Data Cal 2000
Operator's Manual

Part Number: 71-0097RK

Revision: B

Released: 10/10/05

RKI Instruments, Inc. • 33248 Central Ave. • Union City, CA 94587 • (510) 441-5656

Warranty

RKI Instruments, Inc., warrants gas alarm equipment sold by us to be free from defects in materials and workmanship, and performance for a period of one year from 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. 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	Batteries
Pump diaphragms and valves	Filter elements
Fuses	

Warranty is voided by abuse including mechanical damage, alteration, rough handling, or repairs procedures not in accordance with the instruction manual. This warranty indicates the full extent 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 replacement of parts or our complete goods.

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CAUTION: *Read and understand this manual before using the Data Cal 2000. Also read and understand the Model GX-2001 and Model GX-2003 Operator's Manuals included with each instrument.*

Introduction

The Data Cal 2000 Docking Station is a comprehensive and reliable system that provides charging, data downloading, configuration updating, calibration, and bump testing for the GX-2001 and GX-2003 gas detectors. It is designed for use with a Windows-based PC and the Data Cal 2000 Docking Station Software.

The purpose of this manual is to explain how to set up and use the Data Cal 2000 Docking Station and the Data Cal 2000 Docking Station Software. You will learn how to:

- install and launch the software
- install the hardware
- set up the Data Cal 2000 software and hardware
- download data from the GX-2001 and GX-2003
- perform a bump test
- perform a calibration
- view, print, and save data
- change instrument parameters
- change data logging parameters
- use the Data Cal 2000 to charge an instrument

CAUTION: *The GX-2001 and GX-2003 detect oxygen deficiency and elevated levels of oxygen, combustible gases, carbon monoxide, and hydrogen sulfide, all of which can be dangerous or life threatening. When using the GX-2001 and GX-2003, you must follow the instructions and warnings in the Operator's Manual for each instrument 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 Data Cal 2000 and the Data Cal 2000 Docking Station Software, your personal computer must meet the following requirements:

- **Operating Systems:** Windows® 98, Windows® ME, Windows® 2000, Windows NT® 4.0, or Windows® XP.
- **Processor:** IBM® compatible PC running Pentium® 2 processor or equivalent minimum
- **Memory:** 32 MB RAM minimum
- **Hard Disk Space:** 32 MB minimum
- **CD-ROM Drive**

Specifications

Table 1: Data Cal 2000 Specifications

Input Power	115 VAC, 50/60 Hz
Environmental Conditions	• For Indoor Use Only • -10° C to 40° C, below 80% Relative Humidity, Non-Condensing
Number of Docking Modules	Up to 10 docking modules
Applicable Instruments	• GX-2001 • GX-2003
Number of Calibration Gas Cylinders	Up to 5 calibration gas cylinders and one zero air cylinder

Description

The Data Cal 2000 consists of the following components:

- Data Cal 2000 Docking Station
- DM-2001 Docking Module for GX-2001
- DM-2003 Docking Module for GX-2003
- RS-232C serial communication cable for connection of the docking station to a computer
- RS-485 serial communication cables for connection of the docking station to a docking module and for daisy chain connection of additional docking modules to each other
- Power cord
- A 4-gas mix calibration cylinder (optional)
- Demand flow regulator with 3 foot tube (optional)
- A Windows based PC compatible computer (user supplied) with the Data Cal 2000 Docking Station Software loaded

The docking station is designed to be used on a table top with the DM-2001 and/or DM-2003 docking modules extending to the right of the docking station as shown in Figure 1 below. Any combination of docking modules may be used up to a total of 10. If a laptop computer is used, it may be placed on top of the docking station if desired.

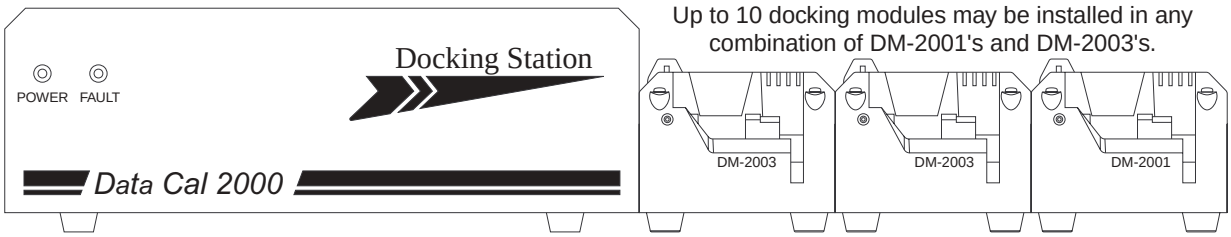


Figure 1: Data Cal 2000

Docking Station

The docking station manages the calibration, bump test, and information exchange functions of the Data Cal 2000 once they have been initiated through the software.The status LED's are on the front panel. The power switch and hose barb fittings for connection of calibration gas cylinders and routing of calibration gas to the docking modules are located on the back panel. Cable connectors for connecting the docking station to a computer and to docking modules are also located on the back panel.

Three recesses are located on the right side of the docking station that mate with tabs on the docking modules. These recesses allow table top assembly of a docking module to the docking station.

Front Panel

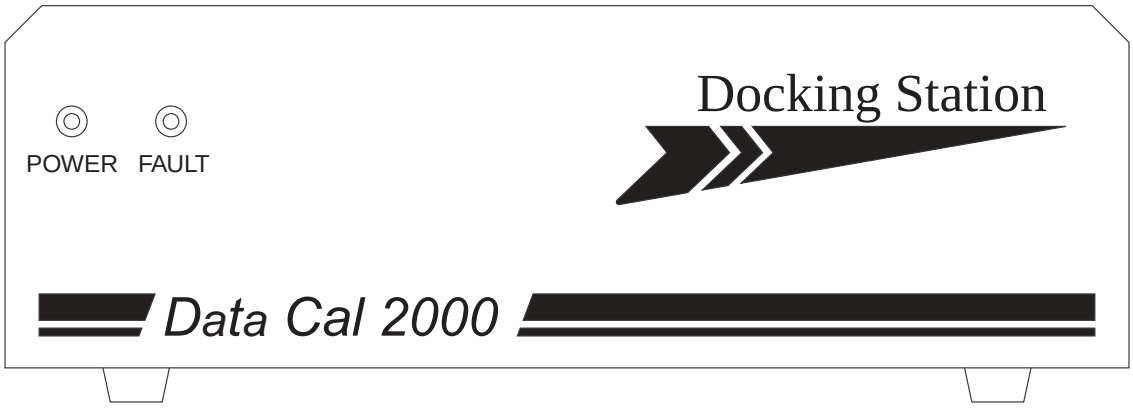


Figure 2: Data Cal 2000 Front Panel

The two status LED's are located on the front panel in the upper left corner. The left LED is green and is the POWER LED. It is on when the docking station is turned on. The right LED is red and is the FAULT LED. It is on when there is a communication error or some hardware problem that affects communication between the docking station and the computer or the docking station and the modules.

Back Panel

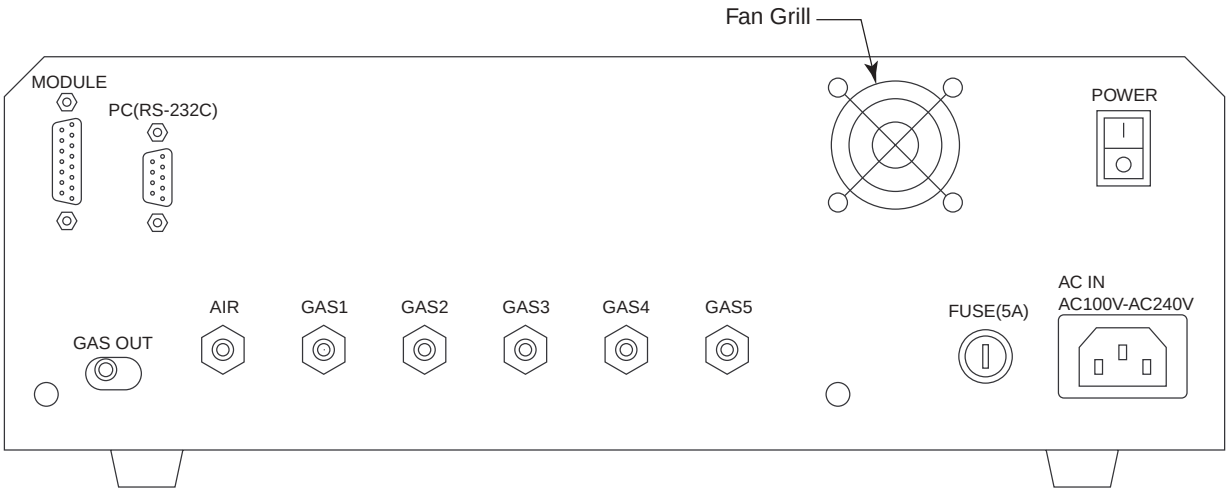


Figure 3: Data Cal 2000 Back Panel

The power switch is a rocker switch and is located in the upper right corner of the back panel. The docking station is on when the upper half of the switch, the “1” position”, is pressed in, and off when the lower half of the switch, the “0” position, is pressed in.

All the gas fittings are located on the back panel. They are hose barb type fittings that accept 3/16” inner diameter (ID) tubing. At the bottom left of the back panel is the GAS OUT fitting. This fitting is used to route calibration gas from the docking station to the docking modules. To the right of the GAS OUT fitting is the AIR fitting. This fitting is used to draw fresh air while the Data Cal 2000 is performing a zeroing operation during bump testing or calibration.

To the right of the AIR fitting are five additional fittings of the same type labeled GAS1, GAS2, GAS3, GAS4, and GAS5. These fittings are used to connect up to 5 calibration gas cylinders that are defined using the software. Usually, only one or two calibration cylinders will be needed. Typical gas cylinders needed are a 4-gas mix of %LEL $CH_4/O_2/CO/H_2S$ or 3-gas mix of %LEL $CH_4/O_2/CO$ and a %volume cylinder of CH4 (if the %volume CH_4 TC sensor is installed on a GX-2003).

There are three connectors on the back panel. A DB-15 (15 pin) receptacle in the upper left corner is used to connect the docking station to the docking modules. It is labeled MODULE. A DB-9 (9 pin) plug to the right of the MODULE connector is used to connect the docking station to the serial port of a computer. It is labeled PC(RS-232C). A 3-pin

recessed plug in the lower right corner of the panel is used to connect an AC line cord. It is labeled AC IN.

A fuse holder is located to the left of the AC IN connector. It is labeled FUSE(5A). The fuse holder consists of a panel mounting socket and a quarter turn fuse holder. The fuse is a 5 amp, 5 mm x 20 mm fuse.

A cooling fan is located inside the docking station on the right side above the fuse holder. It draws warm air out of the docking station to prevent the internal electronic components from overheating.

DM-2001 and DM-2003 Docking Modules

The docking modules are used to facilitate communication between a GX-2001 or GX-2003 and the docking station and computer and to apply fresh air and calibration gas to an instrument during a bump test or calibration. They are also used to charge an instrument's rechargeable battery pack if one is installed. Two multi color LED's, one on the left front and one on the right front of a module, indicate the operation status of the docking module.

