMP FAIL" in red text on the left. To its right is a table with four columns: "No", "SerialNo", "UserID", and "Fail". The first row contains the data: "193140015ID", "1X6010027 RN", "Katie", and "CH4(50%LEL), O2(12.0vol%),". Below this row are several empty rows. A horizontal scrollbar is at the bottom of the table. The bottom section is labeled "CAL. FAIL" in red text on the left. It also has a table with the same four columns and the same first row of data. Below this row are several empty rows. A horizontal scrollbar is at the bottom of the table. At the bottom of the window, there is a text box that says "Please check gas cylinder and all connections, then perform the Calibration again." and an "OK" button.

No	SerialNo	UserID	Fail
193140015ID	1X6010027 RN	Katie	CH4(50%LEL), O2(12.0vol%),

BUMP FAIL

No	SerialNo	UserID	Fail
193140015ID	1X6010027 RN	Katie	CH4(50%LEL), O2(12.0vol%),

CAL. FAIL

Please check gas cylinder and all connections, then perform the Calibration again.

OK

Figure 47: Bump Test Failed/Calibration Failed

- If at any point during the bump test the flow rate to the instrument becomes too low, the PC Controller Program will abort the bump test and display a failed bump test screen. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click an instrument information line to view the bump test or calibration results in the Logs window. The BUMP ▼ LED on the SDM-2012 control panel will turn off. Confirm all tubing connections are correct and that all lines are clear.

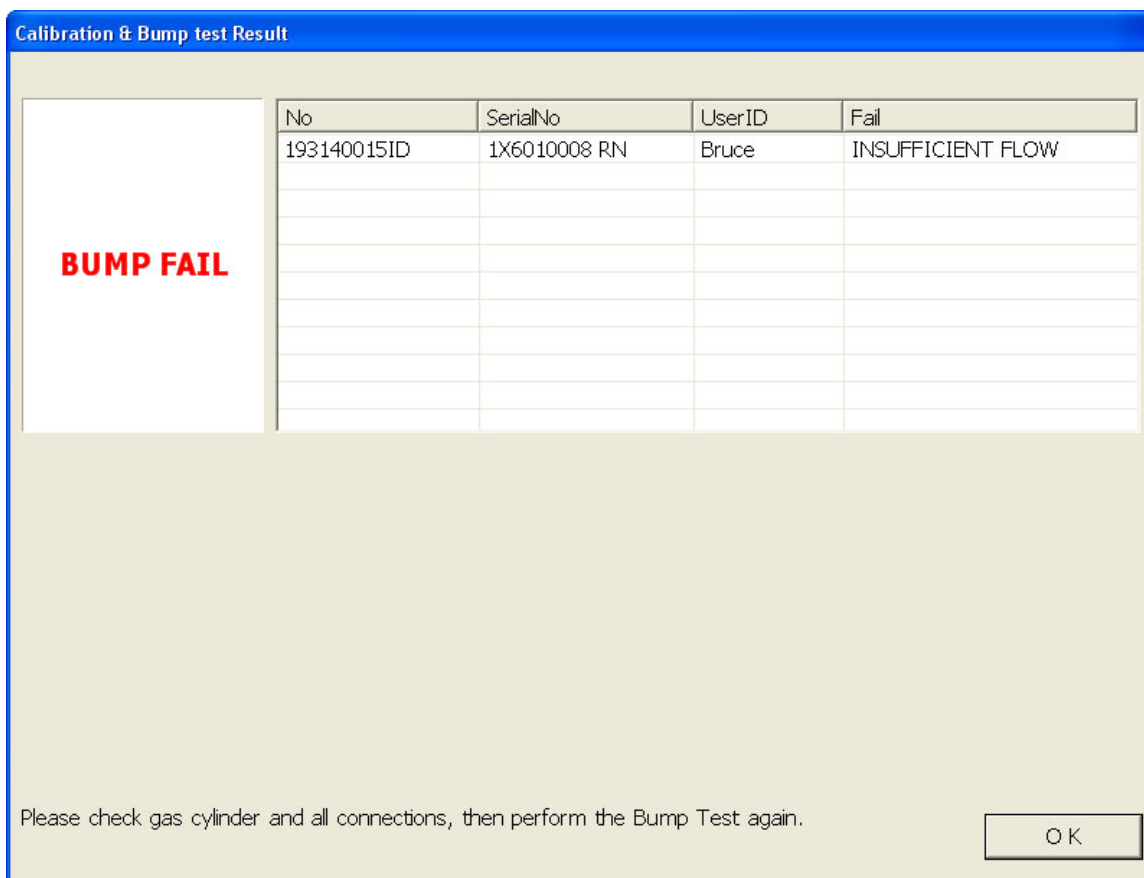


Figure 48: Low Flow Bump Test Failure

16. For all bump test result outcomes, the instruments will be displayed in the main program window in Details View. To return the main program window to Icons View, click the Icons radio button.
17. All bump test results can be viewed in the Logs window. See page 146 for instructions for viewing bump test data.

CAUTION: *After bump testing the %volume sensor in a GX-2012, remove the instrument from the SDM-2012 and allow the readings to return to fresh air readings before performing any more gas testing on that instrument.*

Calibrating a GX-2012

The following instructions apply to GX-2012s with one or more of the standard four sensors (catalytic LEL, O₂, H₂S, and CO) when you are using only a 3-gas or 4-gas cylinder. RKI Instruments, Inc. recommends using a 3-gas or 4-gas cylinder instead of multiple cylinders for calibrating standard instruments. These instructions also apply to GX-2012s with a %volume sensor installed when you are using a 3-gas or 4-gas mix and a %volume calibration cylinder. For instructions to calibrate a Gas Tracer, see page 101.

CAUTION: *After calibrating the %volume sensor in a GX-2012, remove the instrument from the SDM-2012 and allow the readings to return to fresh air readings before performing any more gas testing on that instrument.*

The PC Controller Program is capable of performing a calibration both manually and automatically on a GX-2012. When a calibration is performed, the PC Controller Program performs an air adjust operation on a GX-2012 and then applies calibration gas to the GX-2012. The PC Controller Program analyzes the calibration results and determines if the GX-2012 passed the calibration.

To manually calibrate an instrument or instruments:

1. Establish a connection between the SDM-2012, GX-2012, and the PC Controller program as described in “Connecting Instruments to the PC Controller Program” on page 50.
2. Verify that all of the calibration parameters are set correctly. See page 36 for instructions.
3. Verify that the appropriate calibration gas cylinder or cylinders is connected to the appropriate SDM-2012 or manifold line.
4. Ensure that the gas out to GX-2012 line is connected to the inlet of the GX-2012 and that the exhaust line is connected to the exhaust fitting of the GX-2012.

5. Select the instrument or instruments you wish to calibrate and click on them to highlight them as shown below. To select more than one instrument for calibration, hold down the Control button on the keyboard as you click them.

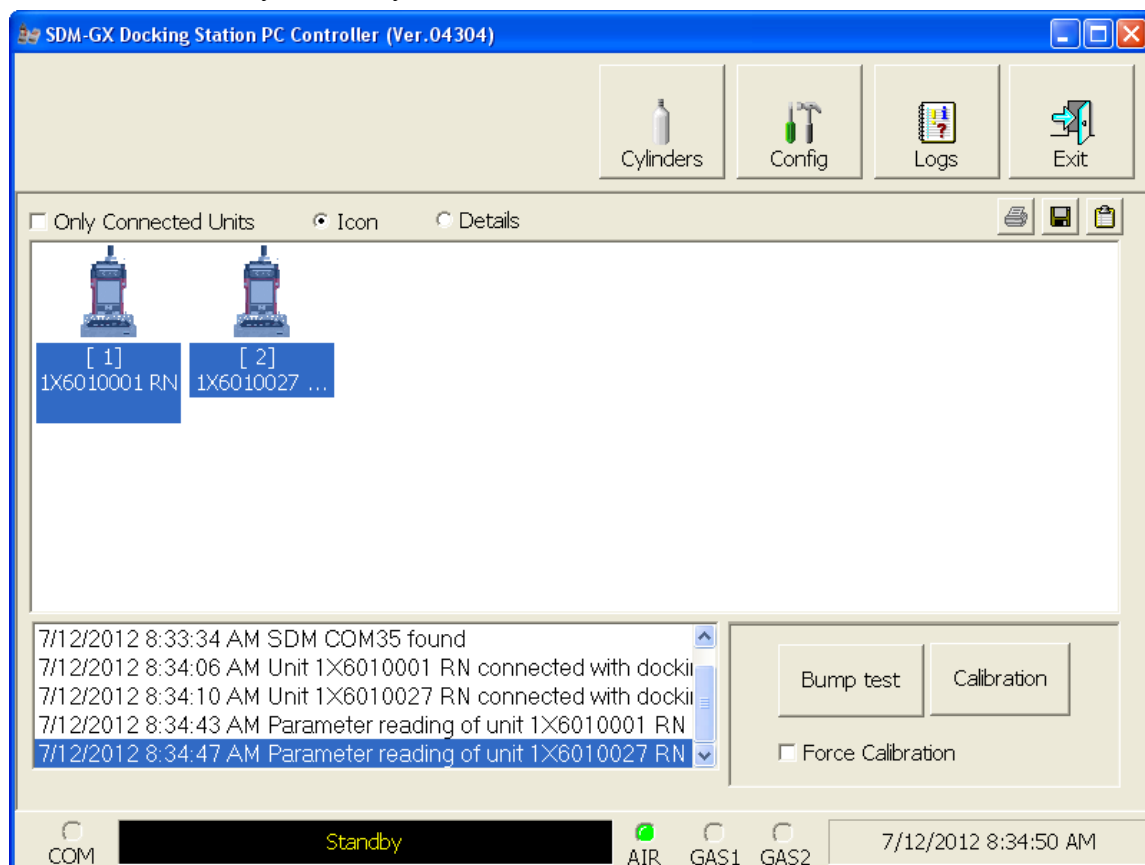


Figure 49: Instrument Selection

6. Click the Calibration button in the lower right corner of the main program window.

7. You will be asked to confirm which GX-2012 channels will use GAS 1 for the calibration. The gas concentration shown next to each channel is the auto calibration value for that channel. If it does not match the gas concentration in the cylinder(s), change the auto calibration value for that channel. See page 174 for instructions. When using a 3-gas (no H₂S channel) or a 4-gas (H₂S channel included) cylinder, to calibrate a standard instrument, select all channels. If your instrument has fewer than 4 channels, your screen will only display the active channels. If your GX-2012 has a %volume combustible gas sensor installed, you cannot select it for use with the GAS 1 inlet. The %volume combustible gas sensor must use the GAS 2 inlet.

Gas	GAS1
CH4(50%LEL)	<input checked="" type="checkbox"/>
O2(12.0vol%)	<input checked="" type="checkbox"/>
CO(50ppm)	<input checked="" type="checkbox"/>
H2S(25.0ppm)	<input checked="" type="checkbox"/>

Standard 4-Gas

Gas	GAS1
CH4(50%LEL)	<input checked="" type="checkbox"/>
O2(12.0vol%)	<input checked="" type="checkbox"/>
CO(50ppm)	<input checked="" type="checkbox"/>
H2S(25.0ppm)	<input checked="" type="checkbox"/>
CH4(100vol%)	<input checked="" type="checkbox"/>

Standard 4-Gas Plus %Volume

Figure 50: Gas Cylinder Confirmation Screen

When all of the desired channels are selected, click OK. If you don't want to proceed, click Cancel to abort the calibration.

8. You will then be asked to confirm the auto calibration values and the instruments that the calibration cylinder will be used for. Be sure the auto calibration values match the values listed on the calibration cylinder. The serial number and gas combination of all selected instruments will appear sequentially beneath the gas cylinder concentration. If you are calibrating a standard 4-gas GX-2012 or GX-2012s, the screen will appear as shown below. All channels will be calibrated using GAS 1.

Gas order confirmation

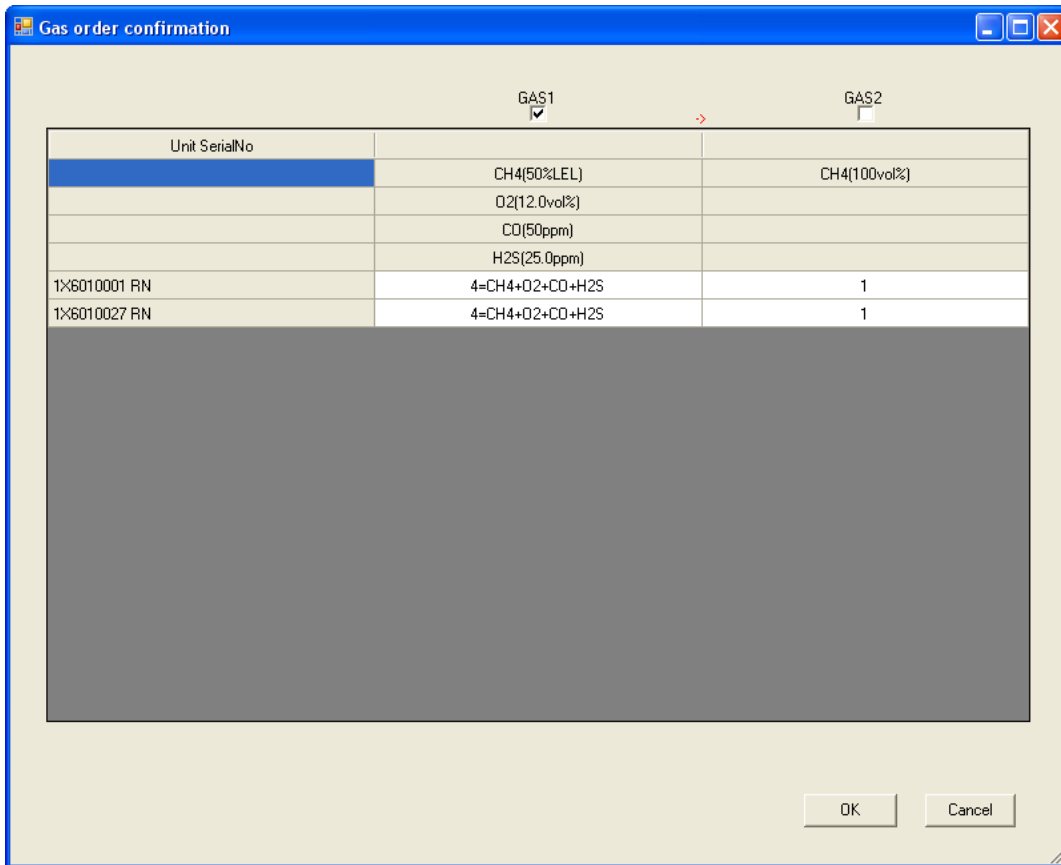
GAS1
☒

Unit SerialNo	
	CH4(50%LEL)
	O2(12.0vol%)
	CO(50ppm)
	H2S(25.0ppm)
1X6010001 RN	4=CH4+O2+CO+H2S
1X6010008 RN	4=CH4+O2+CO+H2S

OK Cancel

Figure 51: Gas Order Confirmation Screen, Standard 4-Gas GX-2012

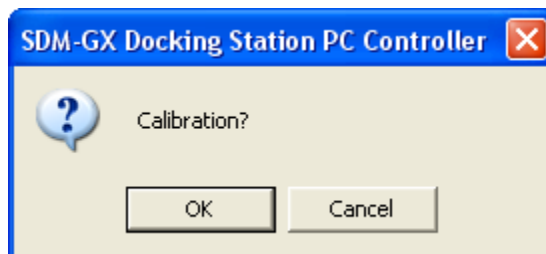
If you are calibrating a standard 4-gas plus %volume GX-2012 or GX-2012s, the screen will appear as shown below. The standard 4 sensors will be calibrated using GAS 1 and the %volume sensor(s) will be calibrated using GAS 2. The GAS 2 selection box is deselected by default. You must select the GAS 2 box if you wish to calibrate the %volume sensor. If you do not wish to calibrate the %volume sensor, leave the GAS 2 box deselected.



Unit	SerialNo	GAS1	GAS2
		CH4(50%LEL)	CH4(100vol%)
		O2(12.0vol%)	
		CO(50ppm)	
		H2S(25.0ppm)	
1X6010001 RN		4=CH4+O2+CO+H2S	1
1X6010027 RN		4=CH4+O2+CO+H2S	1

Figure 52: Gas Order Confirmation Screen, Standard 4-Gas Plus %Volume GX-2012

- Click OK. You will be asked if you want to calibrate the instrument(s). Click OK to proceed. If you don't want to proceed with the calibration, click Cancel to return to the main program window.



SDM-GX Docking Station PC Controller

Calibration?

OK Cancel

10. The pump(s) will start and the program will indicate that air is flowing. The CAL ▲ LED will begin to flash amber. Air will be applied to the instrument(s) for 5 seconds, then the PC Controller Program will perform a zero adjustment on all the channels.

If at any point during the calibration you wish to cancel the calibration, click the Cancel button in the lower right corner of the screen. The calibration will be aborted and the CAL ▲ LED will turn solid amber.

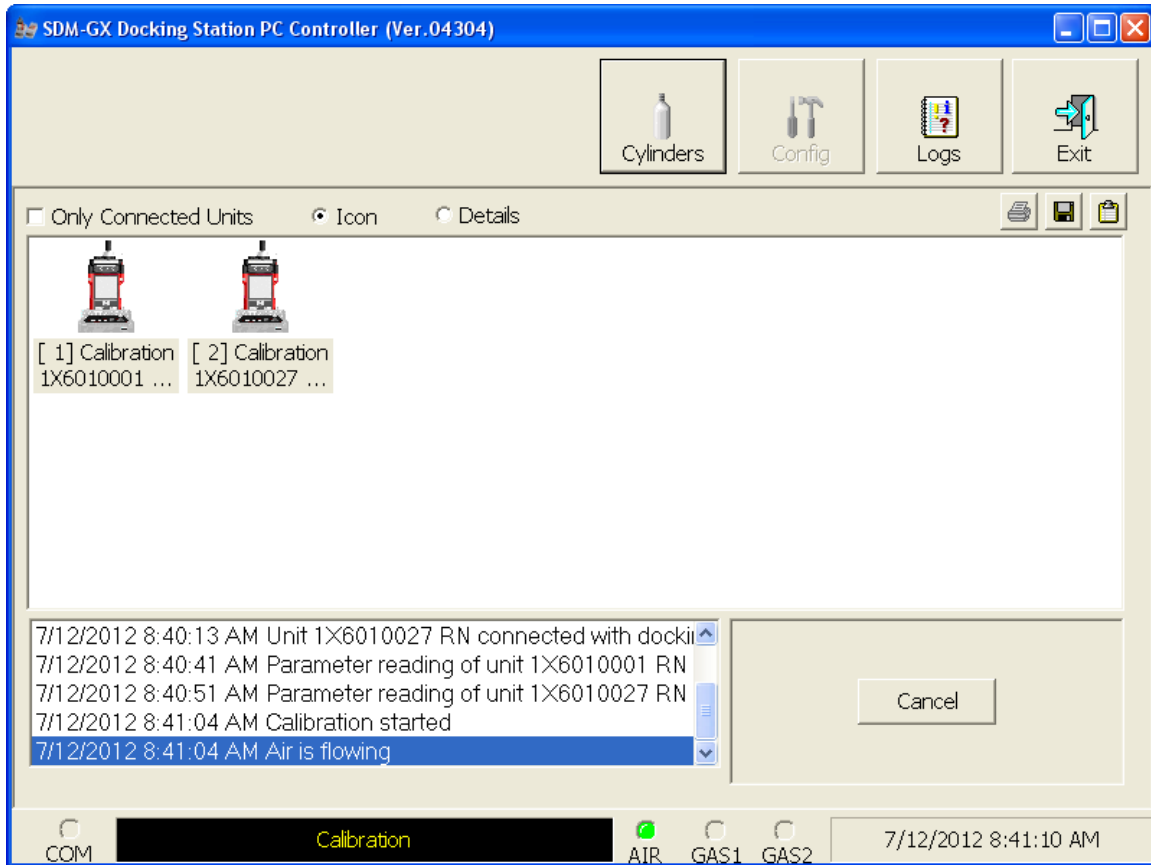


Figure 53: Air Flowing

The PC Controller Program will analyze the zero adjustment results. If any sensors failed the zero adjustment, the calibration will be aborted.1

11. After air is applied, and if all the channels passed the zero adjustment, calibration gas will be applied. The GAS 1 indicator on the program screen will come on. Calibration gas will be applied to the instrument(s) for 90 seconds.

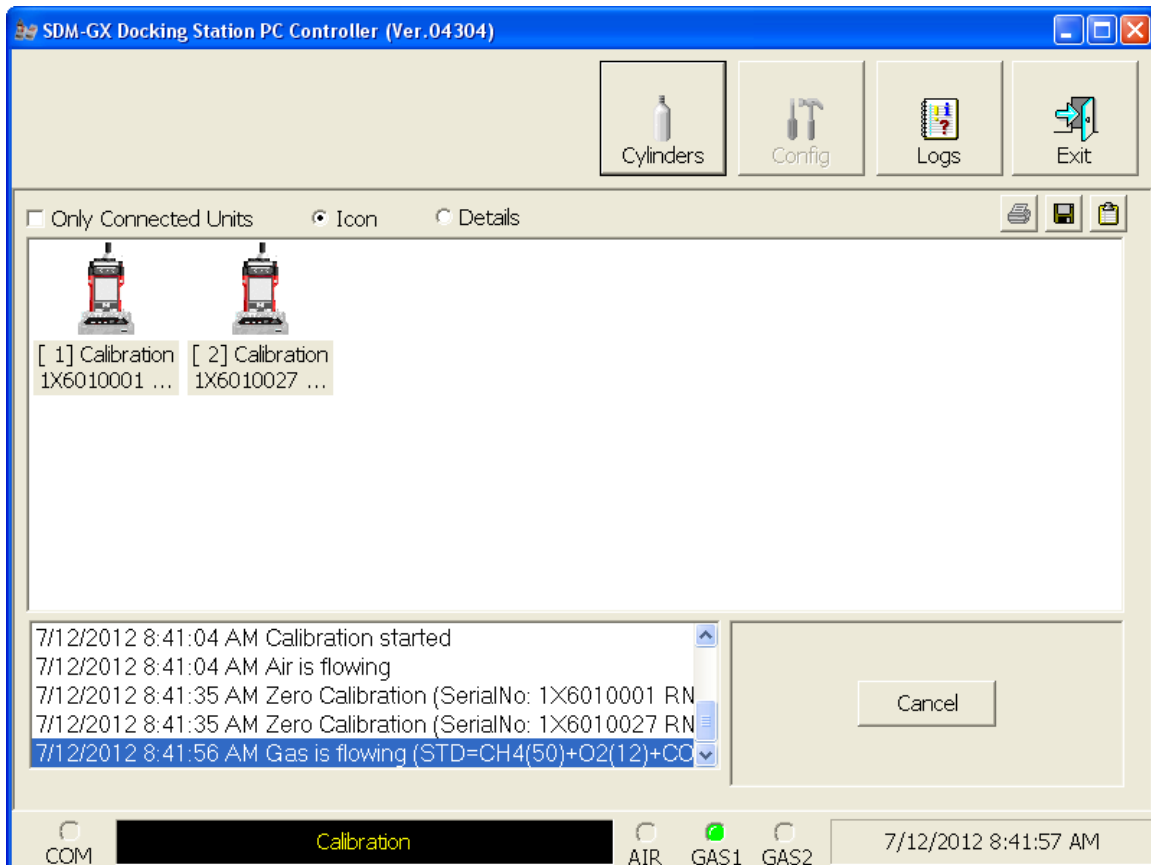


Figure 54: GAS 1 Calibration Gas Flowing

The PC Controller Program will analyze the results.

12. If you do not have a %volume sensor installed in your GX-2012(s), continue with step 13.
If you have a %volume sensor installed, GAS 2 calibration gas will be applied to the instrument(s) for 90 seconds.

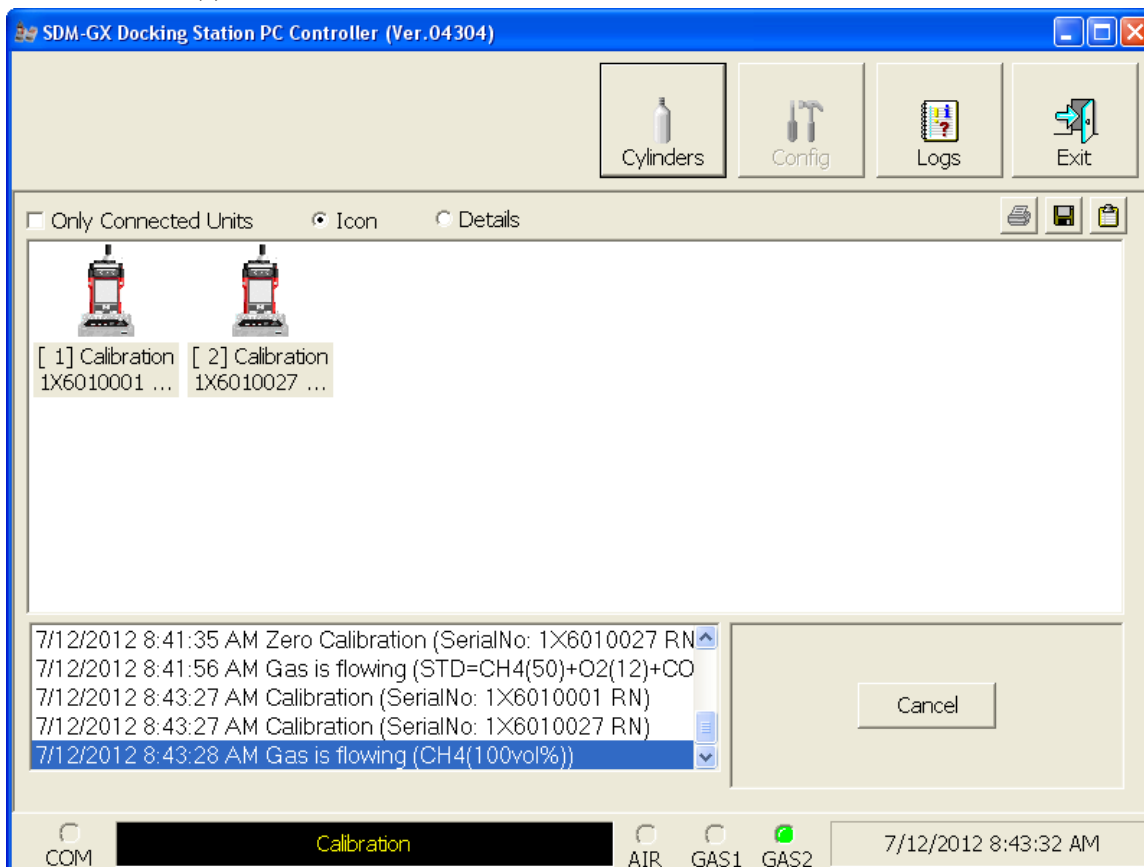


Figure 55: GAS 2 Calibration Gas Flowing

The PC Controller Program will analyze the results.

13. After calibration gas is applied, the docking station will purge with fresh air for 5 seconds if no %volume sensor is installed or 30 seconds if a %volume sensor is installed.

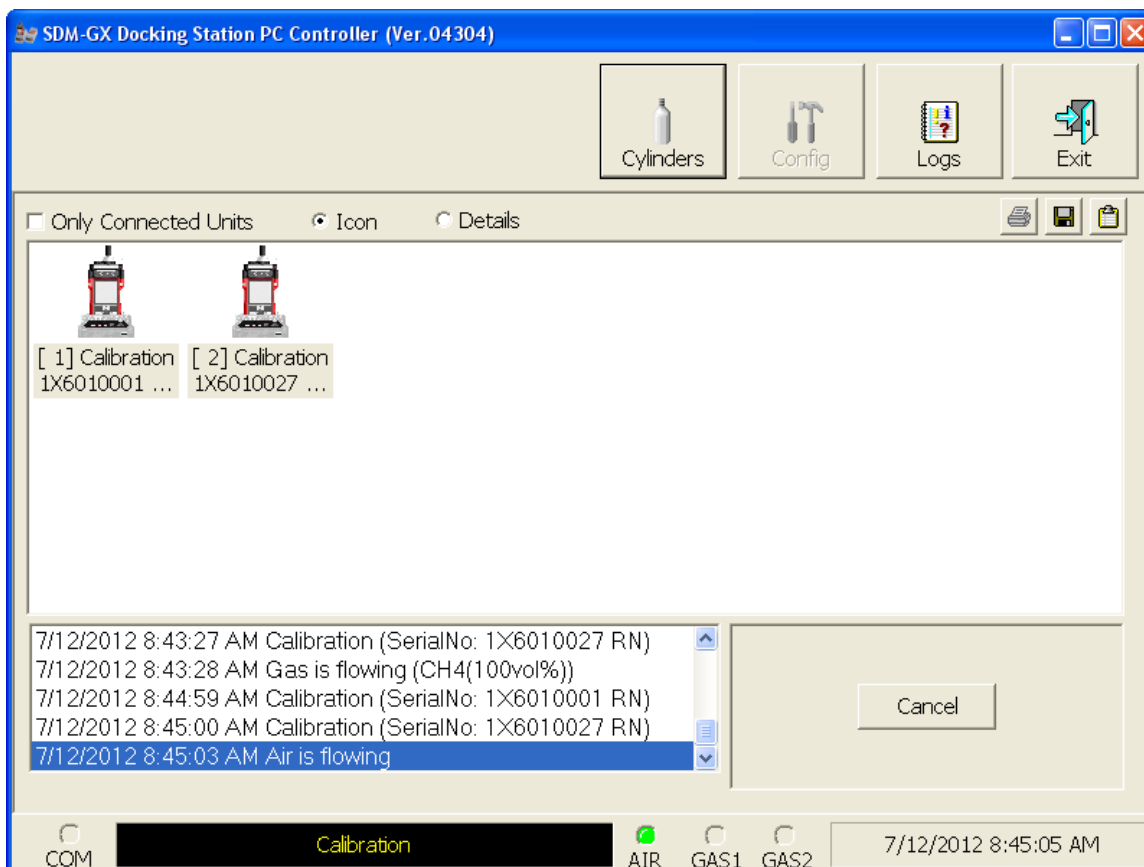


Figure 56: Fresh Air Purge

14. After the fresh air purge is complete,

- If the calibration passes, the following window will open indicating that. The CAL ▲ LED on the SDM-2012 control panel will be solid green. Click OK to return to the main program window. The CAL ▲ LED will turn off.

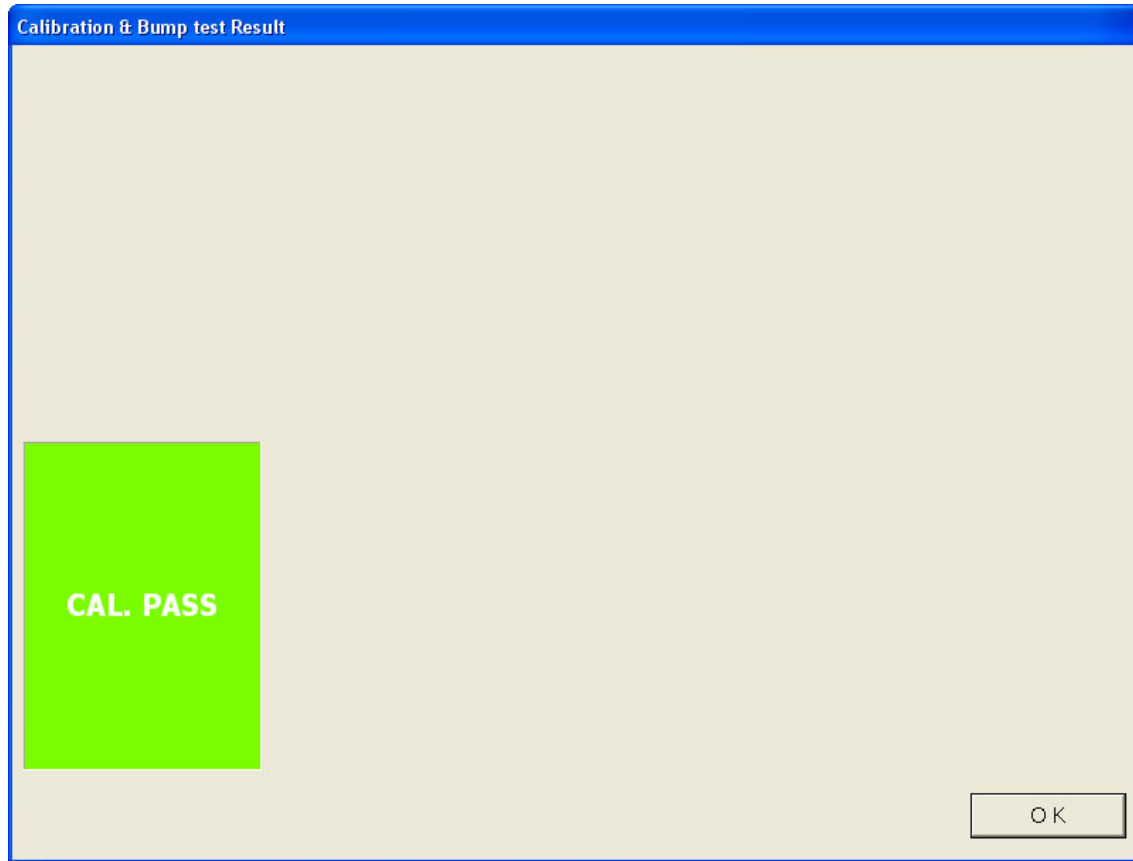


Figure 57: Calibration Passed

- The GX-2012 will automatically be shut off 20 seconds after a successful calibration.

- If the calibration fails, the following window will open indicating which channels failed to calibrate. The CAL ▲ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the calibration results in the Logs window. The CAL ▲ LED on the SDM-2012 control panel will turn off.

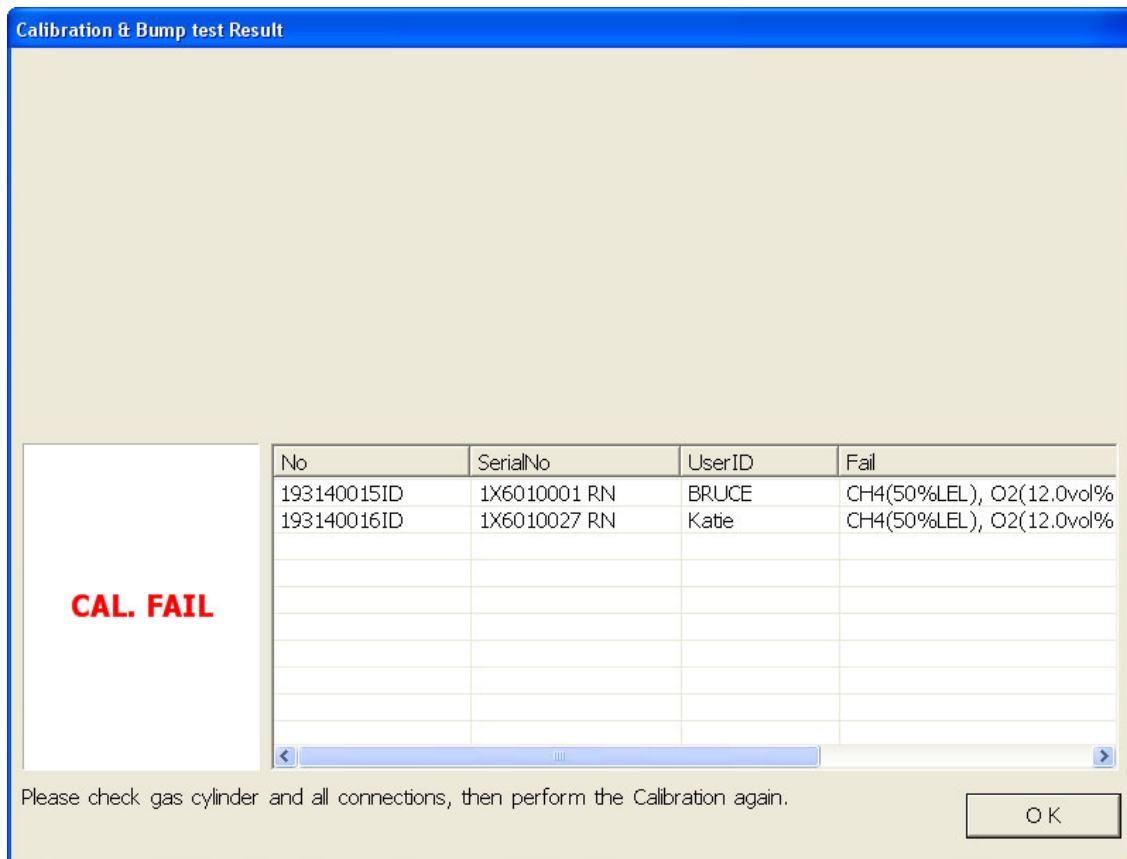


Figure 58: Calibration Failed

- If at any point during the calibration the flow rate to the instrument becomes too low, the PC Controller Program will abort the calibration and display a failed calibration screen. The CAL ▲ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the calibration results in the Logs window. The CAL ▲ LED on the SDM-2012 control panel will turn off. Confirm all tubing connections are correct and that all lines are clear.

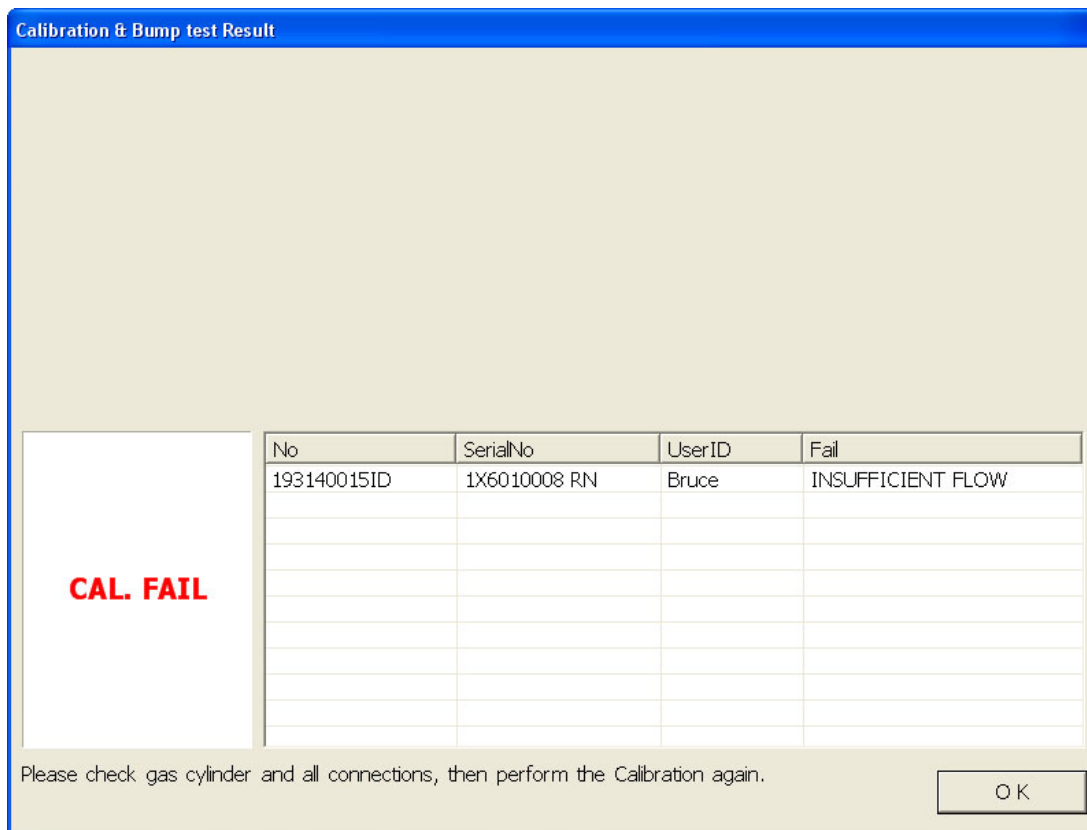


Figure 59: Low Flow Calibration Failure

15. For both calibration result outcomes, the instrument(s) will be displayed in the main program window in Details View. To return to Icons View, click the Icons radio button.
16. When a calibration is performed, any bump test or calibration data that is being stored in the instrument will be downloaded to the PC Controller Program. This data can be viewed in the Logs window along with the results of the calibration just performed. See “Bump Test Data” on page 146 or “Calibration Data” on page 131 for instructions for viewing bump test or calibration data.

CAUTION: *After calibrating the %volume sensor in a GX-2012, remove the instrument from the SDM-2012 and allow the readings to return to fresh air readings before performing any more gas testing on that instrument.*

Bump Testing a Gas Tracer

The following instructions apply to standard Gas Tracers that contain the standard sensors (catalytic LEL, ppm combustible, O₂, and CO). They also apply to Gas Tracers that have a %volume combustible gas sensor installed. See “Bump Testing a GX-2012” on page 60 for instructions to bump test a GX-2012.

CAUTION: *After bump testing the %volume sensor in a Gas Tracer, remove the instrument from the SDM-2012 and allow the readings to return to fresh air readings before performing any more gas testing on that instrument.*

The PC Controller Program is capable of performing a bump test both manually and automatically when a Gas Tracer is connected to it. When a bump test is performed, the PC Controller Program performs an air adjust operation on a Gas Tracer and then applies calibration gas to the instrument. The program analyzes the response results based on predefined criteria and determines if the Gas Tracer passed the bump test.

The criteria that the PC Controller Program uses to determine if the Gas Tracer passes a bump test, whether the Bump Test button is active, and whether or not the PC Controller Program automatically performs a bump test if it is due on a connected Gas Tracer is defined in the Parameter tab of the Configuration Window. See page 39 for a description of the bump test configuration setup.

NOTE: The PC Controller program performs a complete bump test on the ppm combustible sensor first. Be sure that the 500 ppm methane calibration cylinder is connected to the GAS 2 fitting on the back of the SDM-2012 using a 24 inch humidifier tube.

To manually bump test an instrument or instruments:

NOTE: Do not use a 4-gas cylinder or any cylinder that includes H₂S when bump testing a Gas Tracer. H₂S adversely affects the ppm combustible sensor.

1. Establish a connection between the SDM-2012, Gas Tracer, and the PC Controller program as described on page 50.
2. Verify that all of the bump test parameters are set correctly. See page 36 for instructions.
3. Verify that the appropriate calibration gas cylinder(s) are connected to the appropriate SDM-2012(s) or manifold line(s). The ppm sensor will be bump tested first. Be sure that a 24 inch humidifier tube is used to connect the ppm calibration cylinder to the GAS 2 fitting on the back of the SDM-2012 or that a humidifier manifold has been assembled for the GAS 2 fittings (see page 20). If you are using a zero air cylinder for the fresh air adjustment, install a 24 inch humidifier tube between the regulator and the AIR fitting on the back of the SDM-2012.
4. Ensure that the gas out to instrument line is connected to the inlet of the Gas Tracer and that the exhaust line is connected to the exhaust fitting of the Gas Tracer.

5. Select the instrument or instruments you wish to bump test and click on them to highlight them as shown below. To select multiple instruments for bump testing, hold down the Control button on the keyboard as you click them.

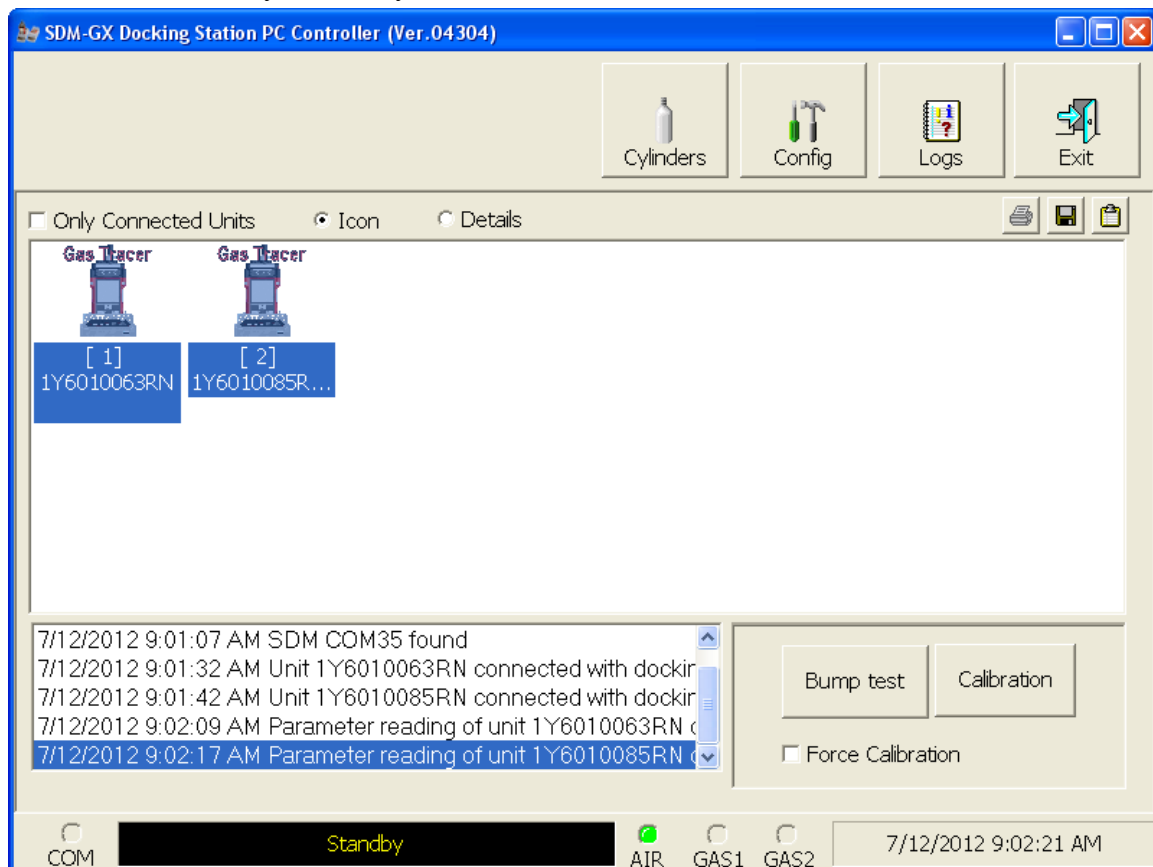


Figure 60: Instrument Selection

6. If you would like an automatic calibration to occur after a failed bump test, select the Force Calibration selection box.
7. Click the Bump test button in the lower right corner of the main program window.

8. You will be asked to confirm which Gas Tracer channels will use GAS 1 for the bump test. The gas concentration shown next to each channel is the auto calibration value for that channel. If it does not match the gas concentration in the cylinder(s), change the auto calibration value for that channel. See page 174 for instructions. The ppm sensor cannot be selected for use with the GAS 1 inlet and must use the GAS 2 inlet. If you are bump testing a Gas Tracer that includes a %volume sensor, the %volume sensor cannot be selected for use with the GAS 1 inlet and must use the GAS 2 inlet.

Gas	GAS1
CH4(500ppm)	
CH4(50%LEL)	<input checked="" type="checkbox"/>
O2(12.0vol%)	<input checked="" type="checkbox"/>
CO(50ppm)	<input checked="" type="checkbox"/>

OK Cancel

Gas	GAS1
CH4(500ppm)	
CH4(50%LEL)	<input checked="" type="checkbox"/>
O2(12.0vol%)	<input checked="" type="checkbox"/>
CO(50ppm)	<input checked="" type="checkbox"/>
CH4(100vol%)	

OK Cancel

Standard Gas Tracer

Standard Gas Tracer Plus %Volume

Figure 61: Gas Cylinder Confirmation Screen

When all of the desired channels are selected, click OK. If you don't want to proceed, click Cancel to abort the bump test.

9. You will then be asked to confirm the auto calibration values and the instruments that the calibration cylinder will be used for. Be sure the auto calibration values match the values listed on the calibration cylinder. The serial number and gas combination of all selected instruments will appear sequentially beneath the gas cylinder concentrations. If you are bump testing a standard Gas Tracer or Gas Tracers (catalytic LEL, ppm combustible, O₂, and CO), the screen will appear as shown below. The ppm sensor will be bump tested first with GAS 2 and then the remaining 3 sensors will be bump tested with GAS 1. The GAS 2 selection box is deselected by default. You must select the GAS 2 box if you wish to bump test the ppm combustible sensor. If you do not wish to bump test the ppm combustible sensor, leave the GAS 2 box deselected.

If the SDM-2012 is not in a fresh air environment, a zero air cylinder must be used with a 24 inch humidifier tube connecting the cylinder to the AIR fitting. Another 24 inch humidifier tube or a humidifier tube manifold must always be used to connect the calibration gas cylinder to the GAS 2 fitting.

GAS2		GAS1
Unit	SerialNo	
	CH4(500ppm)	CH4(50%LEL)
		O2(12.0vol%)
		CO(50ppm)
216010100RN	1	3=CH4+O2+CO
216010094RN	1	3=CH4+O2+CO

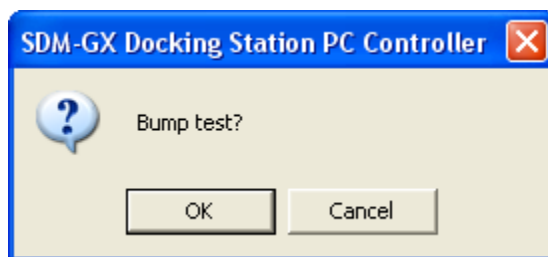
Figure 62: Gas Order Confirmation Screen, Standard Gas Tracer

If you are bump testing a standard Gas Tracer plus a %volume sensor, the screen will appear as shown below and will indicate a gas cylinder change is needed. The ppm sensor will be bump tested first with GAS 2. The standard 3 sensors will then be bump tested using GAS 1. The %volume sensor will then be bump tested with GAS 2. The user must change the GAS 2 cylinder before the %volume sensor can be bump tested. The GAS 2 selection boxes are deselected by default. You must select the GAS 2 boxes if you wish to bump test the ppm combustible sensor and/or the %volume sensor. If you do not wish to bump test the ppm combustible sensor or the %volume sensor, leave the appropriate GAS 2 box deselected. Be sure that the ppm calibration cylinder is connected to the GAS 2 fitting with a 24 inch humidifier tube at the start of the bump test.

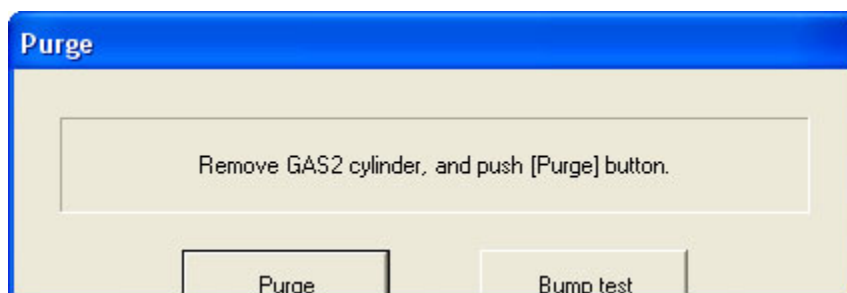
Unit SerialNo	CH4(500ppm)	CH4(50%LEL)	O2(12.0vol%)	CO(50ppm)	CH4(100vol%)
1Y6010063RN	1	3=CH4+O2+CO			1
1Y6010085RN	1	3=CH4+O2+CO			1

Figure 63: Gas Order Confirmation Screen, Standard Gas Tracer Plus %Volume Sensor

10. Click OK. You will be asked if you want to bump test the instrument(s). Click OK to proceed. If you don't want to proceed with the bump test, click Cancel to return to the main program window.

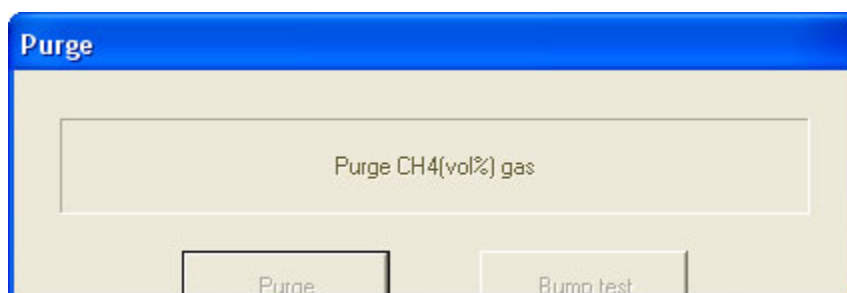


11. If a bump test or calibration has already been performed by the PC Controller program on a GX-2012 or a Gas Tracer with a %volume sensor installed, the docking station will perform a purge before beginning the bump test. The purge ensures that any %volume calibration gas does not come in contact with the ppm sensor and affect its readings. The screen will indicate that you need to remove the gas cylinder from the GAS 2 fitting on the back of the SDM-2012.

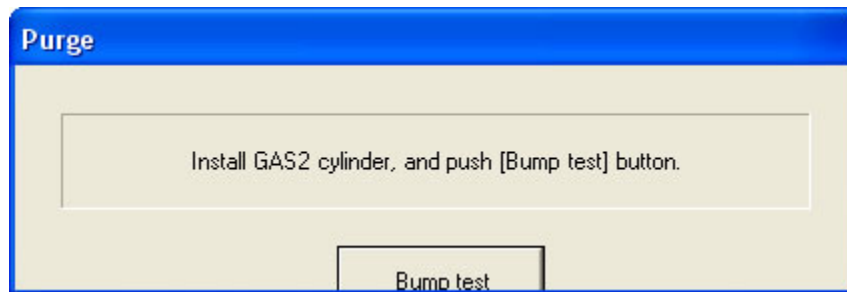


If the previous instrument tested did not include a %volume sensor, the program will proceed as described in step 15.

12. Remove any connected cylinder from the GAS 2 fitting and click the Purge button. The SDM-2012 will purge for 30 seconds.



13. At the end of the purge cycle, you will be prompted to reconnect the calibration cylinder to the GAS 2 fitting.



14. Reconnect the ppm calibration cylinder to the GAS 2 fitting and click the Bump test button.
15. The pump will start and the program will indicate that air is flowing. The AIR indicator on the program screen will be on. The BUMP ▼ LED on the SDM-2012 control panel will be flashing amber. Air will be applied to the ppm sensor for 15 seconds, then the PC Controller Program will perform a zero adjustment on the ppm channel.

If at any point during the bump test you wish to cancel the bump test, click the Cancel button in the lower right corner of the screen. The bump test will be aborted and the BUMP ▼ LED will turn solid amber.

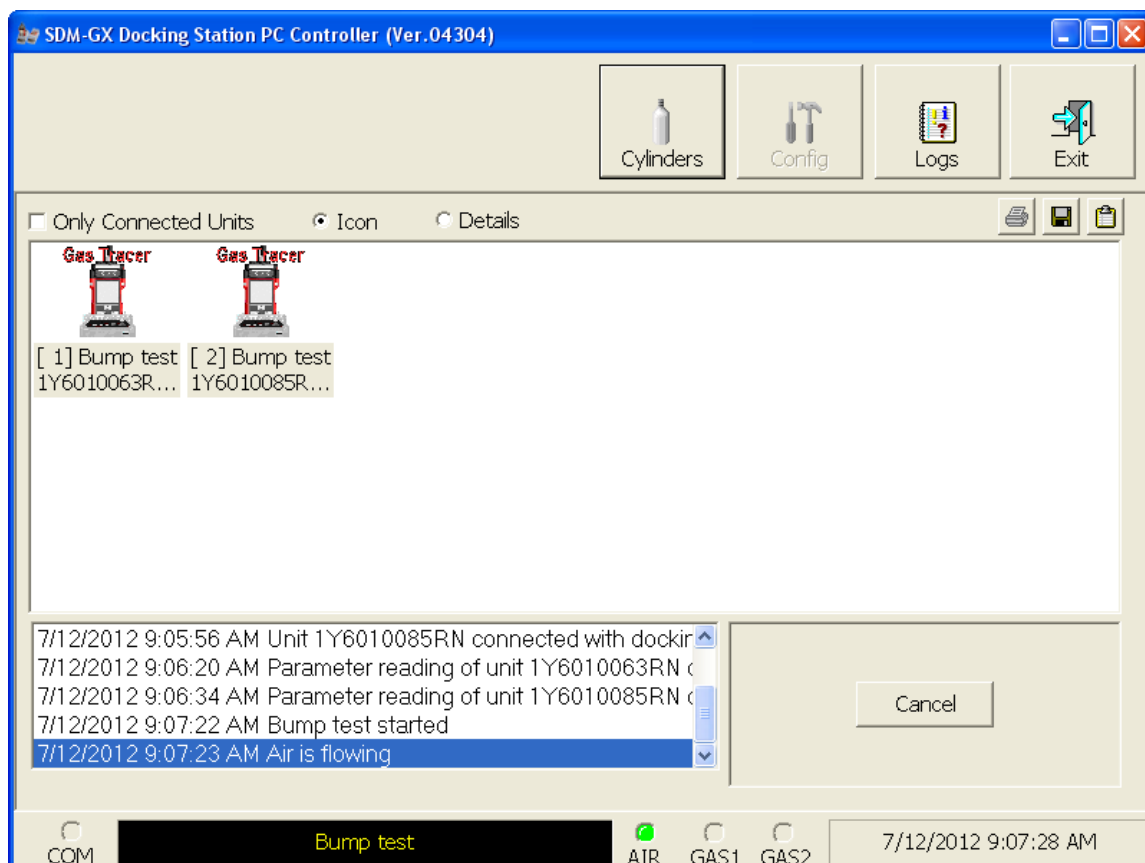


Figure 64: Air Flowing to PPM Sensor

The PC Controller Program will analyze the zero adjustment results. If the ppm sensor failed the zero adjustment, the bump test will be aborted.

16. After air is applied, and if the ppm sensor passed the zero adjustment, calibration gas from the GAS 2 cylinder will be applied to the ppm sensor. The GAS 2 indicator on the program screen will come on and calibration gas will be applied to the ppm sensor for the duration specified in the Gas Exposure Time parameter in the Configuration Window.

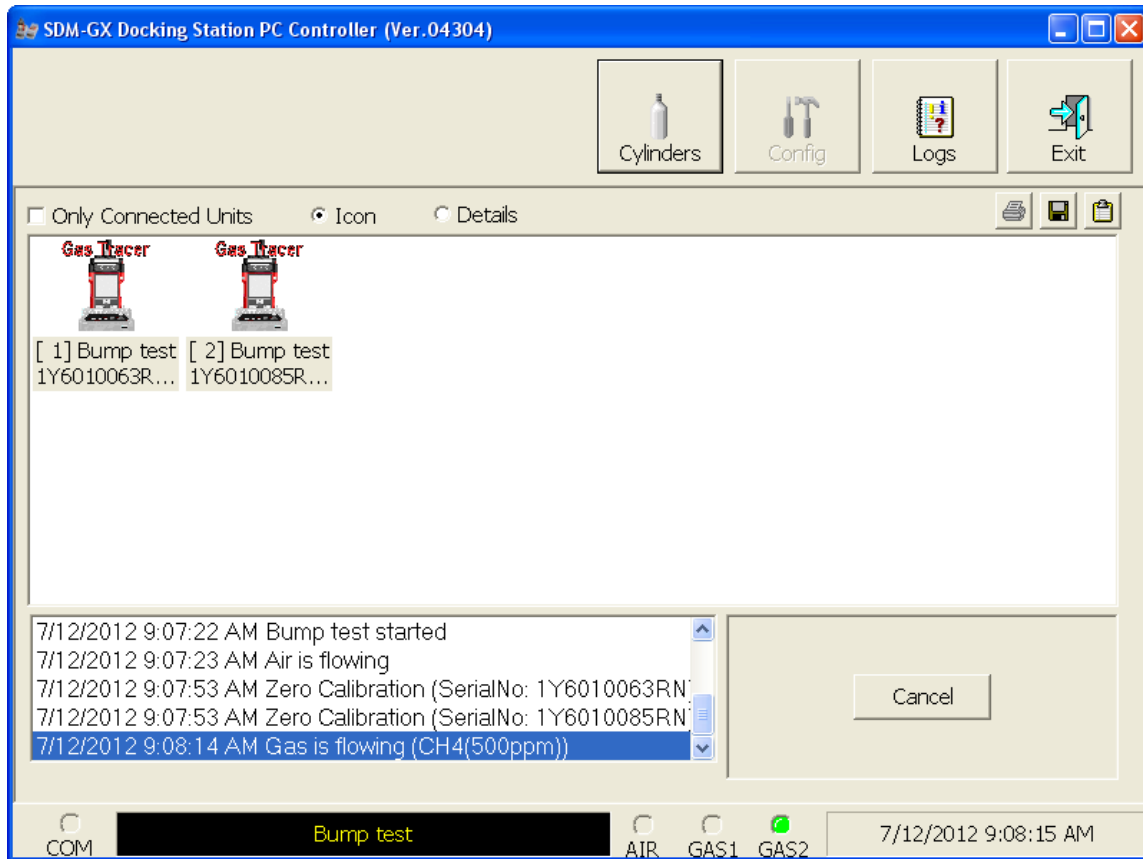


Figure 65: GAS 2 PPM Gas Flowing

The PC Controller program will analyze the results. If the bump test on the ppm sensor fails and Force Calibration is selected, a calibration will automatically begin on the ppm sensor and GAS 2 calibration gas will continue to flow.

17. After calibration gas has been applied to the ppm sensor, fresh air will be applied to the standard 3 sensors (catalytic LEL, O₂, and CO) and the %volume sensor (if installed) for 45 seconds and the PC Controller program will perform a zero adjustment.

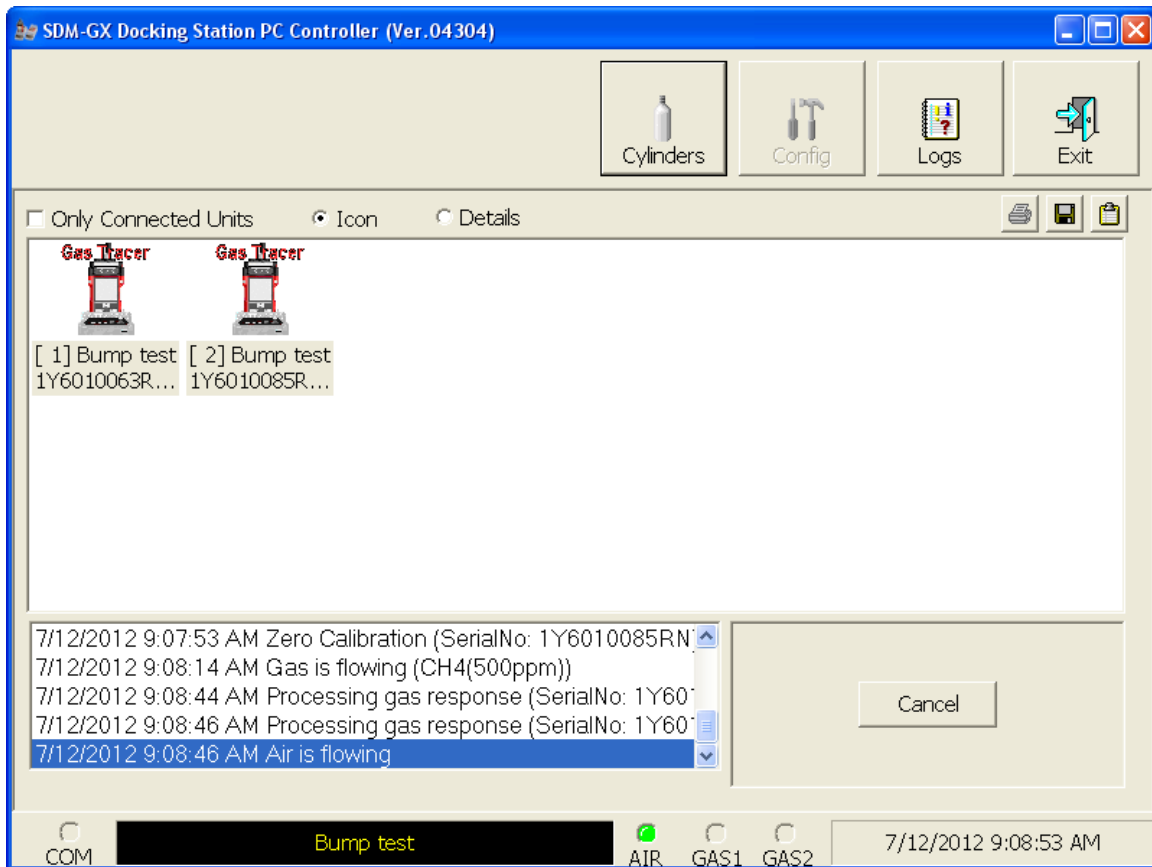


Figure 66: Air Flowing to Standard 3 Sensors

The PC Controller Program will analyze the zero adjustment results. If any of the standard 3 sensors or %volume sensor (if installed) failed the zero adjustment, the bump test will be aborted.

18. After air is applied, and if all standard 3 channels and the %volume channel (if installed) passed the zero adjustment, calibration gas from the GAS 1 cylinder will be applied. The GAS 1 indicator on the program screen will come on and calibration gas will be applied to the instrument(s) for the duration specified in the Gas Exposure Time parameter in the Configuration Window.

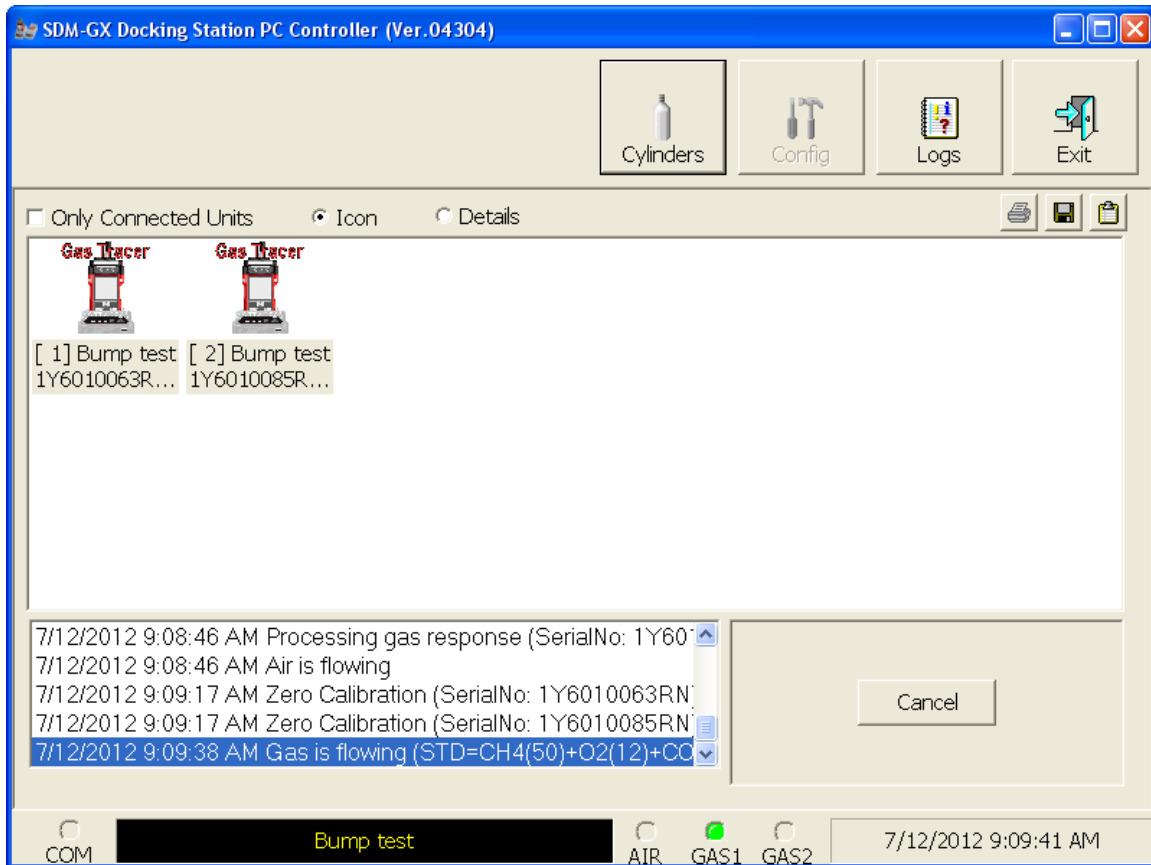
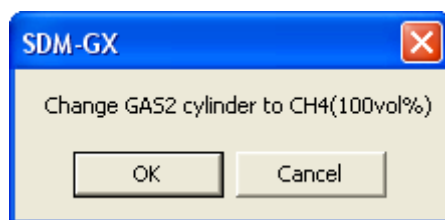


Figure 67: GAS 1 Flowing

The PC Controller Program will analyze the results. If the bump test on the standard 3 sensors fails and Force Calibration is selected, a calibration will automatically begin on the standard 3 sensors and GAS 1 calibration gas will continue to flow.

19. If you are not bump testing an instrument or instruments with a %volume sensor installed, continue to step 22.

If you are bump testing an instrument or instruments with a %volume sensor installed, you will be prompted to change the GAS 2 cylinder. The pump(s) on the instrument(s) will stop.



20. Change the cylinder connected to the GAS 2 fitting to the %volume calibration cylinder.
21. When you have changed the GAS 2 cylinder, click OK. The bump test will continue and the second GAS 2 calibration gas will be applied to the %volume sensor for the duration specified in the Gas Exposure Time parameter in the Configuration Window.

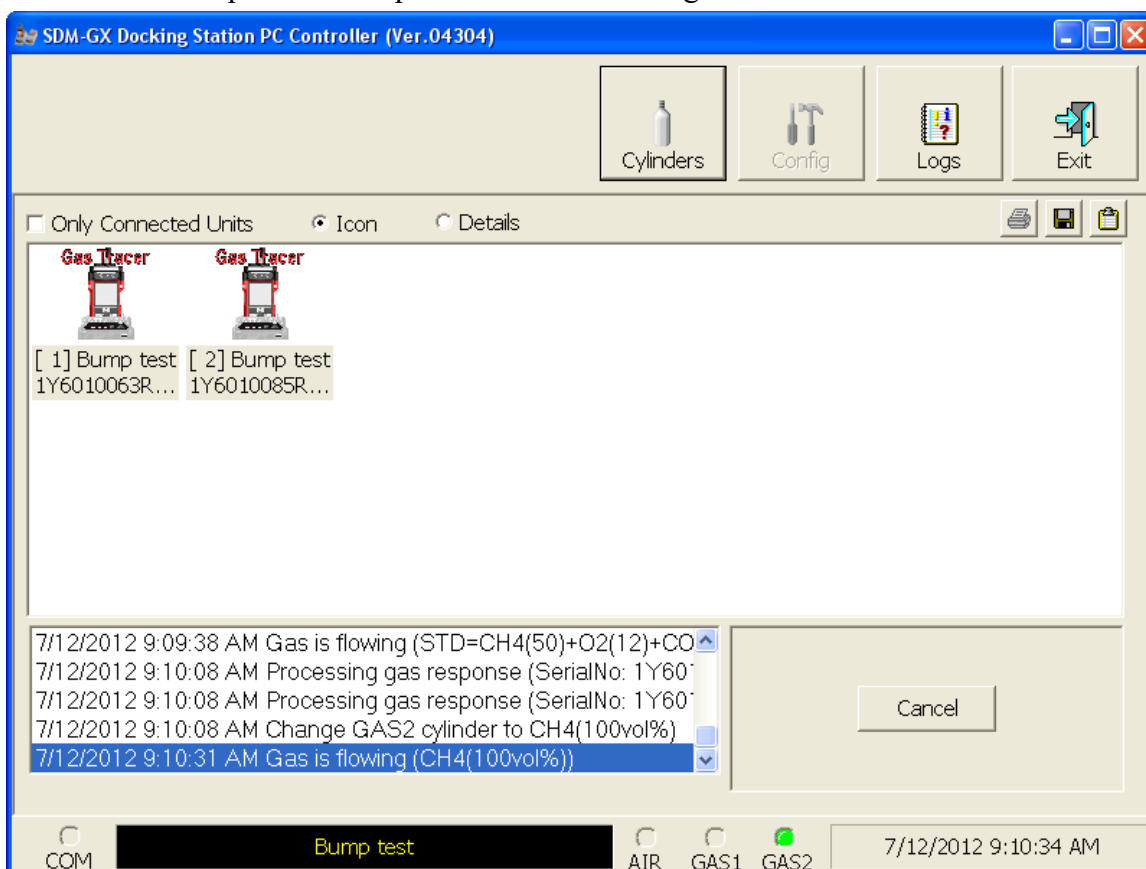


Figure 68: %Volume GAS 2 Flowing

The PC Controller Program will analyze the results. If the bump test on the %volume sensor fails and Force Calibration is selected, a calibration will automatically begin and GAS 2 calibration gas will continue to flow.

22. After GAS 2 calibration gas has been applied, the docking station will purge with fresh air for 5 seconds if no %volume sensor is installed or 30 seconds if a %volume sensor is installed.

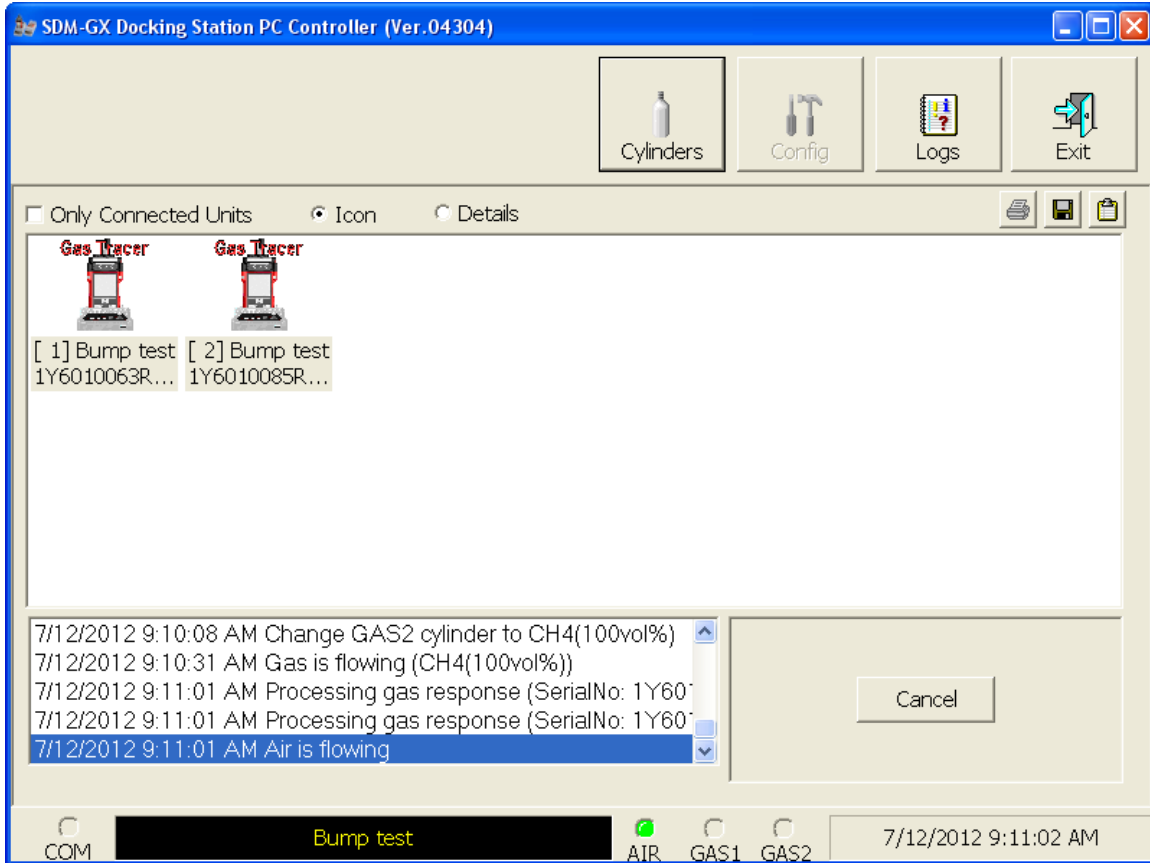


Figure 69: Fresh Air Purge

23. After the fresh air purge is complete,

- If the bump test passes, the following window will open indicating that. The BUMP ▼ LED will be solid green. Click OK to return to the main program window. The BUMP ▼ LED will turn off.

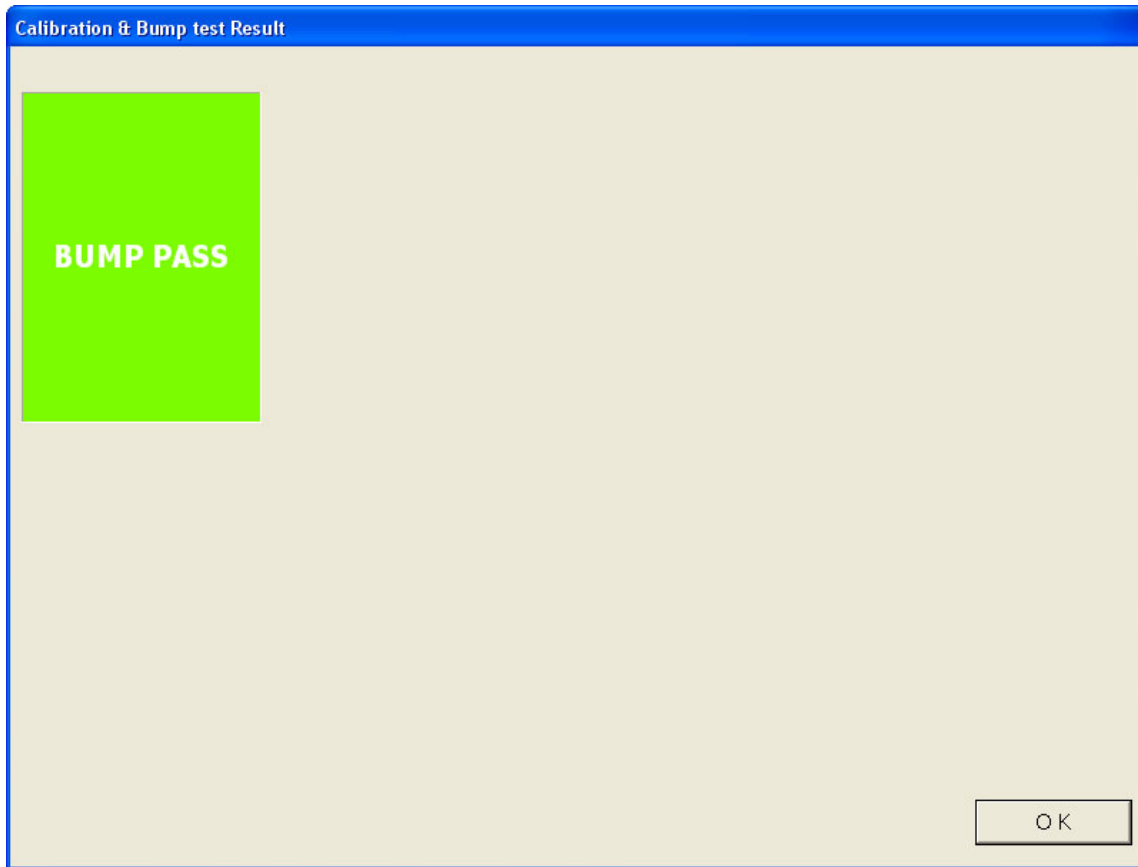


Figure 70: Bump Test Passed

- The Gas Tracer will automatically be shut off 20 seconds after a successful bump test.

- If the bump test fails and the Force Calibration box was not selected, the following window will open indicating which channels failed the bump test. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the bump test results in the Logs window. The BUMP ▼ LED on the SDM-2012 control panel will turn off.

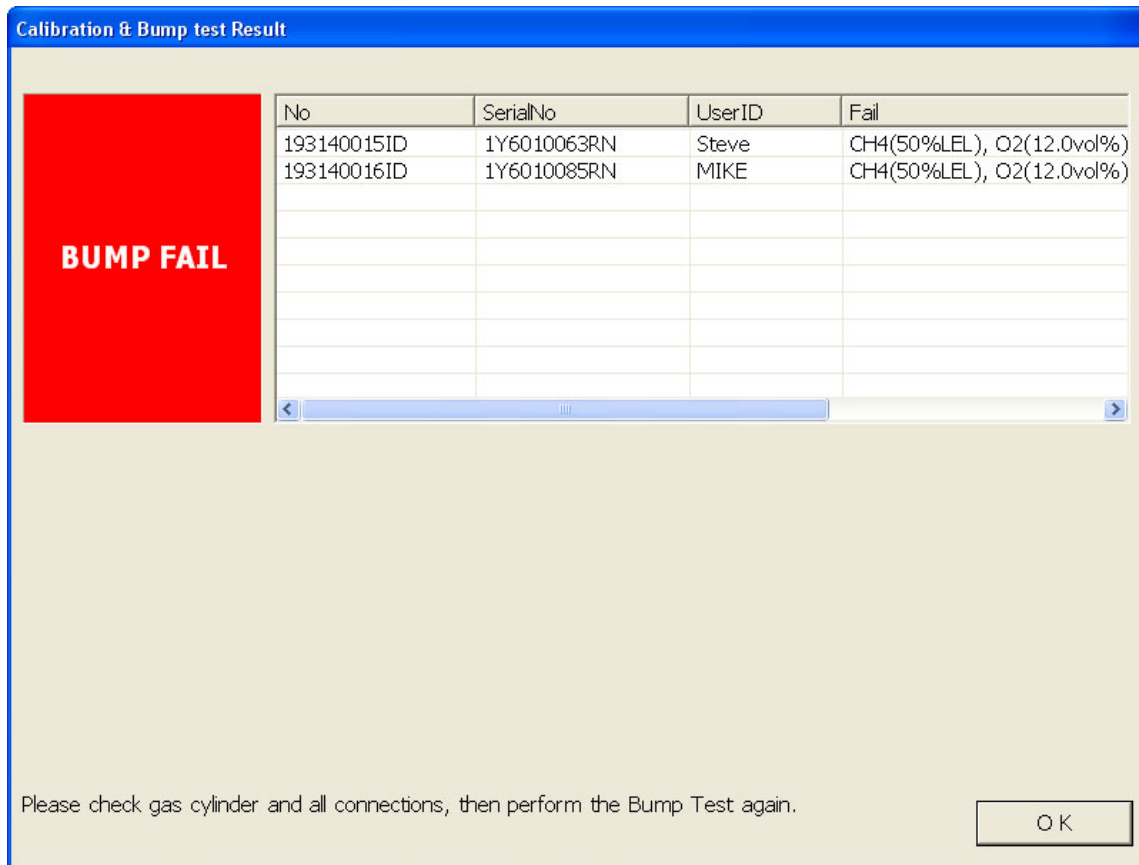


Figure 71: Bump Test Failed

- If the bump test fails and the Force Calibration box was selected, the SDM-2012 automatically performs a calibration immediately after the failed bump test. The results screen will indicate the results of both the bump test and calibration. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. The CAL ▲ LED will be solid green if the calibration passed or solid red if the calibration failed. Click OK to return to the main program window or double click an instrument information line to view the bump test or calibration results in the Logs window. The BUMP ▼ LED and CAL ▲ LED on the SDM-2012 control panel will turn off.

Calibration & Bump test Result

No	SerialNo	UserID	Fail
193140015ID	1Y6010063RN	Steve	CH4(50%LEL), O2(12.0vol%)
193140016ID	1Y6010085RN	MIKE	CH4(50%LEL), O2(12.0vol%)

BUMP FAIL

No	SerialNo	UserID	Fail
193140016ID	1Y6010085RN	MIKE	CH4(50%LEL), O2(12.0vol%)

CAL. FAIL

Please check gas cylinder and all connections, then perform the Calibration again.

OK

Figure 72: Bump Test Failed/Calibration Failed

- If at any point during the bump test the flow rate to the instrument becomes too low, the PC Controller Program will abort the bump test and display a failed bump test screen. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click an instrument information line to view the bump test or calibration results in the Logs window. The BUMP ▼ LED on the SDM-2012 control panel will turn off. Confirm that all tubing connections are correct and that all lines are clear.

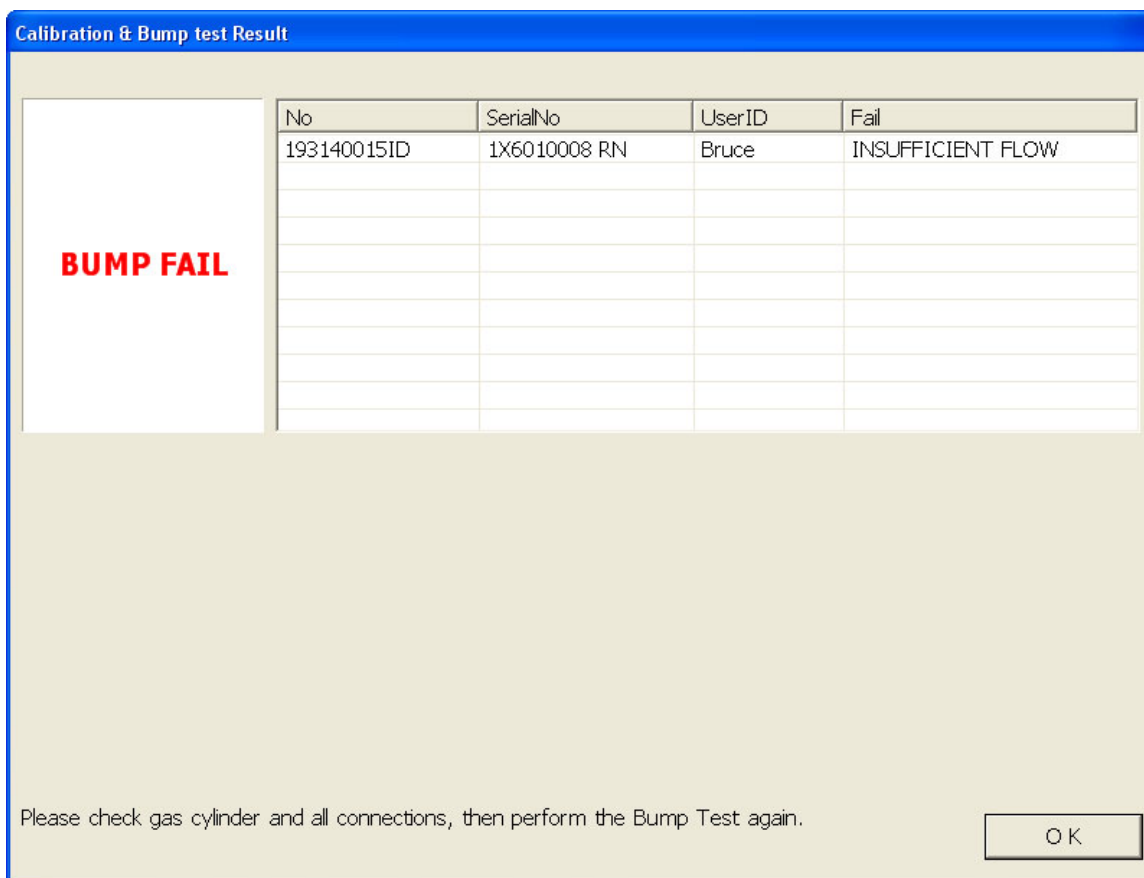


Figure 73: Low Flow Bump Test Failure

24. For all bump test result outcomes, the instruments will be displayed in the main program window in Details View. To return the main program window to Icons View, click the Icons radio button.
25. All bump test results can be viewed in the Logs window. See page 146 for instructions for viewing bump test data.

CAUTION: *After bump testing the %volume sensor in a Gas Tracer, remove the instrument from the SDM-2012 and allow the readings to return to fresh air readings before performing any more gas testing on that instrument.*

Calibrating a Gas Tracer

The following instructions apply to standard Gas Tracers that contain the standard sensors (catalytic LEL, ppm combustible, O₂, and CO). They also apply to Gas Tracers that have a %volume combustible gas sensor installed. See “Calibrating a GX-2012” on page 73 for instructions to calibrate a GX-2012.

CAUTION: *After calibrating the %volume sensor in a Gas Tracer, remove the instrument from the SDM-2012 and allow the readings to return to fresh air readings before performing any more gas testing on that instrument.*

The PC Controller Program is capable of performing a calibration both manually and automatically on a Gas Tracer. When a calibration is performed, the PC Controller Program performs an air adjust operation on a Gas Tracer and then applies calibration gas to the Gas Tracer. The PC Controller Program analyzes the calibration results and determines if the Gas Tracer passed the calibration.

NOTE: The PC Controller program performs a complete calibration on the ppm combustible sensor first. Be sure that the 500 ppm methane calibration cylinder is connected to the GAS 2 fitting on the back of the SDM-2012 using a 24 inch humidifier tube.

To manually calibrate an instrument or instruments:

NOTE: Do not use a 4-gas cylinder or any cylinder that includes H₂S when calibrating a Gas Tracer. H₂S adversely affects the ppm combustible sensor.

1. Establish a connection between the SDM-2012, Gas Tracer, and the PC Controller program as described on page 50.
2. Verify that all of the calibration parameters are set correctly. See page 36 for instructions.
3. Verify that the appropriate calibration gas cylinder(s) are connected to the appropriate SDM-2012(s) or manifold line(s). The ppm sensor will be bump tested first. Be sure that a 24 inch humidifier tube is used to connect the ppm calibration cylinder to the GAS 2 fitting on the back of the SDM-2012 or that a humidifier manifold has been assembled for the GAS 2 fittings (see page 20). If you are using a zero air cylinder for the fresh air adjustment, install a 24 inch humidifier tube between the regulator and the AIR fitting on the back of the SDM-2012.
4. Ensure that the gas out to instrument line is connected to the inlet of the Gas Tracer and that the exhaust line is connected to the exhaust fitting of the Gas Tracer.

5. Select the instrument or instruments you wish to calibrate and click on them to highlight them as shown below. To select multiple instruments for calibration, hold down the Control button on the keyboard as you click them.

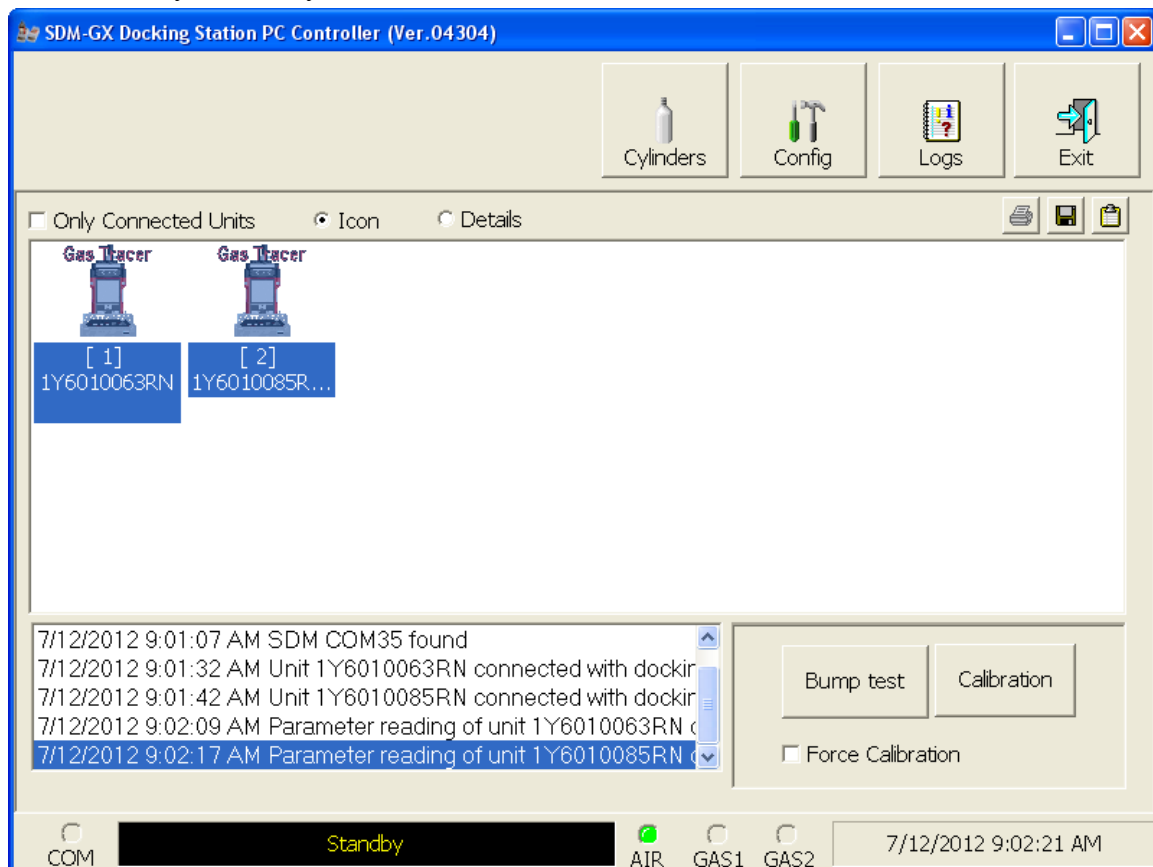


Figure 74: Instrument Selection

6. Click the Calibration button in the lower right corner of the computer program screen.

7. You will be asked to confirm which Gas Tracer channels will use GAS 1 for the calibration. The gas concentration shown next to each channel is the auto calibration value for that channel. If it does not match the gas concentration in the cylinder(s), change the auto calibration value for that channel. See page 174 for instructions. The ppm sensor cannot be selected for use with the GAS 1 inlet and must use the GAS 2 inlet. If you are calibrating a Gas Tracer that includes a %volume sensor, the %volume sensor cannot be selected for use with the GAS 1 inlet and must use the GAS 2 inlet.

Gas	GAS1
CH4(500ppm)	
CH4(50%LEL)	<input checked="" type="checkbox"/>
O2(12.0vol%)	<input checked="" type="checkbox"/>
CO(50ppm)	<input checked="" type="checkbox"/>

Standard Gas Tracer

Gas	GAS1
CH4(500ppm)	
CH4(50%LEL)	<input checked="" type="checkbox"/>
O2(12.0vol%)	<input checked="" type="checkbox"/>
CO(50ppm)	<input checked="" type="checkbox"/>
CH4(100vol%)	<input checked="" type="checkbox"/>

Standard Gas Tracer Plus %Volume

Figure 75: Gas Cylinder Confirmation Screen

When all of the desired channels are selected, click OK. If you don't want to proceed, click Cancel to abort the calibration.

8. You will then be asked to confirm the auto calibration values and the instruments that the calibration cylinder will be used for. Be sure the auto calibration values match the values listed on the calibration cylinder. The serial number and gas combination of all selected instruments will appear sequentially beneath the gas cylinder concentrations. If you are calibrating a standard Gas Tracer or Gas Tracers (catalytic LEL, ppm combustible, O₂, and CO), the screen will appear as shown below. The ppm sensor will be calibrated first with GAS 2 and then the remaining 3 sensors will be calibrated with GAS 1. If you do not wish to calibrate the ppm sensor, the GAS 2 box can be deselected. The GAS 2 selection box is deselected by default. You must select the GAS 2 box if you wish to calibrate the ppm combustible sensor. If you do not wish to calibrate the ppm combustible sensor, leave the GAS 2 box deselected.

If the SDM-2012 is not in a fresh air environment, a zero air cylinder must be used with a 24 inch humidifier tube connecting the cylinder to the AIR fitting. Another 24 inch humidifier tube must always be used to connect the calibration gas cylinder to the GAS 2 fitting.

Unit SerialNo	
	CH4(50%LEL)
	O2(12.0vol%)
	CO(50ppm)
	H2S(25.0ppm)
1X6010001 RN	4=CH4+O2+CO+H2S
1X6010008 RN	4=CH4+O2+CO+H2S

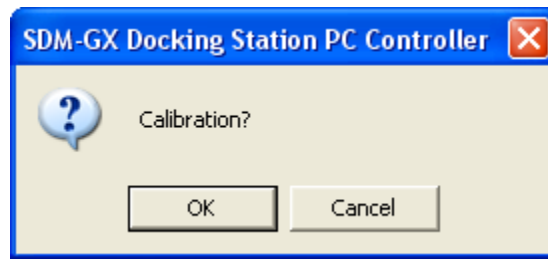
Figure 76: Gas Order Confirmation Screen, Standard Gas Tracer

If you are calibrating a standard Gas Tracer plus a %volume sensor, the screen will appear as shown below and will indicate a gas cylinder change is needed. The ppm sensor will be calibrated first with GAS 2. The standard 3 sensors will then be calibrated using GAS 1. The %volume sensor will then be calibrated with GAS 2. The user must change the GAS 2 cylinder before the %volume sensor can be calibrated. The GAS 2 selection boxes are deselected by default. You must select the GAS 2 boxes if you wish to calibrate the ppm combustible sensor and/or the %volume sensor. If you do not wish to calibrate the ppm combustible sensor or the %volume sensor, leave the appropriate GAS 2 box deselected. Be sure that the ppm calibration cylinder is connected to the GAS 2 fitting at the start of the calibration.

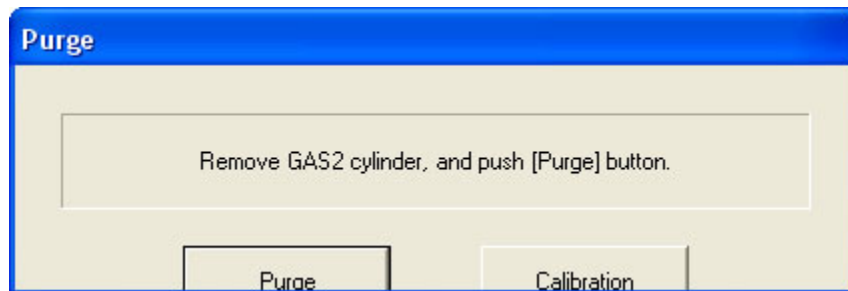
Unit SerialNo	GAS2	GAS1
	CH4(500ppm)	CH4(50%LEL)
		O2(12.0vol%)
		CO(50ppm)
216010100RN	1	3=CH4+O2+CO
216010094RN	1	3=CH4+O2+CO

Figure 77: Gas Order Confirmation Screen, Standard Gas Tracer Plus %Volume Sensor

9. Click OK. You will be asked if you want to calibrate the instrument(s). Click OK to proceed. If you don't want to proceed with the calibration, click Cancel to return to the main program window.