Each module has three connection tabs on the left side near the bottom of the module and three connection recesses on the right side near the bottom of the module. The tabs from one module can be pushed into the recesses on the docking station or on another module to mechanically connect the module to the docking station or to another module. If multiple modules are used, one of them will be connected to the docking station and then each additional module will be connected to the end module as shown below in Figure 4.

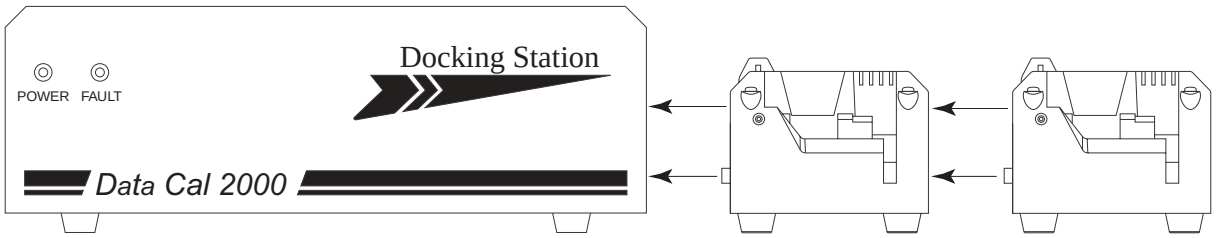


Figure 4: Assembling Docking Modules to Data Cal 2000

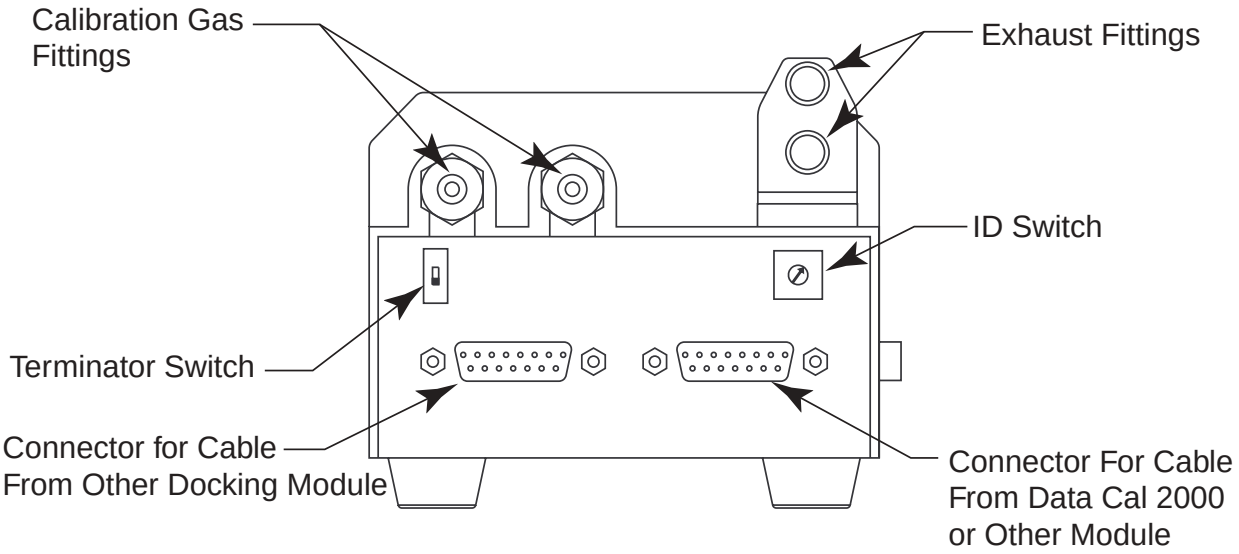


Figure 5: Back of Docking Module

Two DB-15 connectors on the back of each module allow connection to other docking modules or directly to the docking station.

Two hose barb fittings that accept 3/16” ID tubing are located in the upper left corner of the back of each module and are each labeled CAL. GAS. They allow sample gas connection to the module and from the module to another module. The right fitting (as viewed from the back) is for connection to the GAS OUT fitting on the docking station or to the left fitting of the previous module in the system. The left fitting is for connection to the next docking module in the system or, if the docking module is the last one in the flow system, it is plugged with a push-on plug that is supplied with the docking station.

A two port exhaust routing fitting is located in the upper right corner of the back of a module. It allows routing of the exhausted calibration gas from all the modules to the last module so the exhaust gas can be safely routed to a convenient exhaust location.

NOTE: 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.

Both types of modules also include a 10-position rotary switch, the ID switch, above the right DB-15 connector, and a 2-position slide switch, the terminator switch, above the left DB-15 connector. The ID switch sets

the ID number of a module from 0 - 9, for a maximum of 10 module IDs. The terminator switch is set to the down position if the module is the last module in the system and to the up position for any other module.

DM-2001 Docking Module

The GX-2001 fits into the DM-2001 module as shown in Figure 6 below. The module includes a snap-on sample adapter for the GX-2001. The exhaust port of the adapter is connected to a port on the front left of the module by a short tube and the adapter's inlet port is connected to a port on the top rear of the module by a coiled tube. The sample adapter snaps onto the sensor side of the GX-2001 before the GX-2001 is installed into the module.

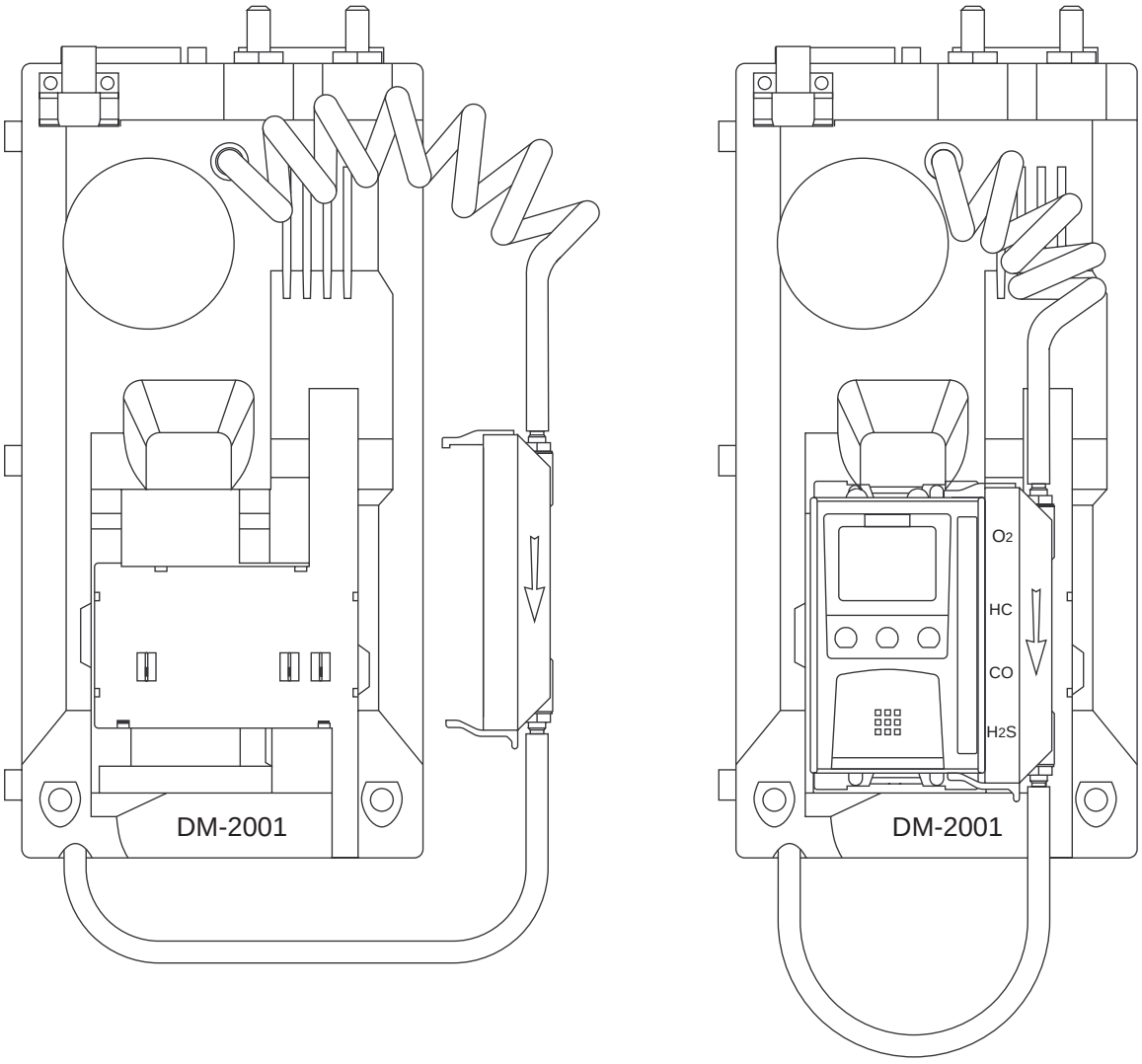


Figure 6: DM-2001 Docking Module

DM-2003 Docking Module

The GX-2003 fits into the module as shown in Figure 7 below. A coiled black tube with a plastic push-on fitting resides in a recess in the left rear corner of the top of the module. The coiled tube routes gas to the GX-2003 and extends to connect to the GX-2003's inlet fitting. A straight green tube comes out of the top of the module to the right of the coiled tube and also has a plastic push-on fitting on its end. The fitting on this tube is pushed onto the GX-2003 exhaust fitting and routes gas away from the GX-2003.

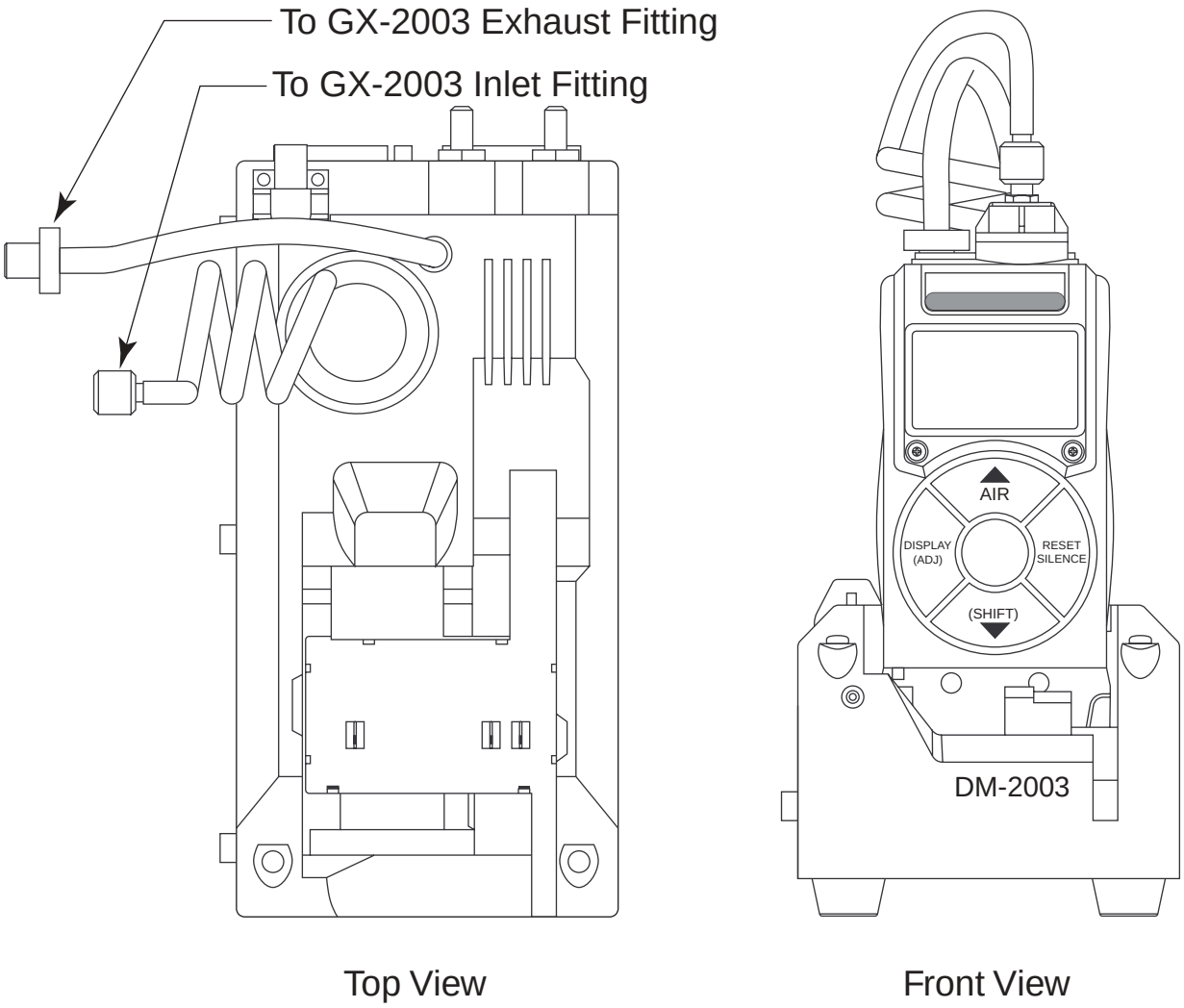


Figure 7: DM-2003 Docking Module

Communication Cables

The number of communication cables needed depends on how many docking modules are used. Every system has at least two cables, an RS-232C cable with a DB-9 receptacle on each end (docking station cable supplied with docking station) to connect the docking station to a computer and an RS-485 cable with a DB-15 plug on each end (docking module cable supplied with docking module) to connect the docking station to the first docking module. For every additional docking module, an additional RS-485 cable is needed to connect the additional module to the previous module.

Power Cord

A three-pronged AC power cord is provided with the Data Cal 2000. One end connects to a standard AC wall outlet and the other end plugs into the AC power socket on the back of the docking station.

4-Gas Mix Calibration Cylinder

The Data Cal 2000 may be ordered with or without calibration gas and a demand flow regulator. The standard configuration of the Data Cal 2000 includes a demand flow regulator and one 58 liter 4-gas mix calibration cylinder which typically contains 50% LEL CH_4/12.0% oxygen/50 ppm CO/25 ppm H_2S. If another cylinder is required for your system, for example if you need a % volume CH_4 cylinder for a 5-sensor GX-2003, it will have to be ordered separately along with an additional demand flow regulator.

Demand Flow Regulator & 3 ft. Tube

The standard configuration of the Data Cal 2000 includes one demand flow regulator with 3 feet of flexible polyurethane tubing. The demand flow regulator screws onto a calibration cylinder and the tube is used to connect the regulator to the appropriate calibration gas fitting on the back of the docking station. When the regulator senses a vacuum at its fitting, it allows the gas from the cylinder to flow.

Data Cal 2000 Hardware Setup

There are two parts to preparing the Data Cal 2000 Docking Station for use: hardware setup and software setup.This section describes hardware setup. The hardware setup consists of setting the docking module configuration switches, simple mechanical assembly, cable installation, and tubing installation.

Setting the Docking Module Configuration Switches

The docking module configuration switches determine module ID and the order in which the modules are physically installed. Before using the Data Cal 2000, you will need to set the configuration switches as described below. If you are adding a module or modules to a system that is already setup, make sure the system is setup as described below after the new module or modules are added.

ID Switch

The ID switch is located above the right DB-15 connector on the back of the docking module. It is a 10 position rotary switch with settings from 0 to 9. A Data Cal 2000 may have up to 10 docking modules. Each module in the system must have a unique ID for the system to work properly. When you receive a Data Cal 2000, set the ID setting for each module in the system so that no two modules have the same ID. The IDs should be set sequentially to make it easy to keep track of the IDs. For example, if you have 5 modules in a system, the IDs should be set to 0, 1, 2, 3, & 4. Although the system will still operate properly if ID numbers are skipped, for example using IDs 0, 3, 4, 6, & 8, setting them sequentially makes it easier to keep track of the module IDs and spot duplicate ID settings. If it is necessary to change the ID on a module, use a small flat blade screwdriver to adjust the switch to the desired setting. A small arrow in the middle of the switch points to the current ID setting.

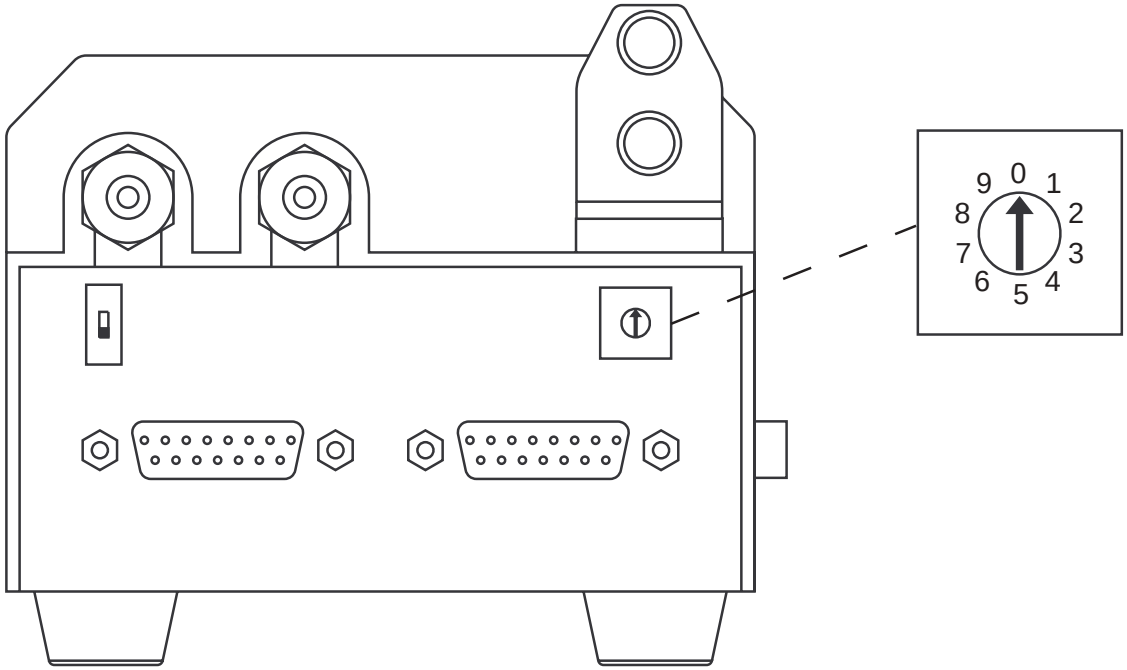


Figure 8: ID Switch Setting

Termination Switch

The termination switch is located above the left DB-15 connector on the back of the docking module. It is a two position slide switch. The switch position indicates whether the module is physically the last module in the installation or not. When the Data Cal 2000 is viewed from the front, the last module in the installation is the module on the far right and it must have the termination switch set to the down position for the Data Cal 2000 to operate properly. All other modules in the system must have the switch set to the up position. If only one module is used in a system, that module must have the termination switch set to the down position.

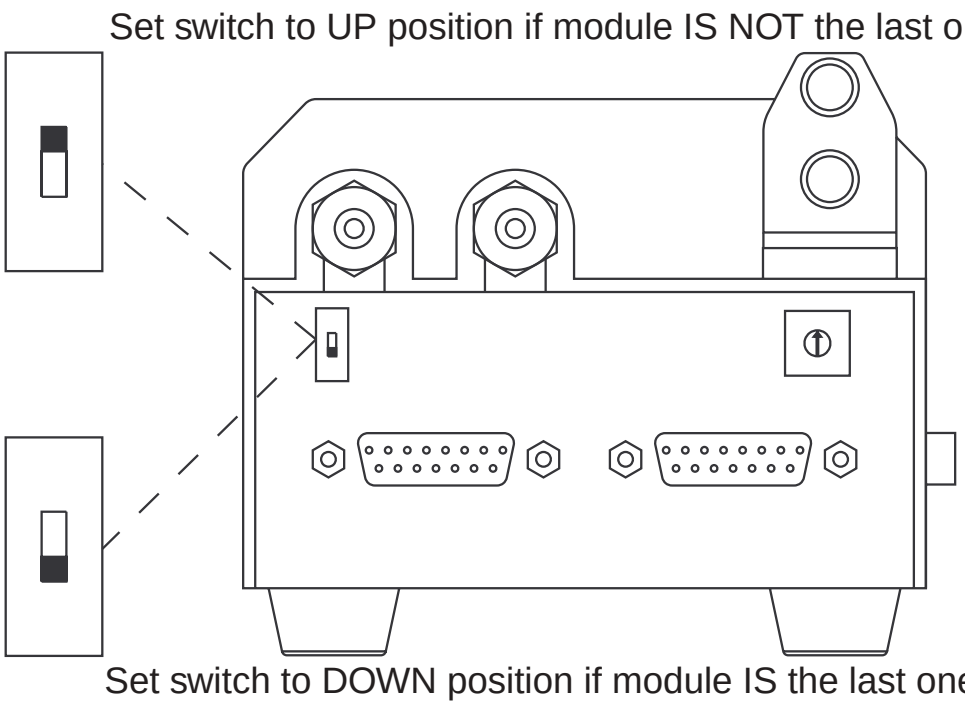


Figure 9: Termination Switch Setting

Mechanical Assembly

The Data Cal 2000 is designed for table top use. Perform the following steps to assemble the docking station and docking modules.

1. Find a location that is well ventilated and near a window so that the exhaust can be routed out of the window.
2. Find a table or other flat surface that is large enough to accommodate the docking station and the number of modules in your system.
3. Place the docking station on the flat surface with enough room to the right of the docking station (when viewed from the front) to fit all of the docking modules side by side.
4. Place the first docking module to the right of the docking station and line up the three tabs on the left side of the module with the three recesses on the right side of the docking station.
5. Push the module toward the docking station so the tabs mate with the recesses and the module is flush against the docking station. If

only one module is used in your system, then mechanical assembly is done. If more modules are used in your system, continue with step 6.