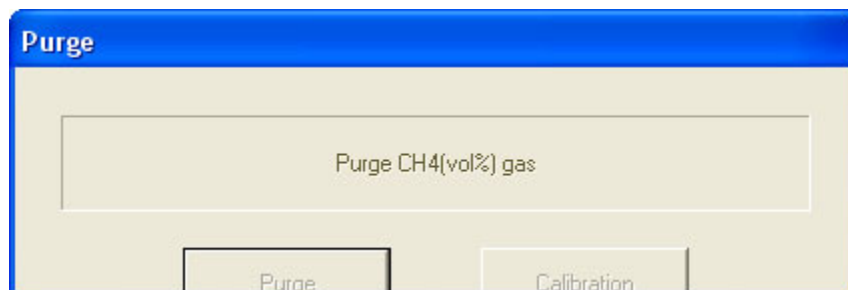


10. If a bump test or calibration has already been performed by the PC Controller program on a GX-2012 or a Gas Tracer with a %volume sensor installed, the docking station will perform a purge before beginning the calibration. The purge ensures that any %volume calibration gas does not come in contact with the ppm sensor and affect its readings. The screen will indicate that you need to remove the gas cylinder from the GAS 2 fitting on the back of the SDM-2012.

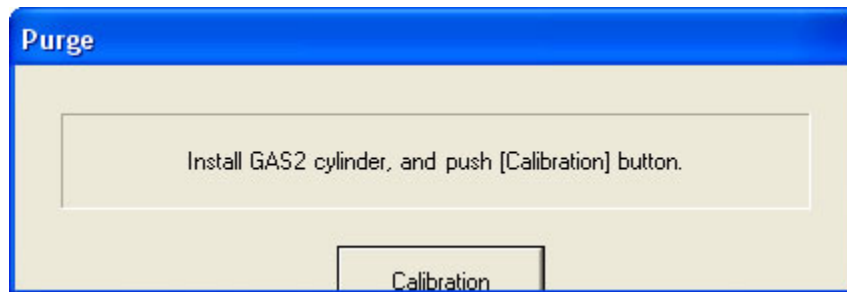


If the previous instrument tested did not include a %volume sensor, the program will proceed as described in step 14.

11. Remove any connected cylinder from the GAS 2 fitting and click the Purge button. The SDM-2012 will purge for 30 seconds.



12. At the end of the purge cycle, you will be prompted to reconnect the calibration cylinder to the GAS 2 fitting.



13. Reconnect the ppm calibration cylinder to the GAS 2 fitting and click the Calibration button.
14. The pump will start and the program will indicate that air is flowing. The AIR indicator on the program screen will be on. The CAL ▲ LED will begin to flash amber. Air will be applied to the ppm sensor for 15 seconds, then the PC Controller Program will perform a zero adjustment on the ppm sensor.

If at any point during the calibration you wish to cancel the calibration, click the Cancel button in the lower right corner of the screen. The calibration will be aborted and the CAL ▲ LED will turn solid amber.

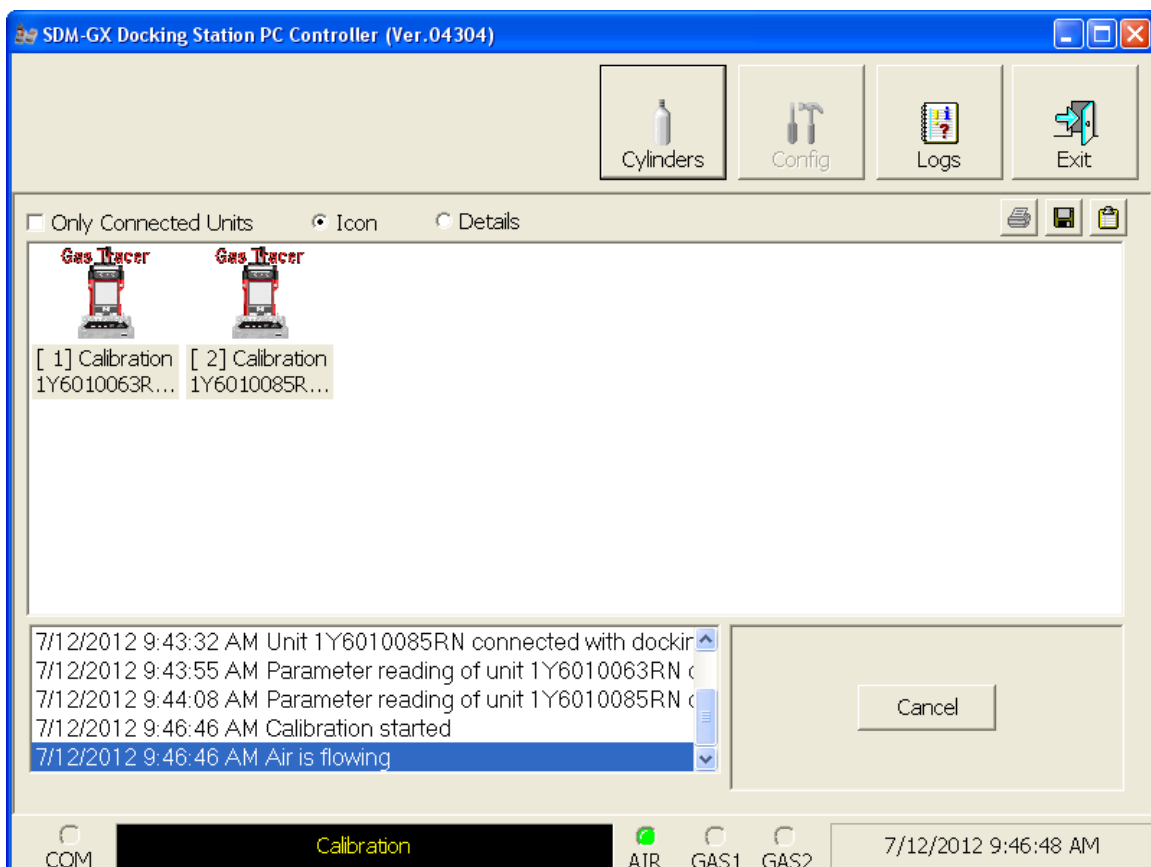


Figure 78: Air Flowing, PPM Sensor

The PC Controller Program will analyze the zero adjustment results. If the ppm sensor failed the zero adjustment, the calibration will be aborted.

15. After air is applied, and if the ppm sensor passed the zero adjustment, calibration gas from the GAS 2 cylinder will be applied to the ppm sensor. The GAS 2 indicator on the program screen will come on and calibration gas will be applied to the ppm sensor for 90 seconds.

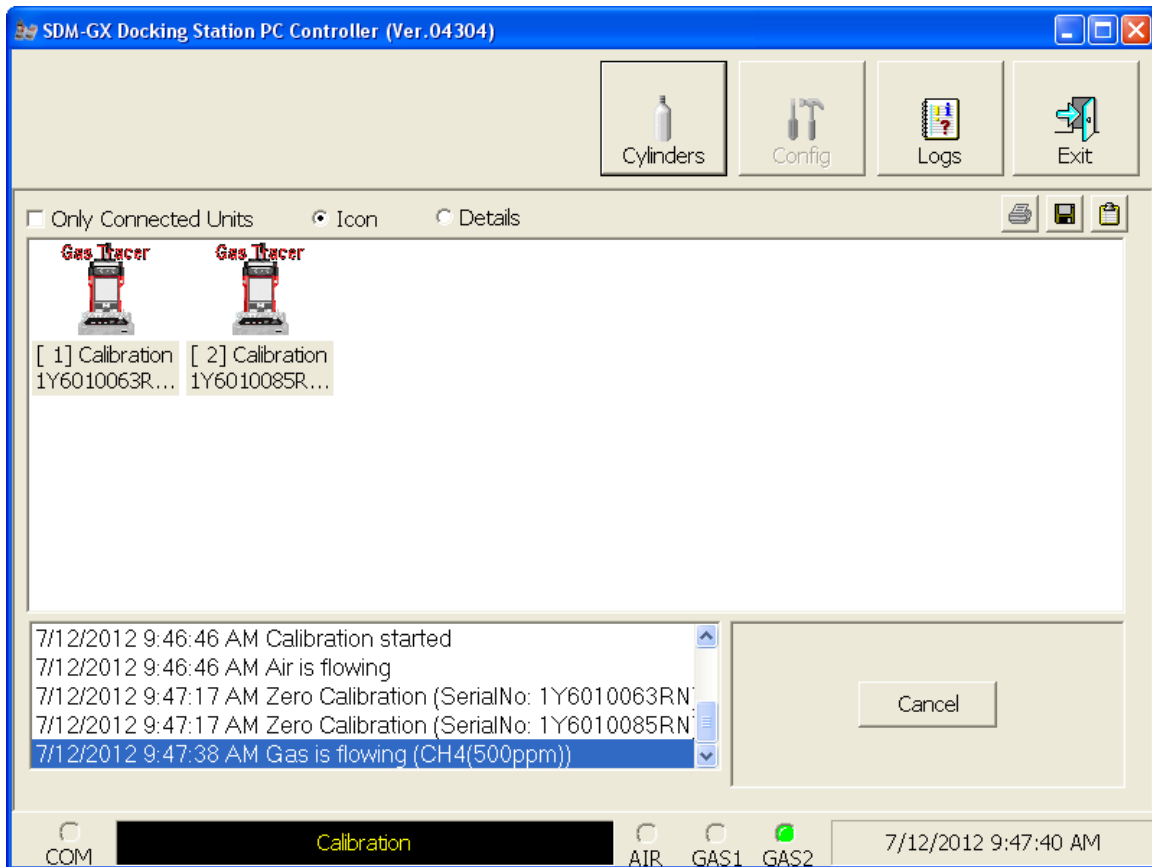


Figure 79: GAS 2 PPM Gas Flowing

The PC Controller program will analyze the results.

16. After calibration gas has been applied to the ppm sensor, fresh air will be applied to the standard 3 sensors (catalytic LEL, O₂, and CO) and the %volume sensor (if installed) for 45 seconds and the PC Controller program will perform a zero adjustment.

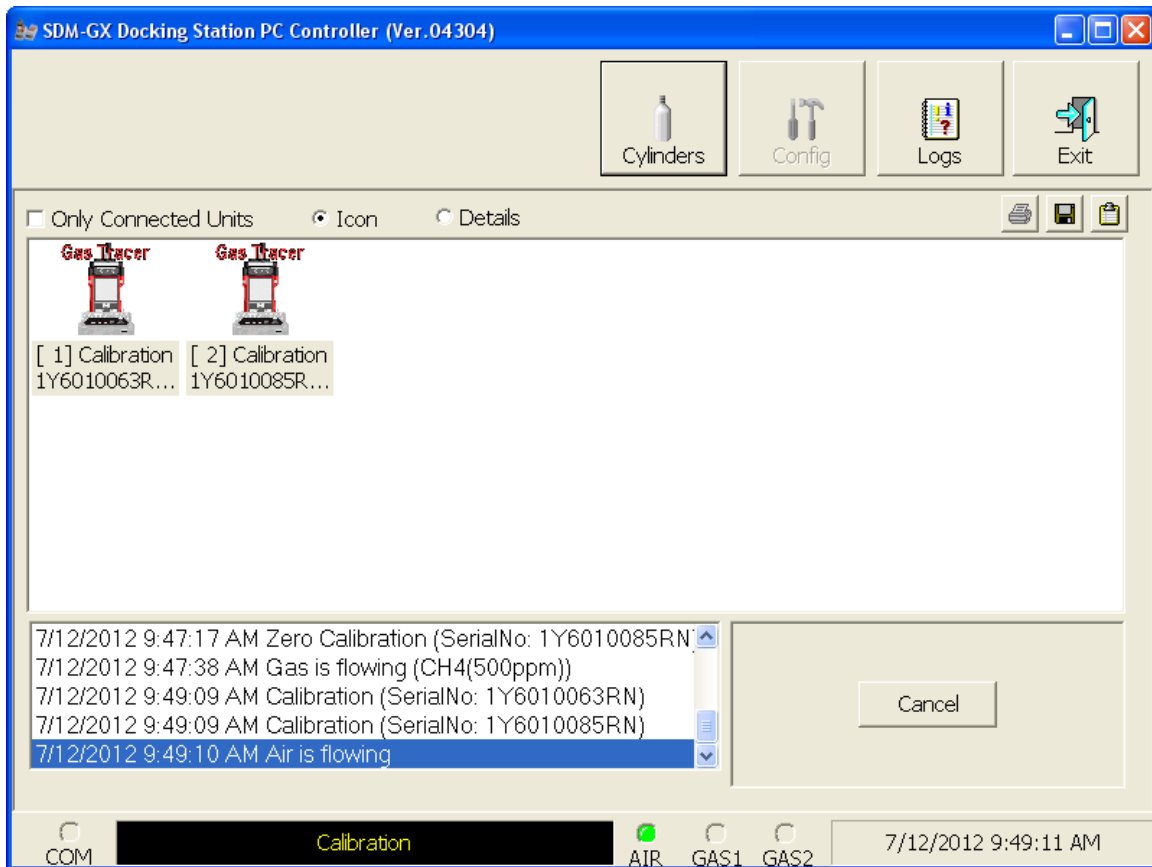


Figure 80: Air Flowing to Standard 3 Sensors

The PC Controller Program will analyze the zero adjustment results. If any of the standard 3 sensors or the %volume sensor (if installed) failed the zero adjustment, the calibration will be aborted.

17. After air is applied, and if all 3 channels and the %volume channel (if installed) passed the zero adjustment, calibration gas from the GAS 1 cylinder will be applied. The GAS 1 indicator on the program screen will come on. GAS 1 calibration gas will be applied to the instrument(s) for 90 seconds.

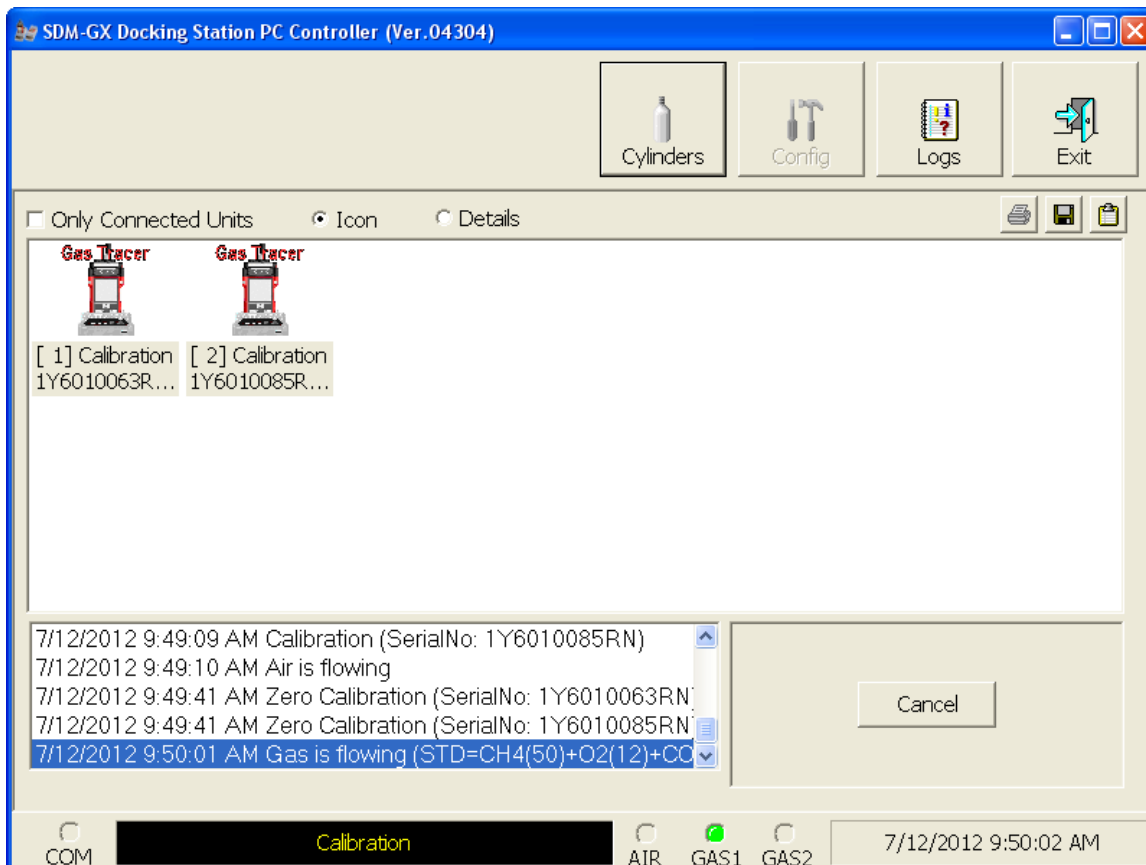
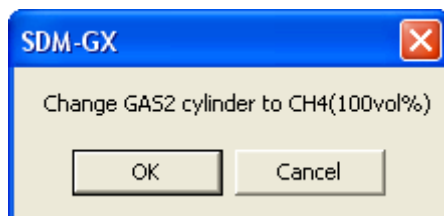


Figure 81: GAS 1 Flowing

The PC Controller Program will analyze the results.

18. If you are not calibrating an instrument or instruments with a %volume sensor installed, continue to step 22.

If you are calibrating an instrument or instruments with a %volume sensor installed, you will be prompted to change the GAS 2 cylinder. The pump(s) on the instrument(s) will stop.



19. Change the cylinder connected to the GAS 2 fitting to the %volume calibration cylinder.

20. When you have changed the GAS 2 cylinder, click OK. The calibration will continue and the second GAS 2 calibration gas will be applied to the %volume sensor for 90 seconds.

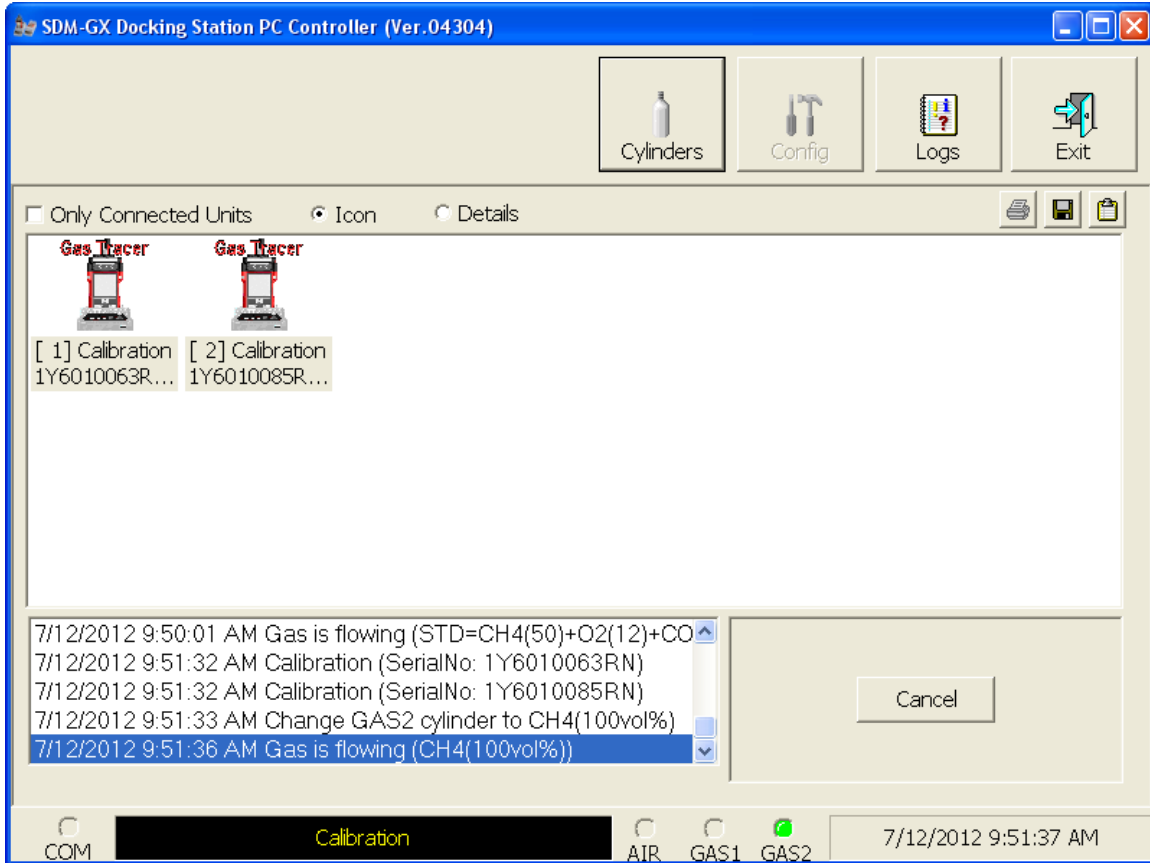


Figure 82: %Volume GAS 2 Flowing

The PC Controller Program will analyze the results.

21. After calibration gas is applied, the docking stations will purge with fresh air for 5 seconds if no %volume sensor is installed or 30 seconds if a %volume sensor is installed.

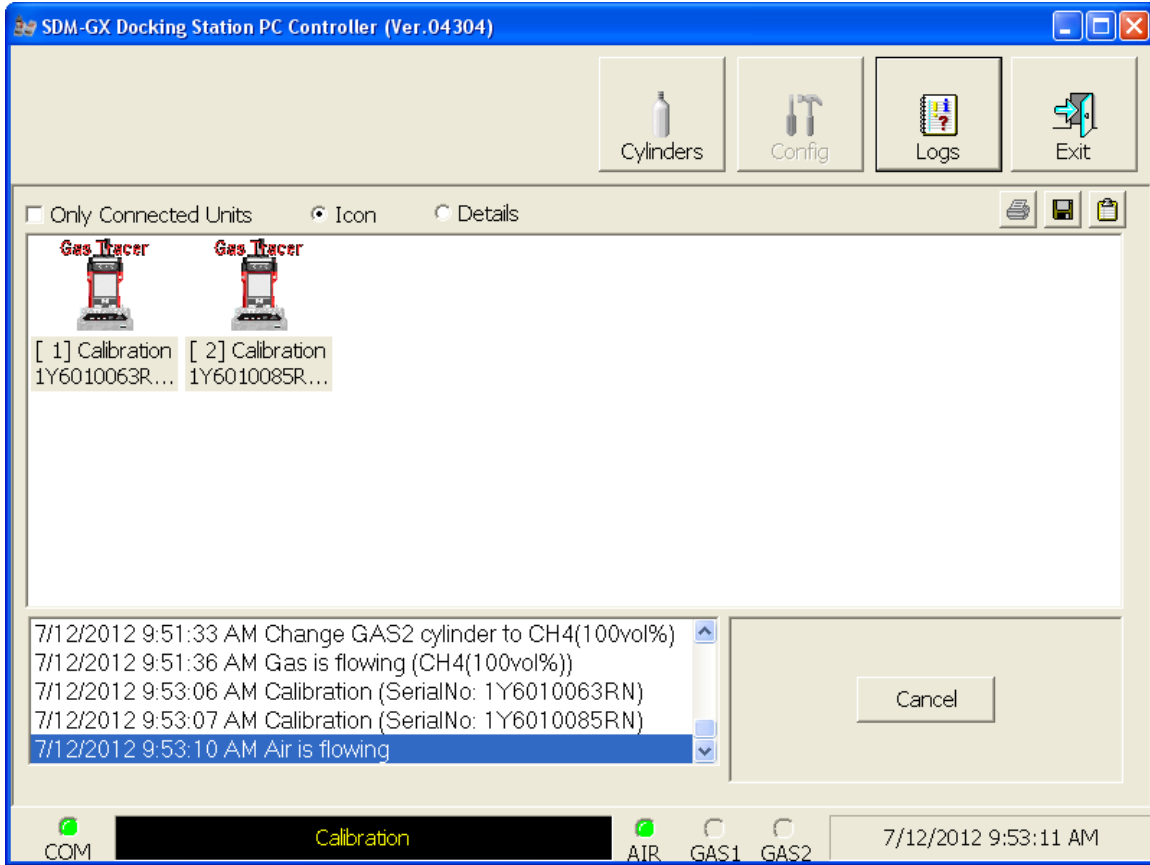


Figure 83: Fresh Air Purge

22. After the fresh air purge is complete,

- If the calibration passes, the following window will open indicating that. The CAL ▲ LED on the SDM-2012 control panel will be solid green. Click OK to return to the main program window. The CAL ▲ LED will turn off.

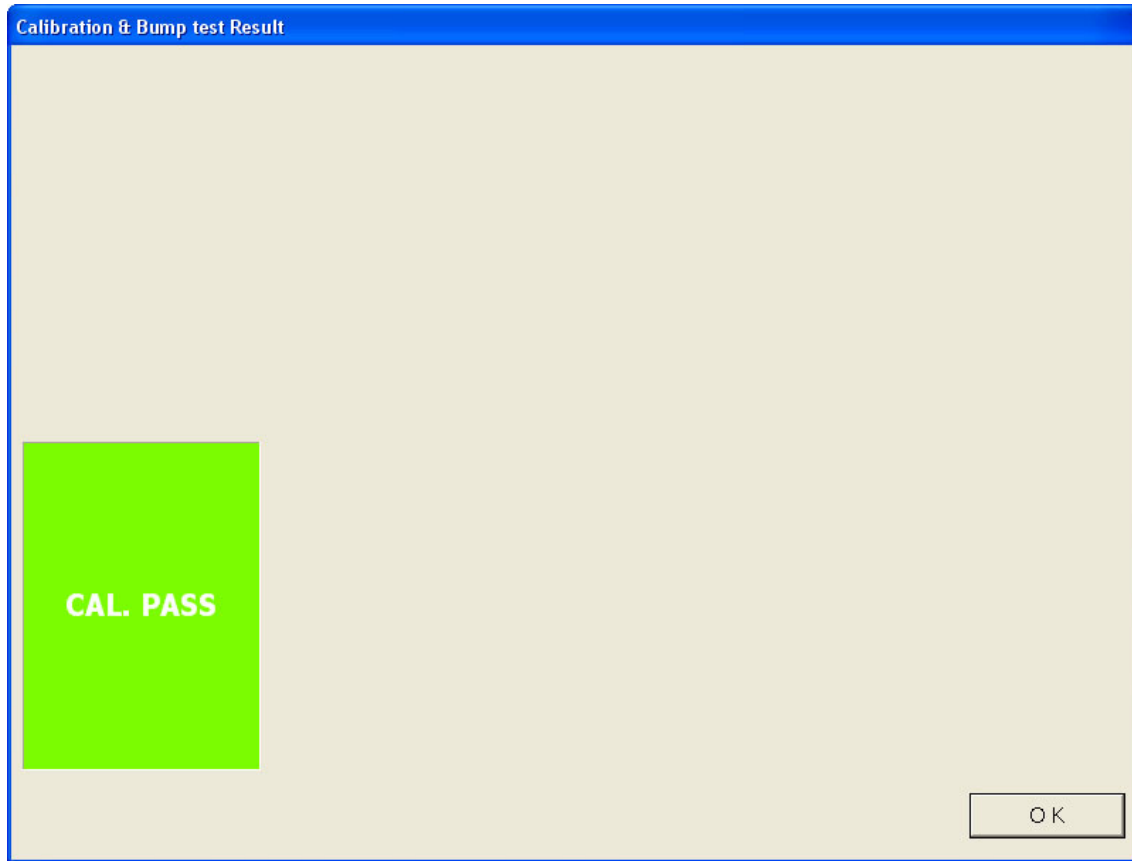


Figure 84: Calibration Passed

- The Gas Tracer will automatically be shut off 20 seconds after a successful calibration.

- If the calibration fails, the following window will open indicating which channels failed to calibrate. The CAL ▲ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the calibration results in the Logs window. The CAL ▲ LED on the SDM-2012 control panel will turn off.

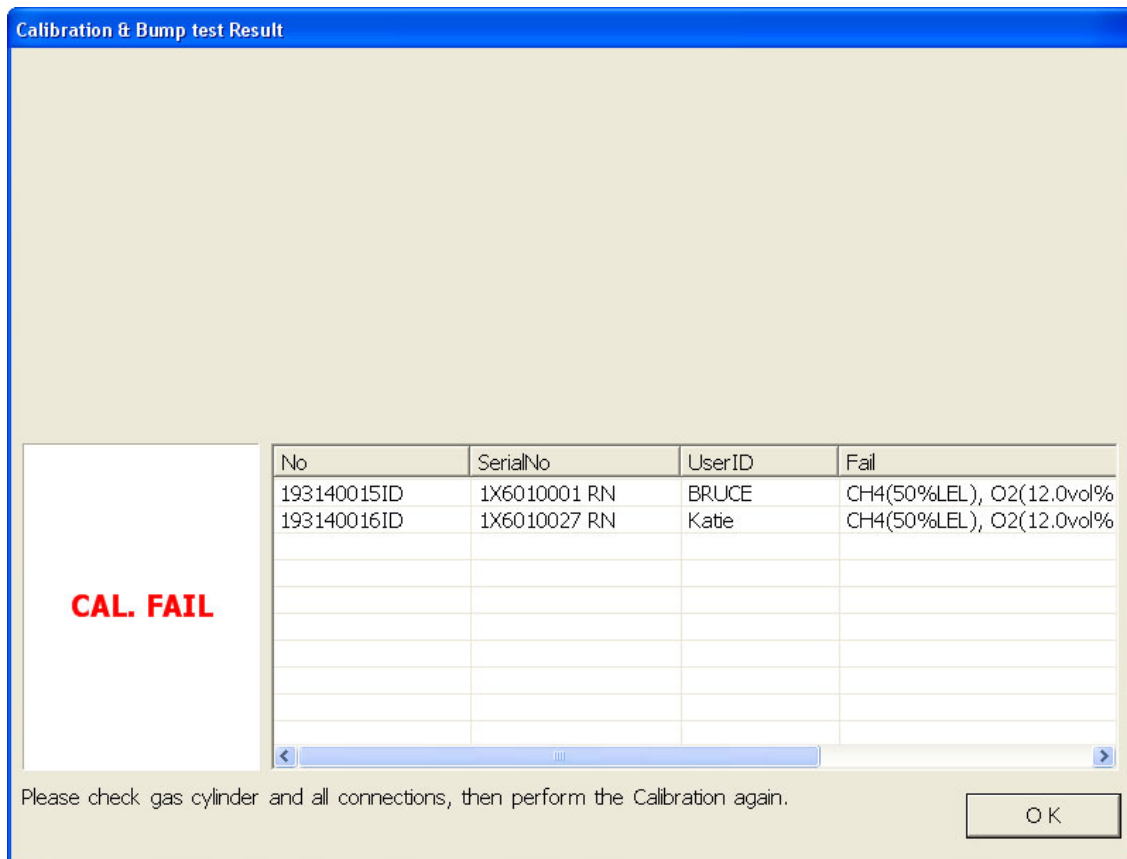


Figure 85: Calibration Failed

- If at any point during the calibration the flow rate to the instrument becomes too low, the PC Controller Program will abort the calibration and display a failed calibration screen. The CAL ▲ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the calibration results in the Logs window. The CAL ▲ LED on the SDM-2012 control panel will turn off. Confirm all tubing connections are correct and that all lines are clear.

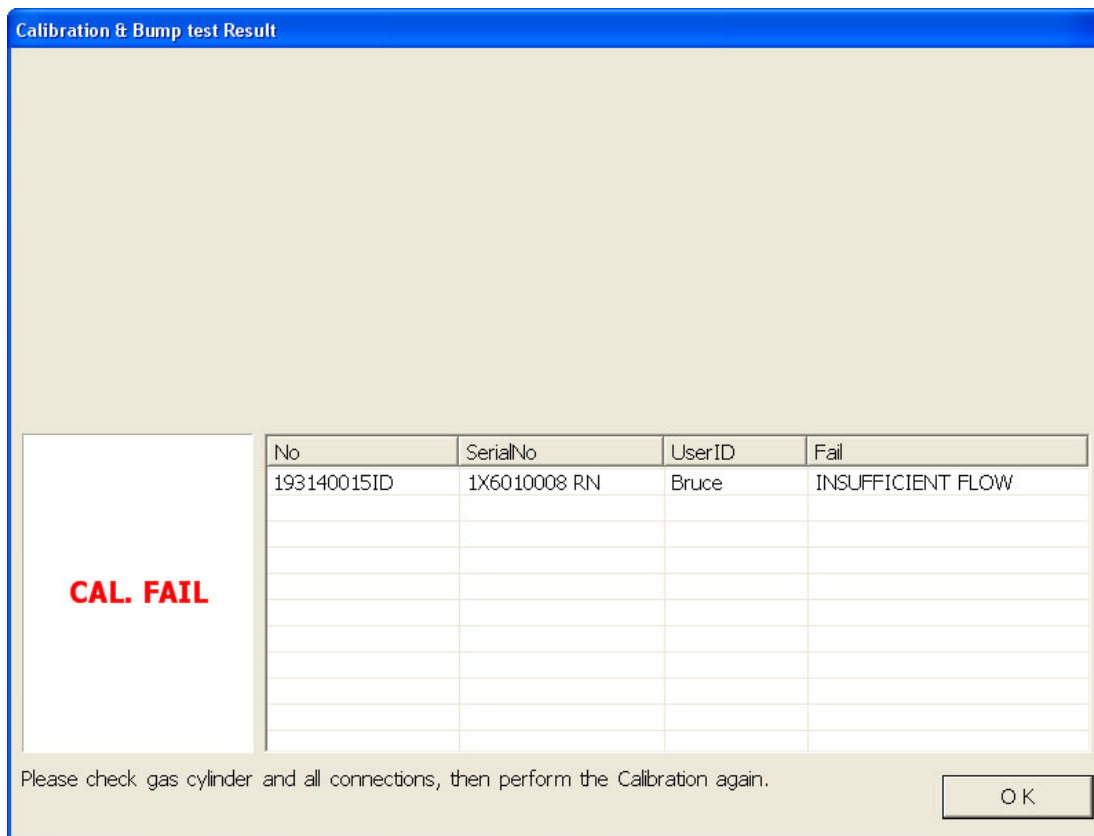


Figure 86: Low Flow Calibration Failure

23. For both calibration result outcomes, the instrument(s) will be displayed in the main program window in Details View. To return to Icons View, click the Icons radio button.
24. When a calibration is performed, any bump test or calibration data that is being stored in the instrument will be downloaded to the PC Controller Program. This data can be viewed in the Logs window along with the results of the calibration just performed. See “Bump Test Data” on page 146 or “Calibration Data” on page 131 for instructions for viewing bump test or calibration data.

CAUTION: *After calibrating the %volume sensor in a Gas Tracer, remove the instrument from the SDM-2012 and allow the readings to return to fresh air readings before performing any more gas testing on that instrument.*

Power Off Function

This function can be activated by either right clicking an instrument and selecting Power Off(P) when the pull down menu appears or by selecting an instrument and then using the alt/P key combination. The Power Off function turns off the selected instrument. If you select Power Off, a confirmation box appears. Click OK to turn off the selected unit.

Chapter 6: Maintenance

Troubleshooting

NOTE: This troubleshooting guide describes SDM-2012 problems only. See the GX-2012 Operator's Manual or Gas Tracer Operator's Manual for problems you may encounter with the GX-2012 or Gas Tracer.

Table 4: Troubleshooting the SDM-2012

Symptoms	Probable Causes	Recommended Action
<ul style="list-style-type: none">• Fresh air adjustment fails	<ul style="list-style-type: none">• The SDM-2012 is not in a fresh air environment or the cylinder being used is not a zero air cylinder.• If a zero air cylinder is used, the calibration cylinder is out of gas.• If a zero air cylinder is used, the gas out to instrument line is not connected to the inlet of the instrument.	<ol style="list-style-type: none">1. Confirm that the SDM-2012 is in a fresh air environment or that a zero air cylinder is attached to the AIR fitting.2. If a zero air cylinder is used, verify that it contains an adequate supply of test sample.3. Check to make sure the gas out to instrument line is connected to the inlet of the instrument.4. If a zero air cylinder is used, check all calibration tubing for leaks or for any bad connections.5. If the fail condition continues, replace the sensor(s) in the instrument.6. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.

<ul style="list-style-type: none"> • Calibration fails 	<ul style="list-style-type: none"> • The auto calibration values do not match the cylinder gas concentrations. • The calibration cylinder is out of gas or is outdated. • The calibration cylinder is not connected to the appropriate GAS 1 or GAS 2 fitting. • The gas out to instrument line is not connected to the inlet of the instrument. • The tubing from the regulator to the GAS 1 or GAS 2 fitting or manifold is not connected. 	<ol style="list-style-type: none"> 1. Confirm that the auto calibration values match the concentrations listed on the gas cylinder. 2. Verify that the calibration cylinder contains an adequate supply of fresh test sample. 3. Verify that the calibration cylinder is connected to the appropriate GAS 1 or GAS 2 fitting. 4. Check to make sure the gas out to instrument line is connected to the inlet of the instrument. 5. Check all calibration tubing for leaks or for any bad connections. 6. If the fail condition continues, replace the sensor(s) in the instrument. 7. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.
<ul style="list-style-type: none"> • No connection between instrument and PC Controller Program 	<ul style="list-style-type: none"> • SDM-2012 is not turned on. • The instrument is not correctly inserted into the instrument cradle. • The IR window is dirty. • The USB cable is not properly plugged into the SDM-2012 or the PC. 	<ol style="list-style-type: none"> 1. Turn on the SDM-2012. If it does not turn on, check that the AC adapter is plugged into an AC socket and to the jack on the back of the SDM-2012. 2. Check to make sure the instrument is inserted properly. 3. Clean the IR window on the SDM-2012. 4. Check to make sure the USB cable is plugged into the back of the SDM-2012 and to a USB port on your PC. 5. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.
<ul style="list-style-type: none"> • The Li-ion battery pack in the instrument is not charging 	<ul style="list-style-type: none"> • The instrument has an alkaline battery pack installed. • The battery pack is faulty. • The instrument is not in the proper recess of the instrument cradle. • The instrument is not properly inserted in the instrument cradle. • The charger is malfunctioning. 	<ol style="list-style-type: none"> 1. Check to make sure your instrument doesn't have alkaline battery pack installed. 2. Replace the battery pack and attempt to charge it. 3. Be sure that the instrument is inserted in the front recess of the instrument cradle. 4. Be sure that the instrument is fully inserted in the instrument cradle. 5. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.

Charging an Instrument in an SDM-2012

The SDM-2012 can be used to charge the rechargeable batteries in a GX-2012 or Gas Tracer. To maximize the instrument's run time and the battery life, make sure the batteries' charge is as low as possible before recharging them.

Recharging a Battery Pack After Performing a Bump Test or Calibration

To recharge the battery pack in an instrument after performing a bump test or calibration:

1. Perform a bump test or calibration on an instrument as described in "Bump Testing a GX-2012" on page 60, "Calibrating a GX-2012" on page 73, "Bump Testing a Gas Tracer" on page 85, or "Calibrating a Gas Tracer" on page 101.
2. After the bump test or calibration has been completed, turn off the instrument(s) by selecting the instrument(s), right clicking on them, and selecting Power Off. The docking station will automatically turn off the instrument(s) 20 seconds after a successful bump test or calibration or if there is no activity for the time period defined by Auto Power OFF Time in the Configuration Window.
3. Be sure that the AC adapter is plugged into a wall outlet, that the power jack is plugged into the back panel of the SDM-2012, and that the instrument is properly installed in the front recess of the instrument cradle.
4. While the instrument is on, the CHARGE LED will be blinking green. When the instrument is turned off, the CHARGE LED will blink amber. The BUMP ▼ and/or CAL ▲ LED will continue to be either green or red depending on the result of the previous bump test or calibration. If the bump test or calibration was canceled, the BUMP ▼ or CAL ▲ LED will be solid amber.

NOTE: The SDM-2012 does not start charging the batteries until the instrument is off. While the instrument is on, the CHARGE LED will blink green. Once the instrument is shut off, the CHARGE LED will begin to blink amber.

5. If the battery pack is fully charged, then the CHARGE LED will turn solid green in a few minutes.

If the battery pack is drained enough for the docking station to charge it, the CHARGE LED will continue to blink amber while charging is taking place. The SDM-2012 will take approximately 4 hours to charge a fully discharged battery pack.

If the charging process encounters a fail condition, the CHARGE LED will turn steadily red.
6. When the charge is complete, the CHARGE status LED will turn solid green.

Recharging a Battery Pack Without Performing Any Operations

To recharge the batteries in an instrument without performing any other operations:

1. Confirm that the AC adapter is connected to the back panel of the SDM-2012 and to an AC wall socket.
2. Insert the instrument or battery pack into the front recess of the instrument cradle.

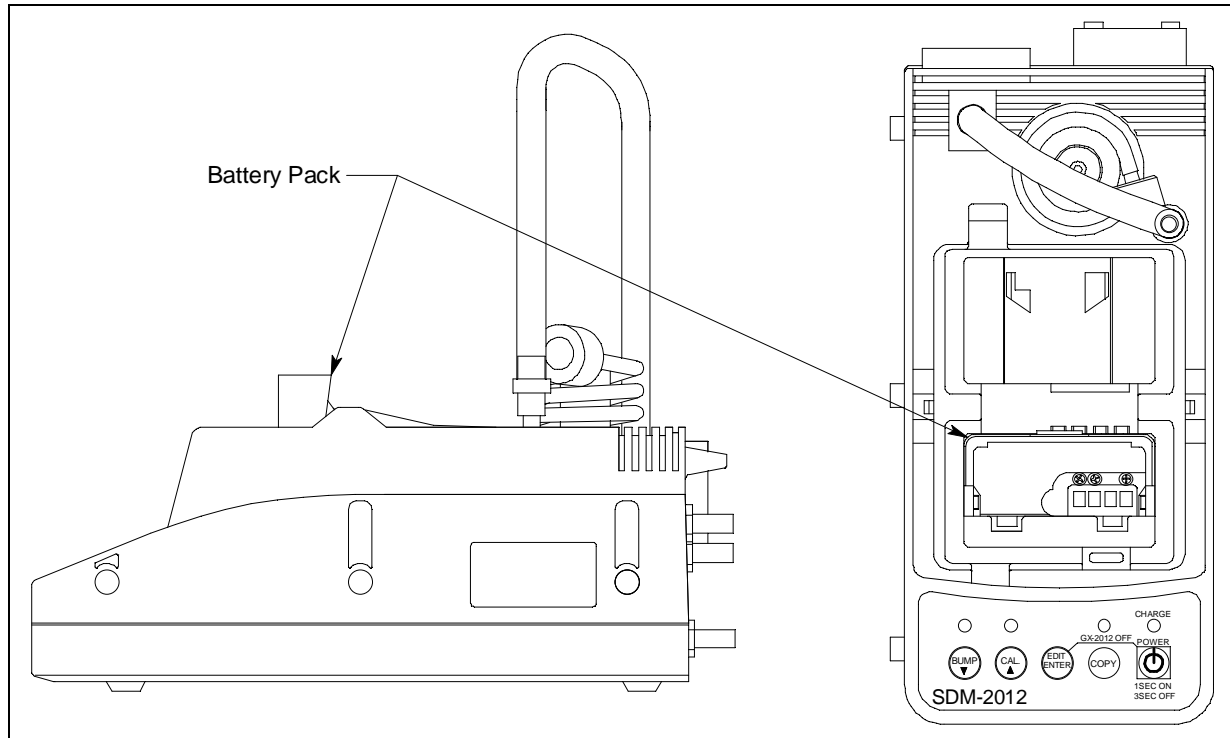


Figure 87: Inserting the Battery Pack for Charging

3. Press and hold the SDM-2012's POWER button. The LEDs will turn amber.
4. When the BUMP ▼ and CAL ▲ LEDs turn off, release the POWER button.
5. The CHARGE LED will be blinking amber.
6. If the battery pack is fully charged, then the blinking amber LED will turn solid green in a few minutes.

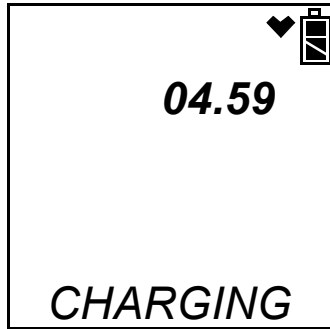
If the battery pack is drained enough for the SDM-2012 to charge it, the CHARGE LED will continue to blink amber while charging is taking place. The SDM-2012 will take approximately 4 hours to charge a fully discharged battery pack.

If the charging process encounters a fail condition, the CHARGE LED will turn steadily red.

7. When the charge is complete, the CHARGE status LED will turn solid green.

Battery Pack Too Drained for PC Controlled Operation

If the Li-ion battery pack does not have enough power to keep the instrument on, it will go into a 5 minute charge cycle and the following screen will be displayed on the instrument screen.



It will not connect to the docking station. The instrument cannot be bump tested or calibrated in the charge cycle. Once the 5 minute charge cycle has ended, the unit will automatically turn back on and connect to the docking station. The unit can now be bump tested or calibrated.

Chapter 7: Managing Log Data

Download Function

This function can be activated by either right clicking an instrument and selecting Download(D) when the pull down menu appears or by selecting an instrument and then using the alt/D key combination. The Download function downloads all logged data and calibration information from the instrument. If you select Download(D), a confirmation box appears. Click the **OK** button to proceed with downloading from the instrument.

Clear Logs Function

This function can be activated by either right clicking an instrument and selecting Clear Logs(C) when the pull down menu appears or by selecting an instrument and then using the alt/C key combination. The Clear Logs function clears all logged data and calibration files from an instrument. If you select Clear Logs(C), a confirmation box appears. Click the OK button to proceed with clearing all the data from the instrument. The message window will indicate that the data is being cleared. When the data has been cleared, the message window will indicate this.

Logs Window Overview

The Logs Window contains saved data from instruments in addition to records of bump tests and calibrations performed with the PC Controller Program. If you perform a complete download by right clicking a selected instrument and clicking Download, the Logs Window will contain alarm trend data, calibration data, event data, interval trend data, memo data, bump test data, barhole data, normal operation snap log data, and leak check snap log data (Gas Tracer only). If you do not perform a complete download or select Down Load Data Logger in the Configuration Window but perform a calibration, the Logs Window will contain instrument bump test data, instrument calibration data, memo files, and files from any bump tests or calibrations performed while the instrument was connected to the PC Controller Program.

The Logs Window is divided into four frames. The upper left frame is the Data Frame and displays all the data folders. If no data has been saved, then no folders will appear in the Data Frame.

The upper right frame shows the contents of a data folder that is selected in the Data Frame. The lower right frame shows the summary information for a data file that is selected in the upper right frame.

The lower left frame contains three selection boxes for organizing data. When viewing the data, it can be organized in two ways:

1. Base View Format

If you do not select Serial No, Station ID, or User ID, the Base view box appears next to the selection boxes. The data can be organized by either data type or by the year and month of the saved data.

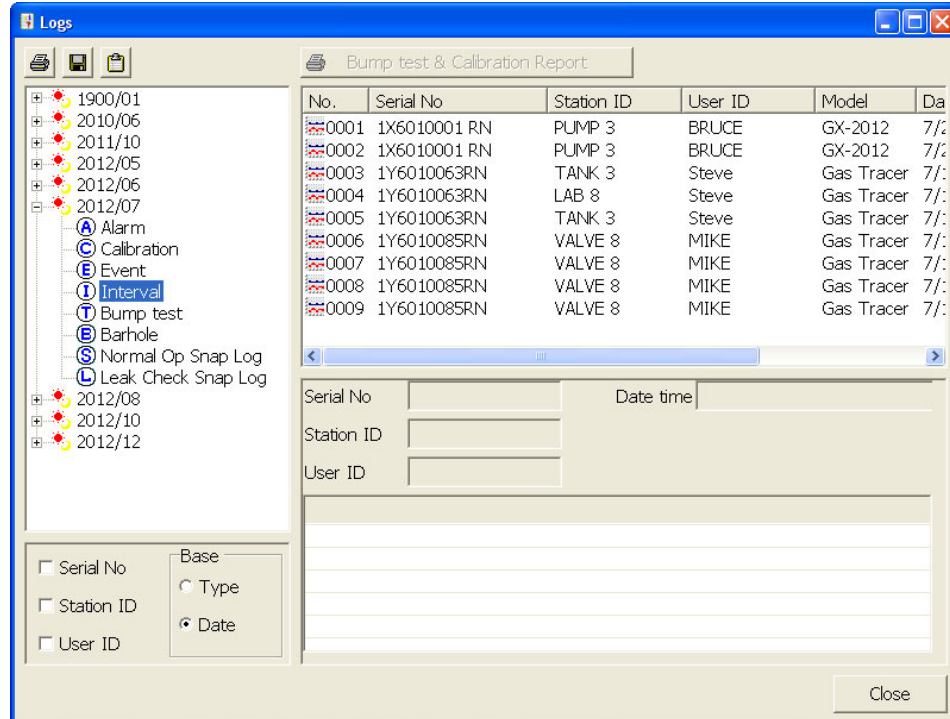


Figure 88: Logs Window in Base View Format, Date

To view data in the Date Base View Format:

- Select Date in the Base view box.
- Click the expanded view symbol (+) next to a date folder in the Data frame of the Logs window or double click the folder to view the contents below it.
- Single click on the data type folder (Alarm, Calibration, etc.). All of the files in that data type folder will appear in the upper right frame of the Logs window.
- If an item is expanded and you want to close it, click the (-) symbol next to the item or double click it.

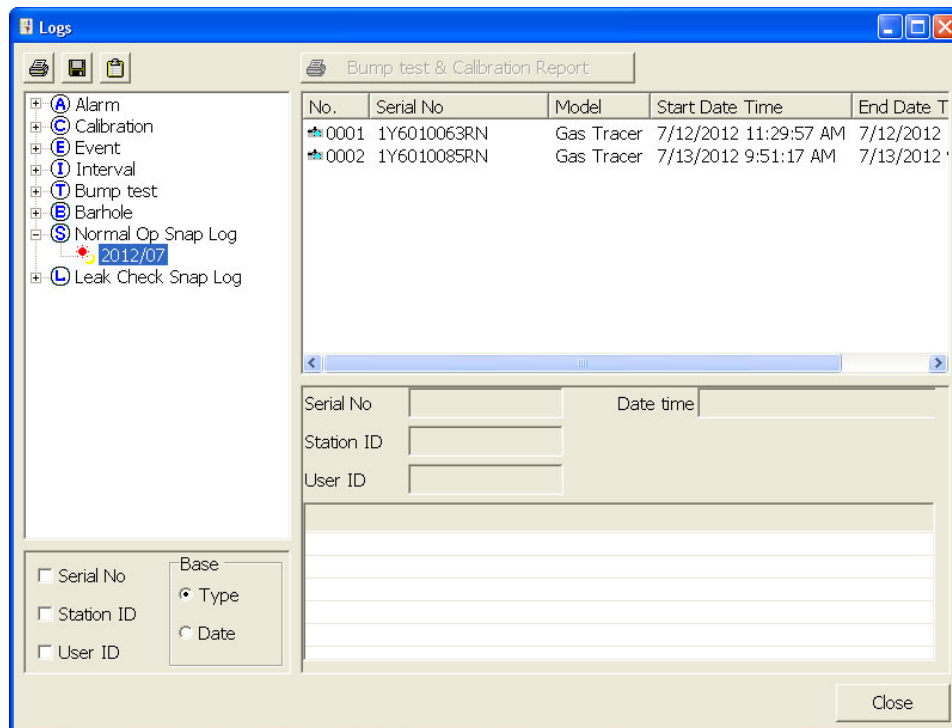


Figure 89: Logs Window in Base View Format, Type

To view data in the Type Base View Format:

- Select Type in the Base view box.
- Click the expanded view symbol (+) next to a data type folder (Alarm, Calibration, etc.) in the Data frame of the Logs window or double click the folder to view the contents below it.
- Single click on a date folder. The dates are displayed in year/month format. All of the files in that date folder will appear in the upper right frame of the Logs window.
- If an item is expanded and you want to close it, click the (-) symbol next to the item or double click it.

2. ID View Format

The data may be organized by one or more of the following parameters:

- Serial Number
- Station ID
- User ID

If any of these boxes are selected, the Base view box disappears. Click the selection box or boxes in the lower left frame to organize the data as desired.

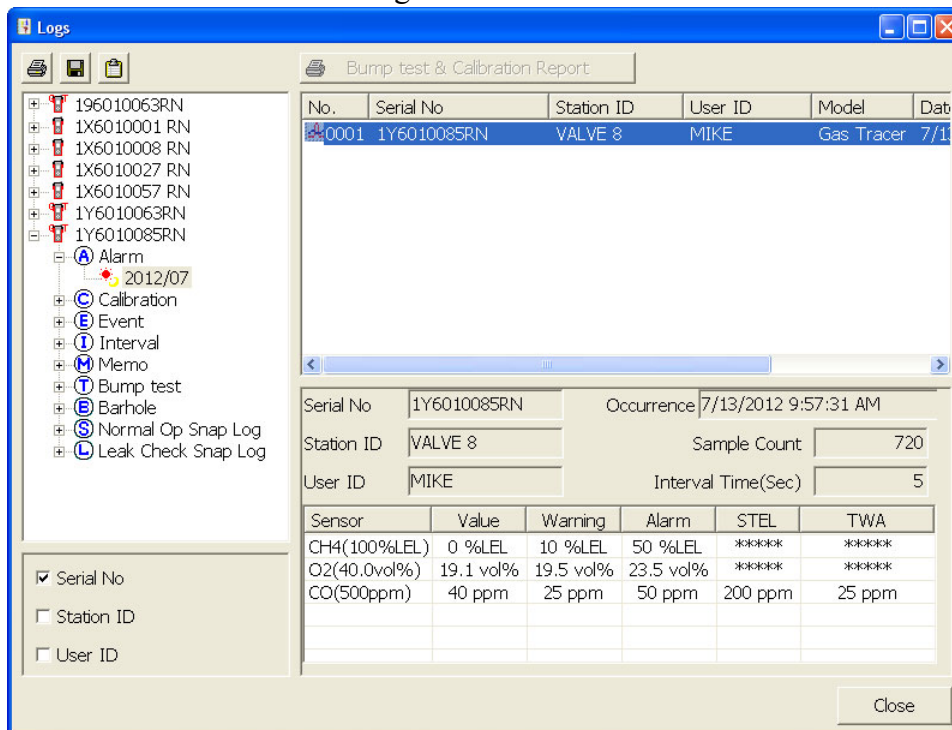


Figure 90: Logs Window in ID View Format

To view data in the ID View Format:

- Select one or more of the ID view choices, Serial No., Station ID, or User ID.
- Click the expanded view symbol (+) next to an ID folder (Serial No., Station ID, or User ID) in the Data frame of the Logs window or double click the folder to view the contents below it.
- Click the expanded view symbol (+) next to the data type folder (Alarm, Calibration, etc.) you wish to view or double click the folder to view the contents below it.
- Single click on a date folder. The dates are displayed in year/month format. All of the files in that date folder will appear in the upper right frame of the Logs window.
- If an item is expanded and you want to close it, click the (-) symbol next to the item or double click it.

When viewing data by Serial No., no two instruments should have the same serial number. However, if two instruments do have the same serial number and have data for the same year/month, they will be distinguished by their different Station ID or User ID. When viewing data by Station ID or by User ID, if two instruments have the same Station ID and/or User ID and have data for the same year/month, they will be distinguished by their different serial numbers.

NOTE: In the examples that follow, the data will be shown organized by serial number. If you do not select any of the organization boxes or select the Station ID or User ID boxes instead of or in addition to the Serial No. box, your Logs Window will look slightly different.

Alarm Trend Data

The instrument saves files that describe the most recent gas alarm events. If a gas alarm event occurs, then an alarm trend file that is centered around the event is saved. It shows the readings up to 30 minutes before and 30 minutes after the event, with the log interval time every 5 seconds. The readings that are saved are the peak (minimum for oxygen) readings for the previous 5 seconds. If the instrument has not been on for 30 minutes before the alarm event occurs, the data during this time is left blank. If the instrument is turned off less than 30 minutes after an alarm event occurs, the data file will only have logged data until the unit was turned off.

NOTE: If you are operating your instrument in Inert Mode with the oxygen alarm pattern set to H-HH, the maximum reading for the oxygen channel will be saved every 5 seconds instead of the minimum.

The instrument saves up to 8 alarm trend files. When an alarm event triggers an alarm trend file to be saved, subsequent alarm events must occur 15 minutes after the previous triggering event in order to trigger the saving of another alarm trend file. If 8 alarm trend files are already saved in the instrument's memory, the oldest alarm trend file is overwritten when a new alarm trend file is saved.

Alarm trend data is downloaded from an instrument when a complete download is performed. To view and perform desired operations with the alarm trend files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Alarm folder to view the contents. Alarm trend data folders are arranged by year/month.

- Click the year/month folder you wish to view. All alarm trend data files for that instrument in that particular year/month will appear in the upper right frame. The file number, serial number, station ID, user ID, model, date/time, and sample count of the alarm trend file appear in the same line.

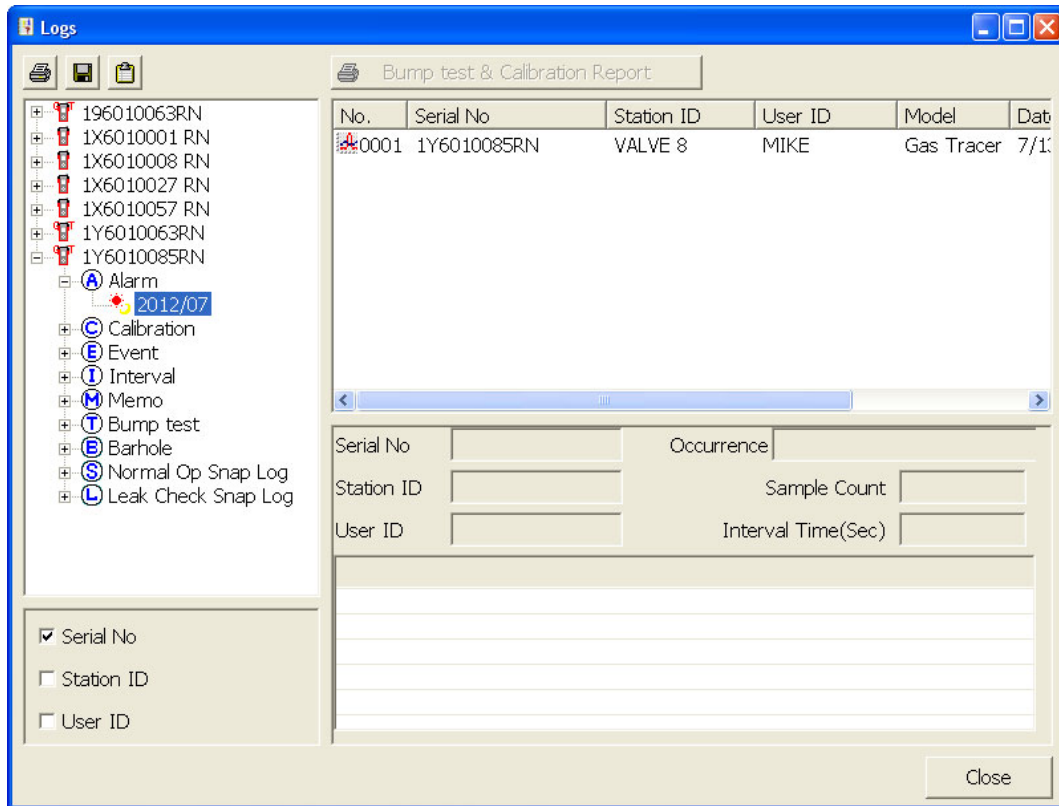


Figure 91: Viewing Alarm Trend Files

- Click a file to see the instrument information, gas readings at the time of the event, and the alarm setpoints in the lower right frame.

The screenshot shows the 'Logs' application window. On the left is a tree view of log categories: 196010063RN, 1X6010001 RN, 1X6010008 RN, 1X6010027 RN, 1X6010057 RN, 1Y6010063RN, 1Y6010083RN, 1Y6010085RN, Alarm (selected), 2012/07, Calibration, Event, Interval, Memo, Bump test, Barhole, Normal Op Snap Log, and Leak Check Snap Log. Below the tree are checkboxes for 'Serial No' (checked), 'Station ID', and 'User ID'. The main area is titled 'Bump test & Calibration Report' and contains a table with columns: No., Serial No, Station ID, User ID, Model, and Date. The first row is highlighted: No. 0001, Serial No 1Y6010085RN, Station ID VALVE 8, User ID MIKE, Model Gas Tracer, Date 7/13/2012. Below this is a scrollable area showing details for the selected event. It includes fields for Serial No (1Y6010085RN), Station ID (VALVE 8), User ID (MIKE), Occurrence (7/13/2012 9:57:31 AM), Sample Count (720), and Interval Time (Sec) (5). At the bottom is a table of sensor readings and alarm setpoints.

Sensor	Value	Warning	Alarm	STEL	TWA
CH4(100%LEL)	0 %LEL	10 %LEL	50 %LEL	*****	*****
O2(40.0vol%)	19.1 vol%	19.5 vol%	23.5 vol%	*****	*****
CO(500ppm)	40 ppm	25 ppm	50 ppm	200 ppm	25 ppm

Close

Figure 92: Alarm Trend Data

- To view the alarm trend data, double click the desired file.

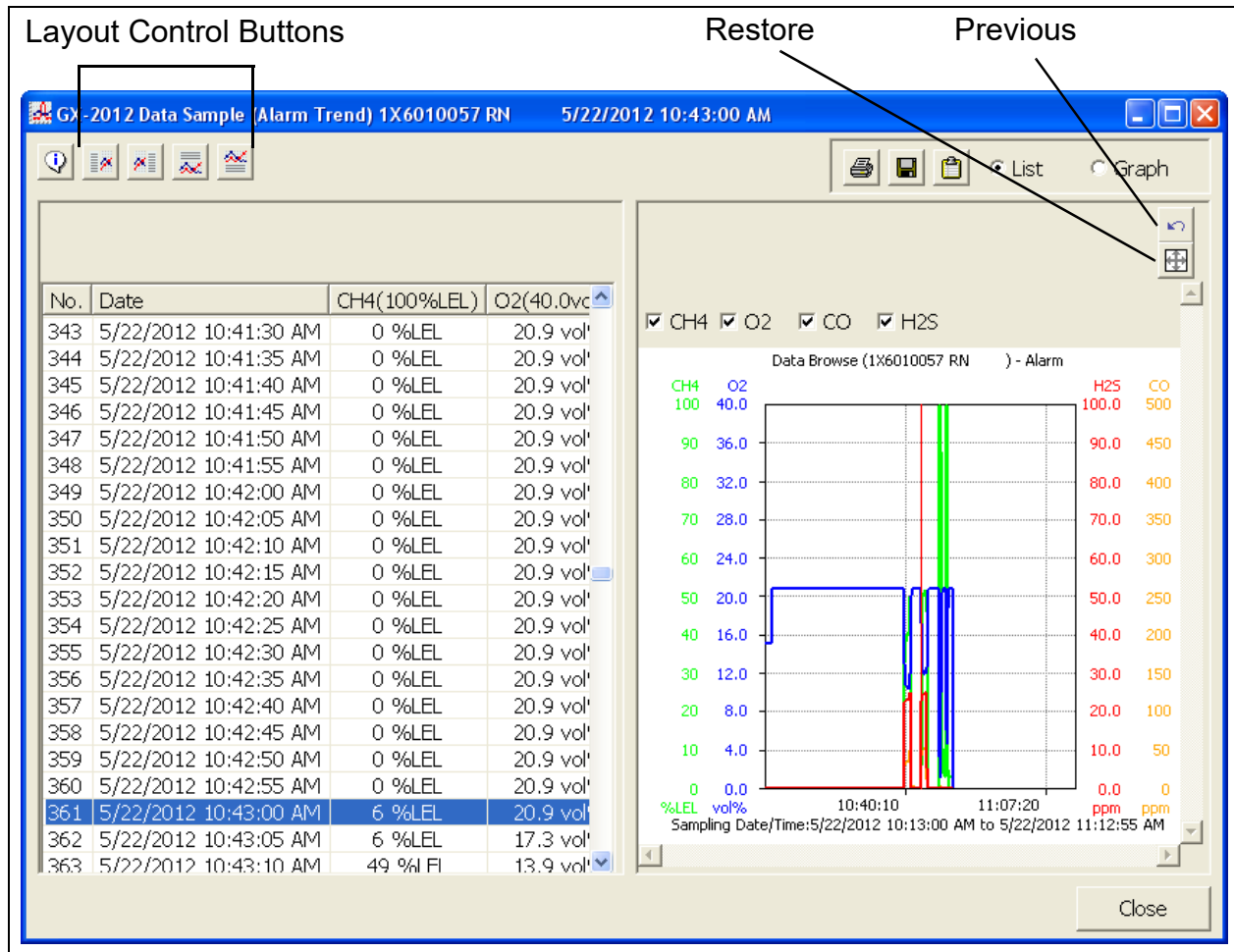


Figure 93: Alarm Trend Data

Each data point will be displayed in the left half of the screen along with the peak readings (minimum for oxygen) over the previous 5 seconds. A graph of the data will appear on the right half of the screen.

To change the layout of the table and chart in relation to each other, click any of the four layout control buttons in the upper left corner of the screen.

To change the proportions of the table to the graph, click the divider between the two and move it.

To display instrument information along with the data table and graph, click the “i” control button in the upper left corner.

- In the table part of the screen,
 - The gas readings at the time of the alarm event around which the logged data is centered are highlighted in red and are the instantaneous readings at that time.

7. In the graph part of the screen,
 - You can choose which gas(es) you want to graph by selecting or deselecting the boxes next to each gas name.
 - To zoom in on a particular part of the graph, drag a box around that area so that it is highlighted in gray. The graph will zoom in. To return to a previous zoom, click the Previous control button in the upper right corner of the graph section. To return to the original zoom, click the Restore control button in the upper right corner of the graph section.
 - A vertical red line appears on the graph at the point that created the alarm trend file. Clicking anywhere on the graph will move that red line and highlight that data point in the table. Clicking a data point in the table will move the red line in the graph to that data point.
8. To print the data, select either List or Graph in the upper right corner of the window and then click the **Print** control button in the upper right corner of the window. The **Print** control button has a printer icon on it. A dialog box will appear confirming if you want to print. Click OK. If Graph is selected, the data will print as a graph. If List is selected, the data will print as a table.
9. To save the data to a file which can be imported into another program, select either List or Graph in the upper right corner of the window and then click the **Save to File** control button. The **Save to File** control button has a floppy disk icon on it. A dialog box will appear for you to specify the file name, file location, and file type.

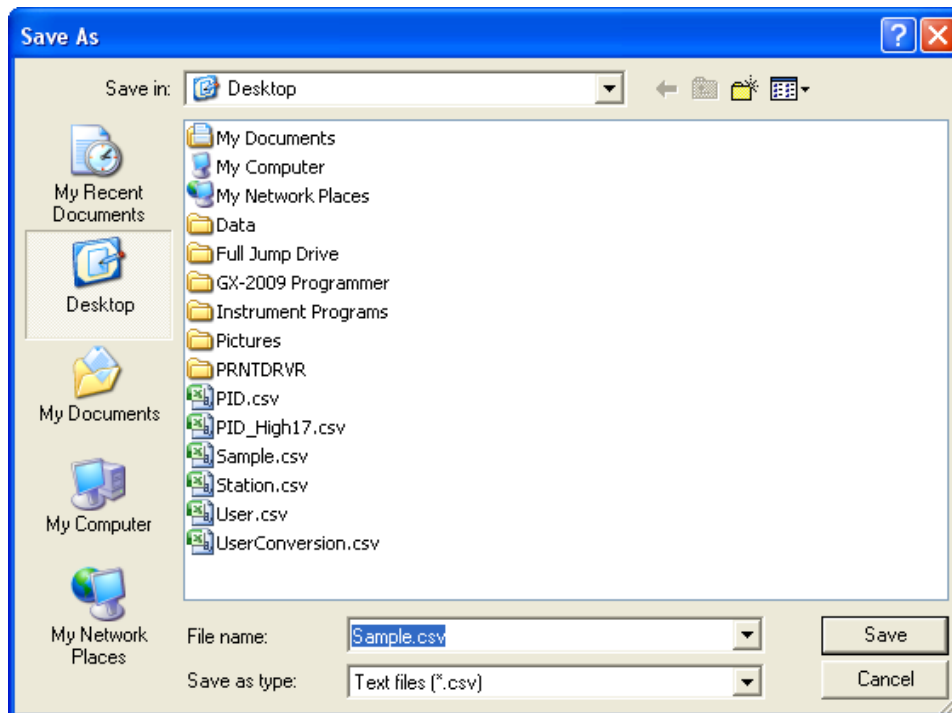


Figure 94: Save As Dialog Box

If List is selected, the file type is “.csv” (comma-separated values). If Graph is selected, the file type is “.bmp” (Windows bitmap). After specifying the file name and file location, click Save to save the file to the specified location.

10. To save the data to the clipboard, select either List or Graph in the upper right corner of the window and then click the **Copy to Clipboard** control button. The **Copy to Clipboard** control button has a clipboard icon on it. The table or graph will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.
11. To go back and view other data, click Close to return to the Logs window.

Calibration Data

The instrument is capable of saving calibration information for up to the 124 most recent calibrations and bump tests combined. When the maximum number of calibration files is reached, the oldest calibration file is overwritten when a new one is saved. When an instrument is connected to the PC Controller Program and a calibration is performed or a complete download occurs, the calibration files are retrieved and stored by the program. In addition, all calibrations performed by the PC Controller Program are stored by the program. To view and perform desired operations with the calibration files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Calibration folder to view the contents. Calibration data folders are arranged by year/month.

- Click the year/month folder you wish to view. All calibration data files for that instrument in that particular year/month will appear in the upper right frame. The file number, serial number, station ID, user ID, model, date/time, and result of the calibration appear in the same line. If calibrations were performed prior to connecting the instrument with the SDM-GX Docking Station PC Controller software, data for those calibrations will not appear until a complete download is performed.

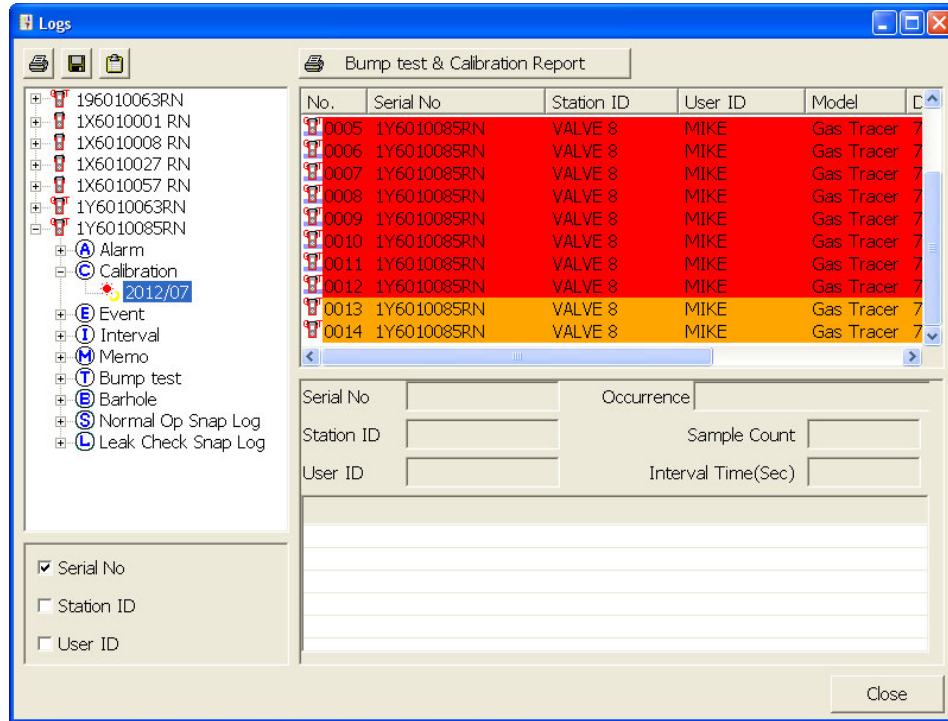


Figure 95: Viewing Calibration Log Files

- Click one of the calibration data files. The fields in the bottom right frame will fill in. The instrument information will be displayed along with the calibration information. The tested sensors will be displayed along with the final gas concentration, the calibration gas values, and the result of the calibration. A **Certificate** button will also appear along the right side of the screen. This button is only active if the selected calibration passed.

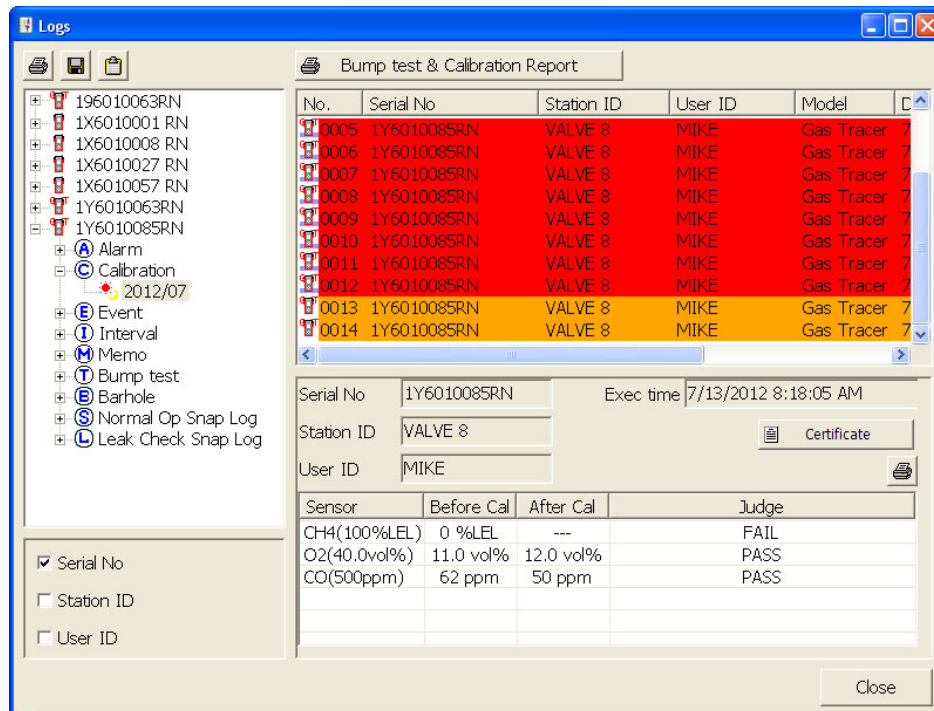


Figure 96: Viewing Calibration Data

- Files that record a failed calibration on all channels are highlighted in red. Files that record a calibration where not all channels passed are highlighted in orange.
- If any calibrations were performed that required more than one gas cylinder, a separate calibration file will be created for the sensor(s) calibrated with the additional cylinder(s). For example, a calibration performed on a GX-2012 that contained the standard 4 sensors plus a %volume sensor would result in one calibration file for the standard 4 sensors if a 4-gas mix was used and one calibration file for the %volume sensor.
- To print the calibration data (everything in the lower right frame of the screen), click the **Print** control button located just above the calibration judge column. A dialog box will appear confirming if you want to print. Click OK.
- To print the basic calibration results from a date folder (everything in the upper right frame), be sure that the desired date folder is selected and click the **Print** control button in the upper left corner of the Logs window. A dialog box will appear confirming if you want to print. Click OK.
- To print detailed calibration data for each calibration file in a date folder, be sure that the desired date folder is selected and click the **Bump Test & Calibration Report** control button along the top of the Logs window. A dialog box will appear confirming if you want to print. Click OK.

10. To print detailed calibration and bump test data (if available) for each calibration and bump test file for a specific serial number, be sure that the desired serial number is selected in the upper left frame and click the **Bump Test & Calibration Report** control button along the top of the Logs window. A dialog box will appear confirming if you want to print. Click OK.
11. To save calibration data from a specific date folder, be sure the desired date folder is highlighted and click the **Save** control button in the upper left corner of the Logs window. A “Save As” dialog box will appear for you to specify the file name and file location.

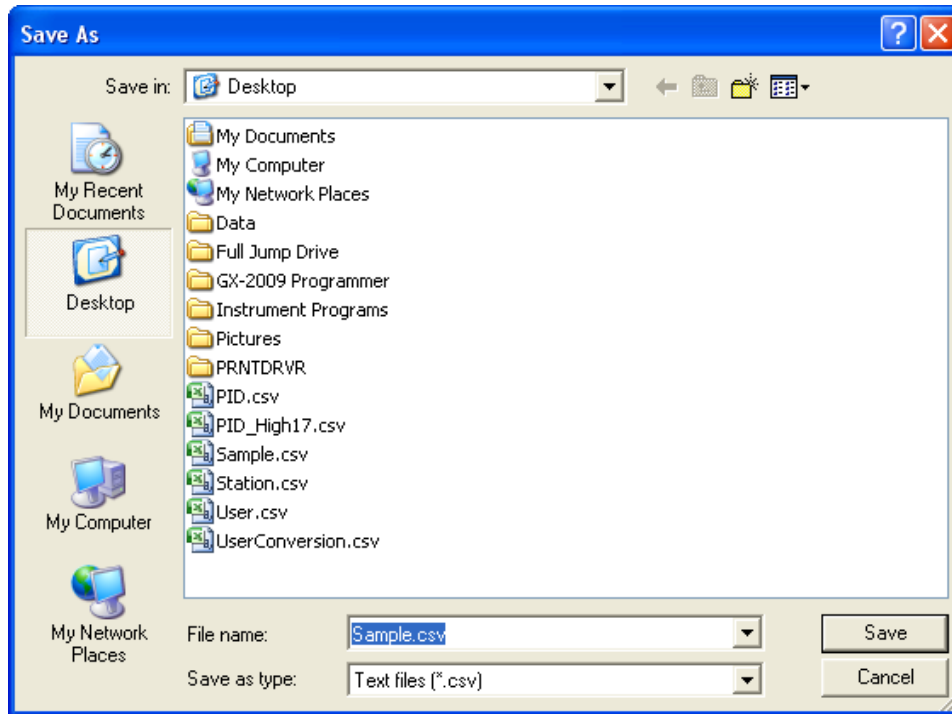


Figure 97: Save As Dialog Box

Specify the file name and location and click Save.

12. To copy calibration data in a date folder to the clipboard, be sure the desired date folder is selected and click the **Save to Clipboard** control button. The data will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.

13. To view or print a calibration certificate for a passed calibration, click the **Certificate** button along the right side of the window. The calibration certificate will appear.

CALIBRATION CERTIFICATE					
Language		Align			
<input checked="" type="radio"/> English (United States) <input type="radio"/> Português (Brasil)		<input checked="" type="radio"/> Left <input type="radio"/> Center			
ISSUE DATE	12/13/2017				
LABORATORY NAME					
LABORATORY ADDRESS					
CERTIFICATE NUMBER	2d90ea6d-9926-4ca6-b95e-57e14875f17c-1				
GAS DETECTOR DATA	Serial	ENG TEST UNIT			
	Manufacturer	RIKEN KEIKI			
	Model	GX-2012			
	Station ID	BLDG 2			
	User ID	KIMBERLY			
STANDARD OR REGULATION USED					
TRACEABILITY					
CALIBRATION RESULT	GAS	CH4(%LEL)	O2(vol%)	CO(ppm)	H2S(ppm)
	Range	0-100%LEL	0-40.0vol%	0-500ppm	0-30.0ppm
	Gas concentration	50 %LEL	12.0 vol%	49 ppm	25.0 ppm
	Reading before calibration	OVER %LEL	11.7 vol%	53 ppm	25.0 ppm
	Reading after calibration	50 %LEL	12.0 vol%	49 ppm	25.0 ppm
ENVIRONMENTAL CONDITIONS					
OBSERVATIONS					
EXECUTOR					

Figure 98: Calibration Certificate

The calibration date, instrument information, and calibration gas concentration information will be displayed. Laboratory name, laboratory address, standard or regulation used, traceability, environmental conditions, observations, and executor fields are all available for user-entered information. If you would like to enter information into any of these fields, click in the field, and type in the desired information.

Use the **English** and **Portuguese** selection dots in the Language section at the top of the screen to choose the language you want the information displayed in.

Use the **Left** and **Center** selection dots in the Align section at the top of the certificate to change the alignment of the information that's manually typed in.

To print a certificate, enter the desired information and click the **Print** button in the top right corner of the screen. Printing the certificate saves any information that was added to the open fields.

Event Data

The instrument saves the 124 most recent alarm events and the 124 most recent trouble events. When an instrument is connected to the PC Controller Program and a complete download is performed, the alarm and trouble event files are retrieved and saved in the program.

Alarm event files save the time, instrument channel, gas, and alarm type of every gas alarm event that occurs on a particular instrument. Warning (low alarm), Alarm (high alarm), STEL, TWA, and overscale events are saved.

Trouble event files note the time, instrument channel, whether the event is an instrument system failure or sensor failure, and the specific type of failure. Calibration failures, dead battery alarms, and sensor failures are among the trouble events that are saved.

Even though two types of files are saved, the PC Controller Program does not distinguish between the two and shows them together and with the same lightning bolt symbol. To view and perform desired operations with the event files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Event folder to view the contents. Event data folders are arranged by year/month.

- Click the year/month folder you wish to view. All event data files for that instrument in that particular year/month will appear in the upper right frame. The file number, serial number, station ID, user ID, model, date/time, channel number, sensor, and event type appear in the same line.

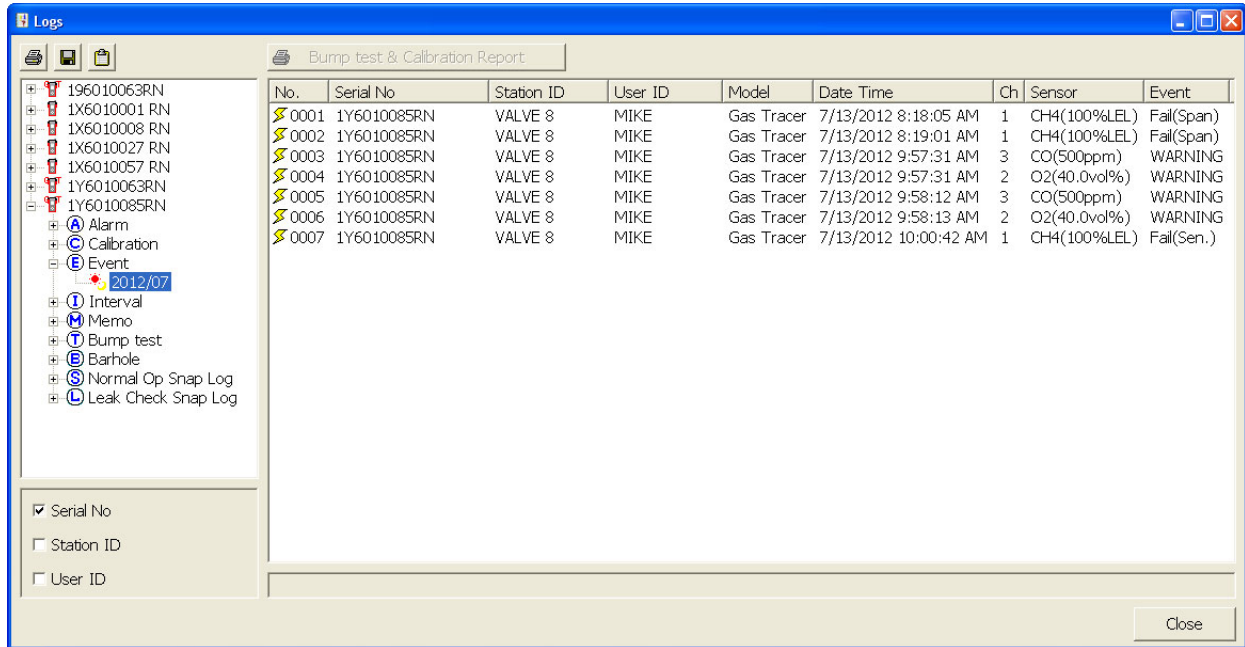


Figure 99: Viewing Event Data

- To print event data from a date folder, be sure the desired date folder is selected and click the **Print** control button in the upper left corner of the Logs window. A dialog box will appear confirming if you want to print. Click OK.

5. To save event data from a date folder, be sure the desired date folder is selected and click the **Save** control button in the upper left corner of the Logs window. A “Save As” dialog box will appear for you to specify the file name and file location.

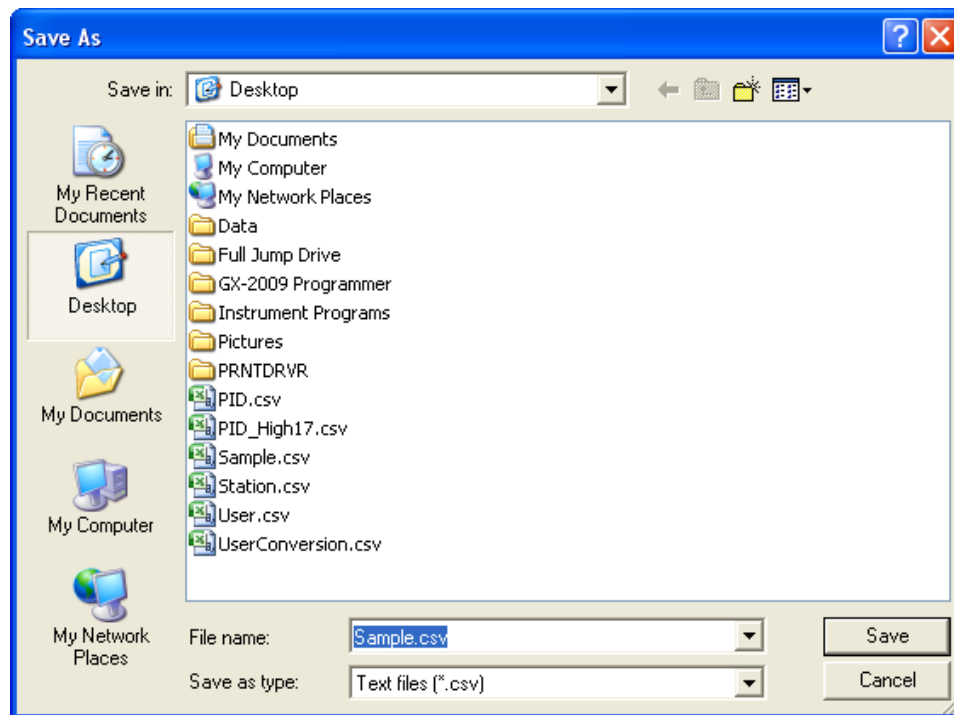


Figure 100: Save As Dialog Box

The file type will be a “.csv” (comma separated value).

Specify the file name and location and click Save.

6. To copy event data from a date folder to the clipboard, be sure the desired date folder is selected and click the **Save to Clipboard** control button. The data will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.

Interval Trend Data

Average gas concentrations over the user defined interval trend time are logged in the interval trend data files. The interval trend time is set using either the Data Log Interval menu item in the Edit Function Screen or in the GX-2012/Gas Tracer Setup Mode. See “Edit Function” on page 164 or the GX-2012 Operator’s Manual or Gas Tracer Operator’s Manual for instructions to set the interval trend time. Events such as gas alarms or sensor failures are saved in the interval trend data file when they occur.

An interval trend data file is created and saved in the instrument when the instrument is turned *off* or when a user ID or station ID is changed during operation. The serial number, user ID, and station ID that are entered in the instrument when it is turned *on* or that are updated during operation are saved for the corresponding interval trend file. If the instrument’s user ID or station ID are changed during operation, any interval trend files that result from subsequent operating sessions will have the new user ID or station ID saved in them.

The data may be viewed in both table format and graph format if at least 5 scheduled data points have been logged at the programmed interval trend time. This does not include events. If an interval data file has fewer than five scheduled data points, the graph controls are not functional and the data is shown only in table format.

Interval trend data will not appear unless a complete download is performed. To view and perform desired operations with the interval trend files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Interval folder to view the contents. Interval data folders are arranged by year/month.
3. Click the year/month folder you wish to view. All interval trend data files for that instrument in that particular year/month will appear in the upper right frame. The file number, serial number, station ID, user ID, model, date/time, and sample count of the interval trend appear in the same line.

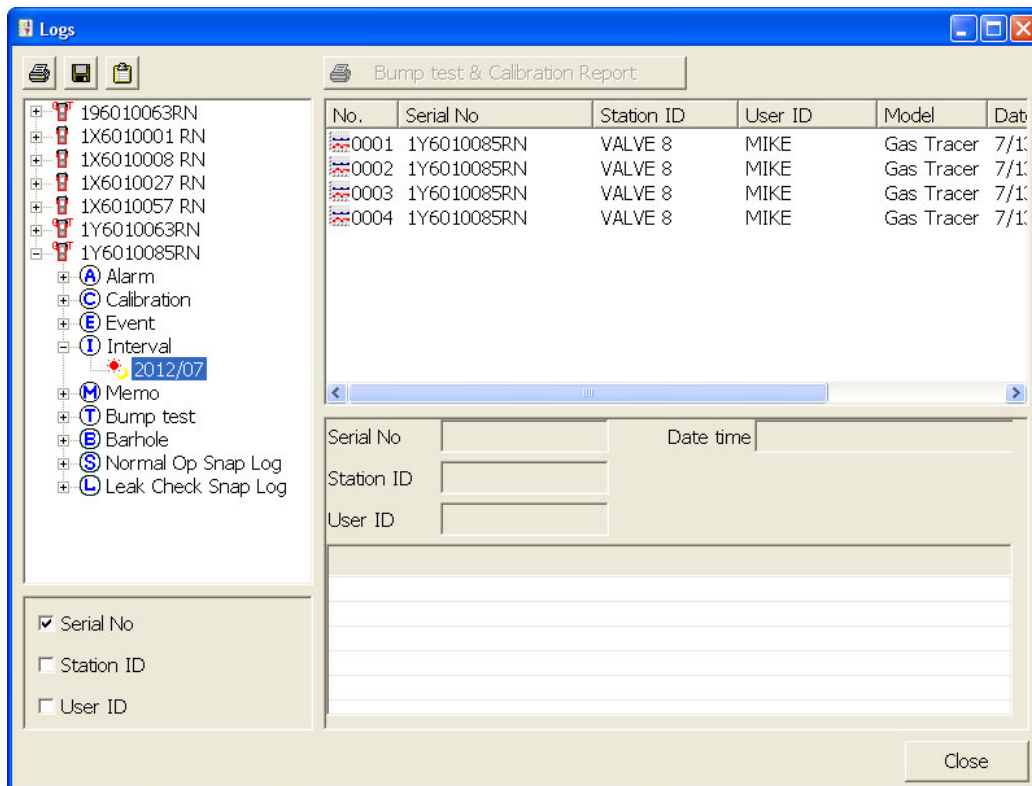


Figure 101: Viewing Interval Trend Files

- Click one of the interval trend data files. The fields in the bottom right frame will fill in. The instrument information will be displayed along with the average, minimum, and maximum gas readings for the operating session. Also displayed are the minimum date, the maximum date, and the warning, alarm, STEL, and TWA setpoints.

The screenshot shows the 'Logs' application window. The left sidebar contains a tree view of log files, with 'Interval' selected under the date '2012/07'. The main display area shows a table of log entries with columns: No., Serial No, Station ID, User ID, Model, Date Time, and Sample. Below this table is a summary section with fields for Serial No, Station ID, User ID, and Period. The bottom right section contains a table of sensor readings with columns: Sensor, Avg. Value, Min Value, Max Value, Min Date, Max Date, Warning, Alarm, STEL, and TWA.

No.	Serial No	Station ID	User ID	Model	Date Time	Sample
0001	1Y6010085RN	VALVE 8	MIKE	Gas Tracer	7/13/2012 8:17:36 AM	14
0002	1Y6010085RN	VALVE 8	MIKE	Gas Tracer	7/13/2012 9:51:42 AM	4
0003	1Y6010085RN	VALVE 8	MIKE	Gas Tracer	7/13/2012 9:57:18 AM	17
0004	1Y6010085RN	VALVE 8	MIKE	Gas Tracer	7/13/2012 10:00:42 AM	1

Serial No	1Y6010085RN	Period	7/13/2012 8:17:36 AM to 7/13/2012 8:19:18 AM						
Station ID	VALVE 8	Sample Count	14						
User ID	MIKE	Interval Time(Sec)	10						

Sensor	Avg. Value	Min Value	Max Value	Min Date	Max Date	Warning	Alarm	STEL	TWA
CH4(100%LEL)	0 %LEL	*****	0 %LEL	*****	*****	10 %LEL	50 %LEL	*****	*****
O2(40.0vol%)	21.7 vol%	0.0 vol%	0.0 vol%	*****	*****	19.5 vol%	23.5 vol%	*****	*****
CO(500ppm)	0 ppm	*****	0 ppm	*****	*****	25 ppm	50 ppm	200 ppm	25 ppm

Figure 102: Interval Trend Data

- To view the interval trend data, double click the desired file.

Layout Control Buttons

Restore

Previous

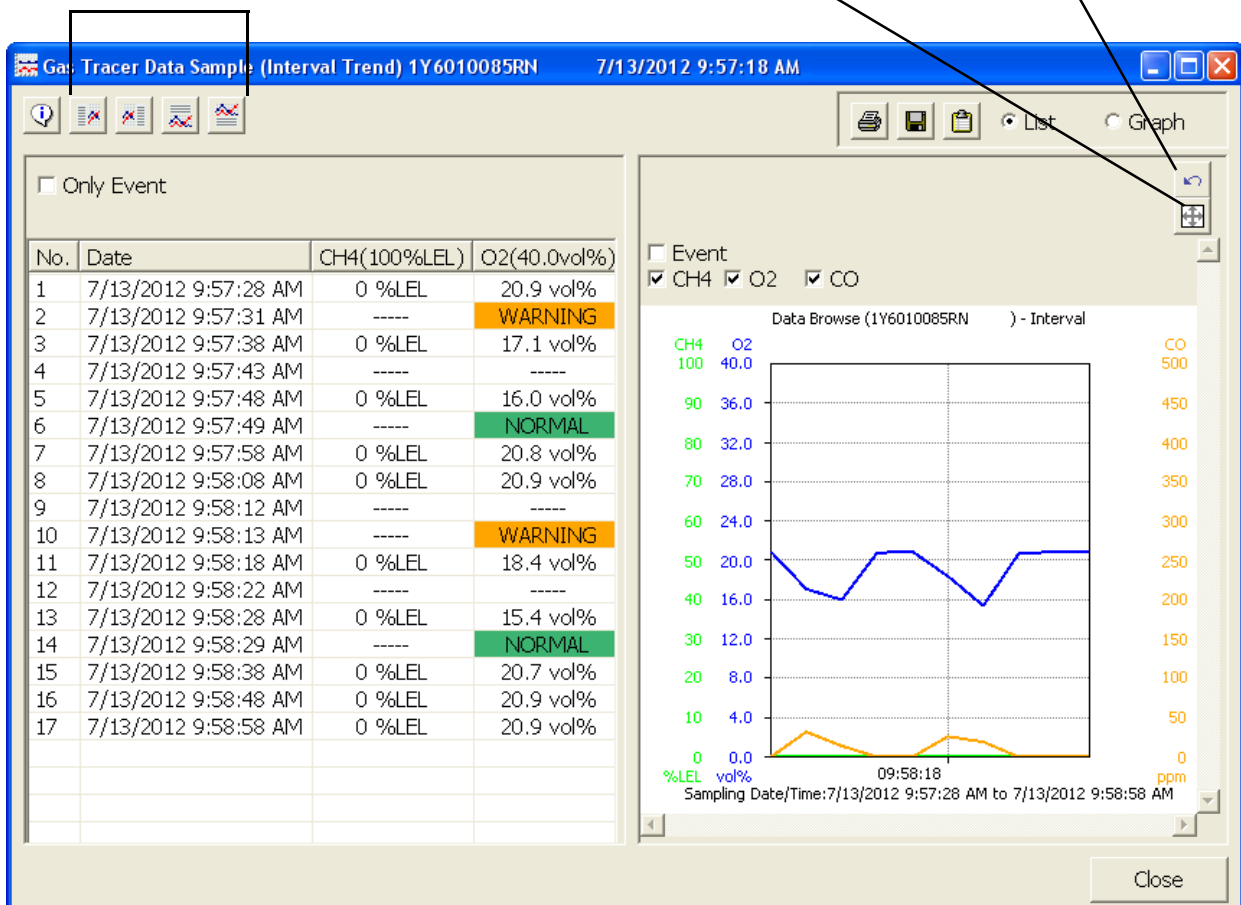


Figure 103: Interval Trend Data

In table format on the left half of the screen, the interval trend data is shown as the average gas readings over the user defined interval trend time. So if the data logging session started at 4:13:38 PM and the interval time is set to 1 minute, then the readings logged at 4:14:38 PM are the average reading for each channel over that one minute period. If a channel went into Warning or Alarm, it will be indicated. A graph of the data will appear on the right half of the screen.

Events are displayed on the screen under the channel in which they occur and with the time of the event. Events are displayed whether they occurred at scheduled log times or in between them. Events include gas alarms such as a warning condition, trouble conditions such as a sensor failure, and an indication that the unit is returning to “normal” condition after an alarm has been reset using the POWER ENTER button on the instrument.

To change the layout of the table and chart, click any of the four layout control buttons in the upper left corner of the screen.

To change the proportions of the table to the graph, click the divider between the two and move it.

To display instrument information along with the data and graph, click the “i” control button in the upper left corner.

6. In the table part of the screen,
 - To view only events in the interval trend data file, click the Only Event selection box.
7. In the graph part of the screen,
 - You can choose which gas(es) you want to graph by selecting or deselecting the boxes next to each gas name.
 - Click the Event box to show event data on the graph. Small indications will appear at the top of the graph to show when an event occurred.
 - To zoom in on a particular part of the graph, drag a box around that area so that it is highlighted in gray. The graph will zoom in. To return to a previous zoom, click the Previous control button in the upper right corner of the graph section. To return to the original zoom, click the Restore control button in the upper right corner of the graph section.
 - Clicking anywhere on the graph will cause a vertical red line to appear and the corresponding data point will be highlighted in the table. Clicking a data point in the table will move the red line in the graph to that data point.
8. To print the data, select either List or Graph in the upper right corner of the window and then click the **Print** control button in the upper right corner of the window. The **Print** control button has a printer icon on it. A dialog box will appear confirming if you want to print. Click OK. If Graph is selected, the data will print as a graph. If List is selected, the data will print as a table.

9. To save the data to a file which can be imported into another program, select either List or Graph in the upper right corner of the window and then click the **Save to File** control button. The **Save to File** control button has a floppy disk icon on it. A dialog box will appear for you to specify the file name, file location, and file type.