6. Place the next docking module to the right of the installed docking module and line up the three tabs on the left side of the module with the three recesses on the right side of the installed module.
7. Push the new module toward the installed module so the tabs mate with the recesses and the new module is flush against the installed module.
8. Repeat steps 6 & 7 for each additional docking module.

CAUTION: *Make sure that the last module in the system, the one on the far right, has the terminator switch set to the down position. If the last module does not have the terminator switch set to the down position, the Data Cal 2000 will not operate properly.*

Cable Installation

1. Install the RS-232C cable from the PC connector on the back of the docking station to the serial port on a computer.
2. Plug the power cord into the power socket on the back of the docking station. Do not connect the cord to an AC outlet at this time.
3. Install a RS-485 cable from the MODULE connector on the back of the docking station to the right (when viewed from the back) DB-15 connector on the back of the first module. If only one module is used in your system, cable installation is done. If more modules are used in you system, continue with step 4.
4. Install a RS-485 cable between each adjacent module from the left connector of one module to the right connector of the next module. The module on the end will not have anything connected to the left connector.

Tubing Installation

Module CAL. GAS Fitting Connections

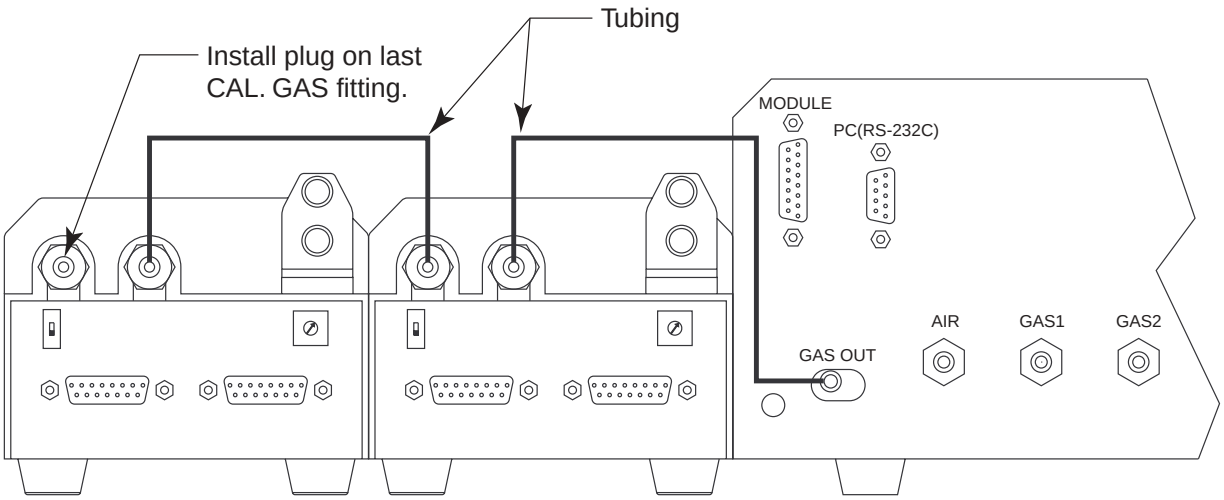


Figure 10: Calibration Gas Fitting Connections

1. Install a black tube (supplied with the docking station) between the GAS OUT fitting on the back of the docking station and the right (when viewed from the back of the module) CAL. GAS fitting on the first docking module in the system, the one next to the docking station.

   If only one module is to be installed in the system, install the black fitting plug that is supplied with the system to the left CAL. GAS fitting of the module. If more modules are used in your system, continue with step 2.

2. Install a black tube (supplied with the docking module) between the left CAL. GAS fitting of the first module and the right CAL. GAS fitting of the next module in the system.
3. Repeat step 2 for each successive module in the system until you get to the last module.
4. Install the black fitting plug on the left CAL. GAS fitting of the last module in the system.

Module Exhaust Fitting Connections

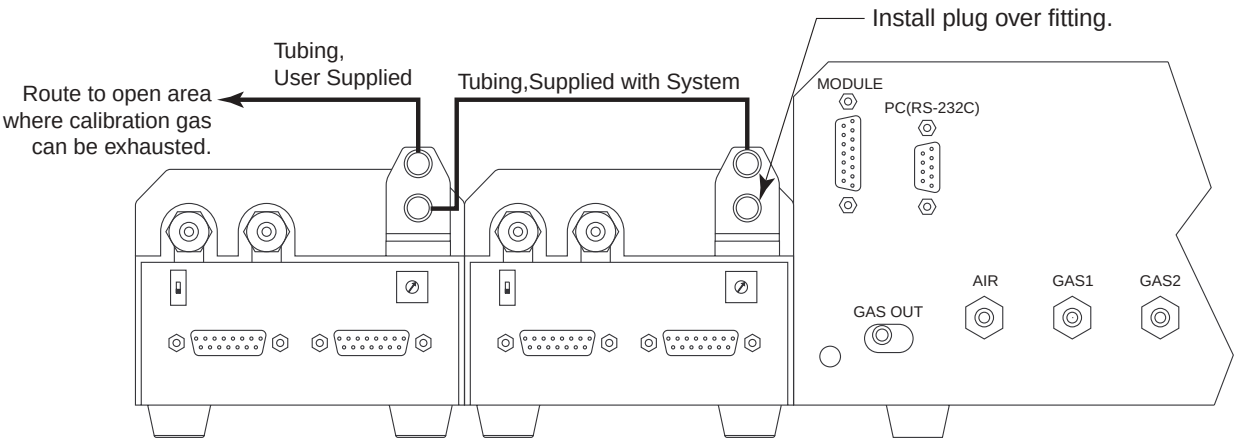


Figure 11: Exhaust Fitting Connections

1. Install a clear fitting plug, supplied with the system, on the bottom port of the exhaust fitting of the first module in the system.
2. Install a clear tube, supplied with the system, between the top exhaust fitting port on the first module and the bottom exhaust fitting port on the next module.
3. Repeat step 2 for each successive module in the system until you get to the last module.
4. On the last module in the system, install the 5/16” ID flexible tube that is included with the Docking Station on the top exhaust fitting port and route the tube to an area where the calibration gas can be safely exhausted.

CAUTION: *The maximum recommended length for the exhaust tube is 10 feet. Do not use more than 10 feet of tubing for the exhaust tube or bump test and calibration accuracy will be adversely affected. The tube that is shipped with the Docking Station is 10 feet long.*

Docking Station Calibration Gas Fitting Connections

The calibration gas fittings on the back panel of the docking station are designed to be used with calibration gas cylinders that are fitted with

demand flow regulators. 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 types of calibration gas cylinders used depend on the gas sensors installed in the GX-2001's and GX-2003's being connected to the docking station. Typically a 4-gas mix will be used if all or most instruments being connected to the system are 4-gas units. If any GX-2003's that are 5-sensor units are being connected, a %volume CH4 cylinder will also be needed. Use Table 2 below as a guide in determining which and how many calibration gas cylinders are appropriate for your system.

Table 2: Recommended Gas Cylinders

Typical Instrument Types	Recommended Calibration Gas Cylinder(s)
GX-2001 LEL/Oxy/H2S/CO	4-gas mix with CH4/Oxy/H2S/CO
GX-2001 LEL/Oxy/CO	3-gas mix with CH4/Oxy/CO
GX-2001 LEL/Oxy/H2S	4-gas mix with CH4/Oxy/H2S/CO
GX-2003 GX-2003: LEL/Oxy H2S/CO	4-gas mix with CH4/Oxy/H2S/CO
GX-2003 %Vol CH4/LEL CH4/Oxy/H2S/CO	• 4-gas mix with CH4/Oxy/H2S/CO • %Volume CH4 in air
GX-2003 LEL/Oxy/CO	3-gas mix with CH4/Oxy/CO
GX-2003 LEL/Oxy/H2S	4-gas mix with CH4/Oxy/H2S/CO

1. If the area around the calibration 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 on 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 to the fitting using a demand flow regulator.

2. Install the demand flow regulator(s) on the calibration gas cylinder(s).
3. Connect the demand flow regulator for each calibration gas cylinder that will be used with the docking station to the desired gas port, GAS1, GAS2, GAS3, GAS4, or GAS5. These ports must be defined in the docking station software during the software setup. See “Setting up the Solenoids” on page 38.

Installing the Data Cal 2000 Docking Station Software

1. Launch Windows®.
2. Exit from all applications and open windows.
3. Insert the Data Cal 2000 Docking Station Software Installation CD into your computer’s CD-ROM drive.
4. The Docking Station InstallShield Wizard comes up to guide you through installation. Click **Next** to proceed to the License Agreement window.
5. Read the license agreement and click the agreement acceptance selection box, then click **Next** to proceed to the Customer Information window.
6. Enter a user name and organization, the click **Next** to proceed to the Destination Folder window.
7. The default installation folder (C:\Program Files\Docking Station\) is displayed. If you want to install the software in the default folder continue with step 5. If you want to install the software in a different location, click **Change** and choose a new installation folder now and then continue with step 5.
8. Click **Next** to proceed to the Ready to Install the Program window.
9. Review the installation settings. If they 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.

10. During software installation, the installation program may find newer versions of Windows files on your computer than those in the Installation CD. If this happens, the installation software will ask you if you want keep these newer files. Click **Yes** to do so.
11. Follow the on-screen instructions to complete software installation.

Launching the Data Cal 2000 Software

1. Click **Start** on the Windows® Icon Tray, then select **Programs/ Docking Station**. The Data Cal 2000 program is launched and the docking station main program window appears.

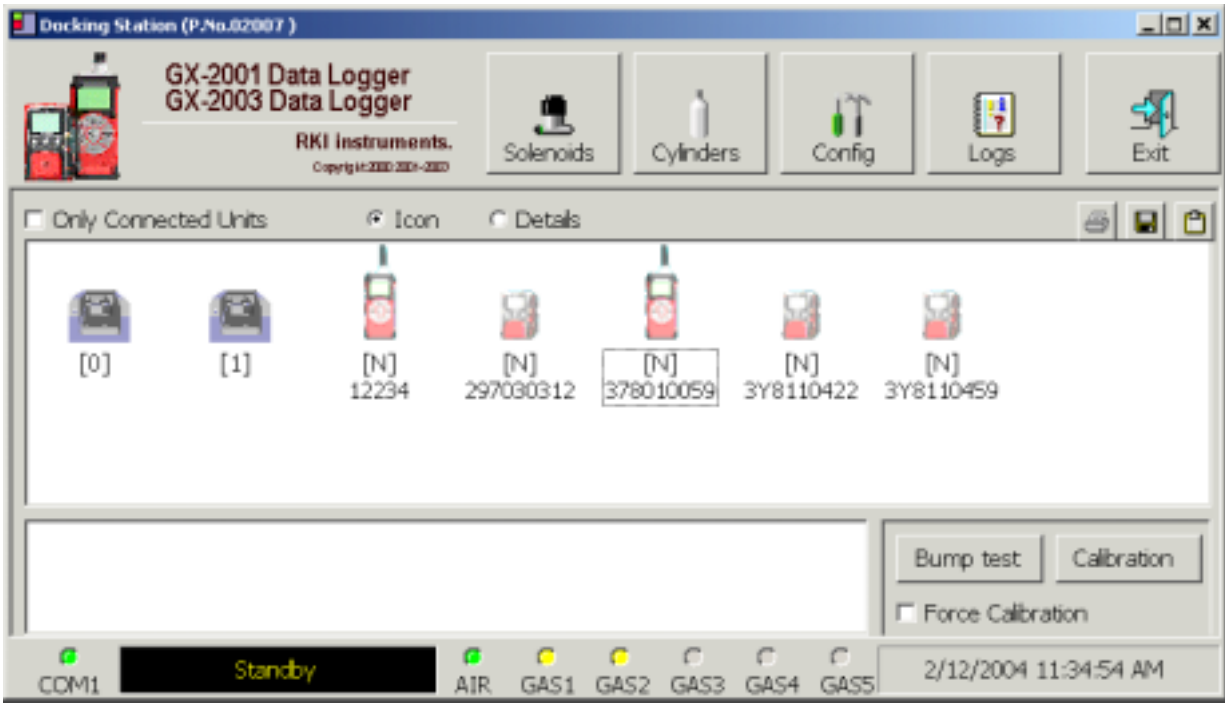


Figure 12: Data Cal 2000 Main Window

NOTE: You can also start the software by double clicking on the **Docking Station** shortcut that the installation CD puts on the Windows® Desktop or in the **Start** menu.