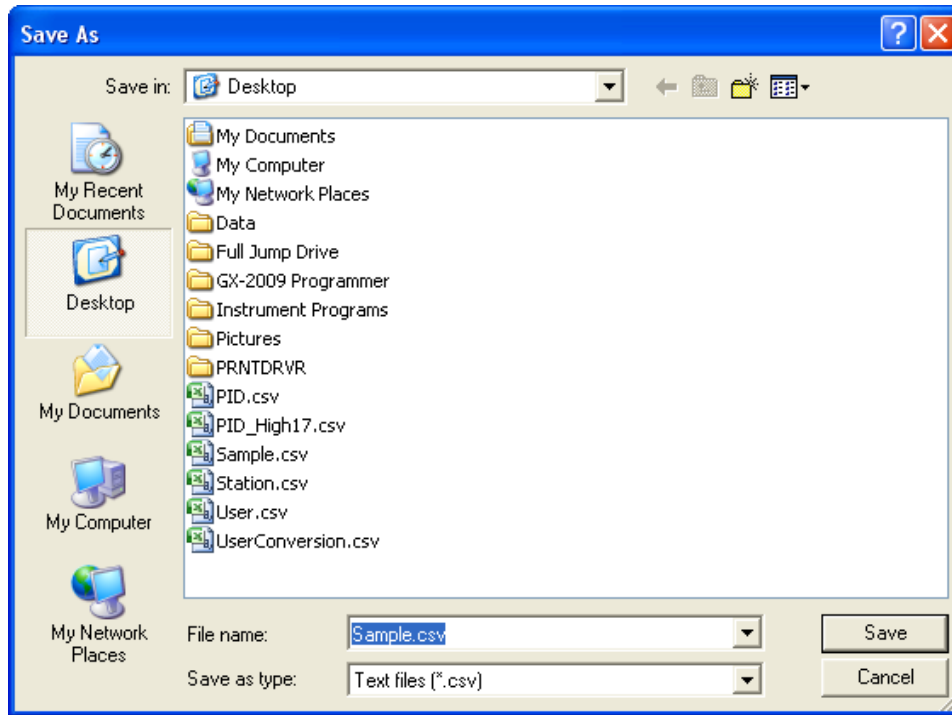


Figure 104: Save As Dialog Box

If List is selected, the file type is “.csv” (comma-separated values). If Graph is selected, the file type is “.bmp” (Windows bitmap). After specifying the file name and file location, click Save to save the file to the specified location.

10. To save the data to the clipboard, select either List or Graph in the upper right corner of the window and then click the **Copy to Clipboard** control button. The **Copy to Clipboard** control button has a clipboard icon on it. The table or graph will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.
11. To go back and view other data, click Close to return to the Logs window.

Memo Data

Any information entered into the Memo field in the Edit window is saved in a file in the Logs window. If there is text in the Memo field, a new file is created every time an instrument is connected to the PC Controller Program. If a change is made to the Memo, the change is saved in the Memo file for that operating session. See page 164 for instructions to use the Memo field. To view and perform desired operations with the memo files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.

- Click the expanded view symbol (+) of or double-click the Memo folder to view the contents. Memo data folders are arranged by year/month.
- Click the year/month folder you wish to view. All memo files for that instrument in that particular year/month will appear in the upper right frame. The file number, serial number, station ID, user ID, model, date/time, and the first few words of the memo appear in the same line.

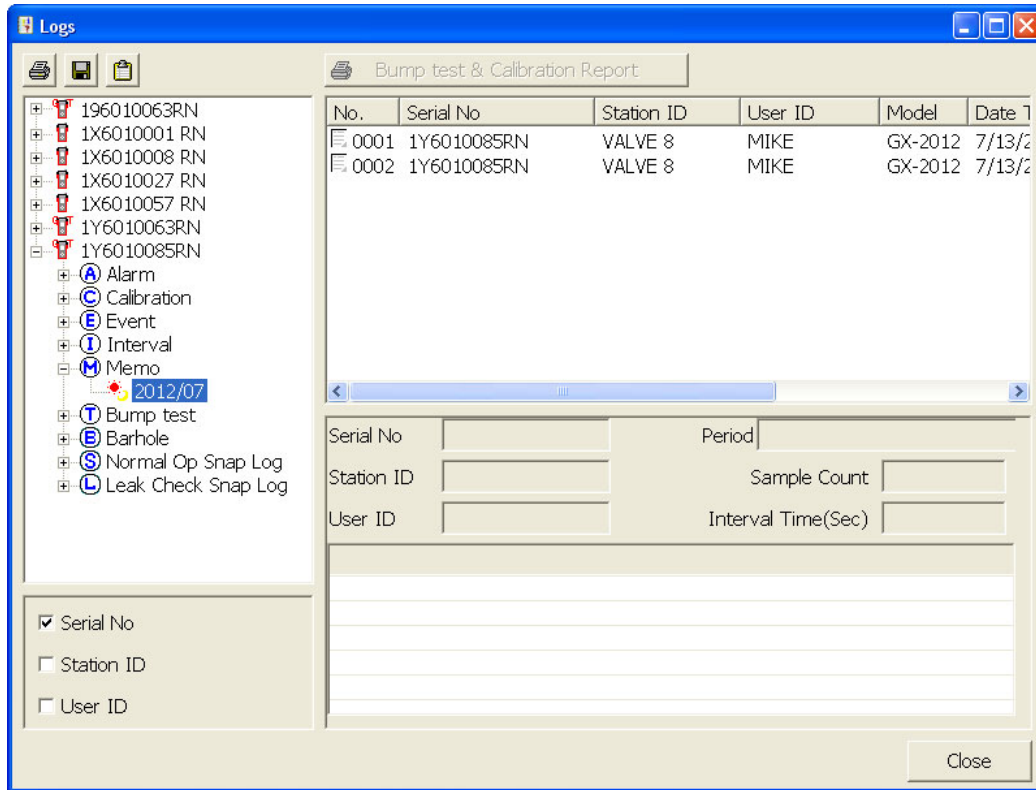


Figure 105: Viewing Memo Files

- Click on one of the memo files. The fields in the bottom right screen will fill in. The instrument information will be displayed along with the memo information.

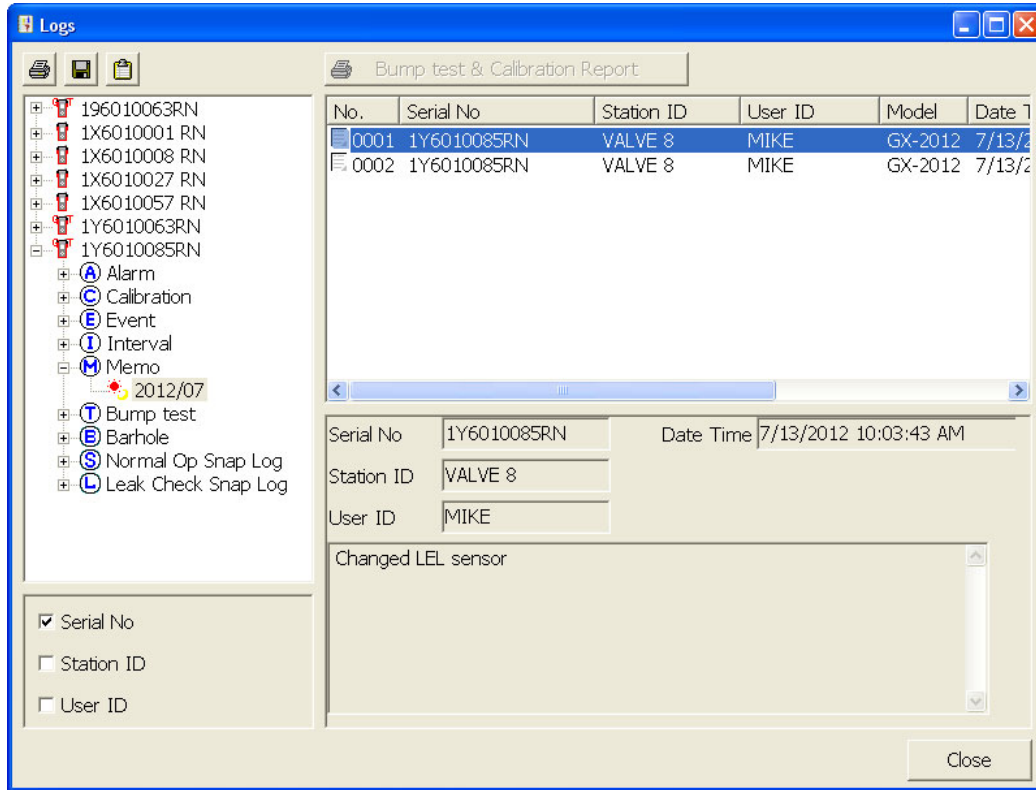


Figure 106: Viewing Memo File Data

- To print memo data, click the **Print** control button in the upper left corner of the Logs window. A dialog box will appear confirming if you want to print. Click OK.

6. To save memo data, click the **Save** control button in the upper left corner of the Logs window. A “Save As” dialog box will appear for you to specify the file name and file location.

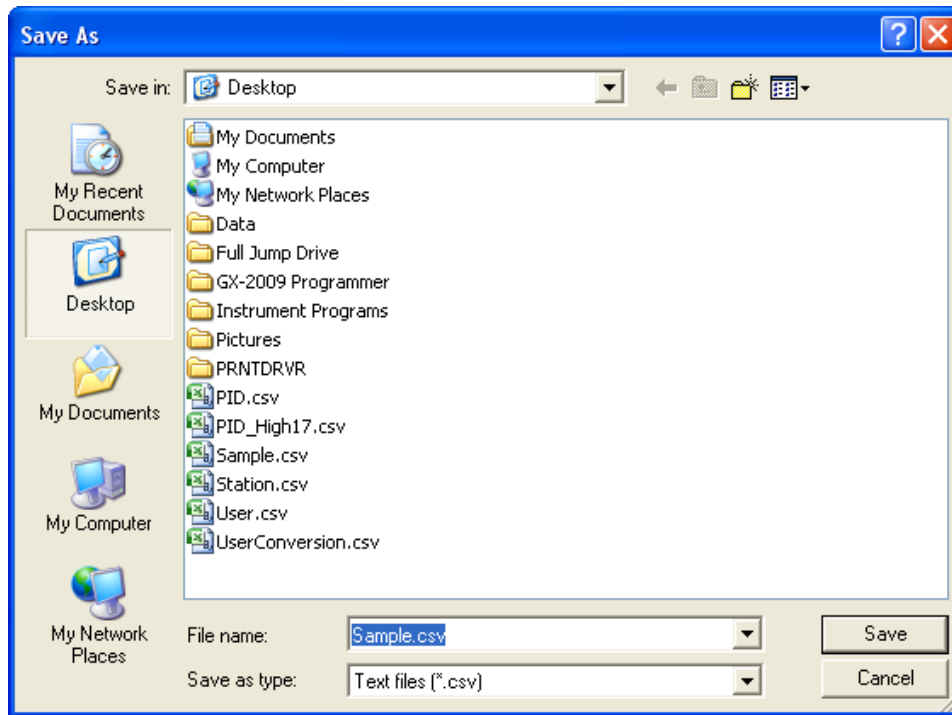


Figure 107: Save As Dialog Box

Specify the file name and location and click Save.

7. To copy memo data to the clipboard, click the **Save to Clipboard** control button. The data will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.

Bump Test Data

The instrument is capable of saving bump test information for up to the 124 most recent calibrations and bump tests combined. When an instrument is connected to the PC Controller Program and a calibration is performed or a complete download occurs, the bump test files are retrieved and stored by the program. In addition, all bump tests performed by the PC Controller Program are stored by the program. To view and perform desired operations with the bump test files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Bump Test folder to view the contents. Bump test data folders are arranged by year/month.

3. Click the year/month folder you wish to view. All bump test data files for that instrument in that particular year/month will appear in the upper right frame. The file number, serial number, station ID, user ID, model, date/time of the bump test, and the results appear in the same line.

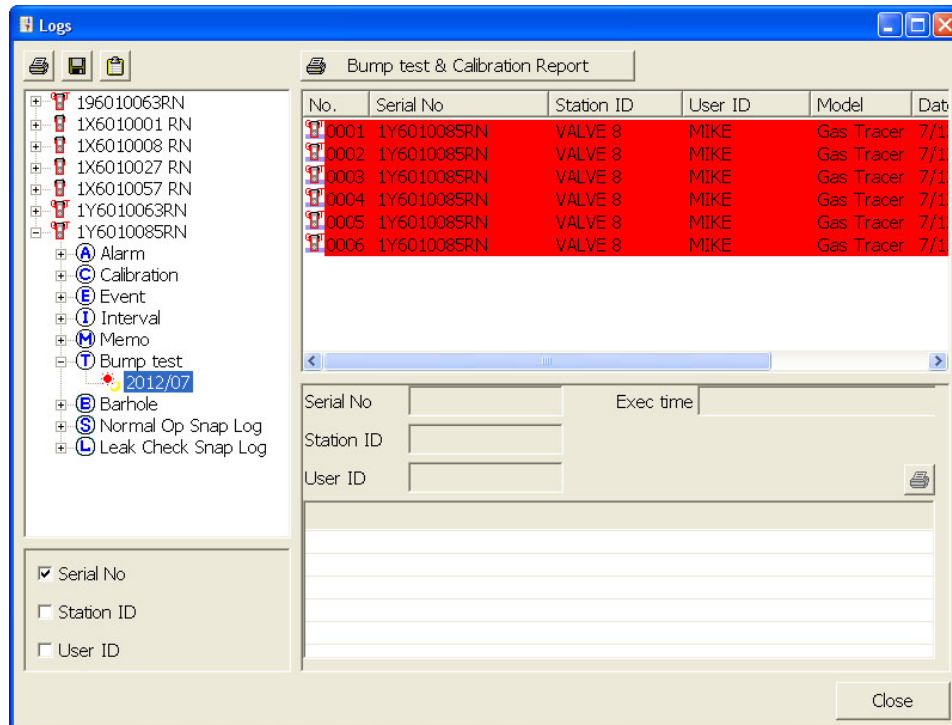


Figure 108: Viewing Bump Test Log Files

- Click on one of the bump test data files. The fields in the bottom right frame will fill in. The instrument information will be displayed along with the bump test information. The tested sensors will be displayed along with the bump test gas reading, the bump test gas values, and the result of the bump test.

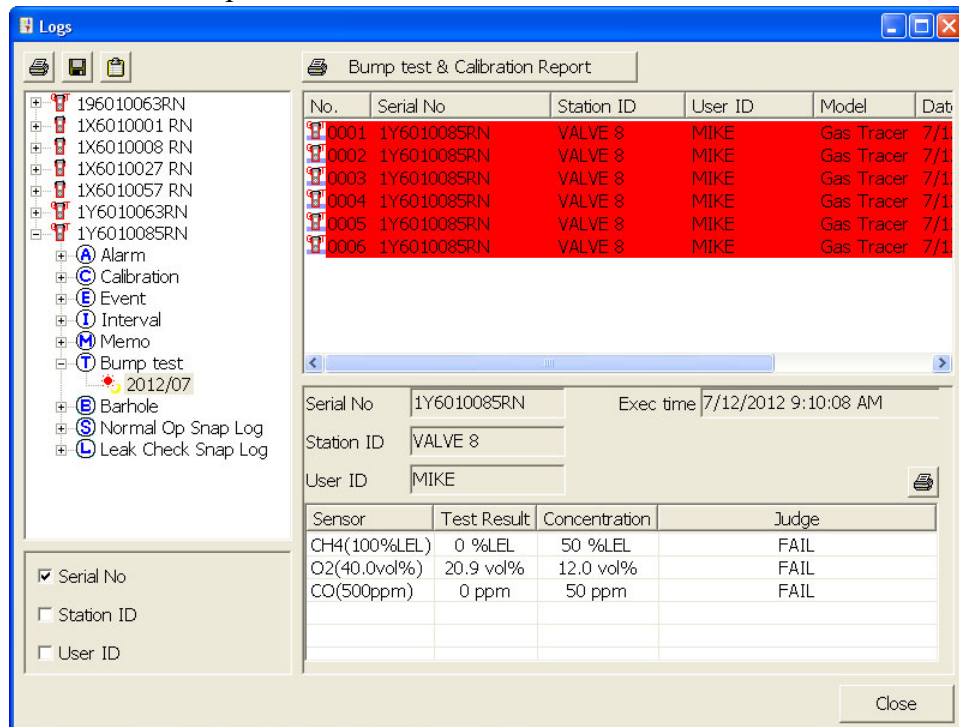


Figure 109: Viewing Bump Test Data

- Files that record a failed bump test on all channels are highlighted in red. Files that record a bump test where not all channels passed are highlighted in orange.
- If any bump tests were performed that required more than one gas cylinder, a separate bump test file will be created for the sensor(s) bump tested with the additional cylinder(s). For example, a bump test performed on a GX-2012 that contained the standard 4 sensors plus a %volume sensor would result in one bump test file for the standard 4 sensors if a 4-gas mix was used and one bump test file for the %volume sensor.
- To print the bump test data (everything in the lower right frame of the screen), click the **Print** control button located just above the bump test judge column. A dialog box will appear confirming if you want to print. Click OK.
- To print the basic bump test results from a date folder (everything in the upper right frame), be sure that the desired date folder is selected and click the **Print** control button in the upper left corner of the Logs window. A dialog box will appear confirming if you want to print. Click OK.
- To print detailed bump test data for each bump test file in a date folder, be sure that the desired date folder is selected and click the **Bump Test & Calibration Report** control button along the top of the Logs window. A dialog box will appear confirming if you want to print. Click OK.

10. To print detailed calibration (if available) and bump test data for each calibration and bump test file for a specific serial number, be sure that the desired serial number is selected in the upper left frame and click the **Bump Test & Calibration Report** control button along the top of the Logs window. A dialog box will appear confirming if you want to print. Click OK.
11. To save bump test data from a specific date folder, be sure the desired date folder is highlighted and click the **Save** control button in the upper left corner of the Logs window. A “Save As” dialog box will appear for you to specify the file name and file location.

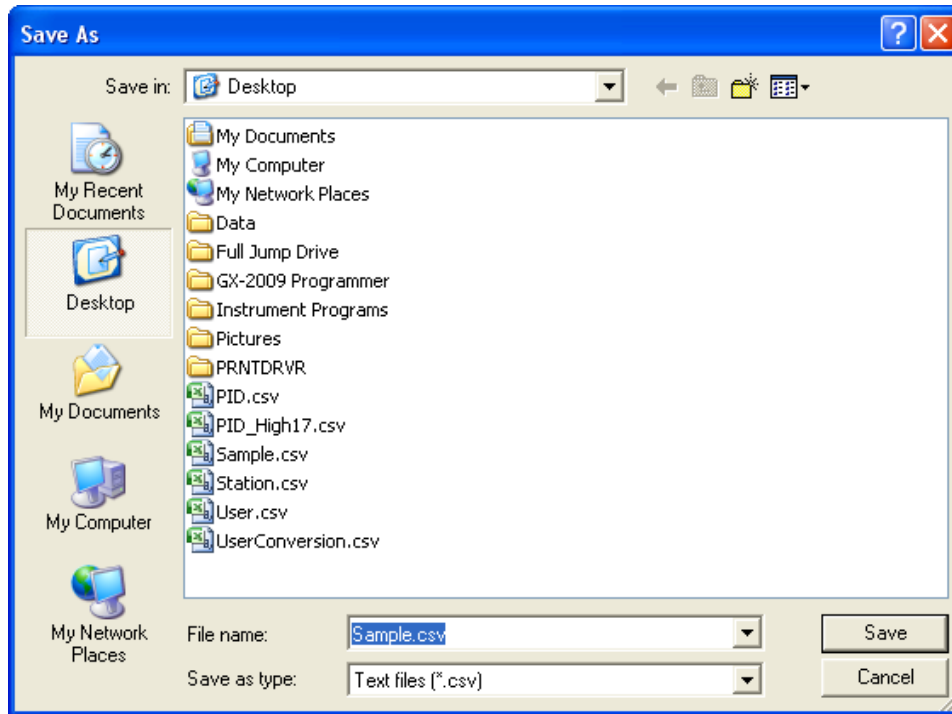


Figure 110: Save As Dialog Box

Specify the file name and location and click Save.

12. To copy bump test data in a date folder to the clipboard, be sure the desired date folder is selected and click the **Save to Clipboard** control button. The data will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.

Barhole Data

To view and perform desired operations with the barhole files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Barhole folder to view the contents. Barhole data folders are arranged by year/month.

- Click the year/month folder you wish to view. All barhole files for that instrument in that particular year/month will appear in the upper right frame. The file number, serial number, station ID, user ID, model, and date/time appear in the same line.

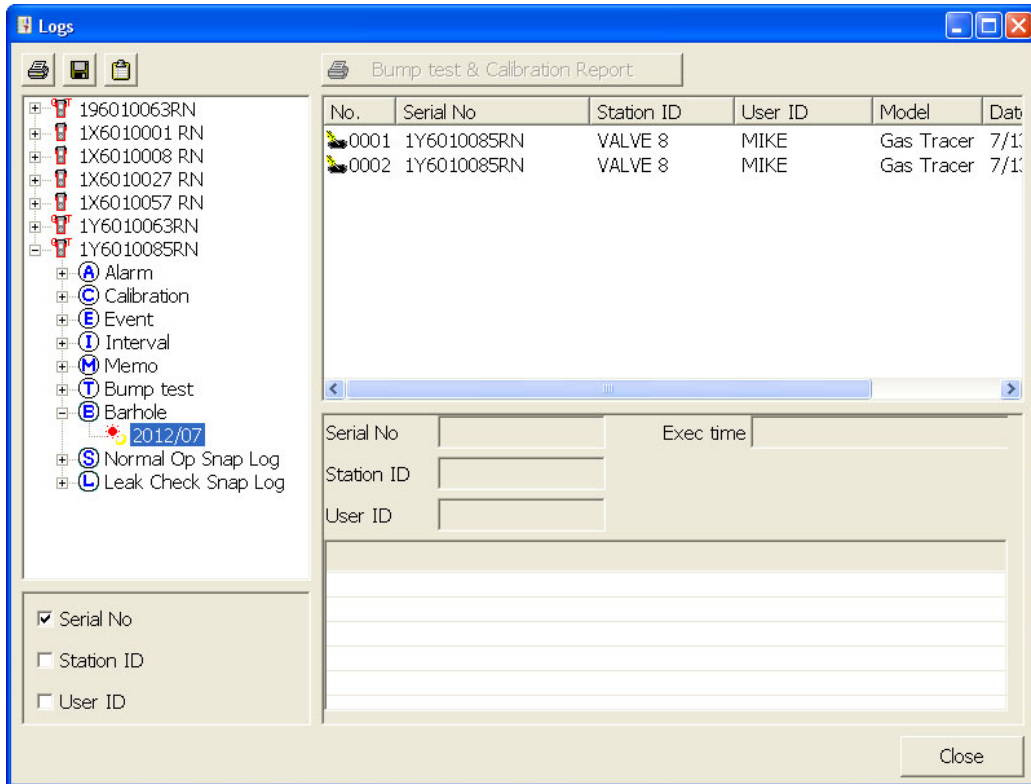


Figure 111: Viewing Barhole Files

- Click on one of the barhole files. Each barhole file corresponds to a barhole test. The fields in the bottom right screen will fill in. The instrument information will be displayed along with the sampling time, average value, minimum value, maximum value, minimum date, maximum date, warning setting, and alarm setting for the combustible gas and oxygen channels.

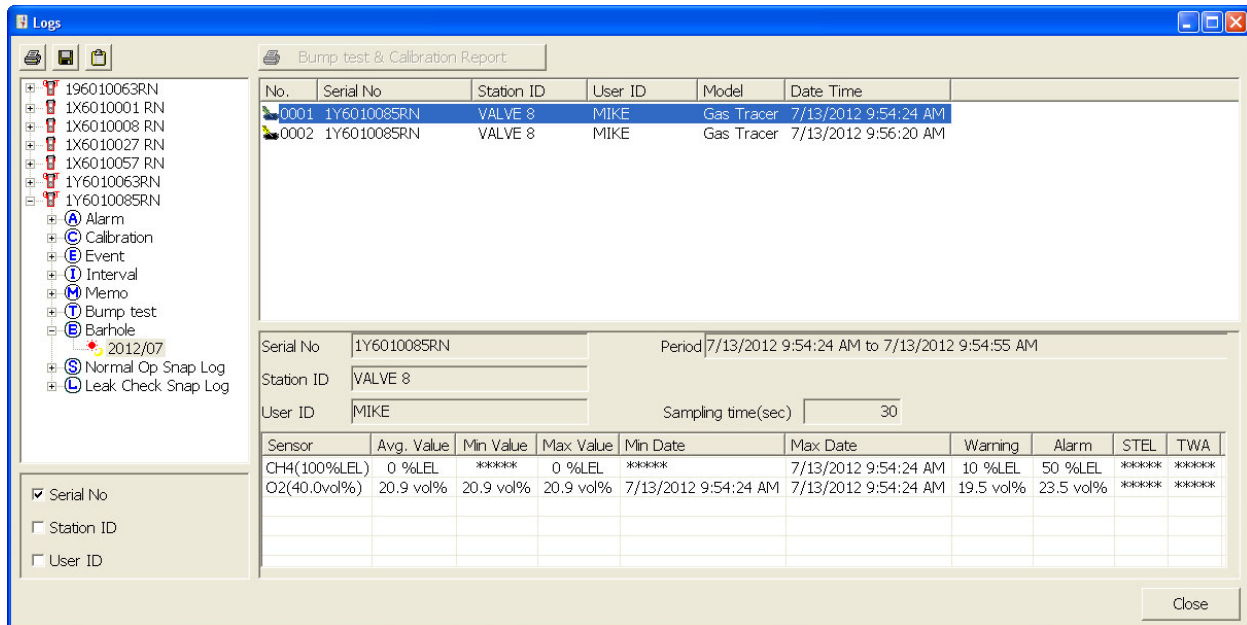


Figure 112: Viewing Barhole File Data

- To print barhole file information from a date folder (everything shown in the upper right frame), be sure that the desired date folder is selected and click the **Print** control button in the upper right corner of the Logs window. A dialog box will appear confirming if you want to print. Click OK.

6. To save barhole file information from a date folder (everything shown in the upper right frame), be sure that the desired date folder is selected and click the **Save** control button in the upper left corner of the Logs window. A “Save As” dialog box will appear for you to specify the file name and file location.

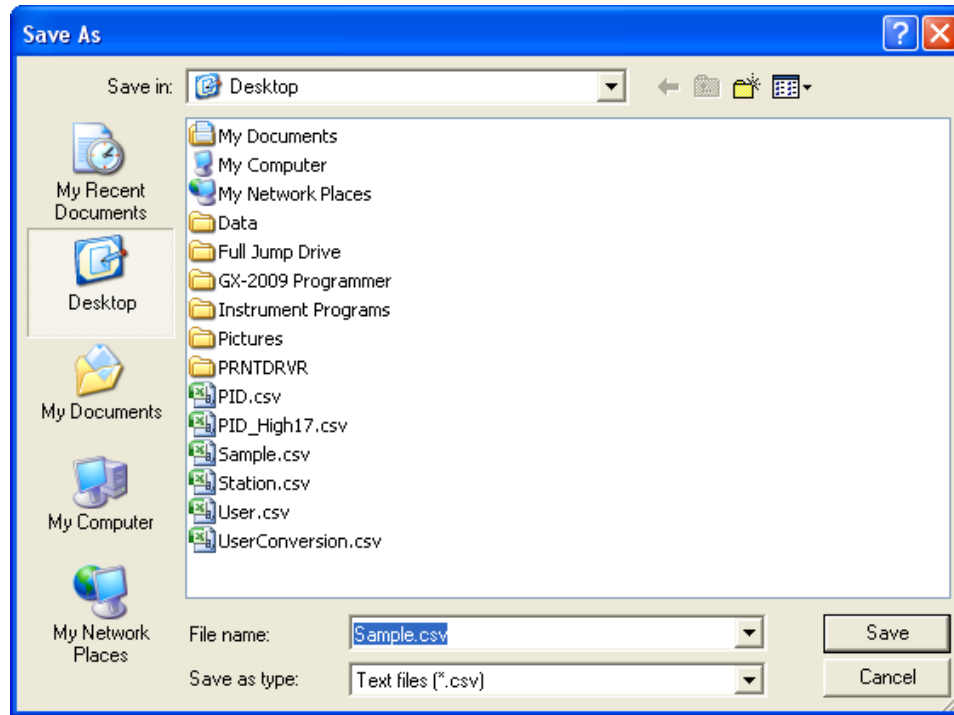


Figure 113: Save As Dialog Box

Specify the file name and location and click Save.

7. To copy barhole file information from a date folder (everything shown in the upper right frame) to the clipboard, be sure that the desired date folder is selected and click the **Save to Clipboard** control button. The data will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.

Normal Operation Snap Log Data

Normal Operation Snap Log Data can be taken on GX-2012 and Gas Tracer instruments. To view and perform desired operations with the normal operation snap log files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Normal Op Snap Log folder to view the contents. Normal operation snap log data folders are arranged by year/month.

- Click the year/month folder you wish to view. One or more snap log files will appear in the top right frame. One snap log file is generated for all normal operation snap logs taken during an operating session. If you turn the instrument off and turn it back on, a new snap log file will be created.

The file number, serial number, model, start date/time, and end date/time appear in the same line for each snap log data file. The start date/time corresponds to the date and time that the instrument was turned on. The end date/time corresponds to the date and time that the instrument was turned off.

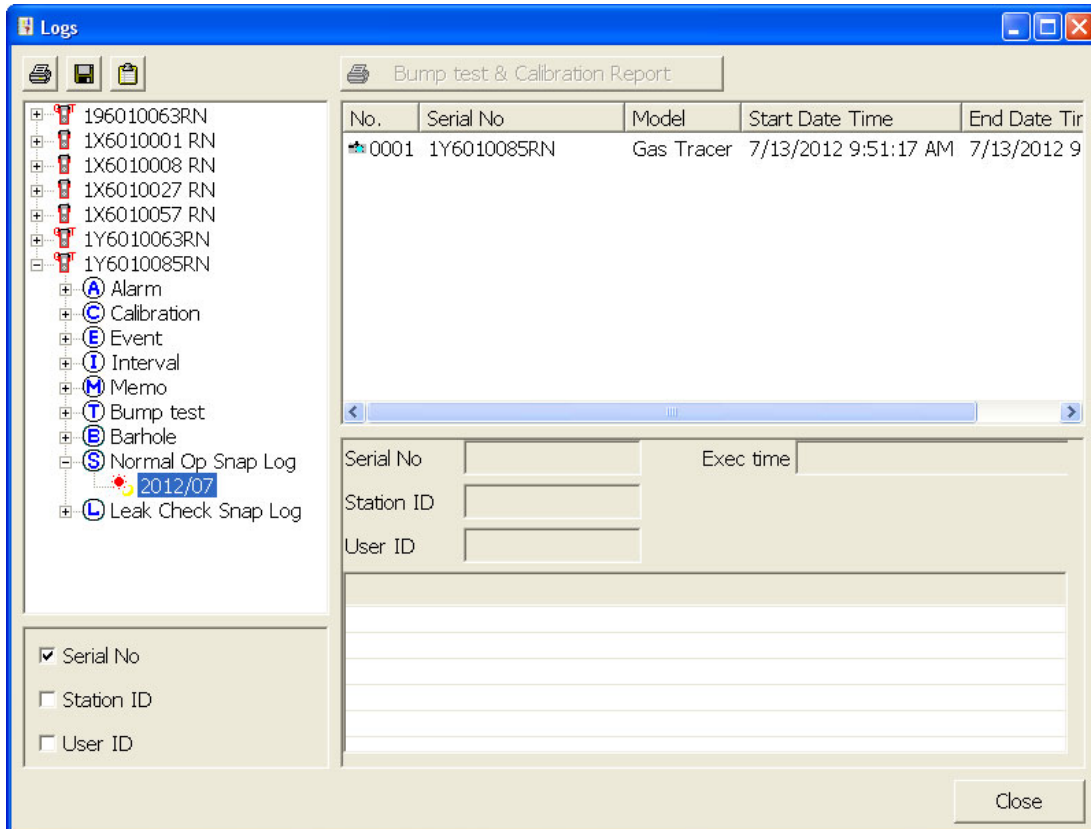


Figure 114: Viewing Normal Operation Snap Log Files

- Click on one of the normal operation snap log files. A summary will appear in the bottom right frame with instrument information. It will also show the gas readings that were saved for the first snap log in the snap log file.

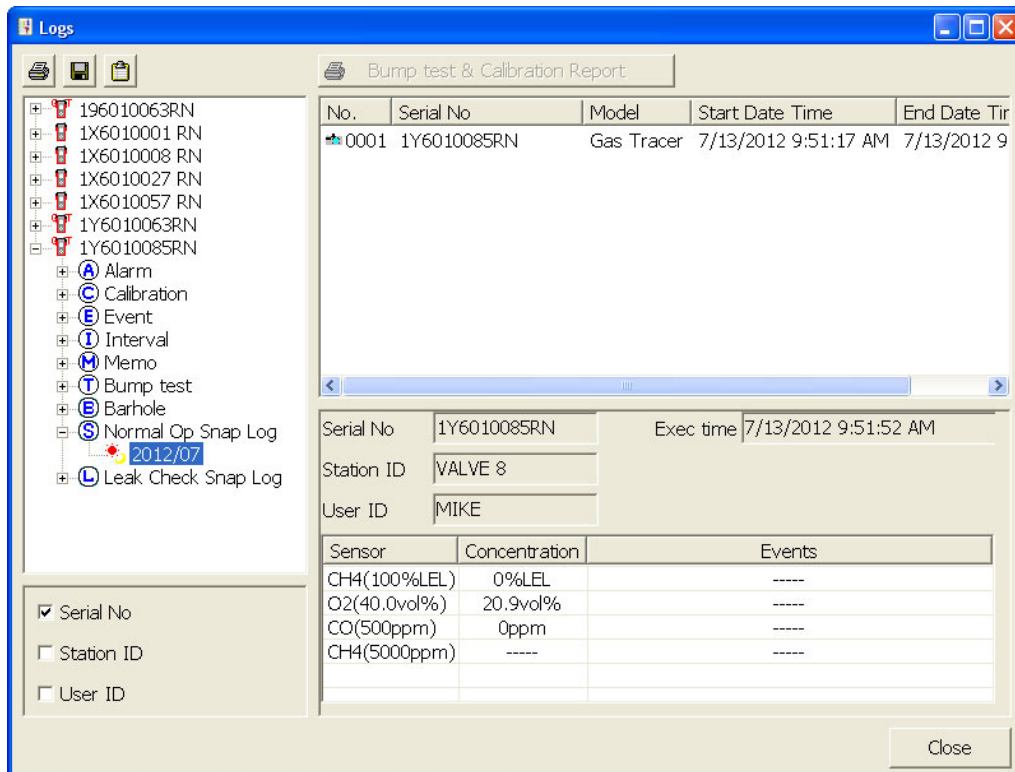


Figure 115: Viewing Normal Operation Snap Log File Data

5. To view the normal operation snap log data, double click the desired file.

[illegible]

Figure 116: Normal Operation Snap Log Data File Opened

The sampling period and instrument serial number will be displayed at the top of the screen. The file number, user ID, station ID, date/time, and channel readings will be displayed in one line for each snap log. Any channel events will appear below that channel's reading.

- To print normal operation snap log data, click the **Print** control button in the upper right corner of the window. A dialog box will appear confirming if you want to print. Click OK.

7. To save normal operation snap log data, click the **Save** control button in the upper right corner of the window. A “Save As” dialog box will appear for you to specify the file name and file location.

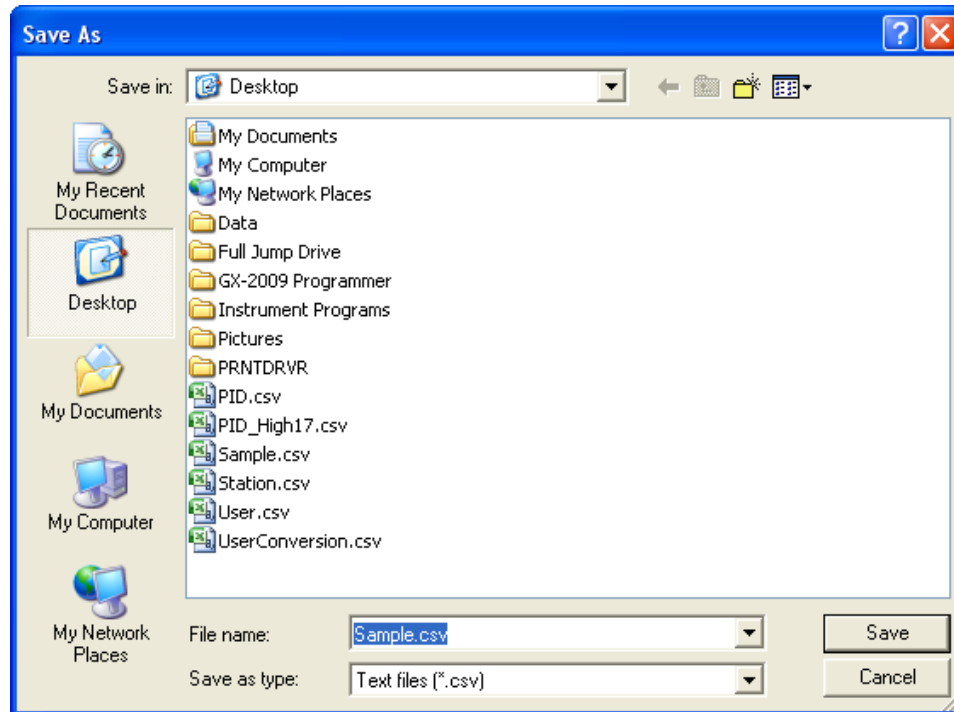


Figure 117: Save As Dialog Box

Specify the file name and location and click Save.

8. To copy normal operation snap log data to the clipboard, click the **Save to Clipboard** control button. The data will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.

Leak Check Mode Snap Log Data

Leak Check Snap Log data can be taken on GX-2012s and Gas Tracers. To view and perform desired operations with the leak check snap log files:

1. While in the Logs window, find your instrument by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Leak Check Snap Log folder to view the contents. Leak check snap log data folders are arranged by year/month.

- Click the year/month folder you wish to view. One or more snap log files will appear in the top right frame. One snap log file is generated for all leak check snap logs taken during an operating session. If you turn the instrument off and turn it back on, a new snap log file will be created.

The file number, serial number, model, start date/time, and end date/time appear in the same line for each snap log file. The start date/time correspond to the date and time that the instrument was turned on. The end date/time correspond to the date and time that the instrument was turned off.

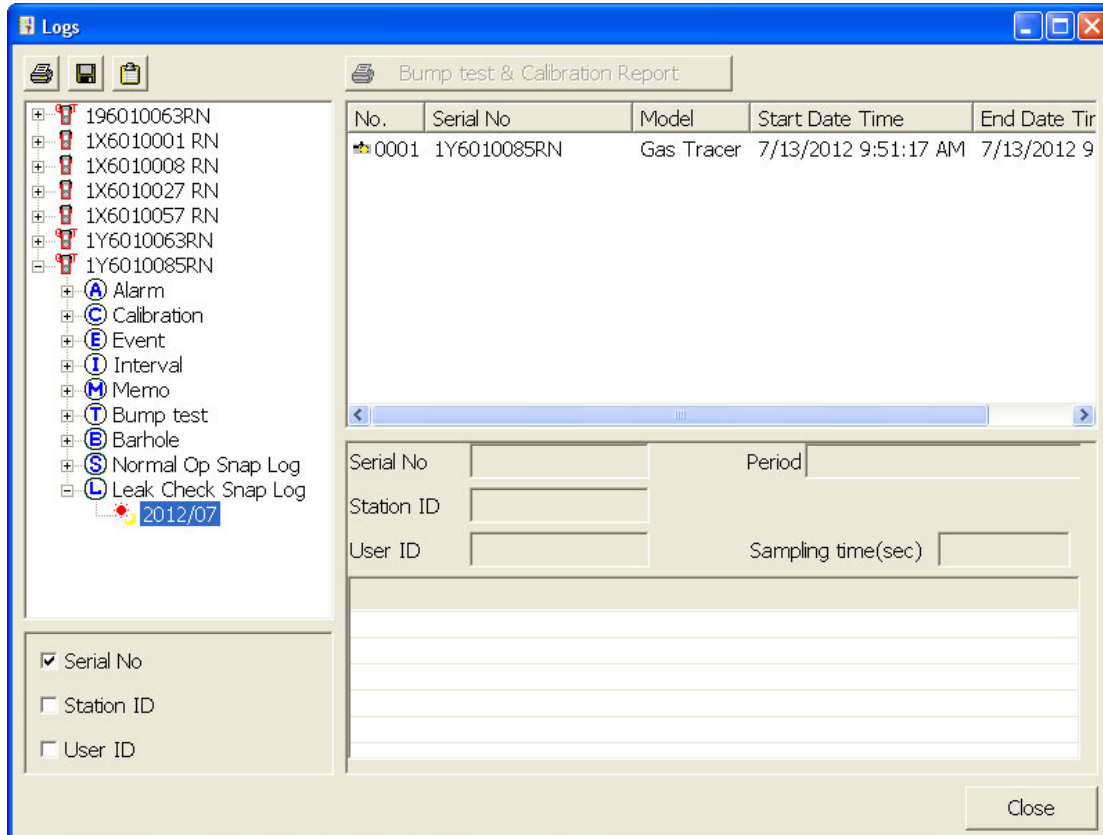


Figure 118: Viewing Leak Check Snap Log Files

- Click on one of the leak check snap log files. The fields in the bottom right screen will fill in. The instrument information will be displayed along with the recorded Base gas concentration for the first snap log.

NOTE: One complete leak check snap log consists of a Base reading and a Peak reading. Simply selecting a leak check snap log file does not allow you to view the complete data for a leak check snap log.

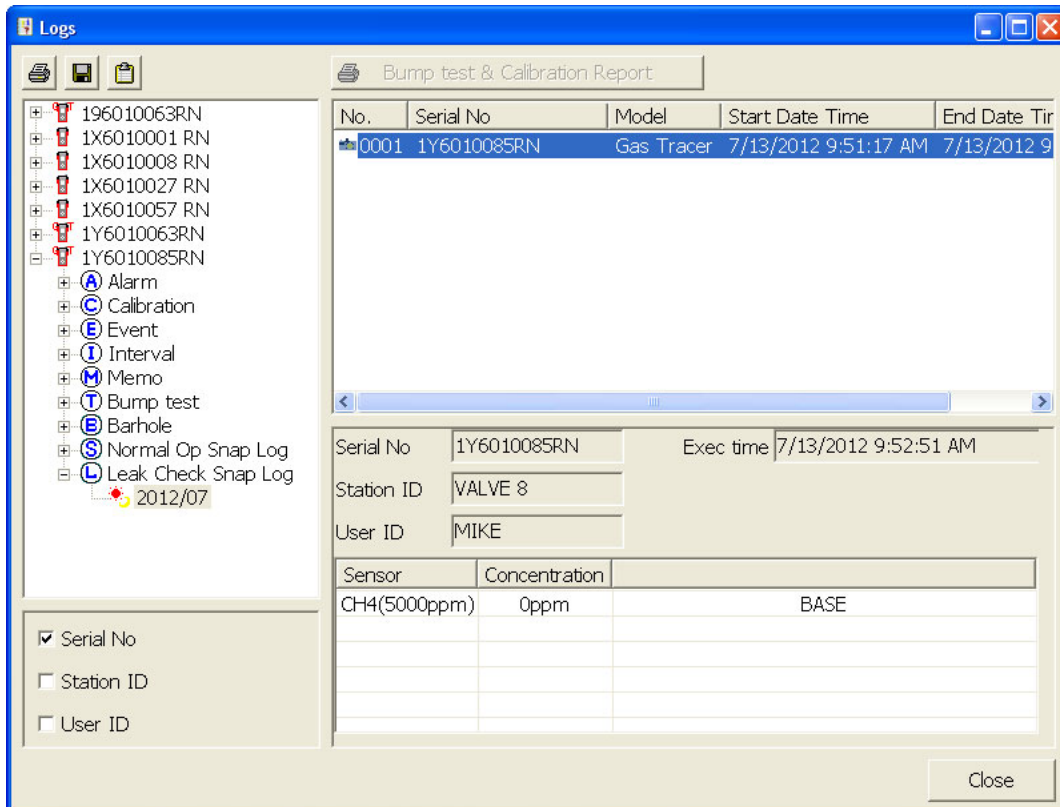


Figure 119: Viewing Leak Check Snap Log File Data

5. To view the complete leak check snap log data, double click the desired file.

[illegible]

Figure 120: Leak Check Snap Log Data File Opened

Each leak check snap log consists of a Base reading and a Peak reading. Base readings are shown in yellow and Peak readings are shown in white. The file number, user ID, station ID, type of reading, date/time, and methane reading are shown. The methane reading is based on a 5000 ppm scale. It does not matter what the display range was set to when the gas reading was taken. The actual gas reading will be displayed up to 5000 ppm. If the concentration was over 5000 ppm, OVER will replace the gas reading.

- To print leak check snap log data, click the **Print** control button in the upper right corner of the window. A dialog box will appear confirming if you want to print. Click OK.

7. To save leak check snap log data, click the **Save** control button in the upper right corner of the window. A “Save As” dialog box will appear for you to specify the file name and file location.

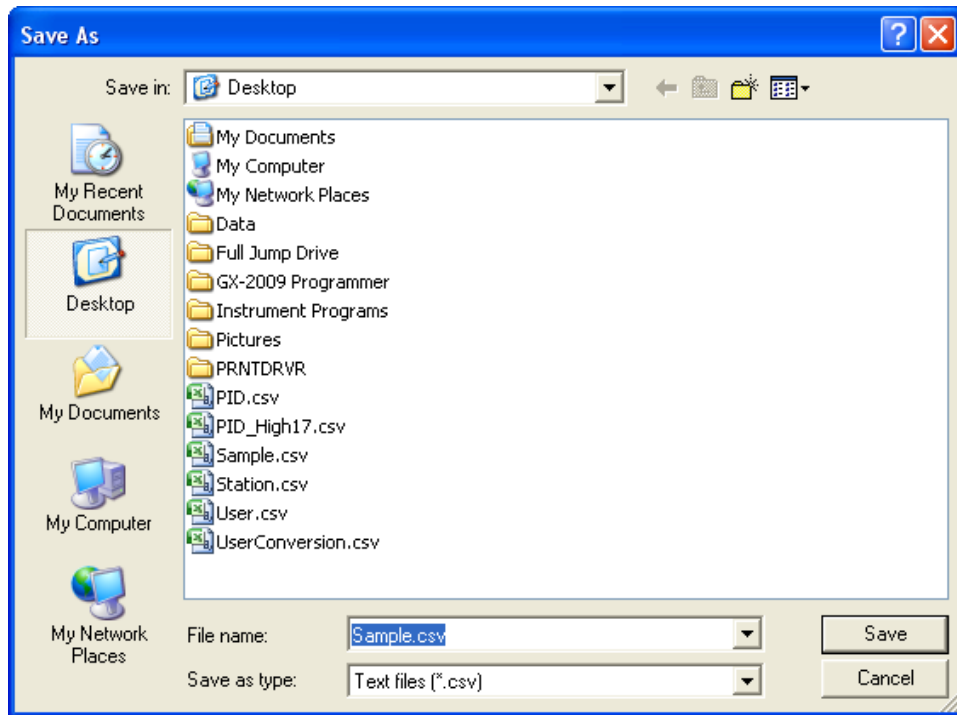


Figure 121: Save As Dialog Box

Specify the file name and location and click Save.

8. To copy leak check snap log data to the clipboard, click the **Save to Clipboard** control button. The data will be saved to the clipboard. It can then be pasted into a document by using the Paste command in an application.

Deleting Data in the Logs Window

Data can be deleted from the Logs window by right clicking on the folder or file you wish to delete. Any file or folder except for Memo data may be deleted.

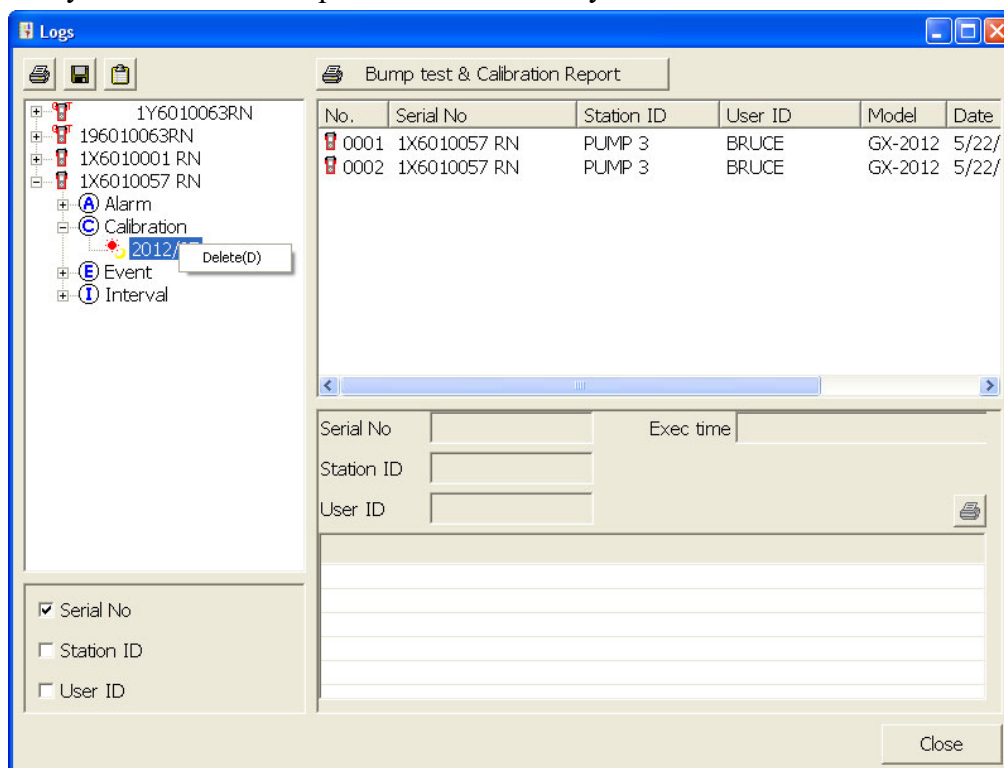


Figure 122: Deleting Data in the Logs Window

1. Right click on the folder or file you wish to delete and click Delete.
2. You will be prompted for a password. The factory set password is ABCDE. It is case sensitive. After you have entered the password, click OK.
3. To delete the folder or file, click OK in the confirmation window that comes up. If you do not want to delete the data, click Cancel.