2. If you are starting the software for the first time, a message window appears informing you that a database has been created. When starting the software for the first time, or if you wish to change the software setup, proceed to the next section, "Overview of the Data Cal 2000 Software".

   If you have already performed the software setup, proceed to “Connecting Instruments to the Data Cal 2000” on page 41.

Overview of the Data Cal 2000 Software

This section provides a brief overview of the software and a description of the main program window. Instructions for using the software are given in other parts of this manual. Use this section to become familiar with the main program window, but before attempting to use the software, make sure to perform the software setup as described in “Setting Up the Data Cal 2000 Software” on page 30.

The Data Cal Docking Station Software is designed to provide manual or automated data downloading, bump testing, and calibration for the GX-2001 and GX-2003. It also provides the capability to update instrument parameters such as active channels and alarm points. The software compiles a database of the instruments that have been connected to the Data Cal 2000 which consists of calibration and bump test history, logged data (if a unit’s data is downloaded), and memos that record user entered information about an instrument at a particular time.

The GX-2001 and the GX-2003 are gas monitoring devices for combustible gas, O_2, CO, and H_2S. They store logged data and calibration information in their internal memories. See the Operator’s Manual for each instrument for a complete description of each instrument.

Data Cal 2000 Functions

The Data Cal 2000 software has the following basic functions accessed or controlled by buttons in the main program screen (see Figure 13)

- Solenoid setup accessed by the **Solenoid** control button
- Gas cylinder setup accessed by the **Cylinders** control button

- Software & system configuration accessed by the **Config** control button (this function is password protected)
- Data viewing accessed by the **Logs** control Button
- Instrument bump testing controlled by the **Bump test** button
- Instrument calibration controlled by the **Calibration** button

Main Program Window

The main program window is where the current status of the software operation is shown. Any docking modules and instruments that are connected to it and any instruments that have been but are not currently connected to it are also shown. The program's various functions are initiated or accessed from this screen. The current date and time are always displayed in the lower right corner of the main window.

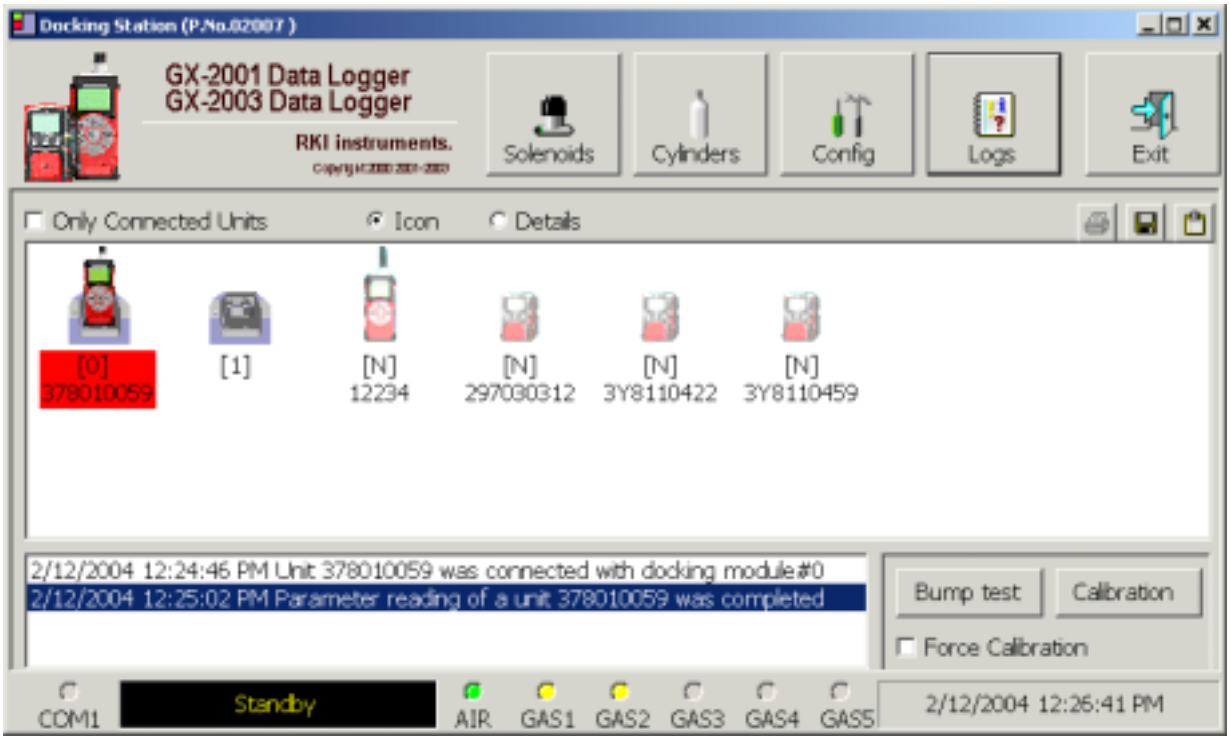


Figure 13: Parts of the Main Program Window

Control Buttons

The **Solenoids**, **Cylinders**, **Config**, **Logs**, and **Exit** control buttons are located along the top left of the window. The **Bump test** and **Calibration** control buttons are located in the lower right of the window along with a Force Calibration selection box. The use of these control buttons and the Force Calibration selection box is described in other parts of this manual.

Docking Module/Instrument Display Area

The large middle portion of the main window displays docking modules and instruments that are currently connected to the Data Cal 2000 and instruments that are in the database. The docking modules are identified by a number that corresponds to the ID switch setting on the back of the docking module. The instruments are identified by their serial number. By selecting either the Icon selection circle or the Details selection circle, the modules and instruments can be displayed either as icons or in a table format that shows various instrument parameter details such as station ID, user ID, the next scheduled bump test date, and the next scheduled calibration date among others. If the Only Connected Units box is checked, then only instruments that are currently connected to the Data Cal 2000 will be shown.

Software Status

Three areas of the main window indicate the software status. The smaller area in the lower left below the docking module/instrument display area is the message window. It displays messages that indicate actions and status of the software.

Below this area, the communications port that is being used by the software is shown in the lower left corner. A round communication indicator is located above the communications port name.

To the right of the communications port indicator is the status field. It displays the current status of the software. It can indicate that the software is in standby mode or if it is downloading among other indications.

Solenoid Indicators

To the right of the status field are 6 round solenoid indicators. They correspond to the fittings on the back of the docking station. They indicate whether the corresponding solenoid is activated so it can allow gas to flow through the fitting it controls and also if the cylinder connected to it has expired. See “Adding and Updating Cylinders” on page 35 for an explanation of how to view and define a cylinder expiration date. The color of the indicator defines the status as follows:

- Green indicates that the solenoid is activated and will allow gas to flow through the corresponding fitting.
- Yellow indicates that the solenoid is not activated.
- Orange indicates that the corresponding cylinder will expire in less than 10 days. When the solenoid is activated, the indicator’s color will change to green while it is activated and then return to orange when the solenoid is deactivated.
- Red indicates that the corresponding cylinder’s expiration date has passed. Although the software will allow use of the cylinder if it is expired, it is recommended that the expired cylinder be changed as soon as possible.

WARNING: If an expired cylinder is used for calibration, the accuracy of the calibration may be adversely affected.

Setting Up the Data Cal 2000 Software

Once the software is installed, you must set up the software for your system. Setting up the Data Cal 2000 software consists of the following tasks:

- setting up the Data Cal 2000 parameter configuration which includes parameters such as the number of docking modules and their ID.

> **NOTE:** Only the Parameter tab of the Configuration window is discussed in this section. See “Configuration Window” on page 77 for a description of the other tabs in the Configuration window.

- defining which calibration gas cylinders will be required
- defining which solenoids will control which calibration gas cylinder

If docking modules are added or removed or if the calibration cylinders being used are different from the defined cylinders, the setup will have to be updated.

Setting Up the Configuration

1. Launch the software as described in “Launching the Data Cal 2000 Software” on page 25.

> **NOTE:** It is not necessary to turn on the Data Cal 2000 if you are only performing configuration setup. With the Data Cal 2000 off, the software will indicate communication errors in the area below the docking module/instrument display area. This is normal if the Data Cal 2000 is not turned on.

2. From the main window, click on the **Config** button located along the top of the window.

3. Enter the password and click **OK**. The default password is “ABCDE” and is case sensitive. After clicking **OK**, the Configuration Window is opened and the Parameter tab will be in the foreground.