Chapter 8: Viewing and Editing GX-2012/Gas Tracer Parameters

When you are in the main program window, if you right click on an instrument or a docking station, the Instrument Function Menu appears.

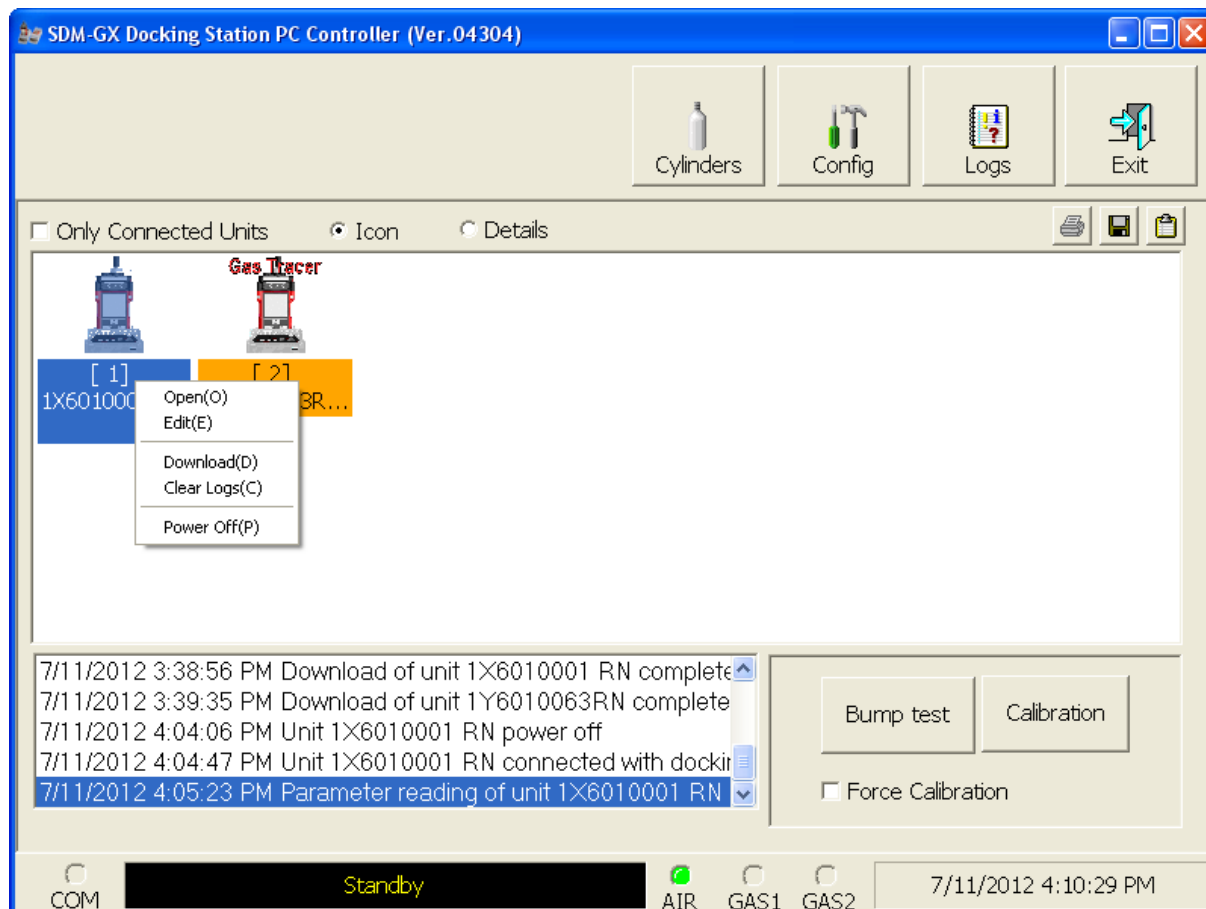


Figure 123: Instrument Function Menu

The functions in the Instrument Function Menu are Open, Edit, Download, Clear Logs, and Power Off. Edit is only selectable if the Change Parameter selection box in the Parameter Tab of the Configuration Window is selected. If you right click on an instrument that is currently connected to a docking station, all items in the Instrument Function Menu are selectable as shown above in Figure 123. If you right click on an instrument that is not currently connected to the SDM-GX PC Controller Program, only the Open function is selectable. The other functions will be grayed out. If you right click on an SDM-2012 that is connected to the SDM-GX PC Controller Program but does not have an instrument in it, no functions will be selectable.

Open Function

This function can be activated by either right clicking an instrument and selecting Open(O) when the pull down menu appears or by selecting an instrument and then using the alt/O key combination. The Open function brings up the Instrument Information window for viewing only. No changes can be made with the Open function. The Instrument Information Window consists of the Parameter Tab, the Sensor Tab, and the Station & User Tab. For further explanation of each tab, see the next section.

1X6010001 RN

Serial No. 1X6010001 RN Station ID LAB 8 Date Time 6/26/2012 8:51:15 AM
Model GX-2012 User ID Katie Load Date 6/26/2012 8:55:09 AM

Parameter Sensor Station & User

Serial No. 1X6010001 RN
Station ID LAB 8
User ID Katie

Cal Interval(Day) 90
Interval Time(Sec) 10

Memo

Option 1 Option 2 Option 3

OXY Alarm Pattern ☒ Falling and Rising ☐ Both Alarms Falling ☐ Both Alarms Rising
Cal past due Act ☒ Confirm to Cal ☐ Must Calibrate ☐ Notification Only
Cal Check Gas 4GAS

☒ Alarm Latching ☐ Cal Reminder ☒ Data Log Overwrite ☐ Pump OFF Display
☒ Alarm Silence ☐ Auto Fresh Air Adj ☒ Data Log Memory ☒ Password Protection
☐ User/StationID ☐ Lunch Break ☒ Zero Adjustment on demand 2102

(Left space 0) OK Cancel

Figure 124: Instrument Information Window, Parameter Tab

To exit the Instrument Information Window and return to the main program window, click Cancel.

Edit Function

This function can be activated by either right clicking an instrument and selecting Edit(E) when the pull down menu appears or by selecting an instrument and then using the alt/E key combination.

NOTE: The Edit function is not active and cannot be selected if the Change Parameter selection box in the Instrument Information section of the Parameter Tab in the Configuration Window is not selected.

Parameter Tab

The Parameter Tab is selected when the Edit function is opened. This tab allows you to view and change various instrument parameters and settings and has information in three sub tabs: the Option 1 Tab, the Option 2 Tab, and the Option 3 Tab.

NOTE: The following parameters are instrument parameters, not PC Controller Program parameters, and with the exception of Calibration Interval and Cal Check Gas, do not affect the operation of the PC Controller Program. Since the PC Controller Program uses the Calibration Interval and Cal Check Gas settings retrieved from the instrument to determine if a calibration is due, changing these settings will affect the program's operation.

Figure 125: Parameter Tab

Several instrument parameters are always selectable and do not depend on which sub tab is selected.

Table 5: Parameter Tab, Main Parameters

Serial No.	To change the current instrument serial number, place the cursor in the Serial No. field and enter the desired serial number. If you change the serial number, once you upload the changes to the instrument and return to the main program window, the PC Controller Program will indicate that the instrument with the old serial number was disconnected. An instrument with the new serial number will then connect to the PC Controller Program.
Station ID	To change the station ID, select the drop-down menu and select the desired station ID. To change the station ID list, see 176.

Table 5: Parameter Tab, Main Parameters

User ID	To change the user ID, select the drop-down menu and select the desired station ID. To change the user ID list, see 176.
Cal Interval (Day)	The calibration interval is the length of time between scheduled calibrations. To change the calibration interval, use the arrows to the right of the current value to increase or decrease the interval. You may also highlight the current setting and type in the new desired setting. It can be set anywhere between 1 and 365 days. The factory setting is 90 days.
Interval Time (sec)	The interval time is how often the instrument will log interval trend readings. It can be set to 5, 10, 20, 30 (factory setting), 60, 180, 300, or 600 seconds. To change the interval time, use the arrows to the right of the current value to increase or decrease it. You may also highlight the current setting and type in the new desired setting. The value that you type in must match the allowable interval settings. If it does not, when you save your changes, your entered value will be shifted to the closest match. For example, if you enter 90 seconds, when you save the changes, the interval will adjust itself to 60 seconds.
Memo	The Memo section of the Parameter Tab allows the user to enter remarks for an instrument that is connected to the program. The Memo may be used to document anything of interest, such as maintenance records (noting when a sensor or a battery pack was changed). The Memo section is empty until the user enters information. The first time information is entered, a Memo file is created in the Logs window. If the Memo is changed in the same operating session, that Memo file is updated. When the instrument is disconnected from the PC Controller Program and connected again, a new Memo file is created with the current memo. If you edit the memo field in that operating session, the new Memo file is updated. If you clear the Memo field for an instrument, the Memo file that was created when the instrument was connected to the PC Controller Program will be deleted since it is now empty. All memos from previous operating sessions will always be available in the Logs window. They cannot be deleted.

Option 1 Sub Tab

1X6010001 RN

Serial No. 1X6010001 RN Station ID LAB 8 Date Time 6/26/2012 8:51:15 AM
 Model GX-2012 User ID Katie Load Date 6/26/2012 8:55:09 AM

Parameter | Sensor | Station & User

Serial No. 1X6010001 RN
 Station ID LAB 8
 User ID Katie

Cal Interval(Day) 90
 Interval Time(Sec) 10

Memo

Option 1 | Option 2 | Option 3

OXY Alarm Pattern
☒ Falling and Rising
☐ Both Alarms Falling
☐ Both Alarms Rising

Cal past due Act
☒ Confirm to Cal
☐ Must Calibrate
☐ Notification Only

Cal Check Gas 4GAS

☒ Alarm Latching ☐ Cal Reminder ☒ Data Log Overwrite ☐ Pump OFF Display
☒ Alarm Silence ☐ Auto Fresh Air Adj ☒ Data Log Memory ☒ Password Protection
☐ User/StationID ☐ Lunch Break ☒ Zero Adjustment on demand 2102

(Left space 0) OK Cancel

Figure 126: Parameter Tab, Option 1

The adjustable instrument parameters in the Option 1 Tab are:

Table 6: Parameter Tab, Option 1 Parameters

OXY Alarm Pattern	<p>Falling and Rising (factory setting): The first oxygen alarm will be a decreasing alarm and the second oxygen alarm will be an increasing alarm.</p> <p>Both Alarms Falling: Both oxygen alarms will be decreasing alarms.</p> <p>Both Alarms Rising: Both oxygen alarms will be increasing alarms.</p>
Cal Past Due Act	<p>Confirm to Cal (factory setting): The instrument will sound an alarm and the user will have to press and release the POWER ENTER button to continue.</p> <p>Must Calibrate: The instrument cannot be used until a calibration has been performed.</p> <p>Notification Only: The instrument will display that a calibration is due but will continue with the warm up sequence.</p>

Table 6: Parameter Tab, Option 1 Parameters

Cal Check Gas	<p>4-GAS (factory setting): The calibration dates for only the standard 4 sensors (LEL, O₂, H₂S, and CO) are used to determine if calibration is due.</p> <p>ALL: The calibration date for the standard 4 sensors along with the %volume sensor and ppm sensor (Gas Tracer only) are used to determine if a calibration is due.</p>
Alarm Latching	<p>Selected (factory setting): The instrument remains in alarm condition until the alarm condition passes <i>and</i> the POWER ENTER button is pressed.</p> <p>Deselected: The instrument automatically resets an alarm when the alarm condition passes.</p>
Alarm Silence	<p>Selected (factory setting): Pressing and releasing any button silences the buzzer when the instrument is in a gas alarm. The LEDs continue to flash and the display continues to show the alarm. When the gas concentration falls below the alarm level, pressing and releasing POWER ENTER clears all alarm indications for that alarm.</p> <p>Deselected: You cannot silence the buzzer. You must wait until the alarm condition clears before you can press POWER ENTER to clear the alarm indications.</p>
User/Station ID	<p>Selected: The ID Screen displays during start up.</p> <p>Deselected (factory setting): The ID Screen does not display during start up. The Select User ID Screen and Select Station ID Screen will always appear in Display Mode regardless of the User/Station ID parameter's setting.</p>
Cal Reminder	<p>Selected (factory setting): The instrument will give an indication at start up if it is due for calibration. The type of indication will depend on the Cal Past Due Act setting.</p> <p>Deselected: The instrument will not give an indication at start up if it is due for calibration.</p>
Auto Fresh Air Adj	<p>Selected: The instrument will perform a fresh air adjustment after the start up sequence.</p> <p>Deselected (factory setting): The instrument will not perform a fresh air adjustment after the start up sequence.</p>
Lunch Break	<p>Selected (factory setting): The Resume Measurements Screen displays during startup. From this screen, you can choose to continue accumulating TWA and PEAK readings and the time in operation from the last time the instrument was used or start collecting new TWA and PEAK readings and reset the time in operation.</p> <p>Deselected: The instrument automatically starts new TWA and PEAK reading collection and resets the time in operation at startup.</p>

Table 6: Parameter Tab, Option 1 Parameters

Data Log Overwrite	<p>Selected (factory setting): The instrument writes over the oldest data with new data when the data logger memory is full.</p> <p>Deselected: The instrument stops saving data to the data logger when the data logger memory is full.</p>
Data Log Memory	<p>Selected (factory setting): The Data Logging Screen in Display Mode asks whether you want to clear the logged data in addition to showing the log time remaining.</p> <p>Deselected: The Data Logging Screen only shows the remaining log time and does not give you the opportunity to clear the logged data.</p>
Zero Adjustment On Demand	<p>Selected (factory setting): The user may perform a fresh air adjustment in normal operation by pressing the AIR▲ button.</p> <p>Deselected: A fresh air adjustment cannot be performed using the AIR▲ button in normal operation.</p>
Pump OFF Display	<p>Selected: The Pump Off Screen appears in Display Mode and the user can turn off the pump in order to conserve battery power.</p> <p>Deselected (factory setting): The Pump Off Screen does not appear in Display Mode and the user cannot turn the pump off.</p> <p><i>WARNING: The instruments are not gas monitoring devices if the pump is turned off.</i></p>
Password Protection	<p>Selected: The instrument prompts you for a password when you enter Calibration Mode. Delete the current password in the box below the selection and enter the desired password.</p> <p>Deselected (factory setting): No password is required to enter Calibration Mode.</p> <p><i>*NOTE: A password is always required to enter Maintenance Mode even if Password Protection is not selected.</i></p>

Option 2 Sub Tab

The Option 2 Tab of the Parameter Tab contains additional instrument parameters that can be changed.

Figure 127: Parameter Tab, Option 2

Table 7: Parameter Tab, Option 2 Parameters

HC Pattern	<p>%LEL ONLY: Combustible channel displays in %LEL units. Standard 4-gas instruments must use this setting.</p> <p>vol% ONLY: Combustible channel displays in vol%. You must have a %volume sensor installed to use this setting.</p> <p>AUTO: The combustible channel will automatically begin reading in %volume when the LEL is exceeded.</p>
Backlight Delay	<p>The Backlight Delay setting is how long the backlight stays on after the last button push. It can be set anywhere from 0 to 255 seconds. The factory setting is 30 seconds.</p>

Table 7: Parameter Tab, Option 2 Parameters

LB Mode	The LB Mode selection allows you to turn on Leak Check Mode, Bar Hole Mode, or both. If any of these modes are turned on, you will be prompted to select an operational mode when you turn the instrument on. The factory setting is OFF. See the GX-2012 Operator's Manual or Gas Tracer Operator's Manual for a description of the operational modes.
BH Measuring Time	The BH Measuring Time parameter only applies to instruments being used in Bar Hole Mode. The BH Measuring Time is the amount of time the unit samples the bar hole. It can be set to 30 (factory setting), 45, or 60 seconds.
Peak Bar Display	Selected: The peak bar appears along the left side of the screen during Normal Operation and on the Peak Screen in Display Mode. It shows the peak readings for each channel in bar graph format. Deselected (factory setting): The peak bar will not appear during Normal Operation or in the Peak Screen in Display Mode.
Confirmation Beep	Selected: The instrument confirms it is still operating by beeping every 5 minutes. Deselected (factory setting): The instrument does not beep to confirm it is still operating.
Leak Check Buzzer	Selected (factory setting): The buzzer will operate in Leak Check Mode. This setting only applies to Gas Tracers. Deselected: The buzzer does not operation in Leak Check Mode.
Leak Check Auto ppm	Selected (factory setting): If the ppm sensor encounters an over-scale gas condition while in Leak Check Mode, the instrument will automatically begin measuring combustible gas with the catalytic LEL sensor. Deselected: The ppm sensor will automatically shut off and enter a warm up period if it encounters an overscale gas condition.

Option 3 Sub Tab

The screenshot shows the 'Option 3' sub-tab of the '1X6010001 RN' configuration window. The window has a blue title bar and standard Windows window controls. The main area is divided into several sections:

- Header Section:** Contains fields for Serial No. (1X6010001 RN), Station ID (LAB 8), Date Time (6/26/2012 8:51:15 AM), Model (GX-2012), User ID (Katie), and Load Date (6/26/2012 8:55:09 AM). There is also a 'Logs' button with a document icon.
- Parameter Section:** Includes tabs for 'Parameter', 'Sensor', and 'Station & User'. The 'Parameter' tab is active, showing fields for Serial No., Station ID, User ID, Cal Interval (Day) set to 90, and Interval Time (Sec) set to 10. A 'Memo' text area is also present.
- Option 3 Section:** Contains three sub-tabs: 'Option 1', 'Option 2', and 'Option 3'. The 'Option 3' sub-tab is active, showing the following settings:
 - Bump Test Function:** Checked.
 - Bump Test Time Remaining:** Unchecked.
 - Bump Test Interval (Day):** Set to 30.
 - Bump Test past due Act:** Set to 'Confirm to Bump Test' (radio button selected).
 - Bump Check Gas:** Set to '4GAS' (dropdown menu).
 - Bump Test Parameter:**
 - Bump Test Time (Sec):** Set to 30.
 - Bump Test Threshold (%):** Set to 30.
 - Calibration after Bump Test Failed:** Unchecked.
 - Calibration Time (sec) after Bump Test Failed:** Set to 90.
- Footer Section:** Includes the text '(Left space 0)' and 'OK' and 'Cancel' buttons.

Figure 128: Parameter Tab, Option 3

Table 8: Parameter Tab, Option 3 Parameters

Bump Test Function	<p>Selected: The BUMP menu item appears in Calibration Mode and Maintenance Mode.</p> <p>Deselected (factory setting): The BUMP menu item does not appear in Calibration Mode or Maintenance Mode.</p>
Bump Test Time Remaining*	<p>Selected: The instrument will give an indication at start up if it is due for bump testing. The type of indication depends on the Bump Test Past Due Act setting.</p> <p>Deselected (factory setting): The instrument will give no indication at start up if it is due for bump testing.</p>
Bump Test Interval (Day)*	<p>The Bump Test Interval(Day) setting defines the amount of time between bump tests. The minimum setting is 0 days and the maximum setting is 30 days (factory setting).</p>

Table 8: Parameter Tab, Option 3 Parameters

Bump Test Past Due Act*	<p>Confirm to Bump Test (factory setting): The instrument will sound an alarm and the user will have to press and release the POWER ENTER button to continue.</p> <p>Must Bump Test: The instrument cannot be used until a bump test has been performed.</p> <p>Notification Only: The instrument will display that a bump test is due but will continue with the warm up sequence.</p>
Bump Test Time (sec)*	The Bump Test Time(Sec) setting indicates the amount of time that the instrument is exposed to gas during a bump test. It can be set to 30 (factory setting), 45, 60, and 90 seconds.
Calibration After Bump Test Failed*	<p>Selected (factory setting): If a bump test performed without the SDM-2012 fails, the unit will automatically begin a calibration.</p> <p>Deselected: If a bump test performed without the SDM-2012 fails, nothing will happen. See the GX-2012 or Gas Tracer Operator's Manual for a description of bump testing the instrument away from the SDM-2012.</p>
Bump Test Threshold (%)*	The Bump Test Threshold(%) setting defines the percentage that the bump test readings can differ from the actual gas concentration. If the bump test reading differs more, the bump test will fail. It can be set to 10, 20, 30 (factory setting), 40, or 50.
Calibration Time (sec) After Bump Test Failed*	This setting defines the amount of time the instrument will remain exposed to calibration gas after a failed bump test if the Calibration After Bump Test Failed parameter is selected. The bump test time is deducted from the calibration time. For example, if Calibration Time(sec) After Bump Test Failed is set to 90 seconds and Bump Test Time(Sec) is set to 30 seconds, the instrument will only be exposed to gas for an additional 60 seconds. The setting can be 60 seconds, 90 seconds (factory setting) or 120 seconds.
* Parameters can be changed and uploaded to the instrument even if Bump Test Function is deselected.	

Sensor Tab

The Sensor Tab displays the alarm settings and auto calibration values for all installed sensors. It also shows the date and time of the most recent calibration for each channel. If you are viewing a standard 4-gas GX-2012 plus a %volume sensor, the information for the %volume sensor will appear directly below the H₂S sensor's information. If you are viewing a standard Gas Tracer plus a %volume sensor, the ppm sensor's information appears directly below the H₂S sensor's information and the %volume sensor's information is directly below the ppm sensor. If a %volume sensor is not installed in the instrument, the %volume information will not appear.

1X6010001 RN

Serial No. 1X6010001 RN Station ID LAB 8 Date Time 6/26/2012 10:03:03 AM

Model GX-2012 User ID Katie Load Date 6/26/2012 10:03:02 AM

Parameter Sensor Station & User

Sensor	Warning	Alarm	STEL	TWA	Auto Cal.	Last Calibration
CH4(100%LEL) - 50000	10	50	*****	*****	50	5/22/2012 10:39:54 AM
O2(40.0vol%)	19.5	23.5	*****	*****	12.0	5/22/2012 10:39:54 AM
CO(500ppm)	25	50	200	25	50	5/22/2012 10:39:54 AM
H2S(100.0ppm)	5.0	30.0	5.0	5.0	25.0	5/22/2012 10:39:54 AM
CH4(100vol%)	*****	*****	*****	*****	100	4/1/2011 12:00:00 AM

(Left space 0) OK Cancel

Figure 129: Sensor Tab %Volume GX-2012

1Y6010063RN

Serial No. 1Y6010063RN Station ID TANK 3 Date Time 7/11/2012 2:53:47 PM

Model Gas Tracer User ID Steve Load Date 7/11/2012 3:05:08 PM

Parameter Sensor Station & User

Sensor	Warning	Alarm	STEL	TWA	Auto Cal.	Last Calibration
CH4(100%LEL) - 50000	10	50	*****	*****	50	4/19/2012 5:18:29 PM
O2(40.0vol%)	19.5	23.5	*****	*****	12.0	4/19/2012 5:18:35 PM
CO(500ppm)	25	50	200	25	50	4/19/2012 5:18:41 PM
CH4(5000ppm)	*****	*****	*****	*****	500	7/11/2012 11:28:54 AM
CH4(100vol%)	*****	*****	*****	*****	100	7/11/2012 9:55:36 AM

(Left space 0) OK Cancel

Figure 130: Sensor Tab %Volume Gas Tracer

Any value in a white box can be changed. Values in shaded boxes cannot be changed. To change a value:

1. Click the box whose value you want to change. The entire box will turn blue.
2. Click the box again and only the value will be highlighted in blue.
3. Type in the new desired value.
4. Repeat steps 1 through 3 for any other values you wish to change and then click OK.
5. You will be asked if you want to save the changes that you made.
 - Select Yes if you wish to save the changes. The PC Controller program will update the instrument and then return you to the main program window.
 - Select No if you do not want to save the changes. The PC Controller program will return you to the main program window.
 - Select Cancel to return to the Sensor Tab and make any additional changes.

Station & User Tab

The Station & User Tab allows you to update the Station ID and User ID lists in a connected instrument.

To edit the Station ID or User ID list, you will need to import a csv (comma separated values) file into the program. A Station csv file and a User csv file are provided with the SDM-2012 product CD. In addition, you can generate csv files for editing from the PC Controller Program.

Creating ID Files

1. To create a csv file for editing, click the Export csv file button for either the Station or User ID list.

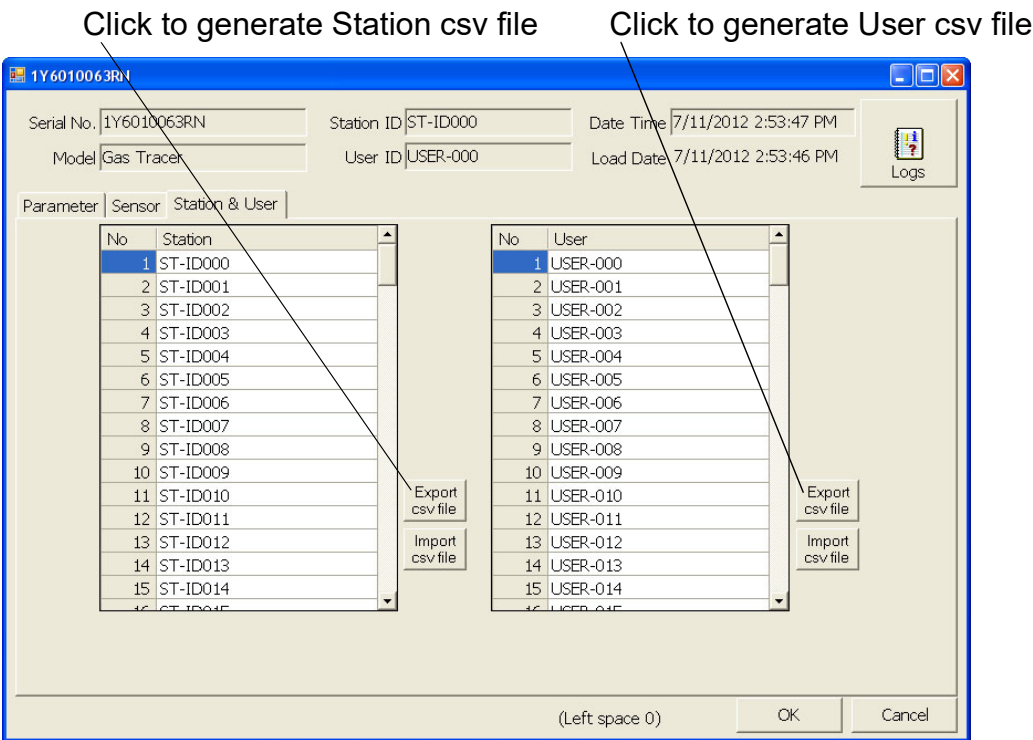


Figure 131: Station and User Tab

2. Navigate to the location you want to save the file, type in a file name, and click Save. You can save multiple station and user ID files if desired.

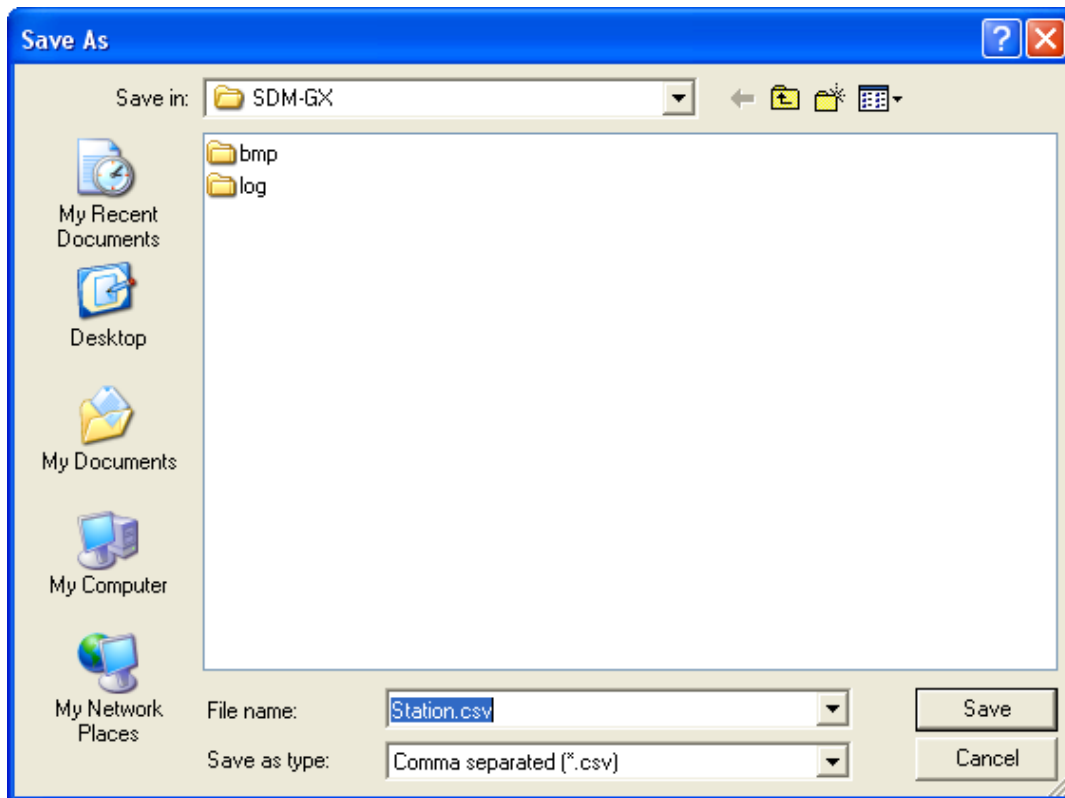


Figure 132: Save As

3. The csv files can be opened, edited, and saved using a word processing program such as Word, WordPad, or Notepad. The Station and User csv files consist of the Station or User ID number and its associated name. Below is an example of the Station csv file opened in WordPad.

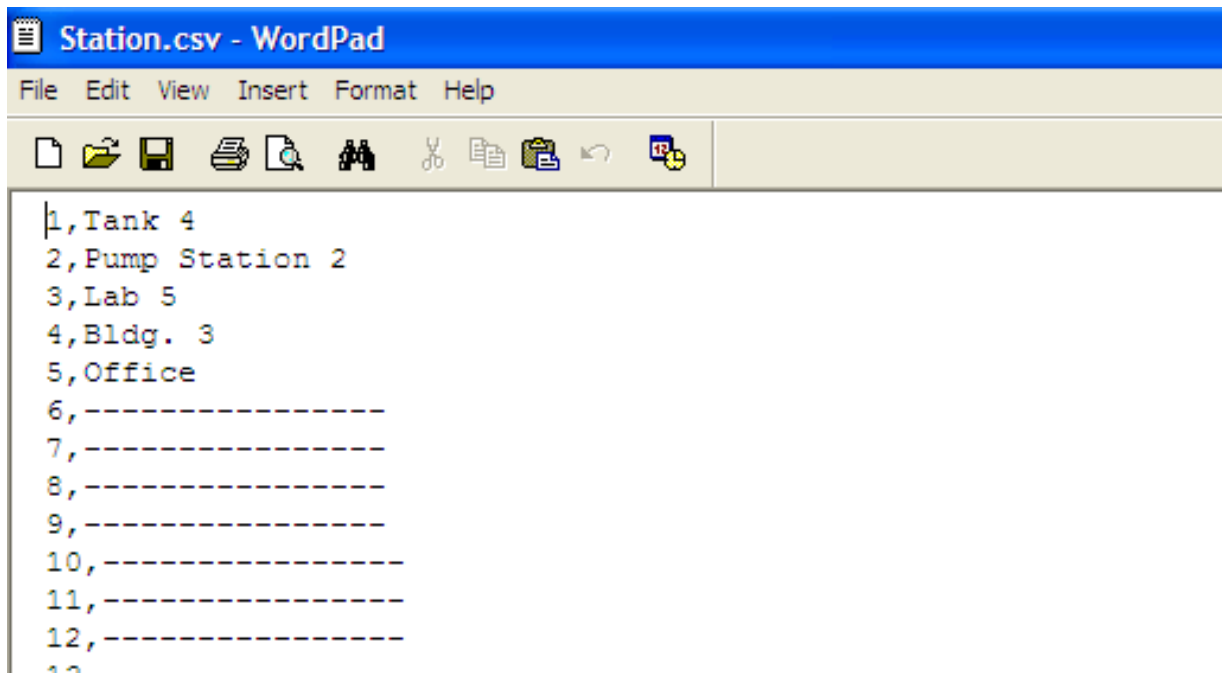


Figure 133: Station ID CSV File Opened in WordPad

Any existing Station or User IDs will be displayed. Undefined Station or User IDs will appear as dashes. To edit a Station or User ID, delete either the existing name or the dashes and replace them with the desired name. The name may consist of any letter, number, or character.

4. Save the changes you made to the csv file.

Loading ID Files

1. In the Station & User Tab, click Import csv file for either the Station ID list or User ID list.

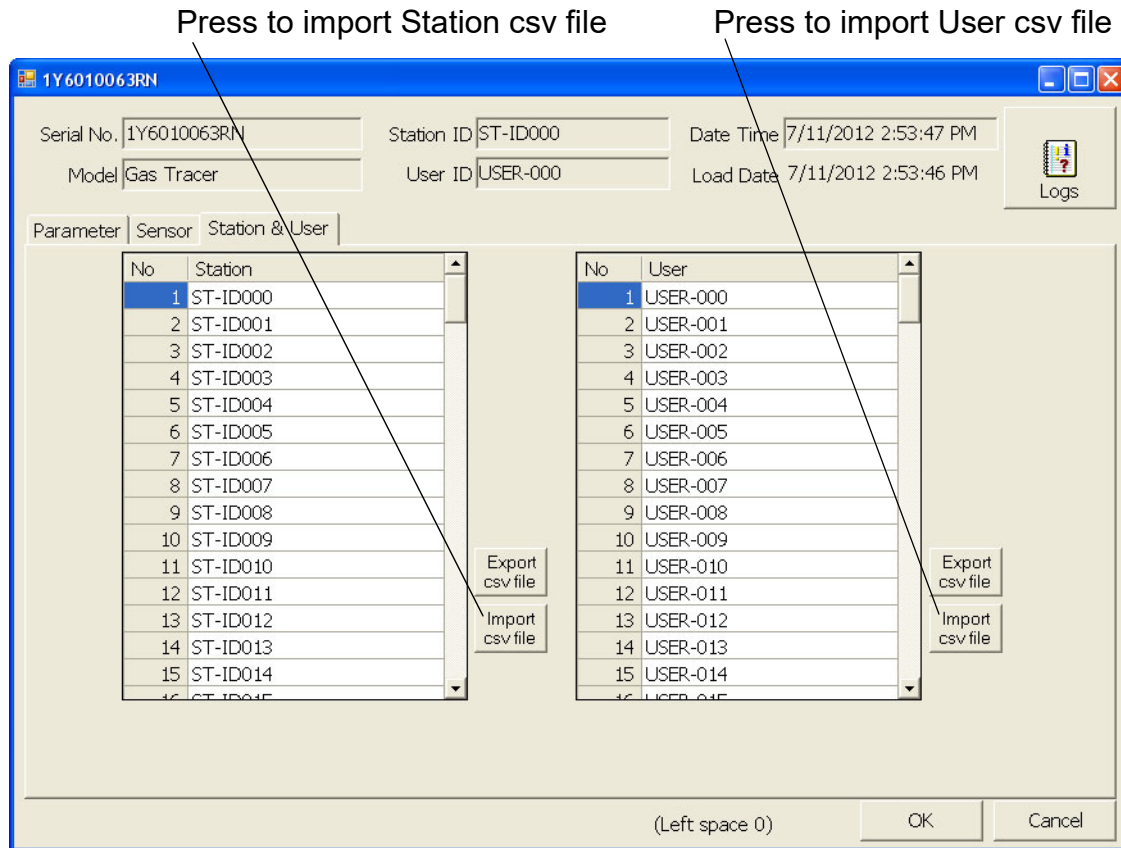


Figure 134: Station and User Tab

2. Navigate to the file you wish to import and click Open.

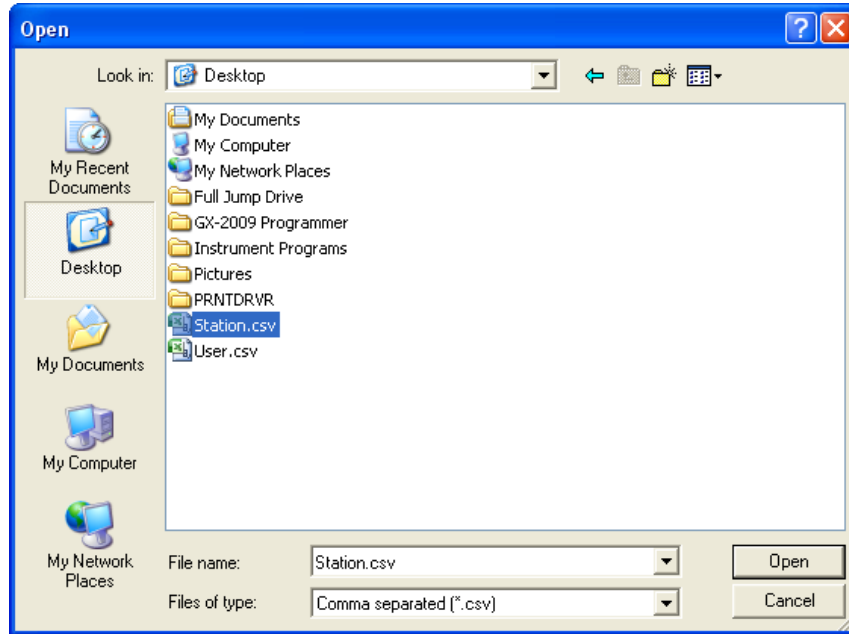


Figure 135: Open Station ID CSV File

3. Once you have imported the Station ID and/or User ID csv files, the new list will be reflected in the Station & User Tab.

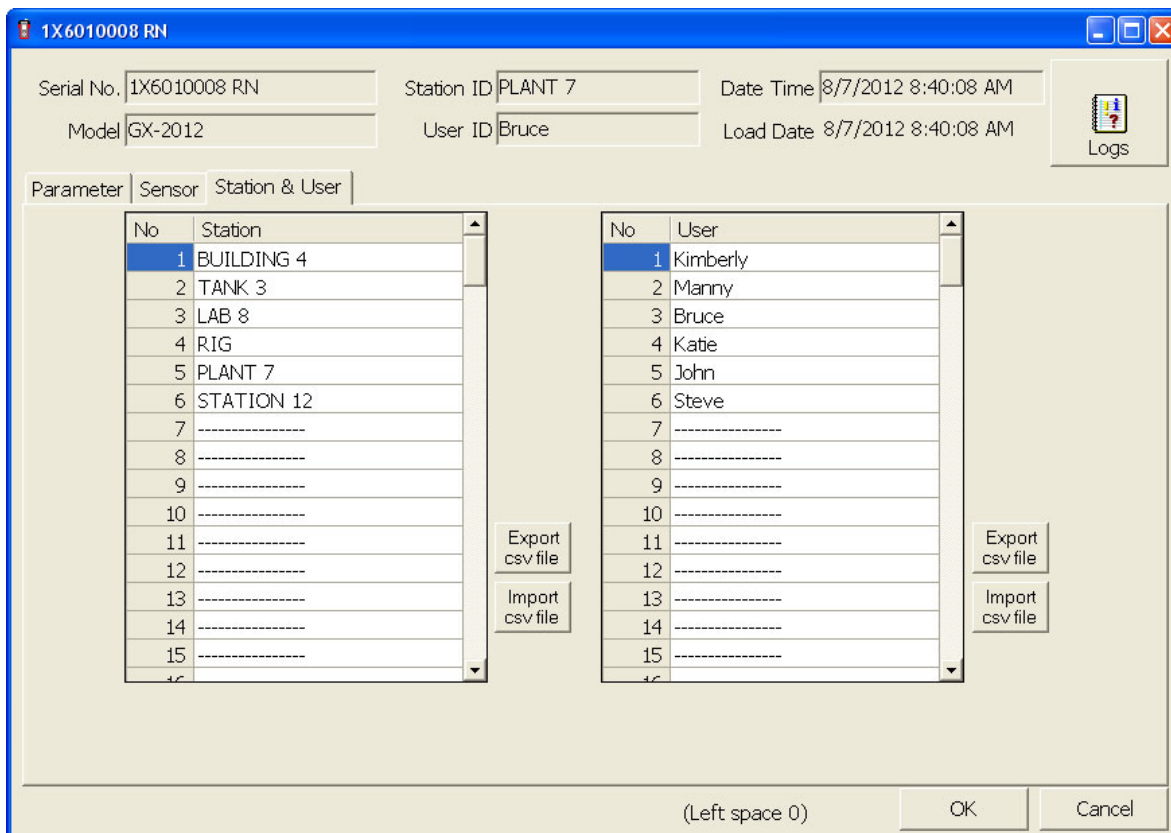


Figure 136: New Station ID List

4. Click OK to save the changes and click Yes in the confirmation window that comes up. The program will tell you to wait while it updates the instrument.
To exit this screen without saving changes, click Cancel.
5. To select a Station ID or User ID for the instrument, go back to the Parameter tab. See page 164 for instructions to select a station ID or user ID.
6. To exit the Station & User Tab, click the OK button in the lower right corner of the window. A confirmation screen will appear asking if you would like to save the changes you have made. To save the changes and return to the main program window, click Yes. To return to the main program window without saving your changes, click No. To return to the Parameter tab and update your changes, click Cancel.
To return to the main program window without saving any changes, click Cancel in the lower right corner of the window.

Chapter 9: Spare Parts List

Table 9: Spare Parts List

Part Number	Description
06-1248RK	Polyurethane tubing, 5/16-inch OD x 3/16-inch ID, for connecting to inlet fittings
06-1248RK-03	Polyurethane tubing, 5/16-inch OD x 3/16-inch ID, 3 foot length
06-1254RK	Polyurethane tubing, 7/16-inch OD x 5/16-inch ID, for exhaust tube, 10 feet maximum
17-0604RK	T-fitting for assembling GAS 1 and GAS 2 manifolds
17-0611RK	T-fitting for assembling exhaust manifold
32-0504RK	Check valve for exhaust fitting (when manifolded)
33-0167RK	Particle air filter replacement, CF-8369
33-2002RK-01	24 inch humidifier tube, for connecting zero air cylinder and ppm calibration cylinder to docking station
47-5073RK	USB cable, Type A to Type B
49-0115RK	Single-port AC adapter
49-2058RK-03	3-port AC adapter
71-0254RK	Operator's Manual, SDM-2012 Docking Station Standalone Configuration
71-0256RK	Operator's Manual, SDM-2012 Docking Station PC Controlled Configuration (this document)
71-8007RK	Product CD, SDM-GX Series, includes Single Module Data Viewer and PC Controller Programs
81-0012RK-01	Calibration cylinder, 50 %LEL CH ₄ in air, 34 liter steel
81-0012RK-03	Calibration cylinder, 50 %LEL CH ₄ in air, 103 liter
81-0016RK-05	Calibration cylinder, 100% vol CH ₄ in N ₂ , 58 liter
81-0018RK-01	Calibration cylinder, 50 %LEL isobutane in air, 34 liter steel
81-0018RK-03	Calibration cylinder, 50 %LEL isobutane in air, 103 liter
81-0026RK-01	Calibration cylinder, 250 ppm isobutane in air, 34 liter steel
81-0026RK-03	Calibration cylinder, 250 ppm isobutane in air, 103 liter
81-0076RK	Zero air cylinder, 17 liter
81-0076RK-01	Zero air cylinder, 34 liter steel

Table 9: Spare Parts List

Part Number	Description
81-0076RK-03	Zero air cylinder, 103 liter
81-0079RK-01	Calibration cylinder, 500 ppm CH ₄ in air, 34 liter steel
81-0079RK-03	Calibration cylinder, 500 ppm CH ₄ in air, 103 liter
81-0090RK-01	Three-gas calibration cylinder, 50% LEL CH ₄ /12% O ₂ /50 ppm CO, 34 liter steel
81-0090RK-03	Three-gas calibration cylinder, 50% LEL CH ₄ /12% O ₂ /50 ppm CO, 103 liter
81-0154RK-02	Four-gas calibration cylinder, 50% LEL CH ₄ /12% O ₂ /50 ppm CO/25 ppm H ₂ S, 58 liter
81-0154RK-04	Four-gas calibration cylinder, 50% LEL CH ₄ /12% O ₂ /50 ppm CO/25 ppm H ₂ S, 34 liter aluminum
81-0158RK-02	Four-gas calibration cylinder, 50% LEL Isobutane/12% O ₂ /50 ppm CO/25 ppm H ₂ S, 58 liter
81-0158RK-04	Four-gas calibration cylinder, 50% LEL Isobutane/12% O ₂ /50 ppm CO/25 ppm H ₂ S, 34 liter aluminum
81-1054RK	Demand flow regulator, 34 liter aluminum, 58 liter, and 103 liter cylinders (cylinders with internal thread)
81-1055RK	Demand flow regulator, for 17 liter and 34 liter steel cylinders (cylinders with external thread)
81-SDM2012	Docking Station for GX-2012 and Gas Tracer
82-6050RK	USB hub, 4-port
82-6051RK	USB hub, 7-port

Appendix A: Multiple Instrument Configurations

RKI Instruments, Inc. recommends bump testing and calibrating GX-2012s and Gas Tracers separately. If desired or needed, however, GX-2012s and Gas Tracers can be bump tested and calibrated at the same time using the PC Controller Program. If you are going to test the instruments together, do not manifold the different types of instruments together. Create a manifold for the docking station(s) testing the GX-2012(s) and a manifold for the docking station(s) testing the Gas Tracer(s). See page 20 for instructions and guidelines to manifold SDM-2012s. Be sure to use a 3-gas mix when testing the Gas Tracers. Do not use a 4-gas mix because the H₂S in the cylinder adversely affects the ppm combustible sensor.

Bump Testing GX-2012s and Gas Tracers

The following instructions apply to standard GX-2012s that contain the standard sensors (catalytic LEL, O₂, H₂S, and CO) as well as standard Gas Tracers that contain the standard sensors (catalytic LEL, ppm combustible, O₂, and CO). They also apply to GX-2012s and Gas Tracers that have a %volume combustible gas sensor installed. See “Bump Testing a GX-2012” on page 60 or “Bump Testing a Gas Tracer” on page 85 for instructions to bump test a GX-2012 or Gas Tracer, respectively.

The PC Controller Program is capable of performing a bump test both manually and automatically when an instrument is connected to it. When a bump test is performed, the PC Controller Program performs an air adjust operation on an instrument and then applies calibration gas to the instrument. The program analyzes the response results based on predefined criteria and determines if the instrument passed the bump test.

The criteria that the PC Controller Program uses to determine if the instrument passes a bump test, whether the Bump Test button is active, and whether or not the PC Controller Program automatically performs a bump test if it is due on a connected instrument is defined in the Parameter tab of the Configuration Window. See page 39 for a description of the bump test configuration setup.

NOTE: The PC Controller program performs a complete bump test on the ppm combustible sensor in the Gas Tracer first. Be sure that the 500 ppm methane calibration cylinder is connected to the GAS 2 fitting on the back of any SDM-2012(s) with Gas Tracers installed using a 24 inch humidifier tube.

To manually bump test instruments:

1. Establish a connection between the SDM-2012, the instruments, and the PC Controller program as described on page 50.
2. Verify that all of the bump test parameters are set correctly. See page 36 for instructions.

3. Verify that the appropriate calibration gas cylinder(s) are connected to the appropriate SDM-2012(s) or manifold line(s). The ppm sensor will be bump tested first. Be sure that a 24 inch humidifier tube is used to connect the ppm calibration cylinder to the GAS 2 fitting on the back of any SDM-2012(s) with Gas Tracers installed. If you have assembled a humidifier manifold for the GAS 2 fittings of the SDM-2012s with Gas Tracers installed (see page 20), be sure the ppm calibration cylinder is connected to the inlet of the manifold. If you are using a zero air cylinder for the fresh air adjustment, install a 24 inch humidifier tube between the regulator and the AIR fitting on the back of the SDM-2012.

NOTE: Do not use a 4-gas cylinder or any cylinder that includes H₂S when bump testing a Gas Tracer. H₂S adversely affects the ppm combustible sensor. If you have assembled a manifold, be sure that one manifold exists for the SDM-2012s with GX-2012s installed and that a separate manifold exists for the SDM-2012s with Gas Tracers installed.

4. Ensure that the gas out to instrument line is connected to the inlet of each instrument and that the exhaust line is connected to the exhaust fitting of the each instrument.

5. Select the instruments you wish to bump test and click on them to highlight them as shown below. To select multiple instruments for bump testing, hold down the Control button on the keyboard as you click them.

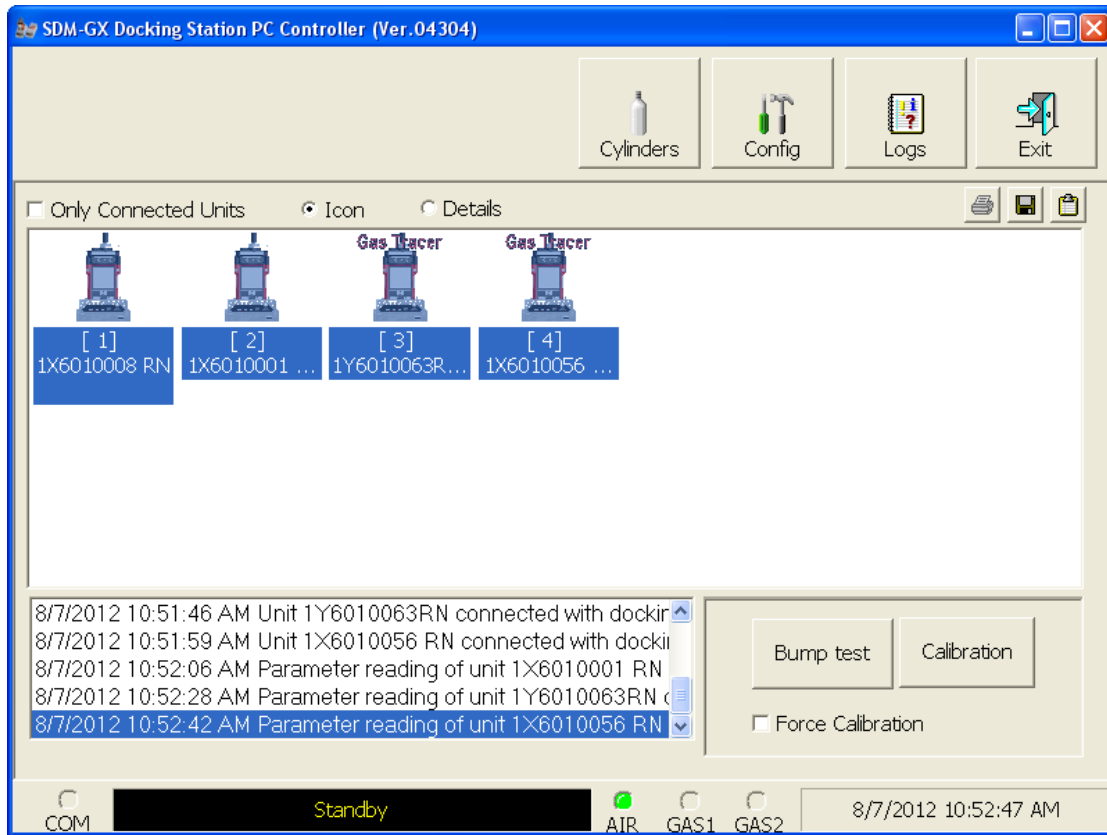


Figure 137: Instrument Selection

6. If you would like an automatic calibration to occur after a failed bump test, select the Force Calibration selection box.
7. Click the Bump test button in the lower right corner of the main program window.

8. You will be asked to confirm which instrument channels will use GAS 1 for the bump test. The gas concentration shown next to each channel is the auto calibration value for that channel. If it does not match the gas concentration in the cylinder(s), change the auto calibration value for that channel. See page 174 for instructions. The Gas Tracer's ppm sensor cannot be selected for use with the GAS 1 inlet and must use the GAS 2 inlet. If any of the instruments you are testing includes a %volume sensor, the %volume sensor cannot be selected for use with the GAS 1 inlet and must use the GAS 2 inlet.

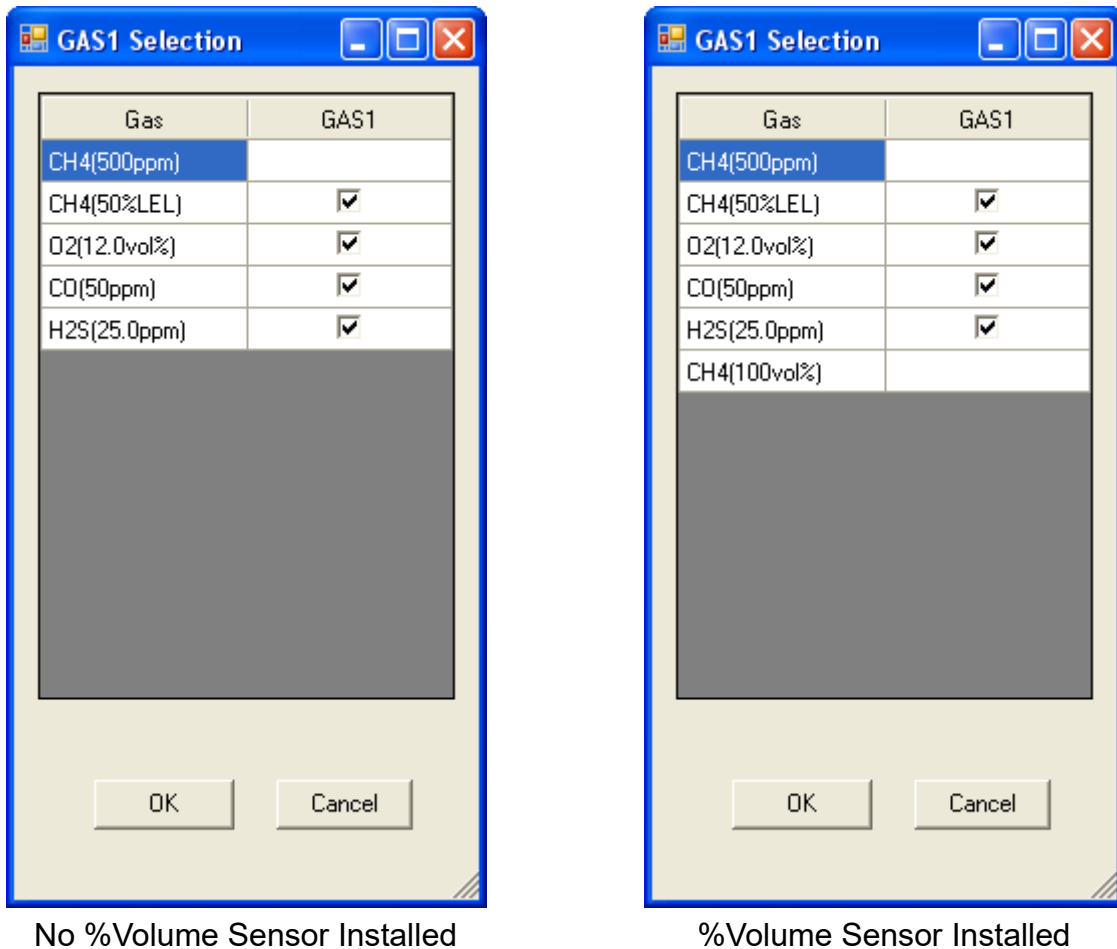


Figure 138: Gas Cylinder Confirmation Screen

When all of the desired channels are selected, click OK. If you don't want to proceed, click Cancel to abort the bump test.

9. You will then be asked to confirm the auto calibration values and the instruments that the calibration cylinder will be used for. Be sure the auto calibration values match the values listed on the calibration cylinder. The serial number and gas combination of all selected instruments will appear sequentially beneath the gas cylinder concentrations. If you are bump testing standard GX-2012s (catalytic LEL, O₂, H₂S, and CO) and standard Gas Tracers (catalytic LEL, ppm combustible, O₂, and CO), the screen will appear as shown below. The ppm sensor will be bump tested first with GAS 2 and then the remaining sensors will be bump tested with GAS 1. The GAS 2 selection box is deselected by default. You must select the GAS 2 box if you wish to bump test the ppm combustible sensor. If you do not wish to bump test the ppm combustible sensor, leave the GAS 2 box deselected.

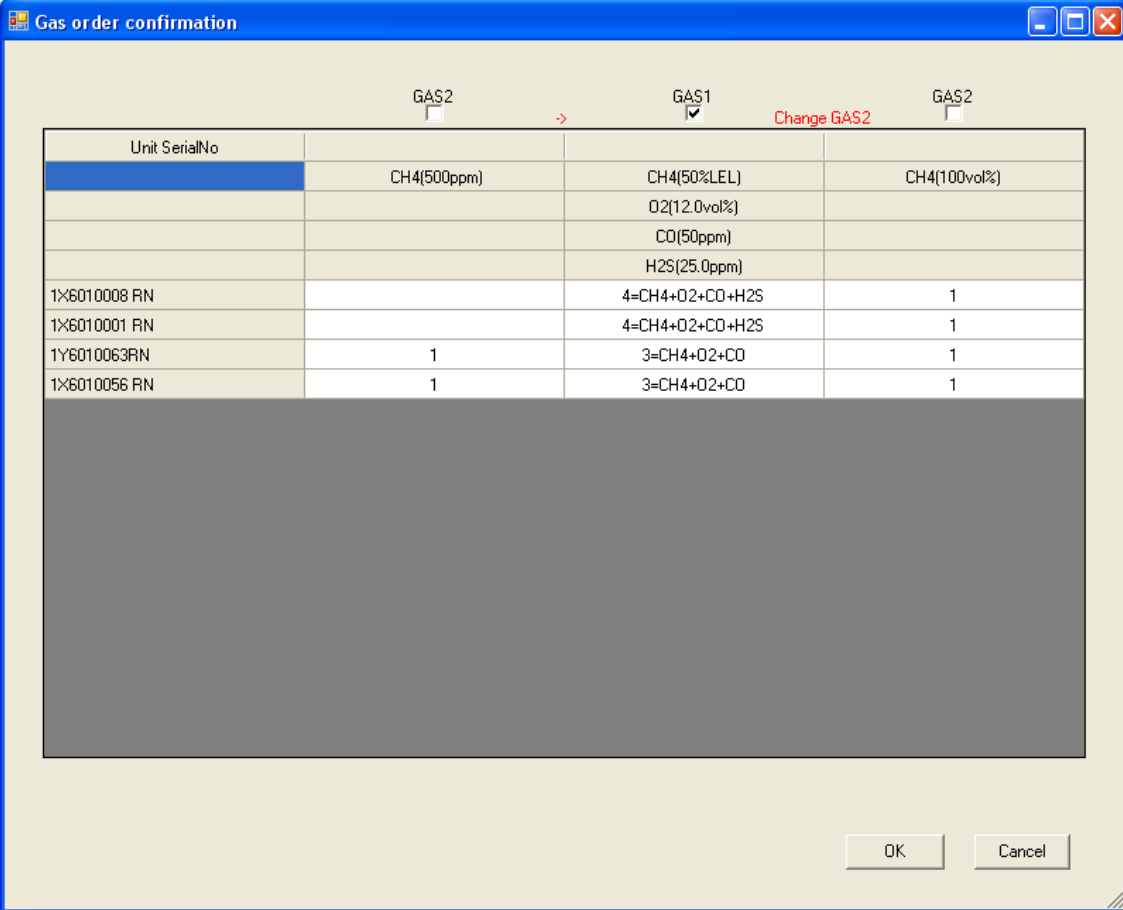
If the SDM-2012 is not in a fresh air environment, a zero air cylinder must be used with a 24 inch humidifier tube connecting the cylinder to the AIR fitting. Another 24 inch humidifier tube or a humidifier tube manifold must always be used to connect the calibration gas cylinder to the GAS 2 fitting.

Unit SerialNo	GAS2	GAS1
	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	CH4(500ppm)	CH4(50%LEL)
		CO(50ppm)
		H2S(25.0ppm)
1X6010008 RN		4=CH4+O2+CO+H2S
1X6010001 RN		4=CH4+O2+CO+H2S
1Y6010063RN	1	3=CH4+O2+CO
1X6010056 RN	1	3=CH4+O2+CO

OK Cancel

Figure 139: Gas Order Confirmation Screen, Standard Instruments

If you are bump testing any instruments that include a %volume sensor, the screen will appear as shown below and will indicate a gas cylinder change is needed. The ppm sensor will be bump tested first with GAS 2. The standard sensors will then be bump tested using GAS 1. The %volume sensor will then be bump tested with GAS 2. The user must change the GAS 2 cylinder before the %volume sensor can be bump tested. The GAS 2 selection boxes are deselected by default. You must select the GAS 2 boxes if you wish to bump test the ppm combustible sensor and/or the %volume sensor. If you do not wish to bump test the ppm combustible sensor or the %volume sensor, leave the appropriate GAS 2 box deselected. Be sure that the ppm calibration cylinder is connected to the GAS 2 fitting with a 24 inch humidifier at the start of the bump test.

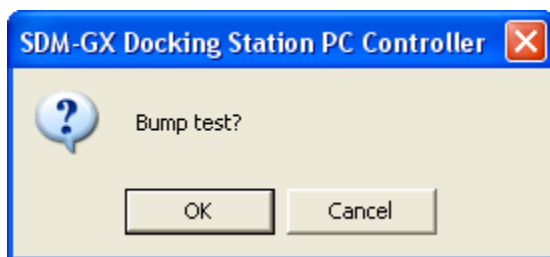


Unit SerialNo	GAS2	GAS1	GAS2
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Change GAS2
	CH4(500ppm)	CH4(50%LEL)	CH4(100vol%)
		O2(12.0vol%)	
		CO(50ppm)	
		H2S(25.0ppm)	
1X6010008 RN		4=CH4+O2+CO+H2S	1
1X6010001 RN		4=CH4+O2+CO+H2S	1
1Y6010063RN	1	3=CH4+O2+CO	1
1X6010056 RN	1	3=CH4+O2+CO	1

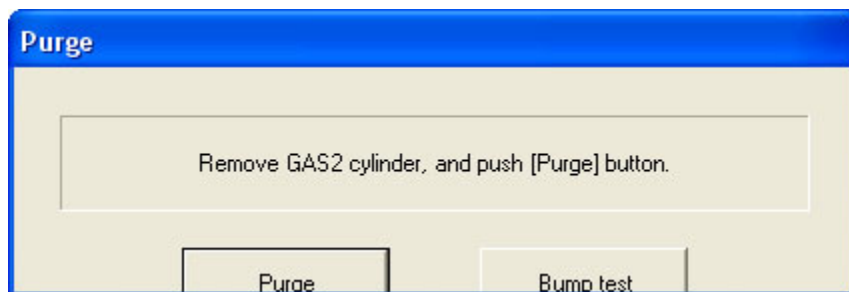
OK Cancel

Figure 140: Gas Order Confirmation Screen, Standard Instruments Plus %Volume Sensor

10. Click OK. You will be asked if you want to bump test the instruments. Click OK to proceed. If you don't want to proceed with the bump test, click Cancel to return to the main program window.

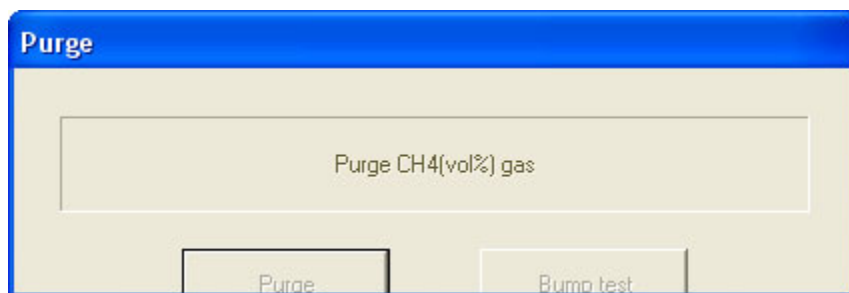


11. If a bump test or calibration has already been performed by the PC Controller program on a GX-2012 or a Gas Tracer with a %volume sensor installed, the docking station will perform a purge before beginning the bump test. The purge ensures that any %volume calibration gas does not come in contact with the ppm sensor and affect its readings. The screen will indicate that you need to remove the gas cylinder from the GAS 2 fitting on the back of the SDM-2012.

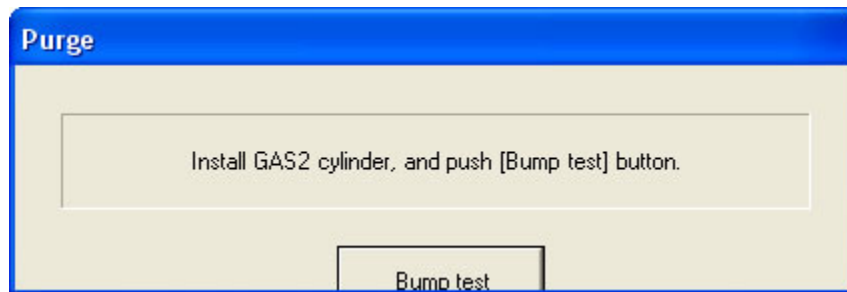


If the previous instrument tested did not include a %volume sensor, the program will proceed as described in step 15.

12. Remove any connected cylinder from the GAS 2 fitting and click the Purge button. The SDM-2012 will purge for 30 seconds.



13. At the end of the purge cycle, you will be prompted to reconnect the calibration cylinder to the GAS 2 fitting.



14. Reconnect the ppm calibration cylinder to the GAS 2 fitting and click the Bump test button.
15. The pumps will start and the program will indicate that air is flowing. The AIR indicator on the program screen will be on. The BUMP ▼ LED on the SDM-2012 control panel will be flashing amber. Air will be applied to the ppm sensor for 45 seconds, then the PC Controller Program will perform a zero adjustment on the ppm channel.

If at any point during the bump test you wish to cancel the bump test, click the Cancel button in the lower right corner of the screen. The bump test will be aborted and the BUMP ▼ LED will turn solid amber.

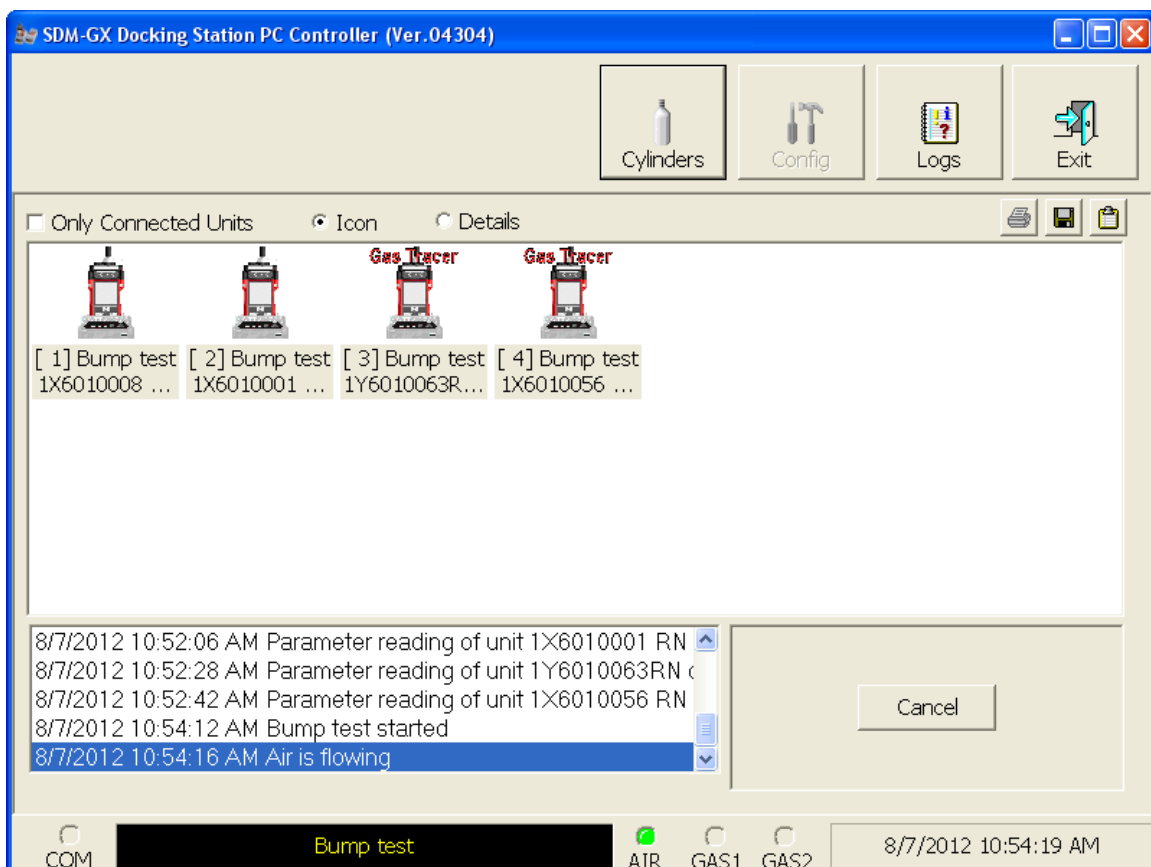


Figure 141: Air Flowing to PPM Sensor

The PC Controller Program will analyze the zero adjustment results. If the ppm sensor failed the zero adjustment, the bump test on that instrument will be aborted for that instrument.

16. After air is applied, and if the ppm sensor passed the zero adjustment, calibration gas from the GAS 2 cylinder will be applied to the ppm sensor. The GAS 2 indicator on the program screen will come on and calibration gas will be applied to the ppm sensor for the duration specified in the Gas Exposure Time parameter in the Configuration Window.

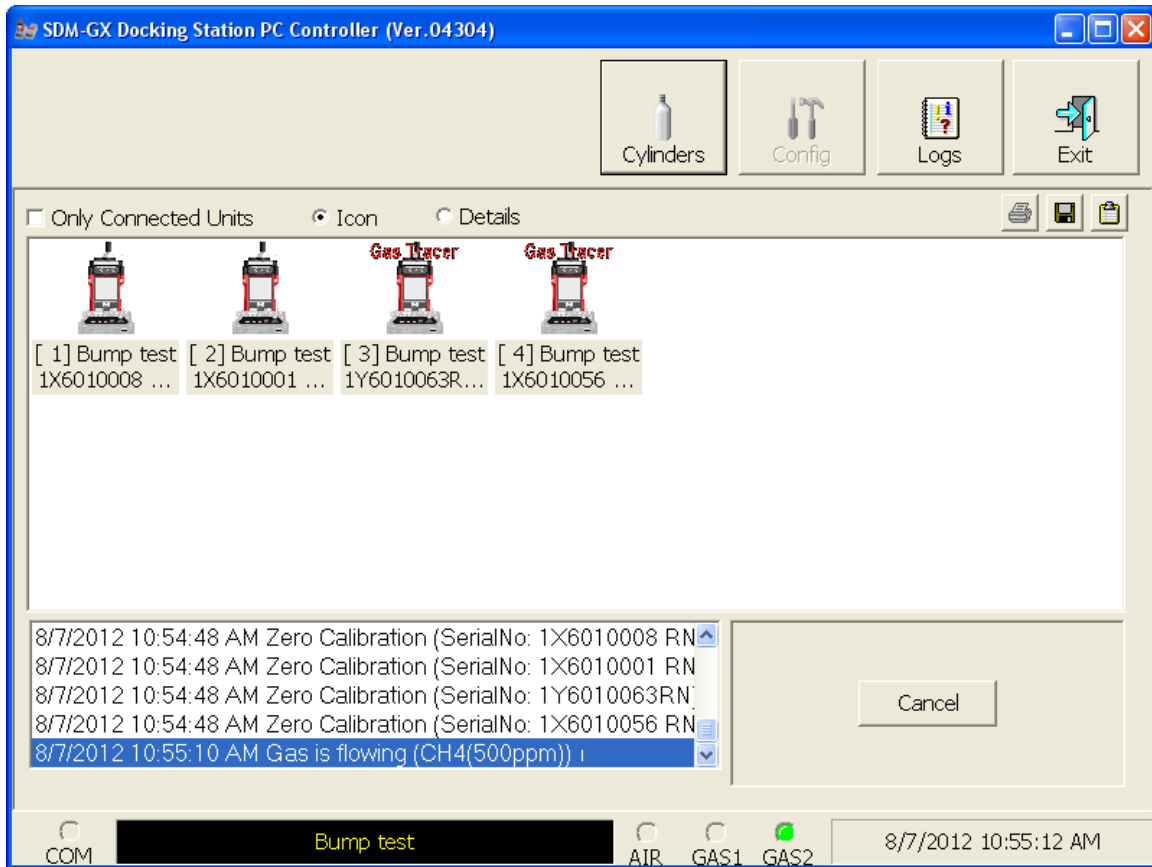


Figure 142: GAS 2 PPM Gas Flowing

The PC Controller program will analyze the results. If the bump test on the ppm sensor fails and Force Calibration is selected, a calibration will automatically begin on the ppm sensor and GAS 2 calibration gas will continue to flow.

17. After calibration gas has been applied to the ppm sensor, fresh air will be applied to the standard sensors (catalytic LEL, O₂, H₂S (*GX-2012 only*), and CO) and the %volume sensor (if installed) for 45 seconds and the PC Controller program will perform a zero adjustment.

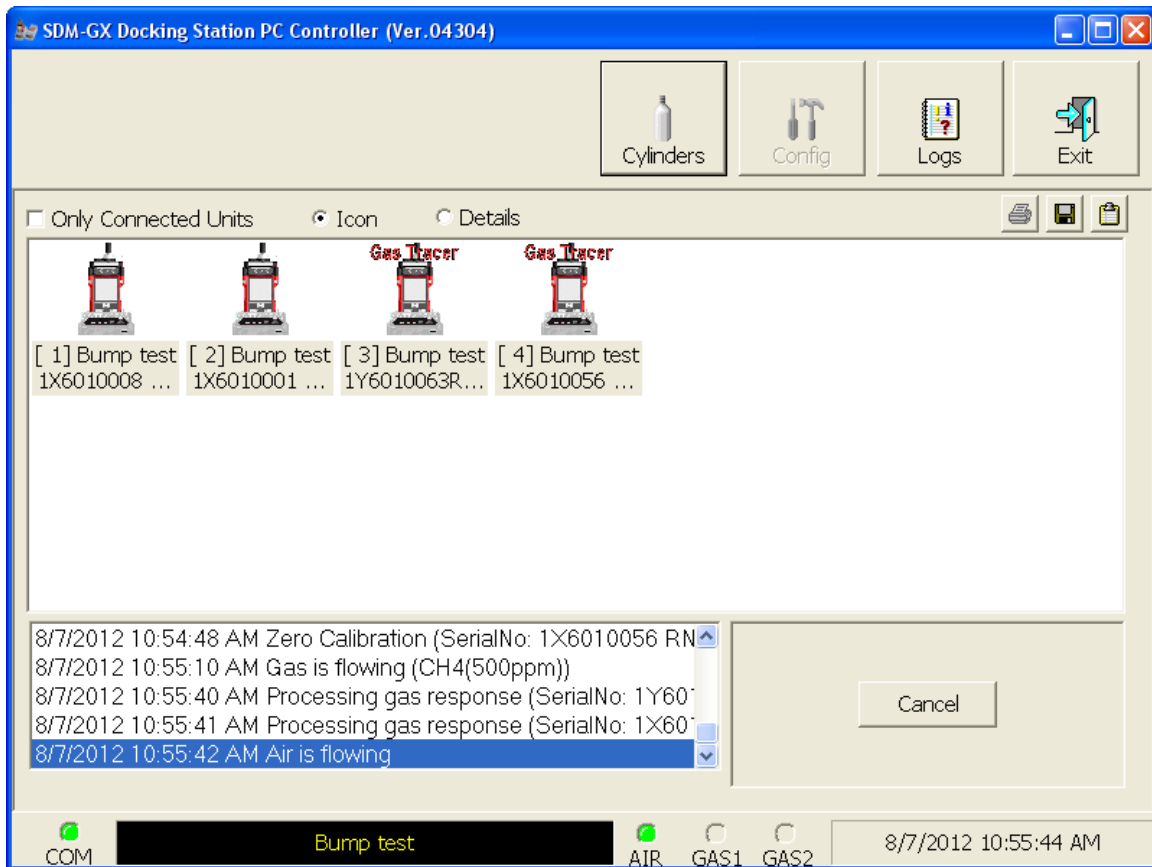


Figure 143: Air Flowing to Standard Sensors

The PC Controller Program will analyze the zero adjustment results. If any of the standard sensors or the %volume sensor (if installed) failed the zero adjustment, the bump test will be aborted for that instrument.

18. After air is applied, and if all standard channels and the %volume channel (if installed) passed the zero adjustment, calibration gas from the GAS 1 cylinder will be applied. The GAS 1 indicator on the program screen will come on and calibration gas will be applied to the instrument(s) for the duration specified in the Gas Exposure Time parameter in the Configuration Window.

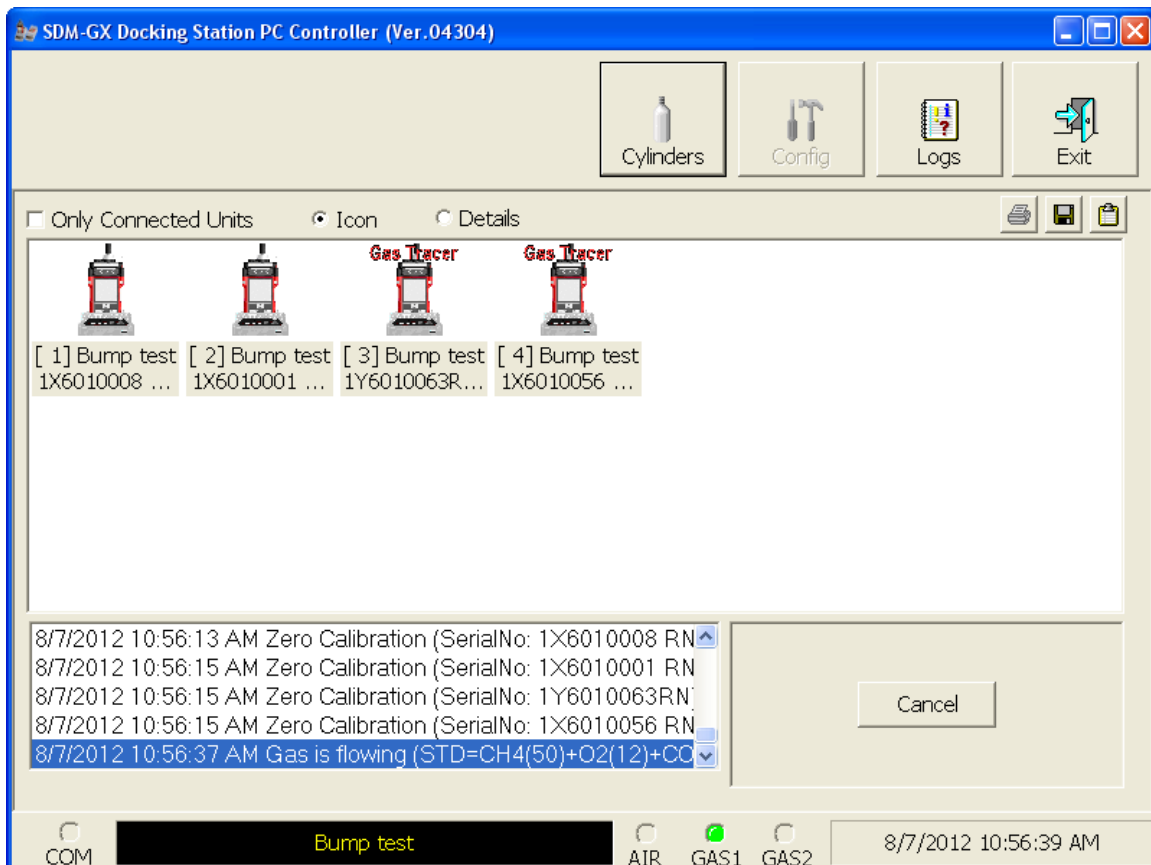
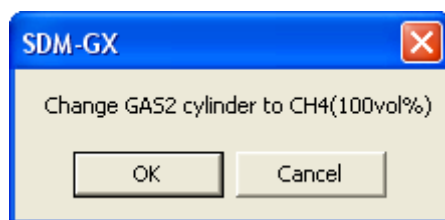


Figure 144: GAS 1 Flowing

The PC Controller Program will analyze the results. If the bump test on the standard sensors of any instruments fails and Force Calibration is selected, a calibration will automatically begin on the standard sensors for those instruments and GAS 1 calibration gas will continue to flow.

19. If you are not bump testing an instrument or instruments with a %volume sensor installed, continue to step 22.

If you are bump testing an instrument or instruments with a %volume sensor installed, you will be prompted to change the GAS 2 cylinder. The pump(s) on the instrument(s) will stop.



20. Change the cylinder connected to the GAS 2 fitting to the %volume calibration cylinder.
21. When you have changed the GAS 2 cylinder, click OK. The bump test will continue and the second GAS 2 calibration gas will be applied to the %volume sensor for the duration specified in the Gas Exposure Time parameter in the Configuration Window.

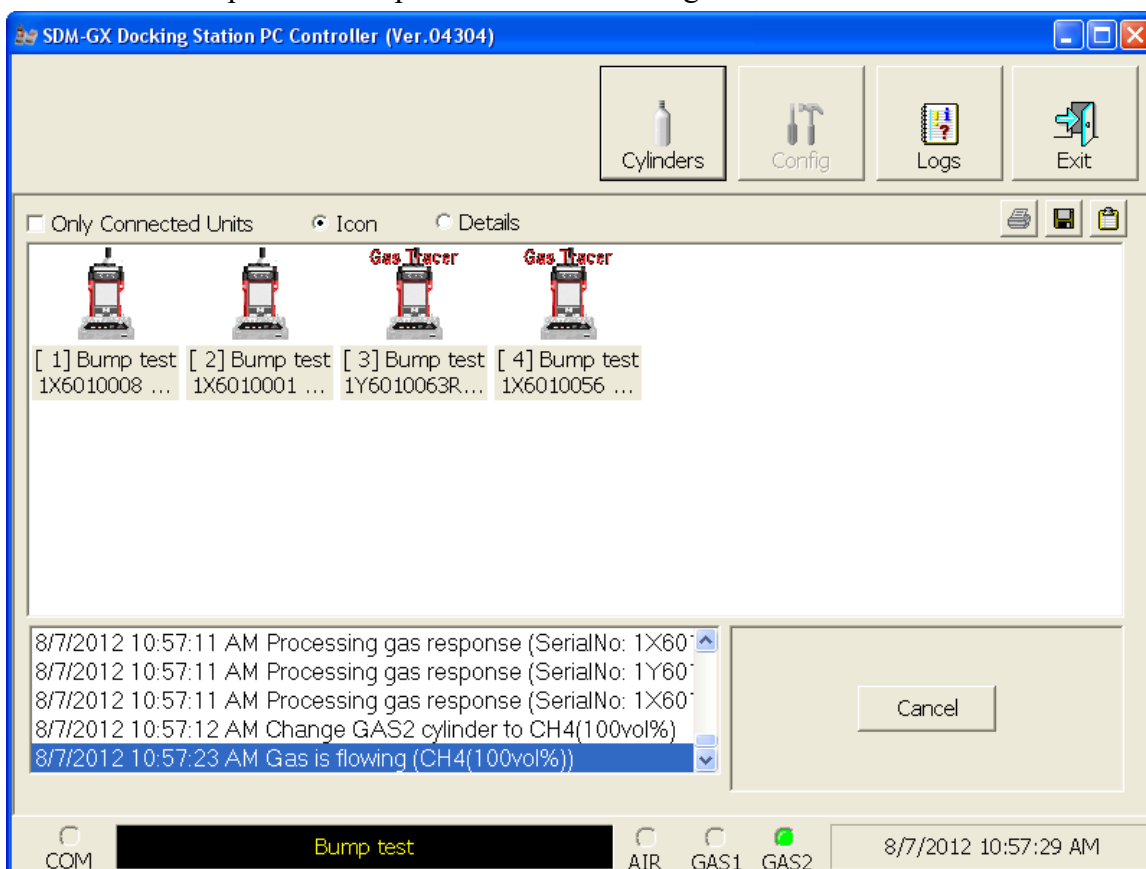


Figure 145: %Volume GAS 2 Flowing

The PC Controller Program will analyze the results. If the bump test on the %volume sensor fails for any instruments and Force Calibration is selected, a calibration will automatically begin on the %volume sensors for those instruments and GAS 2 calibration gas will continue to flow.

22. After GAS 2 calibration gas has been applied, the docking station will purge with fresh air for 45 seconds.

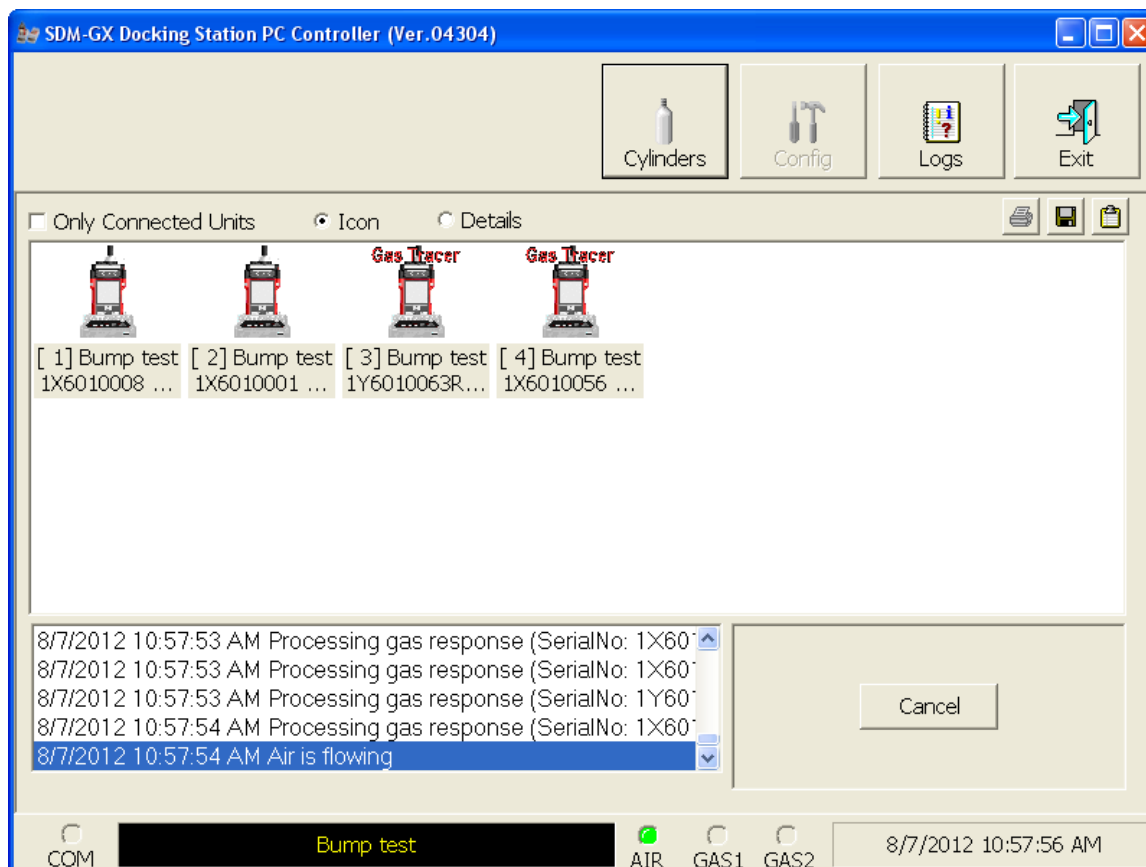


Figure 146: Fresh Air Purge

23. After the fresh air purge is complete,

- If the bump test passes, the following window will open indicating that. The BUMP ▼ LED will be solid green. Click OK to return to the main program window. The BUMP ▼ LED will turn off.

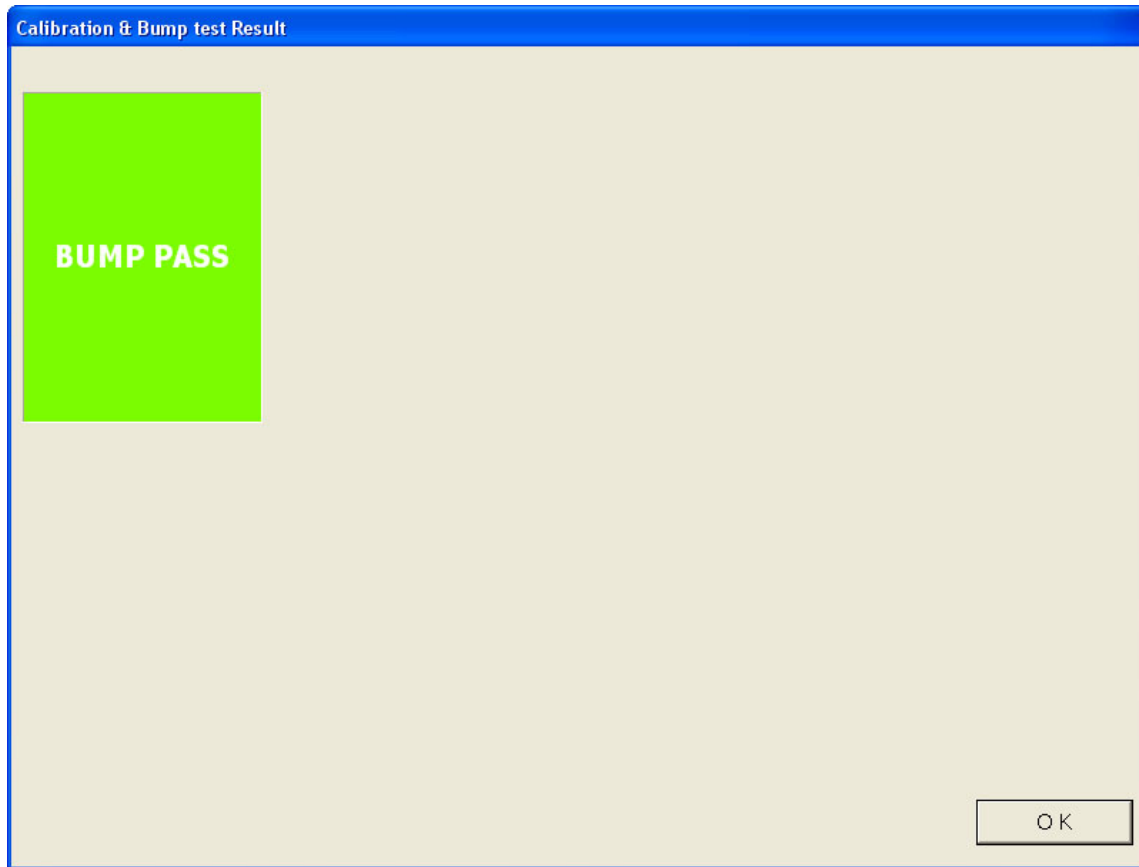


Figure 147: Bump Test Passed

The instrument will automatically be shut off 20 seconds after a successful bump test.

- If the bump test fails and the Force Calibration box was not selected, the following window will open indicating which channels failed the bump test. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the bump test results in the Logs window. The BUMP ▼ LED on the SDM-2012 control panel will turn off.

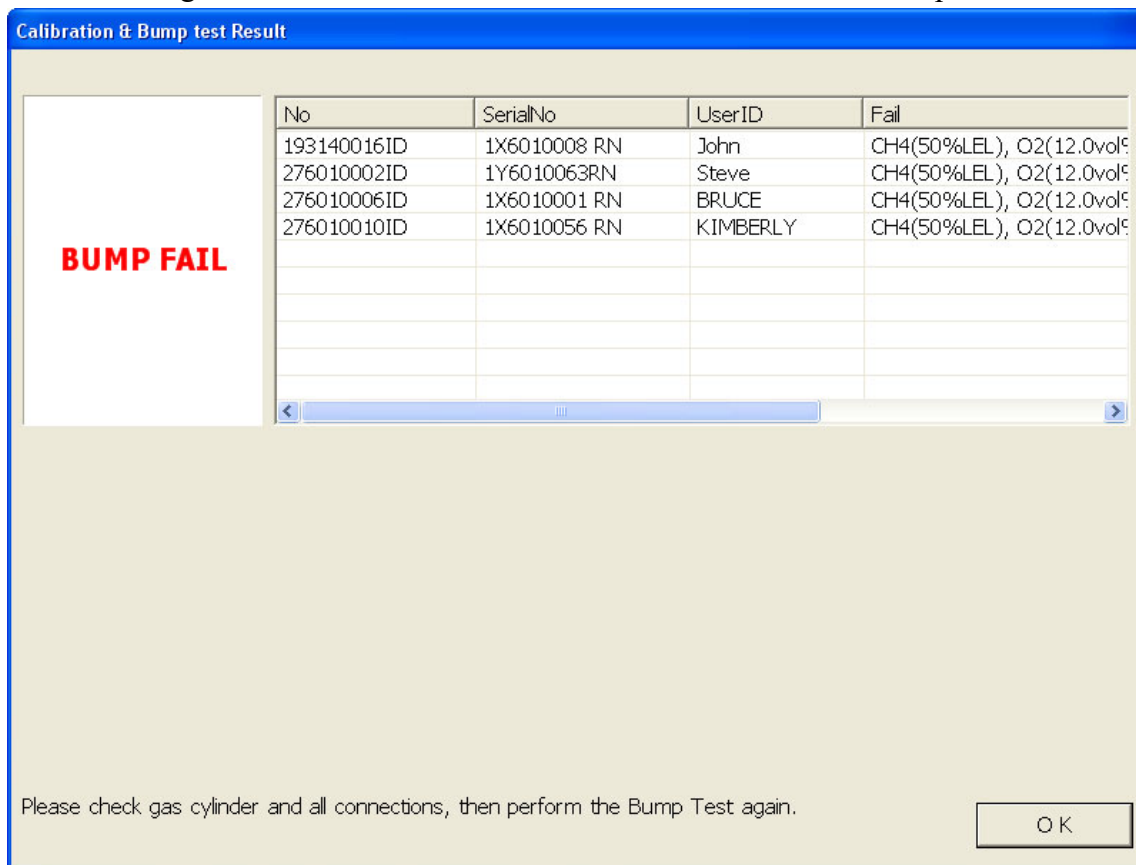


Figure 148: Bump Test Failed

- If the bump test fails and the Force Calibration box was selected, the SDM-2012 automatically performs a calibration immediately after the failed bump test. The results screen will indicate the results of both the bump test and calibration. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. The CAL ▲ LED will be solid green if the calibration passed or solid red if the calibration failed. Click OK to return to the main program window or double click an instrument information line to view the bump test or calibration results in the Logs window. The BUMP ▼ LED and CAL ▲ LED on the SDM-2012 control panel will turn off.

Calibration & Bump test Result

No	SerialNo	UserID	Fail
193140016ID	1X6010008 RN	John	CH4(50%LEL), O2(12.0vol%
276010002ID	1Y6010063RN	Steve	CH4(50%LEL), O2(12.0vol%
276010006ID	1X6010001 RN	BRUCE	COMMUNICATION ERROR
276010010ID	1X6010056 RN	KIMBERLY	CH4(50%LEL), O2(12.0vol%

BUMP FAIL

No	SerialNo	UserID	Fail
193140015ID	1X6010001 RN	BRUCE	CH4(50%LEL), O2(12.0vol%

CAL. FAIL

Please check gas cylinder and all connections, then perform the Calibration again.

OK

Figure 149: Bump Test Failed/Calibration Failed

- If at any point during the bump test the flow rate to the instrument becomes too low, the PC Controller Program will abort the bump test and display a failed bump test screen. The BUMP ▼ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click an instrument information line to view the bump test or calibration results in the Logs window. The BUMP ▼ LED on the SDM-2012 control panel will turn off. Confirm that all tubing connections are correct and that all lines are clear.

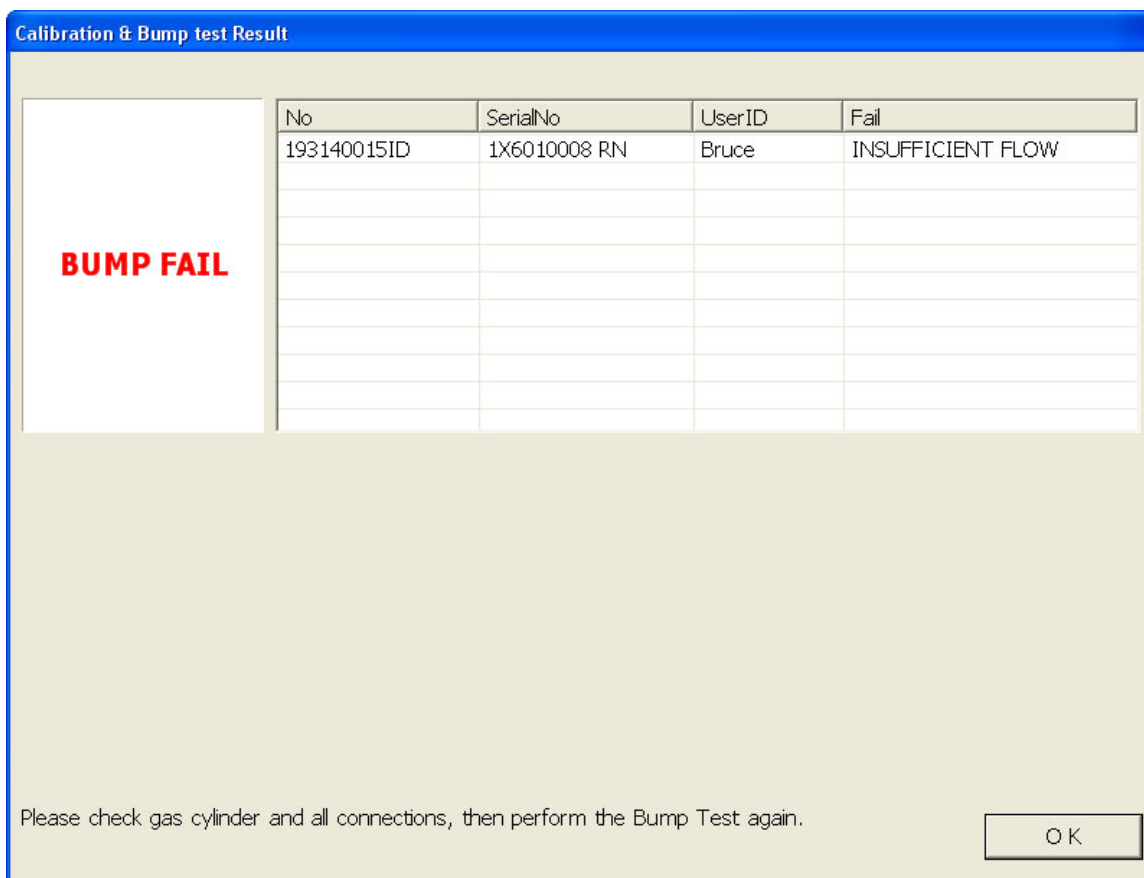


Figure 150: Low Flow Bump Test Failure

24. For all bump test result outcomes, the instruments will be displayed in the main program window in Details View. To return the main program window to Icons View, click the Icons radio button.
25. All bump test results can be viewed in the Logs window. See page 146 for instructions for viewing bump test data.