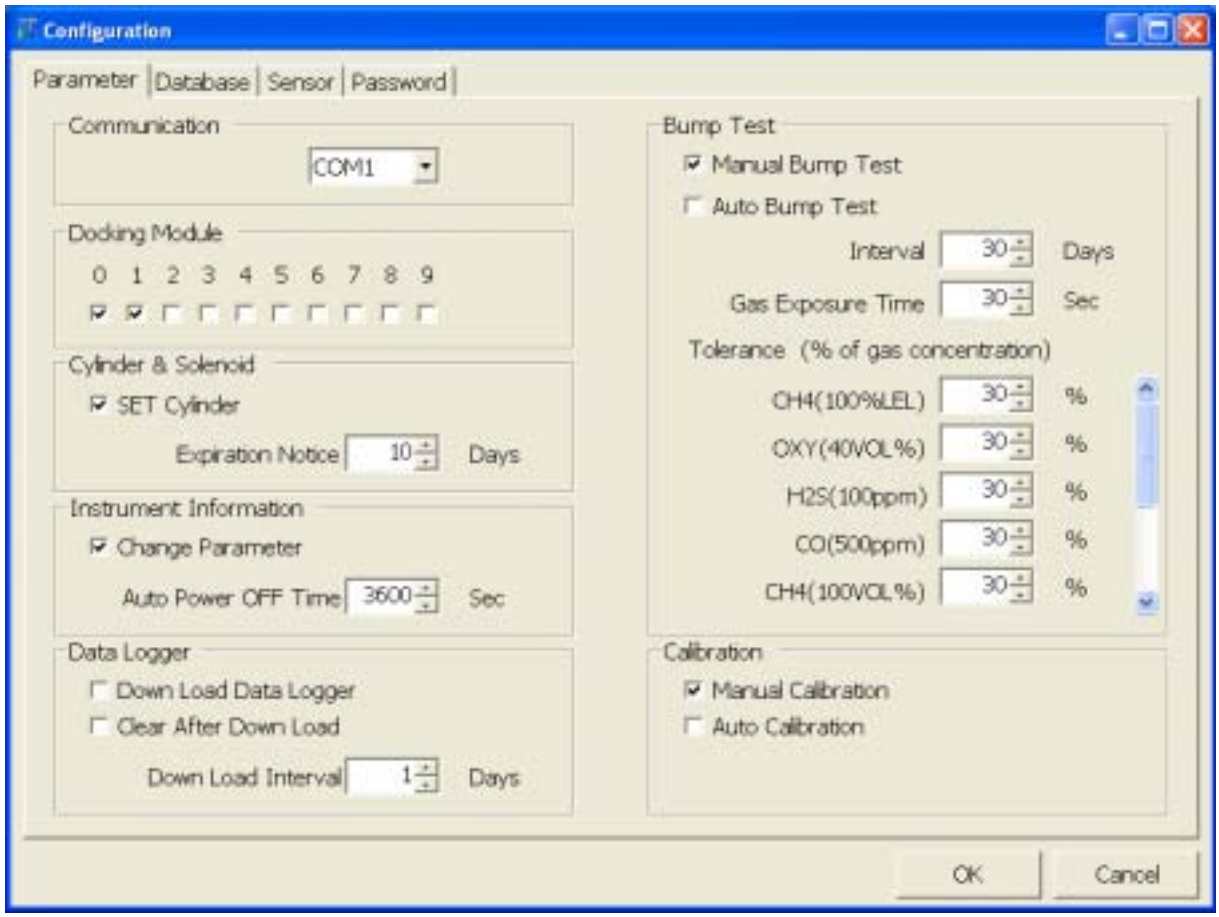


Figure 14: Configuration Window

4. Select the communication port that will be used in the Communication section. This is typically COM1 or COM2. Be sure that the port that is selected is not already being used by some other device.
5. Select the docking modules that are installed in the Docking Module section. Ten selection boxes are displayed with the IDs 0 through 9. The IDs on the selection boxes correspond with the IDs on the docking modules set by the ID switch (See “ID Switch” on page 17) If modules with IDs 0, 1, and 2 are installed, then selection boxes 0, 1, and 2 must be selected. If extra boxes are selected or if the incorrect IDs are selected, communication errors will result and the software will not work properly.

6. Select the cylinder and solenoid options in the Cylinder & Solenoid section.
    - If the SET Cylinder box is selected, then you will be able to enter the Solenoids and Cylinders windows by clicking the **Solenoids** or **Cylinders** button from the main menu. While in these windows you will be able to define which cylinders the solenoids control, update defined cylinders, and add new cylinders. If the SET Cylinder box is not selected, then the **Solenoids** and **Cylinders** buttons in the main program window will not be available to click.
    - The Expiration Notice will define how many days before a cylinder expiration date the software will indicate that a cylinder is nearing the expiration date. It is adjustable from 1 to 180 days.
7. Select the instrument information options in the Instrument Information section.
    - If Change Parameter is selected, you will be able to change various parameters in connected instruments such as the serial number and enter memos. (see “Edit Function” on page 74 and “Edit Function, Memo Entry” on page 75).
    - The Auto Power OFF Time defines when a connected instrument will turned off by the Data Cal 2000 after the most recent operation, such as an automatic download or a manual bump test. It is defined in seconds with a maximum setting of 3600 seconds (1 hour).
8. Select the datalogging options in the Data Logger section.
    - If Down Load Data Logger is selected, the software will automatically download all data from an instrument when it is connected to the Data Cal 2000 if it is due for download. The Down Load interval value (see below) determines if an instrument is due. If Down Load Data Logger and Clear After Down Load are selected, then all logged data in a downloaded instrument will be cleared after it is downloaded.
    - The Down Load Interval defines how often a unit that is connected to the Data Cal 2000 will be downloaded if Down

Load Data Logger is selected. If it is set to 0 days, instruments will be downloaded every time they are connected to the Data Cal 2000. It is adjustable form 0 to 60 days.

9. Select the bump test options in the Bump Test section.
    - Selecting the Manual Bump Test selection box activates the **Bump test** button in the main window and allows you to perform a bump test manually.
    - If the Auto Bump Test selection box is selected, the software will automatically check if a connected instrument is due for a bump test (see the selection of the bump test interval below) and perform a bump test if the instrument is due. If Auto Bump Test is selected, make sure the appropriate calibration gas cylinders are always connected to the appropriate fittings on the back of the docking station when instruments are being connected to the Data Cal 2000.
    - Set the bump test interval to the desired number of days. If Auto Bump Test is selected, when an instrument is connected to the Data Cal 2000, if it has not been bump tested in the number of days defined in the Interval field, it will be bump tested by the Data Cal 2000. It is adjustable from 1 day to 180 days.
    - Select the gas exposure time. The gas exposure time defines the number of seconds that calibration gas is applied to an instrument during a bump test. it is adjustable from 30 seconds to 90 seconds
    - Set the bump test tolerance for each channel. This option for each channel allows you to set up the criteria for determining if an instrument passes a bump test. The default value for each channel for the allowable deviation for a bump test is 30% of the gas concentration used in the test. These values are adjustable from 20% to 50%. If the result of the bump test for a channel is within the set deviation, then the channel passes the bump test. For example, if the tolerance for the CH4(100%LEL) channel is set to 30% and 50% LEL CH_4 is used in the bump test, then the LEL CH_4 channel must respond between 35% LEL and 65% LEL to pass the bump test.

10. Select the calibration settings in the Calibration section

    - Selecting the Manual Calibration selection box activates the **Calibration** button in the main window and allows you to perform a calibration manually.
    - If Auto Calibration is selected, the software will automatically check the last calibration date retrieved from a connected instrument and compare it to the calibration interval to determine if a connected instrument is due for calibration and calibrate the instrument if it is due. For a GX-2003, the calibration interval is saved in the instrument and retrieved by the Data Cal 2000. You can use the Data Cal 2000 software to update the calibration interval in the GX-2003 (see “Edit Function” on page 74). For a GX-2001, the calibration interval is defined in the Data Cal 2000 software and can be updated (see “Edit Function” on page 74). If Auto Calibration is selected, make sure the appropriate calibration gas cylinders are always connected to the appropriate fittings on the back of the docking station when instruments are being connected to the Data Cal 2000.

11. Click the **OK** button to save all changes and return to the main program window.

Viewing the Pre-Defined Cylinders

1. From the main program window, click the **Cylinders** button located along the top of the window. The Cylinders window appears.

   The Cylinders window lists defined cylinders and has four function buttons in the lower right corner of the window for adding, updating, or deleting cylinders. When the software is first loaded, there are two pre-defined cylinders on the list. One is a 58 liter 4-gas mix with 25 ppm H2S, 50 ppm CO, 50% LEL CH4, and 12% Oxygen, RKI part number 81-0154RK-02. This cylinder is included with the Data Cal 2000. The other is a 58 liter 50% volume CH4 cylinder, RKI part number 81-0013RK-05, that is used to calibrate the %volume TC sensor if it is installed in a GX-2003. The %volume CH4 cylinder is not included with the Data Cal 2000 and must be ordered separately.

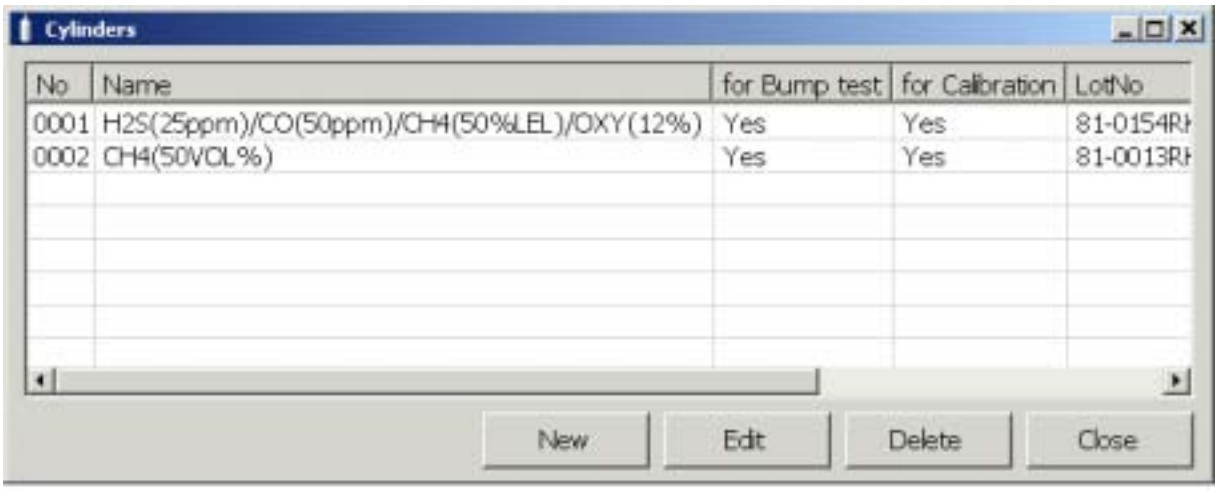


Figure 15: Cylinders Window

2. If the pre-defined cylinders are sufficient for calibrating and bump testing the instruments that will be used with the Data Cal 2000, click the **Close** button to return to the main window and proceed to “Setting up the Solenoids” on page 38.

   If the pre-defined cylinders are not appropriate for the instruments that will be used with the Data Cal 2000, proceed to the next section, "Adding and Updating Cylinders".

Adding and Updating Cylinders

Add a cylinder if the correct cylinder for your bump testing and calibration needs is not on the cylinder list. For example, you may have GX-2001’s that are LEL/Oxy/CO and so do not need to use a 4-gas mix that includes H_2S. In this case you would add a 3-gas cylinder to the cylinder list with the appropriate gas concentrations.

When you begin using a new cylinder that is already on the cylinder list, you will need to update the expiration date of the new cylinder. Also, update the gas concentration of a user defined cylinder if the cylinder you are using is the same as the defined cylinder, but one of the gas concentrations is slightly different. For example if the oxygen concentration in the user defined 4-gas cylinder is defined as 12%, but the cylinder label for the cylinder you will use states that it is 11.5%, update the gas concentration for that cylinder.

If you are using a cylinder that has the same gas or gasses as one of the pre-defined cylinders, but is not the same RKI part number as one of the RKI cylinders that is pre-defined, add the cylinder to the cylinder list instead of changing the concentrations of a pre-defined cylinder.

Adding a Cylinder to the Cylinder List

1. From the Cylinders window, click the **New** button. The CylinderDetail window will appear.

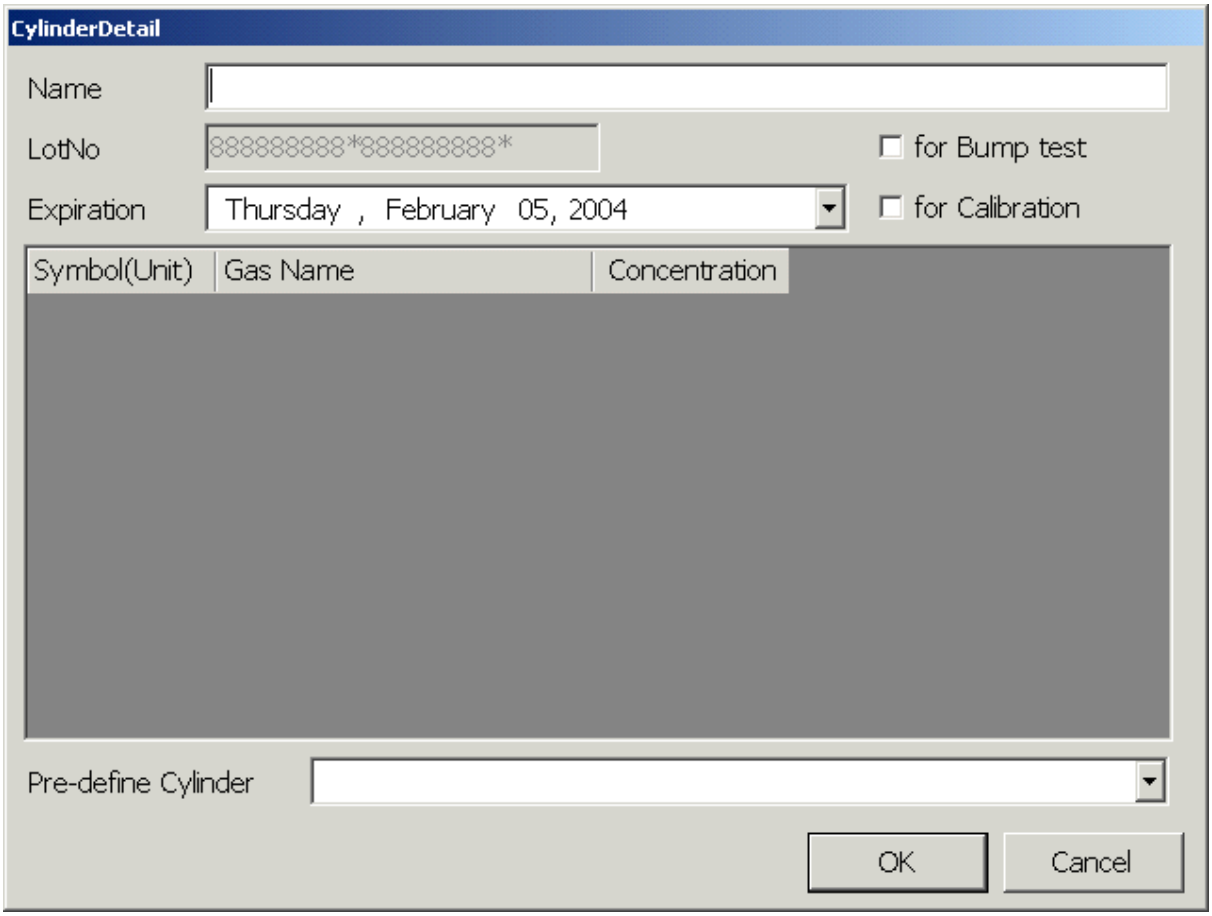


Figure 16: CylinderDetail Window, Adding a Cylinder

2. Put the cursor in the Name field and enter the a cylinder name.
3. Click on the drop down box in the Pre-define Cylinder field and select the blank option. The Symbol (Unit), Gas Name, and Concentration fields become active.
4. Click in the top Symbol(Unit) field. A drop down box will appear.

5. Click on the drop down box and select a gas. When the gas is selected, the name automatically appears in the Gas Name field for that gas.
6. Put the cursor in the gas's Concentration field and enter the concentration for that gas.
7. For each additional gas in the cylinder being entered move to the next Symbol(Unit) field and repeat steps 4 - 6.
8. If the cylinder will be used for bump testing, click in the Bump test selection box to place a check in it.
9. If the cylinder will be used for calibrating, click in the Calibration selection box to place a check in it.
10. Click the **OK** button. A confirmation window appears.
11. Click **Yes** to save the new cylinder's settings and return to the Cylinders window.
12. Click the **Close** button to return to the main window.

Updating Existing Cylinder Parameters

1. From the Cylinders window, click on the cylinder in the cylinder list that you want to update. It will be highlighted.
2. Click the Edit button. The CylinderDetail window for that cylinder will appear.

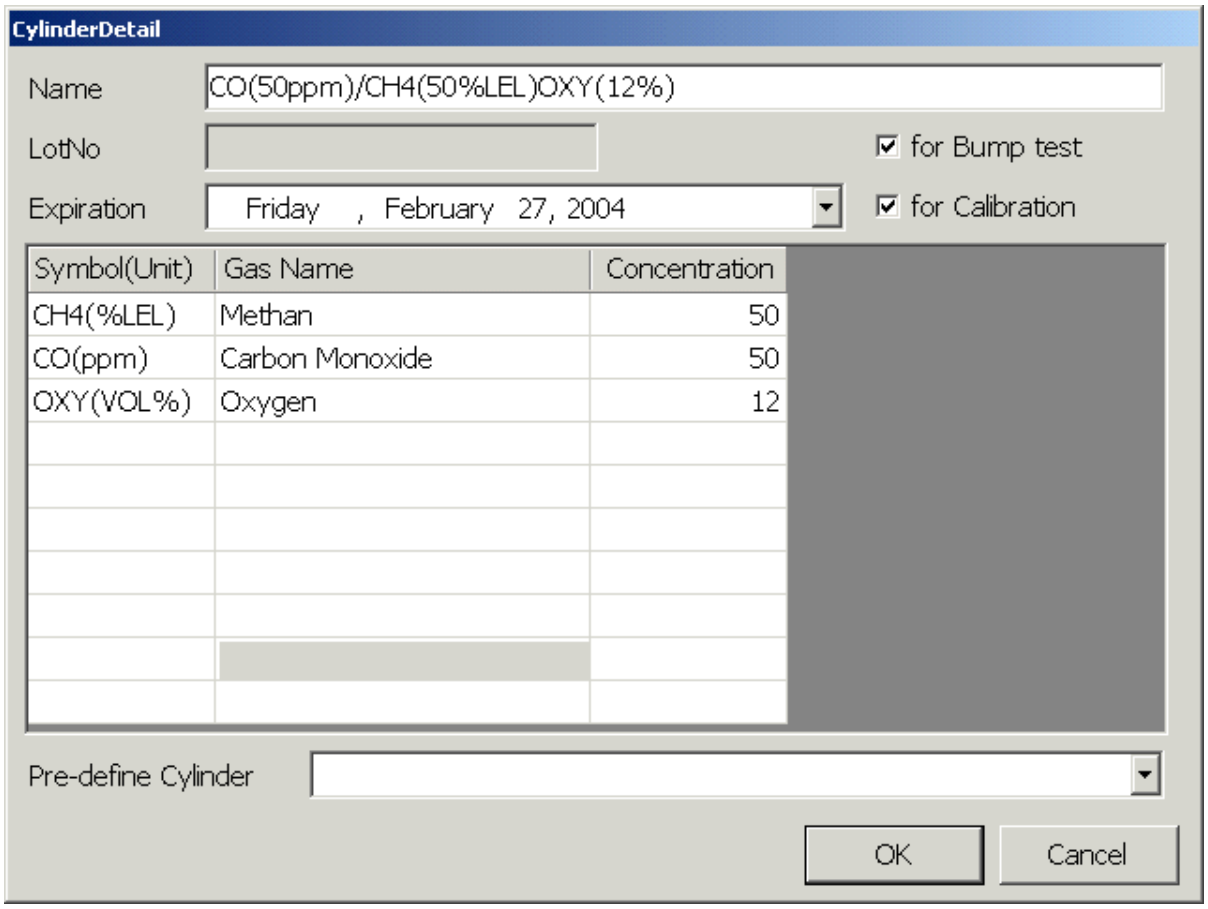


Figure 17: Cylinder Detail Window, Editing a Cylinder

3. Update the cylinder parameters as desired.
4. Click the **OK** button. A confirmation window appears.
5. Click **Yes** to save the changes and return to the Cylinders window.
6. Click the **Close** button to return to the main window.

Setting up the Solenoids

The solenoids are located inside the Data Cal 2000 docking station. They control which fitting on the back of the docking station is used to draw gas from a connected cylinder during a bump test or calibration. In the case of the AIR fitting, it may draw from a zero air cylinder connected to it or from the ambient air. Which fitting is used to draw gas at a particular time during a calibration or bump test is determined by the software depending on the solenoid cylinder assignment and the version of the instrument that is being bump tested or calibrated by the Data Cal 2000.

To enter the Solenoids window, click the **Solenoids** button in the main program window.

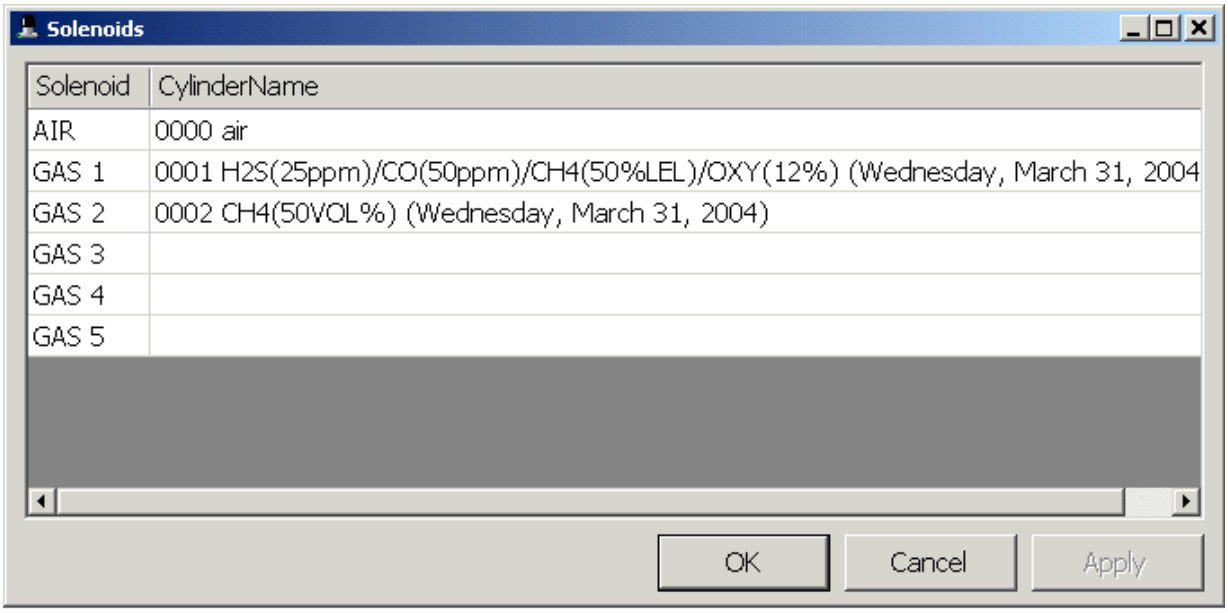


Figure 18: Solenoids Window

When the software is first installed, the solenoids are assigned as follows:

- the AIR solenoid controls the AIR fitting and it is assigned cylinder number 0000 which is defined as “air”. This assignment is fixed and cannot be changed.
- The GAS 1 solenoid which controls the Gas 1 fitting is assigned to Cylinder 0001 which is RKI 4-gas mix 81-00154RK-02.
- The GAS 2 solenoid which controls the Gas 2 fitting is assigned to Cylinder 0002 which is RKI 50% volume CH4 cylinder 81-0013RK-05.
- Solenoids GAS 3, GAS 4, and GAS 5 are unassigned.