Calibrating GX-2012s and Gas Tracers

The following instructions apply to standard GX-2012s that contain the standard sensors (catalytic LEL, O₂, H₂S, and CO) as well as standard Gas Tracers that contain the standard sensors (catalytic LEL, ppm combustible, O₂, and CO). They also apply to GX-2012s and Gas Tracers that have a %volume combustible gas sensor installed. See “Calibrating a GX-2012” on page 73 or “Calibrating a Gas Tracer” on page 101 for instructions to calibrate a GX-2012 or Gas Tracer, respectively.

The PC Controller Program is capable of performing a calibration both manually and automatically on an instrument. When a calibration is performed, the PC Controller Program performs an air adjust operation on an instrument and then applies calibration gas to the instrument. The PC Controller Program analyzes the calibration results and determines if the instrument passed the calibration.

NOTE: The PC Controller program performs a complete calibration on the ppm combustible sensor first. Be sure that the 500 ppm methane calibration cylinder is connected to the GAS 2 fitting on the back of the SDM-2012 using a 24 inch humidifier tube.

To manually calibrate an instrument or instruments:

1. Establish a connection between the SDM-2012, the instrument, and the PC Controller program as described on page 50.
2. Verify that all of the calibration parameters are set correctly. See page 36 for instructions.
3. Verify that the appropriate calibration gas cylinder(s) are connected to the appropriate SDM-2012(s) or manifold line(s). The ppm sensor will be bump tested first. Be sure that a 24 inch humidifier tube is used to connect the ppm calibration cylinder to the GAS 2 fitting on the back of any SDM-2012(s) with Gas Tracers installed. If you have assembled a humidifier manifold for the GAS 2 fittings of the SDM-2012s with Gas Tracers installed (see page 20), be sure the ppm calibration cylinder is connected to the inlet of the manifold. If you are using a zero air cylinder for the fresh air adjustment, install a 24 inch humidifier tube between the regulator and the AIR fitting on the back of the SDM-2012.

NOTE: Do not use a 4-gas cylinder or any cylinder that includes H₂S when bump testing or calibrating a Gas Tracer. H₂S adversely affects the ppm combustible sensor. If you have assembled a manifold, be sure that one manifold exists for the SDM-2012s with GX-2012s installed and that a separate manifold exists for the SDM-2012s with Gas Tracers installed.

4. Ensure that the gas out to instrument line is connected to the inlet of each instrument and that the exhaust line is connected to the exhaust fitting of each instrument.

5. Select the instruments you wish to calibrate and click on them to highlight them as shown below. To select multiple instruments for calibration, hold down the Control button on the keyboard as you click them.

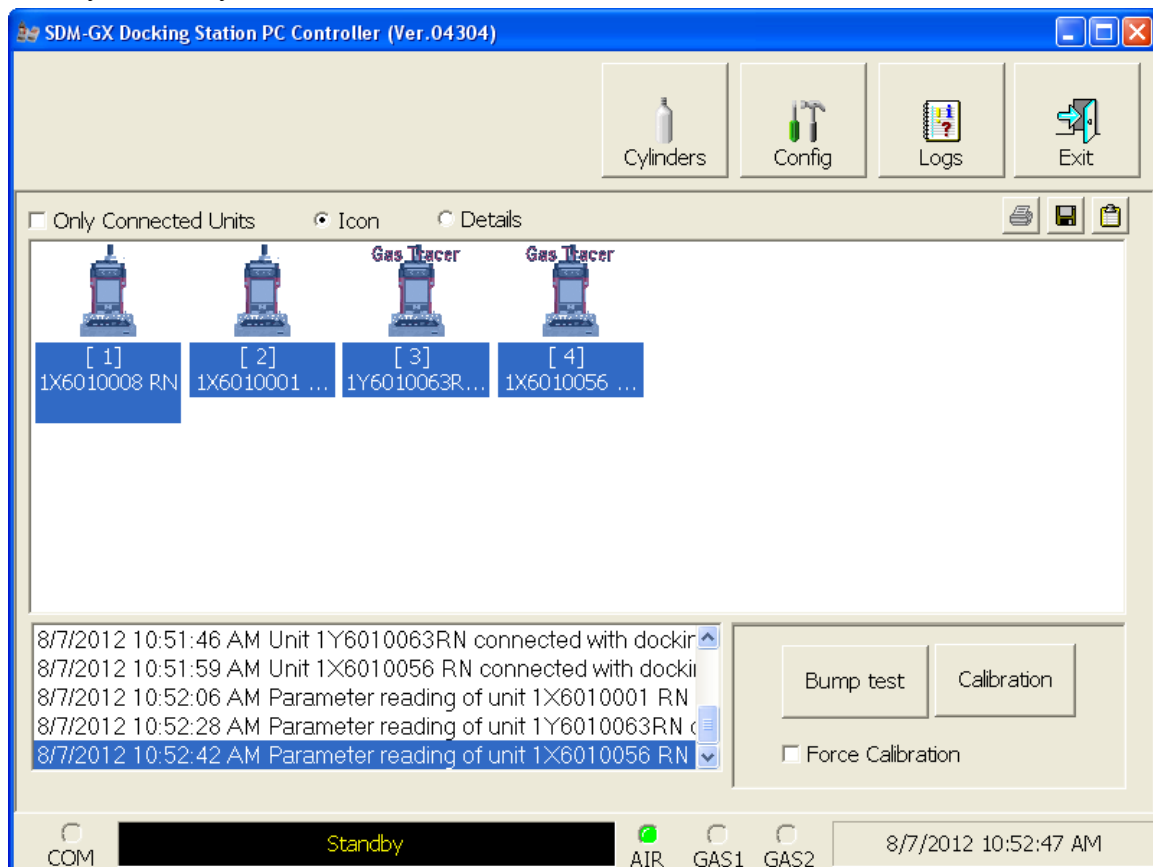


Figure 151: Instrument Selection

6. Click the Calibration button in the lower right corner of the computer program screen.

7. You will be asked to confirm which instrument channels will use GAS 1 for the calibration. The gas concentration shown next to each channel is the auto calibration value for that channel. If it does not match the gas concentration in the cylinder(s), change the auto calibration value for that channel. See page 174 for instructions. The Gas Tracer's ppm sensor cannot be selected for use with the GAS 1 inlet and must use the GAS 2 inlet. If any of the instruments you are testing includes a %volume sensor, the %volume sensor cannot be selected for use with the GAS 1 inlet and must use the GAS 2 inlet.

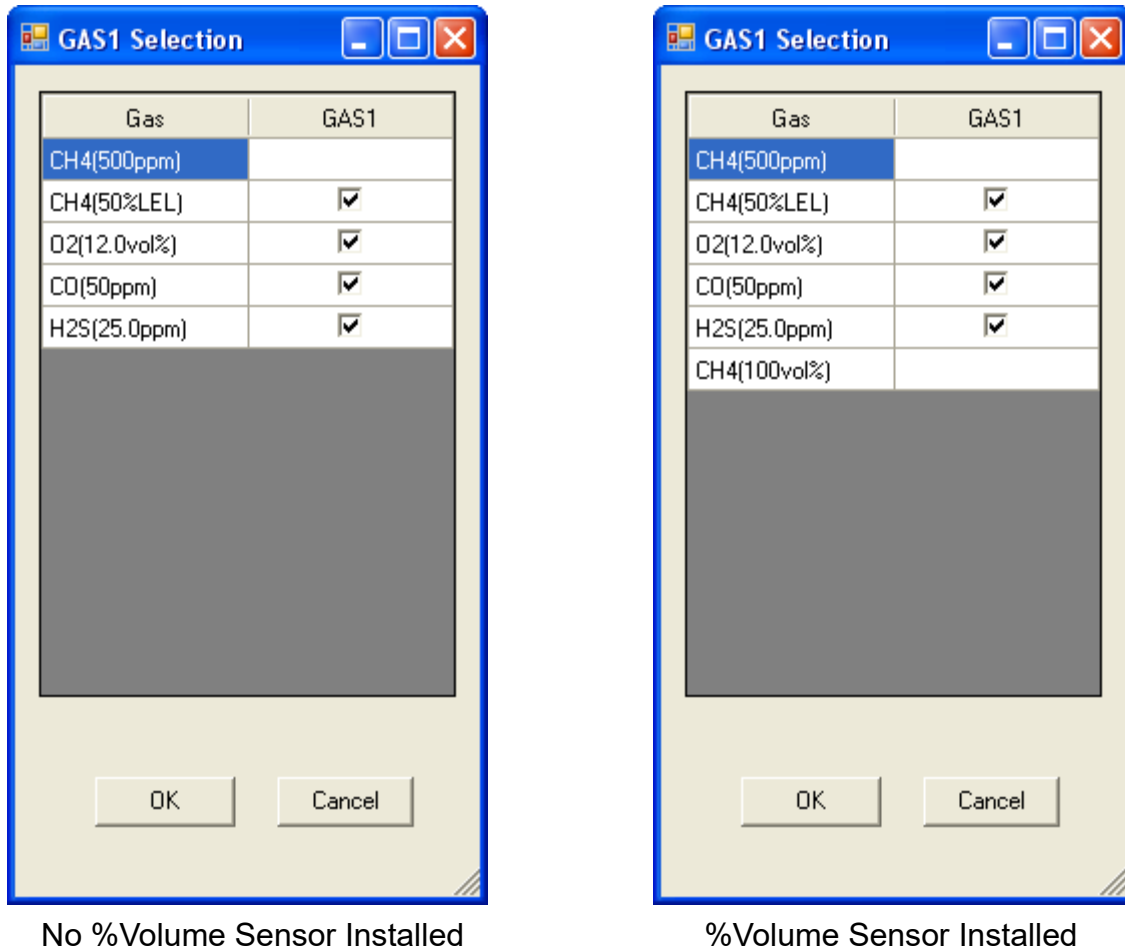


Figure 152: Gas Cylinder Confirmation Screen

When all of the desired channels are selected, click OK. If you don't want to proceed, click Cancel to abort the calibration.

8. You will then be asked to confirm the auto calibration values and the instruments that the calibration cylinder will be used for. Be sure that the auto calibration values match the values listed on the calibration cylinder. The serial number and gas combination of all selected instruments will appear sequentially beneath the gas cylinder concentrations. If you are calibrating standard GX-2012s (catalytic LEL, O₂, H₂S, and CO) and standard Gas Tracers (catalytic LEL, ppm combustible, O₂, and CO), the screen will appear as shown below. The ppm sensor will be calibrated first with GAS 2 and then the remaining sensors will be calibrated with GAS 1. The GAS 2 selection box is deselected by default. You must select the GAS 2 box if you wish to calibrate the ppm combustible sensor. If you do not wish to calibrate the ppm combustible sensor, leave the GAS 2 box deselected.

If the SDM-2012 is not in a fresh air environment, a zero air cylinder must be used with a 24 inch humidifier tube connecting the cylinder to the AIR fitting. Another 24 inch humidifier tube must always be used to connect the calibration gas cylinder to the GAS 2 fitting.

Unit SerialNo	GAS2	GAS1
	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	CH4(500ppm)	CH4(50%LEL)
		CO(50ppm)
		H2S(25.0ppm)
1X6010008 RN		4=CH4+O2+CO+H2S
1X6010001 RN		4=CH4+O2+CO+H2S
1Y6010063RN	1	3=CH4+O2+CO
1X6010056 RN	1	3=CH4+O2+CO

OK Cancel

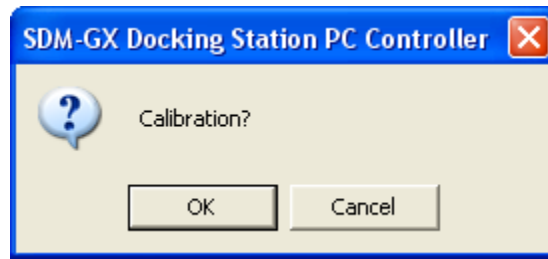
Figure 153: Gas Order Confirmation Screen, Standard Instruments

If you are calibrating any instruments that include a %volume sensor, the screen will appear as shown below and will indicate a gas cylinder change is needed. The ppm sensor will be calibrated first with GAS 2. The standard 3 sensors will then be calibrated using GAS 1. The %volume sensor will then be calibrated with GAS 2. The user must change the GAS 2 cylinder before the %volume sensor can be calibrated. The GAS 2 selection boxes are deselected by default. You must select the GAS 2 boxes if you wish to calibrate the ppm combustible sensor and/or the %volume sensor. If you do not wish to calibrate the ppm combustible sensor or the %volume sensor, leave the appropriate GAS 2 box deselected. Be sure that the ppm calibration cylinder is connected to the GAS 2 fitting at the start of the calibration.

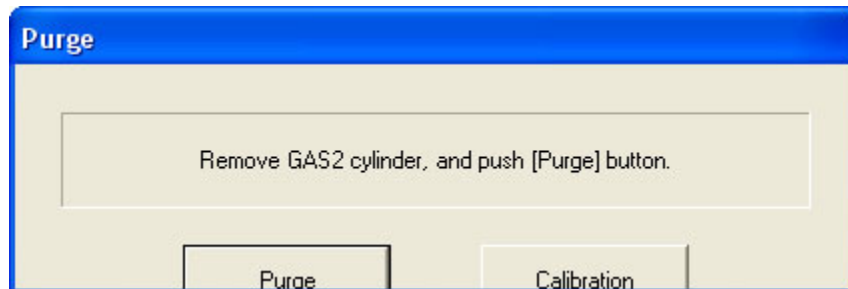
Unit SerialNo	GAS2	GAS1	GAS2
	CH4(500ppm)	CH4(50%LEL)	CH4(100vol%)
		O2(12.0vol%)	
		CO(50ppm)	
		H2S(25.0ppm)	
1X6010008 RN		4=CH4+O2+CO+H2S	1
1X6010001 RN		4=CH4+O2+CO+H2S	1
1Y6010063RN	1	3=CH4+O2+CO	1
1X6010056 RN	1	3=CH4+O2+CO	1

Figure 154: Gas Order Confirmation Screen, Standard Instruments Plus %Volume Sensor

9. Click OK. You will be asked if you want to calibrate the instrument(s). Click OK to proceed. If you don't want to proceed with the calibration, click Cancel to return to the main program window.

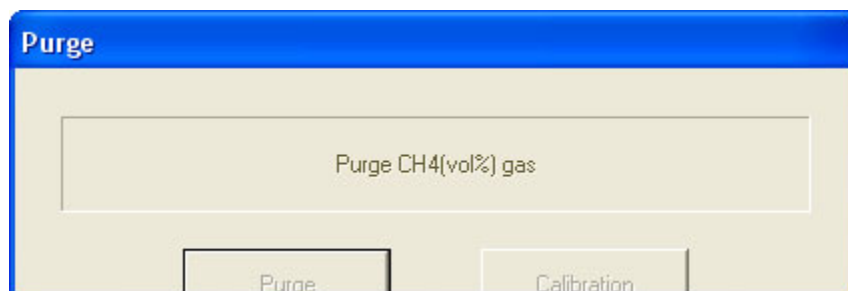


10. If a bump test or calibration has already been performed by the PC Controller program on a GX-2012 or a Gas Tracer with a %volume sensor installed, the docking station will perform a purge before beginning the calibration. The purge ensures that any %volume calibration gas does not come in contact with the ppm sensor and affect its readings. The screen will indicate that you need to remove the gas cylinder from the GAS 2 fitting on the back of the SDM-2012.

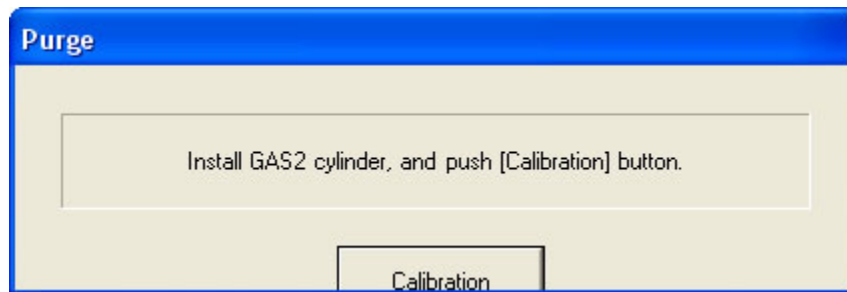


If the previous instrument tested did not include a %volume sensor, the program will proceed as described in step 14.

11. Remove any connected cylinder from the GAS 2 fitting and click the Purge button. The SDM-2012 will purge for 30 seconds.



12. At the end of the purge cycle, you will be prompted to reconnect the calibration cylinder to the GAS 2 fitting.



13. Reconnect the ppm calibration cylinder to the GAS 2 fitting and click the Calibration button.
14. The pumps will start and the program will indicate that air is flowing. The AIR indicator on the program screen will be on. The CAL ▲ LED on the SDM-2012 control panel will begin to flash amber. Air will be applied to the ppm sensor for 45 seconds, then the PC Controller Program will perform a zero adjustment on the ppm sensor.

If at any point during the calibration you wish to cancel the calibration, click the Cancel button in the lower right corner of the screen. The calibration will be aborted and the CAL ▲ LED will turn solid amber.

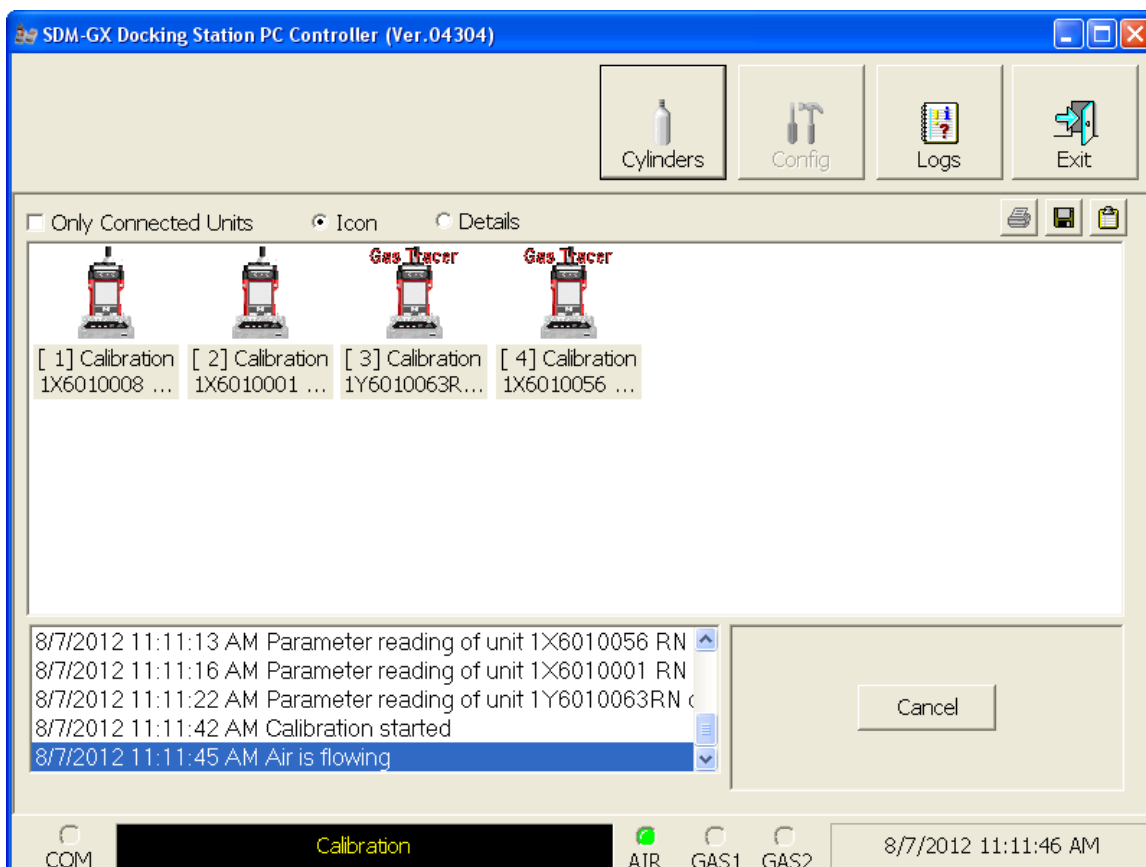


Figure 155: Air Flowing, PPM Sensor

The PC Controller Program will analyze the zero adjustment results. If the ppm sensor failed the zero adjustment, the calibration will be aborted for that instrument.

15. After air is applied, and if the ppm sensor passed the zero adjustment, calibration gas from the GAS 2 cylinder will be applied to the ppm sensor. The GAS 2 indicator on the program screen will come on and calibration gas will be applied to the ppm sensor for 90 seconds.

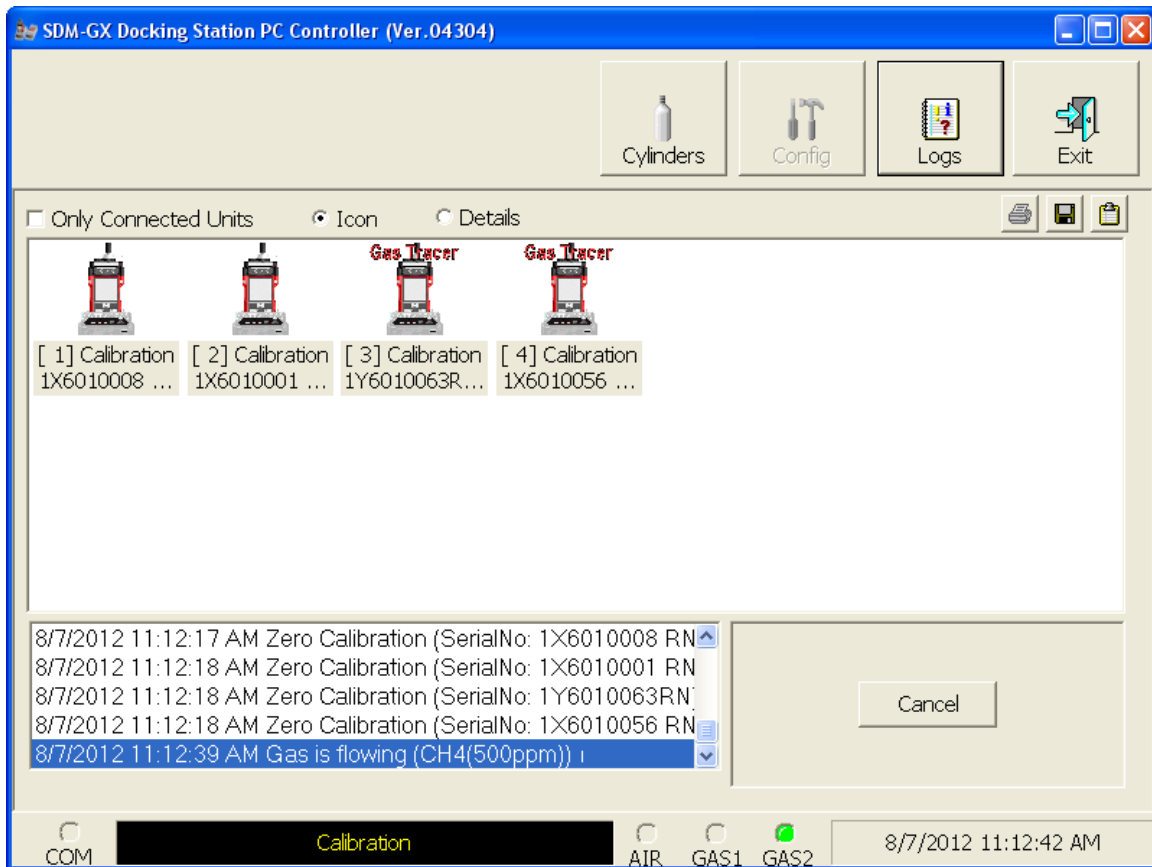


Figure 156: GAS 2 PPM Gas Flowing

The PC Controller program will analyze the results.

16. After calibration gas has been applied to the ppm sensor, fresh air will be applied to the standard sensors (catalytic LEL, O₂, H₂S (*GX-2012 only*) and CO) and the %volume sensor (if installed) for 45 seconds and the PC Controller program will perform a zero adjustment.

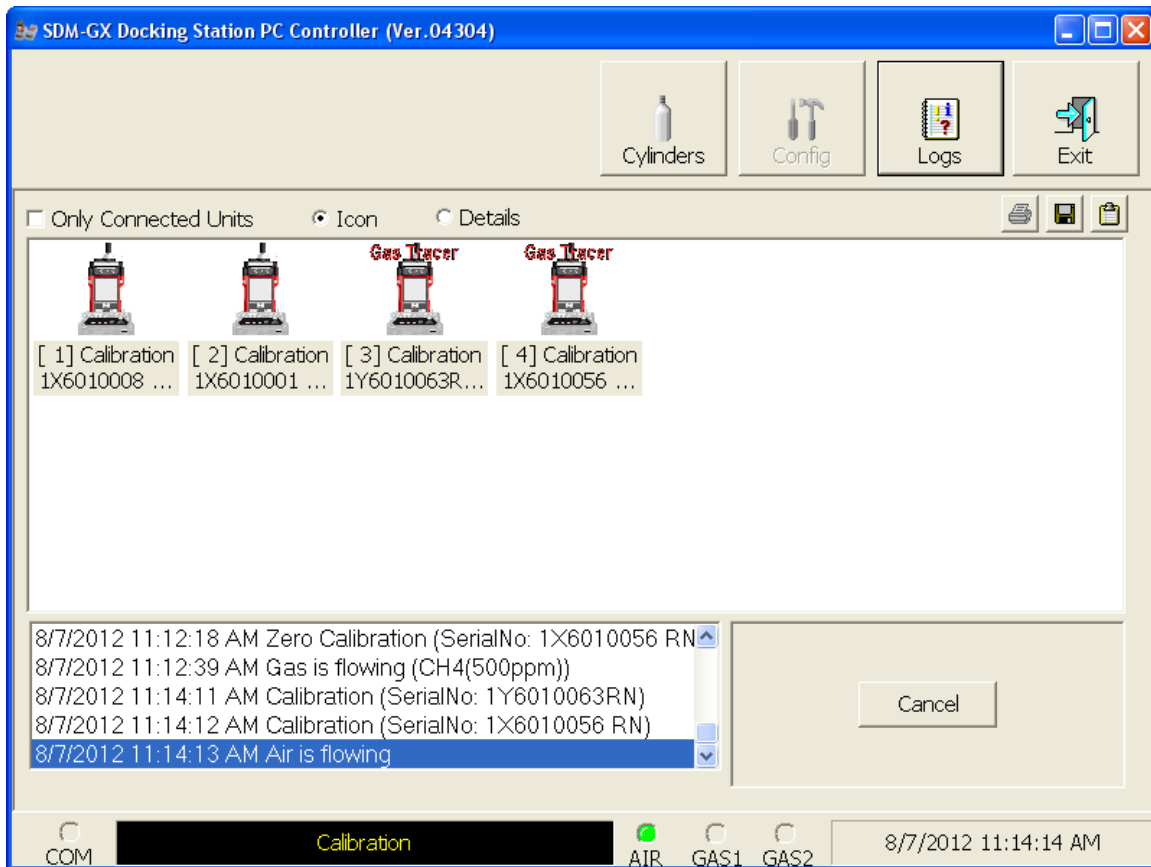


Figure 157: Air Flowing to Standard Sensors

The PC Controller Program will analyze the zero adjustment results. If any of the standard sensors or the %volume sensor (if installed) failed the zero adjustment, the calibration will be aborted for that instrument.

17. After air is applied, and if all standard channels and the %volume channel (if installed) passed the zero adjustment, calibration gas from the GAS 1 cylinder will be applied. The GAS 1 indicator on the program screen will come on. GAS 1 calibration gas will be applied to the instrument(s) for 90 seconds.

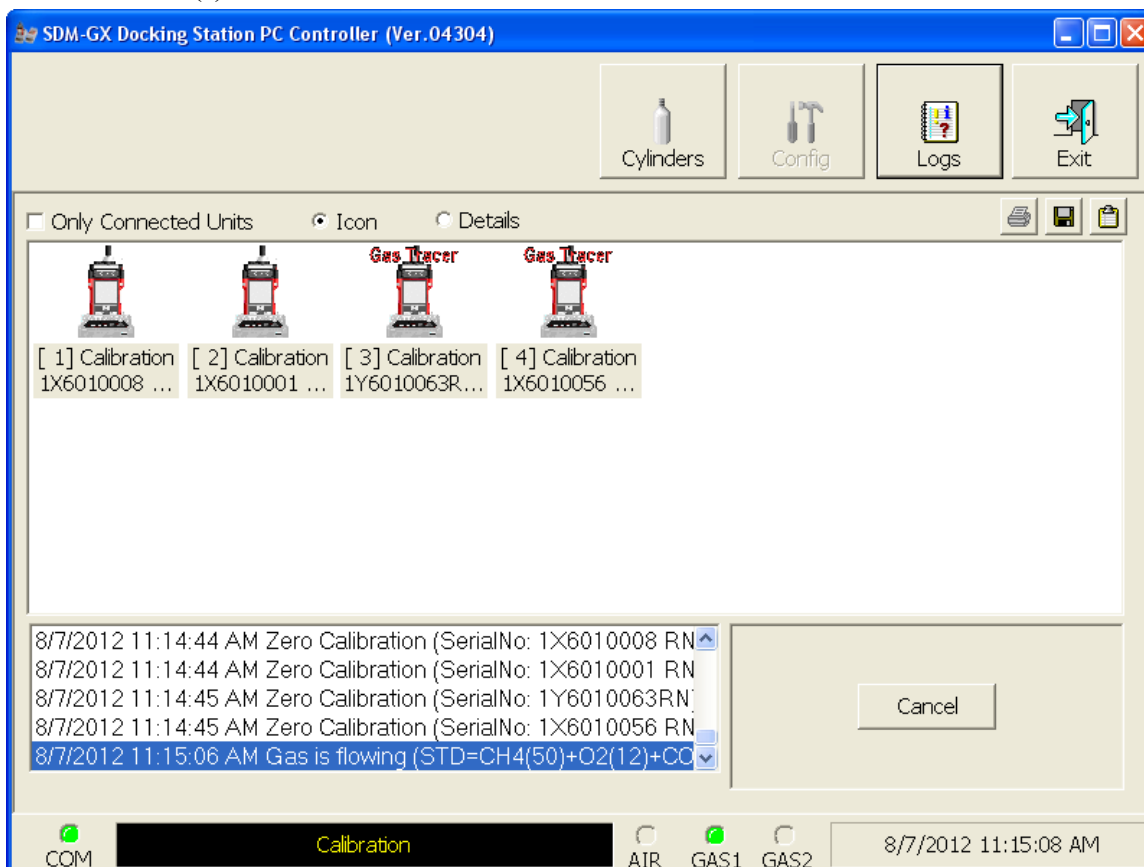
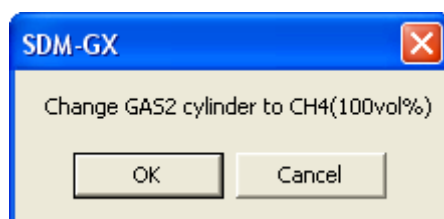


Figure 158: GAS 1 Flowing

The PC Controller Program will analyze the results.

18. If you are not calibrating an instrument or instruments with a %volume sensor installed, continue to step 22.

If you are calibrating an instrument or instruments with a %volume sensor installed, you will be prompted to change the GAS 2 cylinder. The pump(s) on the instrument(s) will stop.



19. Change the cylinder connected to the GAS 2 fitting to the %volume calibration cylinder.

20. When you have changed the GAS 2 cylinder, click OK. The calibration will continue and the second GAS 2 calibration gas will be applied to the %volume sensor for 90 seconds.

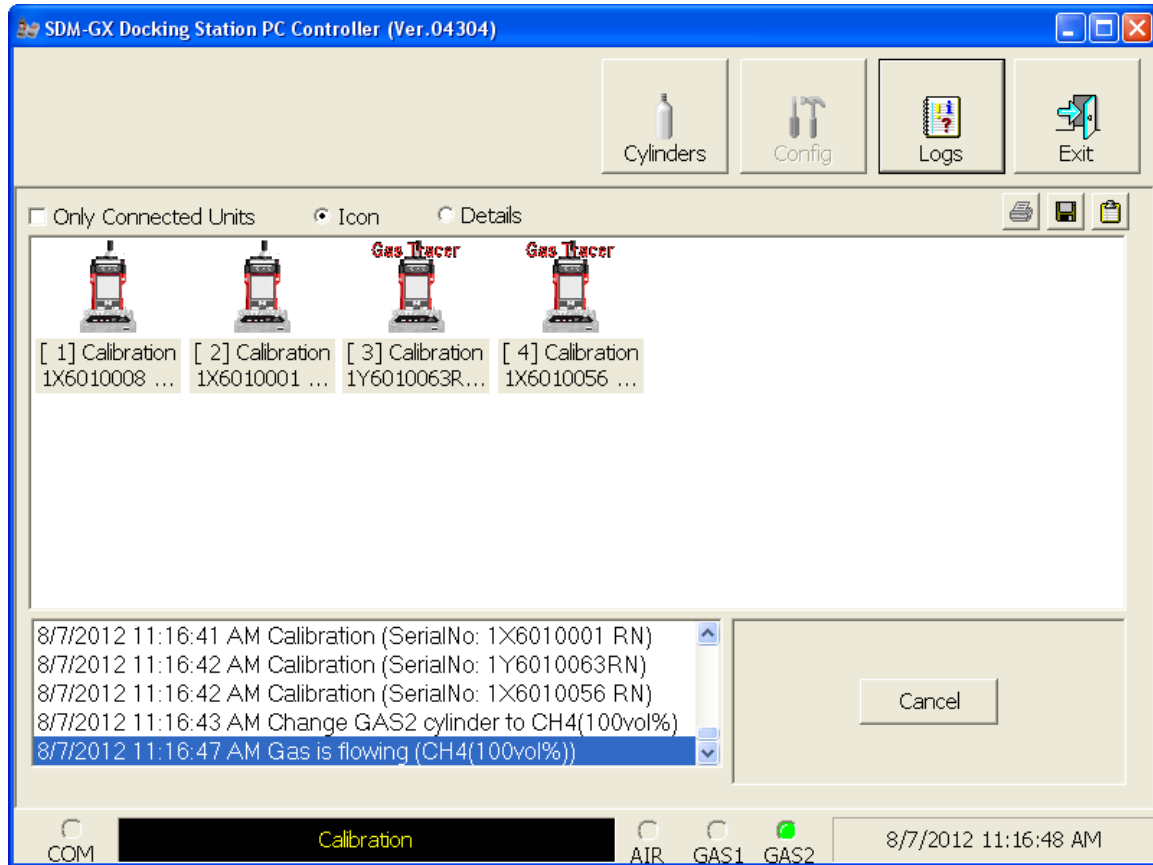


Figure 159: %Volume GAS 2 Flowing

21. The PC Controller Program will analyze the results.

22. After calibration gas is applied, the docking stations will purge with fresh air for 45 seconds.

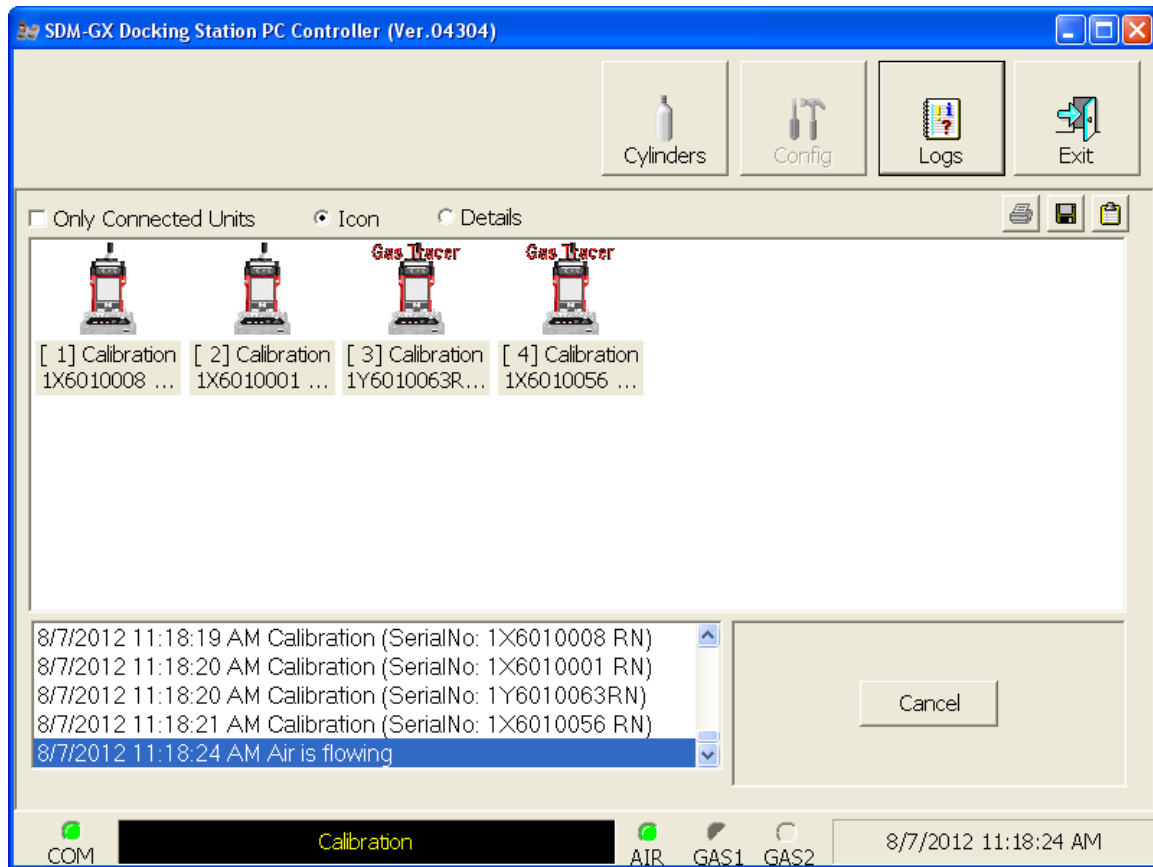


Figure 160: Fresh Air Purge

23. After the fresh air purge is complete,

- If the calibration passes, the following window will open indicating that. The CAL ▲ LED on the SDM-2012 control panel will be solid green. Click OK to return to the main program window. The CAL ▲ LED will turn off.

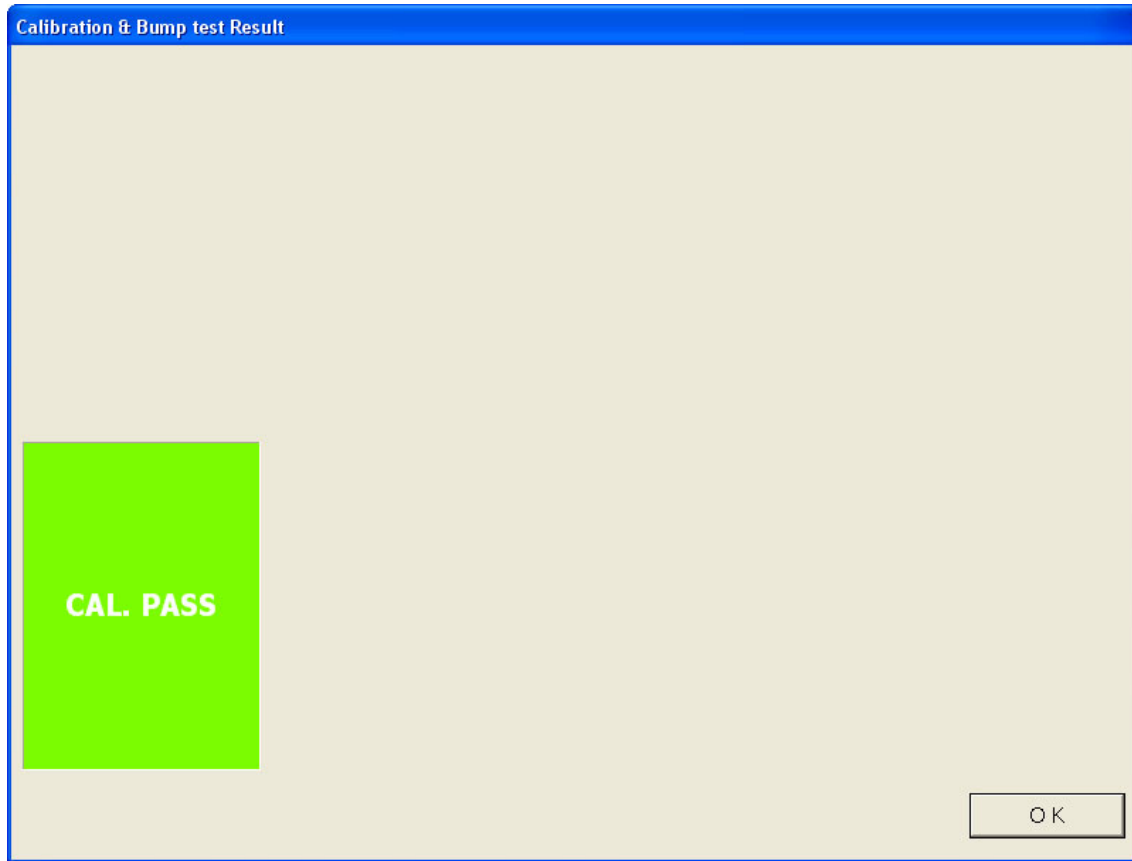


Figure 161: Calibration Passed

The instrument will automatically be shut off 20 seconds after a successful calibration.

- If the calibration fails, the following window will open indicating which channels failed to calibrate. The CAL ▲ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the calibration results in the Logs window. The CAL ▲ LED on the SDM-2012 control panel will turn off.

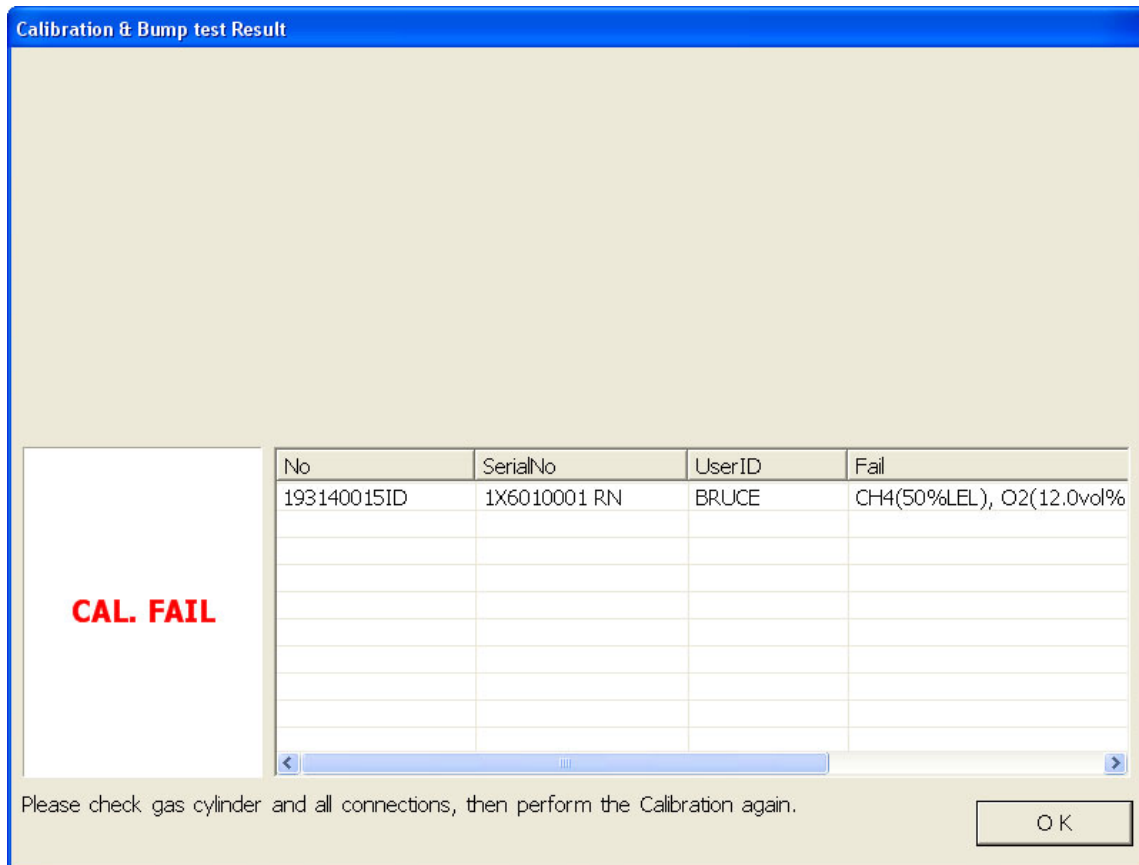


Figure 162: Calibration Failed

- If at any point during the calibration the flow rate to the instrument becomes too low, the PC Controller Program will abort the calibration and display a failed calibration screen. The CAL ▲ LED on the SDM-2012 control panel will be solid red. Click OK to return to the main program window or double click the instrument information line to view the calibration results in the Logs window. The CAL ▲ LED on the SDM-2012 control panel will turn off. Confirm all tubing connections are correct and that all lines are clear.

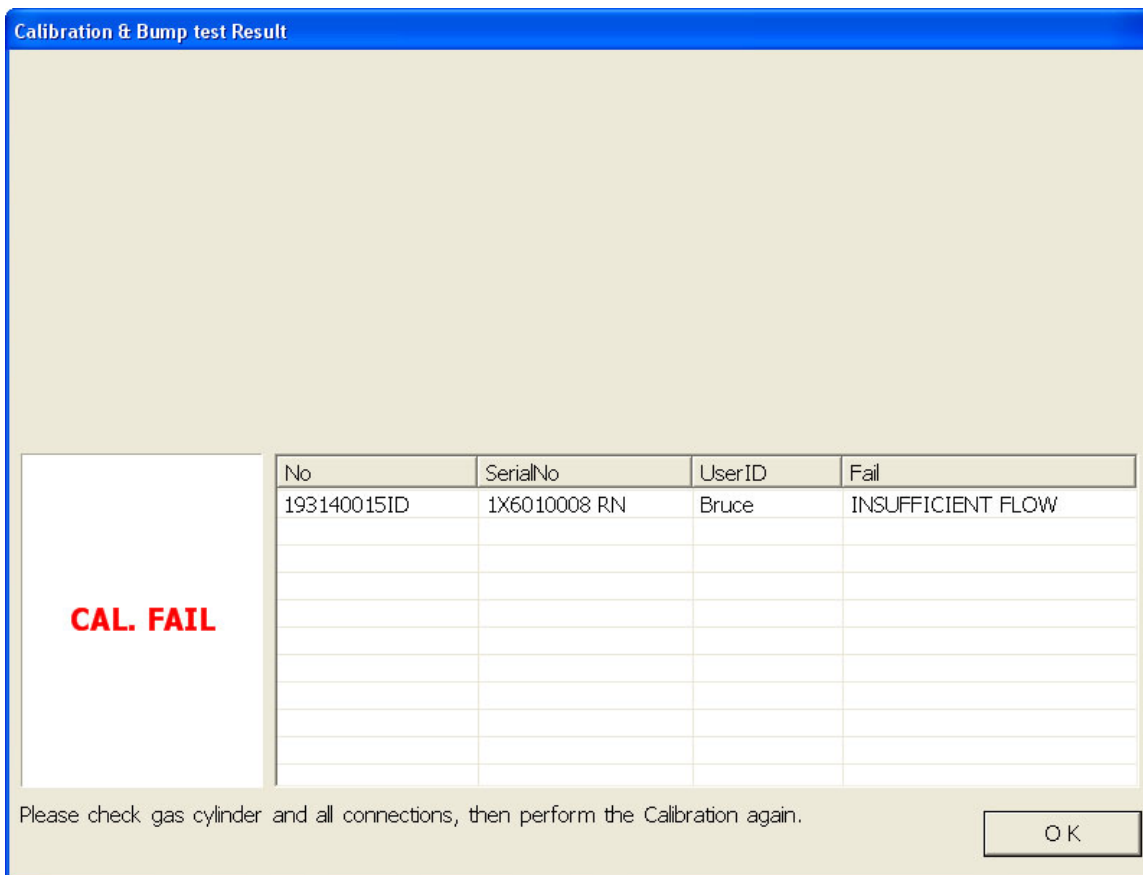


Figure 163: Low Flow Calibration Failure

24. For both calibration result outcomes, the instrument(s) will be displayed in the main program window in Details View. To return to Icons View, click the Icons radio button.
25. When a calibration is performed, any bump test or calibration data that is being stored in the instrument will be downloaded to the PC Controller Program. This data can be viewed in the Logs window along with the results of the calibration just performed. See “Bump Test Data” on page 146 or “Calibration Data” on page 131 for instructions for viewing bump test or calibration data.