If you define additional cylinders and wish to assign them to unassigned solenoids or wish to change the solenoid assignments:

1. From the main program window, click the **Solenoids** button located along the top of the window. The Solenoids window appears.
2. Click in the Cylinder Name field of an assigned solenoid or an assigned solenoid whose assignment you what to change.

3. A drop down arrow will appear in the solenoid position on the far right.
4. Click on the drop down arrow. A list a defined cylinders will appear.
5. Select the cylinder you want assigned to that solenoid.
6. Click the Apply button to make this change.
7. Repeat steps 2 - 6 for any additional assignments you want to make.
8. When you are done making assignments, click the **OK** button. A confirmation window will appear.
9. Click **Yes** to save the changes. You will return to the main program window.

Connecting Instruments to the Data Cal 2000

When an instrument is connected to the Data Cal 2000, the software automatically retrieves the instrument's parameters such as serial number, calibration interval setting, and data logging interval time. It can also automatically download data, bump test, or calibrate an instrument depending on whether these items are selected in the parameter tab of the Configuration window. To connect an instrument or instruments to the Data Cal 2000, perform the following steps:

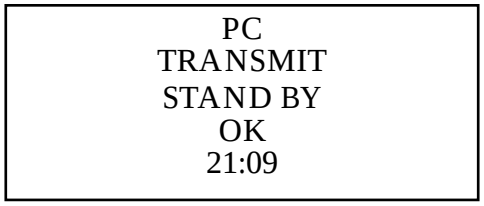
1. If necessary, verify that the Data Cal 2000 is completely assembled and connected to your computer as described in "Data Cal 2000 Hardware Setup" on page 17.
2. If necessary, verify that the Data Cal 2000 software has been set up as described in "Setting Up the Data Cal 2000 Software" on page 30.
3. With the Data Cal 2000 off, put the instrument(s) to be connected into an appropriate docking module. Make sure that a GX-2001 is placed into a DM-2001 and a GX-2003 is placed into a DM-2003.
    - For a GX-2001, attach the flow adapter cup to the sensor side of the instrument before inserting it into the DM-2001.
    - For the GX-2003, place the instrument into the DM-2003, connect the plastic fitting on the end of the coiled black tube to the inlet fitting, and then connect the plastic fitting on the end of the straight green tube to the exhaust fitting.
4. Turn on the Data Cal 2000 with the power switch on the back panel.
5. Launch the Data Cal 2000 software. The main program window will appear.
6. Turn on all instruments that are in the docking modules.

NOTE: As soon as a DM-2003 docking module recognizes that a GX-2003 is installed, a solenoid in the DM-2003 that allows the GX-2003 to draw gas is opened. If a GX-2003 is installed in the docking module when the Data Cal 2000

is turned on, it takes the DM-2003 about 5 seconds after turn on to recognize the GX-2003. The solenoid remains open for 3 minutes and is then closed. Turn on all GX-2003's after this 5 second period and within 3 minutes of the solenoid being opened. If the solenoid is closed when the GX-2003 is turned on, it will go into low flow alarm because the pump activates for a few seconds before the GX-2003 is connected with the software.

If a low flow occurs when the GX-2003 is turned on, disconnect the coiled hose from the inlet fitting, press the RESET button to reset the low flow alarm, and when the PC TRANSMIT STANDBY OK screen appears, reconnect the coiled hose to the inlet fitting.

- A GX-2003 will begin its normal startup sequence and after a few seconds, the pump will turn off and the display will indicate it is ready to communicate with the computer:



- A GX-2001 will begin its normal startup sequence and after a second or two the display will indicate the following:

7. The message window in the main program window will indicate when each unit is connected to the program and what actions are being taken, for example, parameter reading or automatic data downloading. In Figure 19 below, two instruments, a GX-2003 and a GX-2001 are connected to the Data Cal 2000 and their parameters have been downloaded.

   If the Data Cal 2000 software is setup for automatic bump testing or automatic calibration, the software will determine if any connected instruments require bump testing or calibration after their

parameters have been retrieved by the software and data has been retrieved (if software is setup for automatic downloading), then perform bump testing or calibration if necessary.

NOTE: If the software is setup for automatic data downloading, it may take up to 10 minutes to download each GX-2001 if its memory is full, and up to 20 minutes to download each GX-2003 if its memory is full.

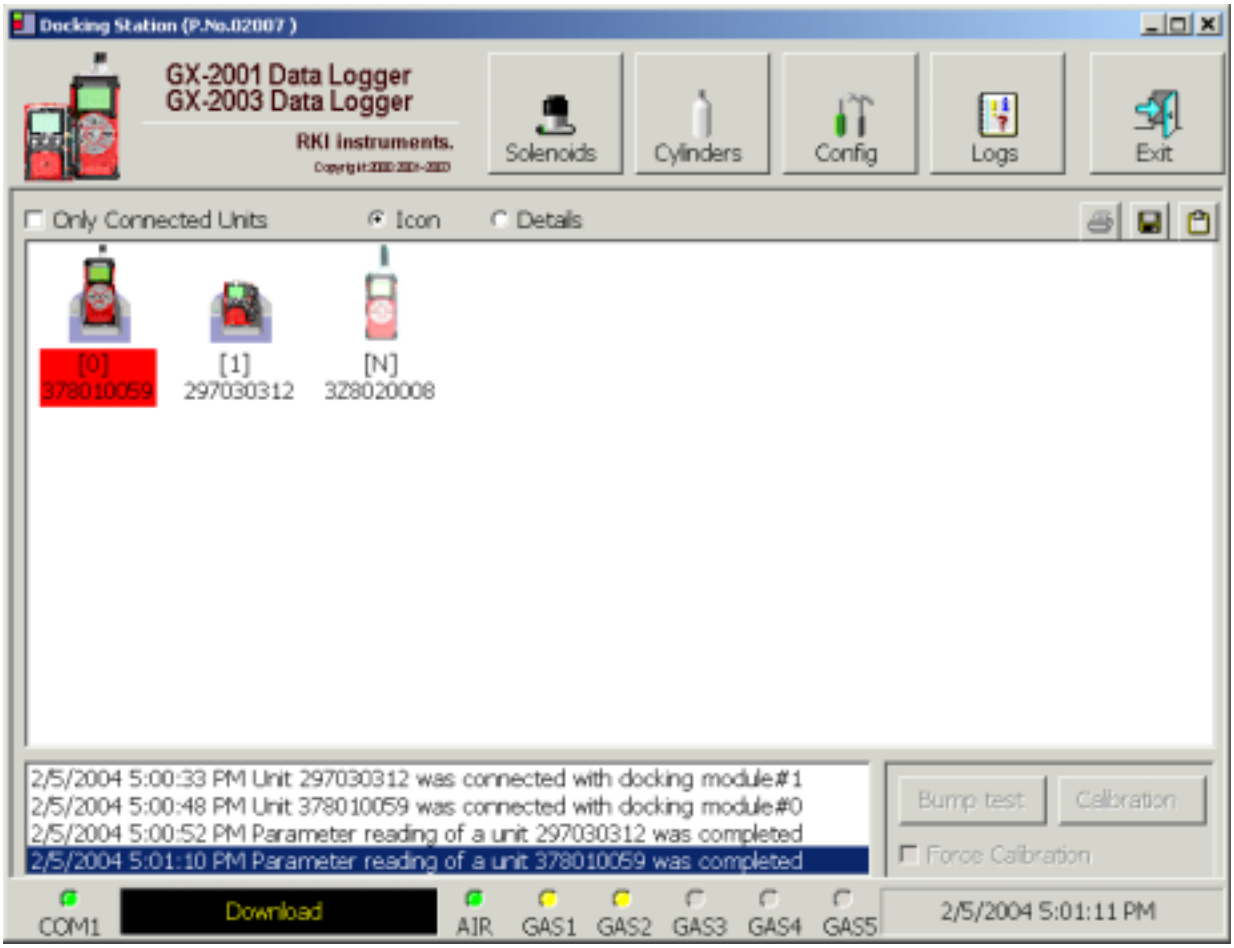


Figure 19: Instruments Connected to Data Cal 2000

8. Once all instruments are connected and all automatic functions are completed, the instruments are available for bump testing, calibration, data downloading, or parameter updates.

Bump Testing Instruments

The Data Cal 2000 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 Data Cal 2000 performs an air adjust operation on an instrument and then applies calibration gas to the instrument. The Data Cal 2000 analyzes the response results based on predefined criteria and determines if the instrument passed the bump test.

The criteria that the Data Cal 2000 uses to determine if the instrument passes a bump test, whether the Bump Test button is active, and whether or not the Data Cal 2000 automatically performs a bump test if it is due on a connected unit is defined in the Configuration window on the Parameter tab. See "Setting Up the Configuration", instruction 9 on page 33 for a description of the bump test configuration setup.

To perform a manual bump test on an instrument that is connected to the software:

1. Verify that the appropriate calibration gas cylinder or cylinders is connected to the appropriate fitting or fittings on the back panel of the Data Cal 2000. See “Setting up the Solenoids” on page 38.
2. From the main program window, select the instrument you want to bump test by clicking on it in the docking module/instrument window.

   To select additional instruments, hold down the Shift key while clicking each additional instrument. All selected instruments will be bump tested.
3. Click the **Bump test** button. The Data Cal 2000 will initiate a bump test. During the bump test, the Data Cal 2000 will perform the following functions:
   - It will apply fresh air to the instrument for 45 seconds.
   - It will perform a zero operation on the instrument.
   - It will apply the necessary calibration gas to the unit for the number of seconds defined in the Gas Exposure Time setting in the Parameter Tab of the Configuration Window (see instruction 9 on page 33). If more than one cylinder is required for a bump test, such as a %volume CH4 cylinder and a 4-gas

mix cylinder for a 5 sensor GX-2003, then gas from each cylinder will by applied separately for the required amount of time.

4. When the bump test is completed, the software will analyze the results and display the Calibration & Bump test Result window which shows the bump test results. If the instrument or instruments passed the bump test then the following indication is given.

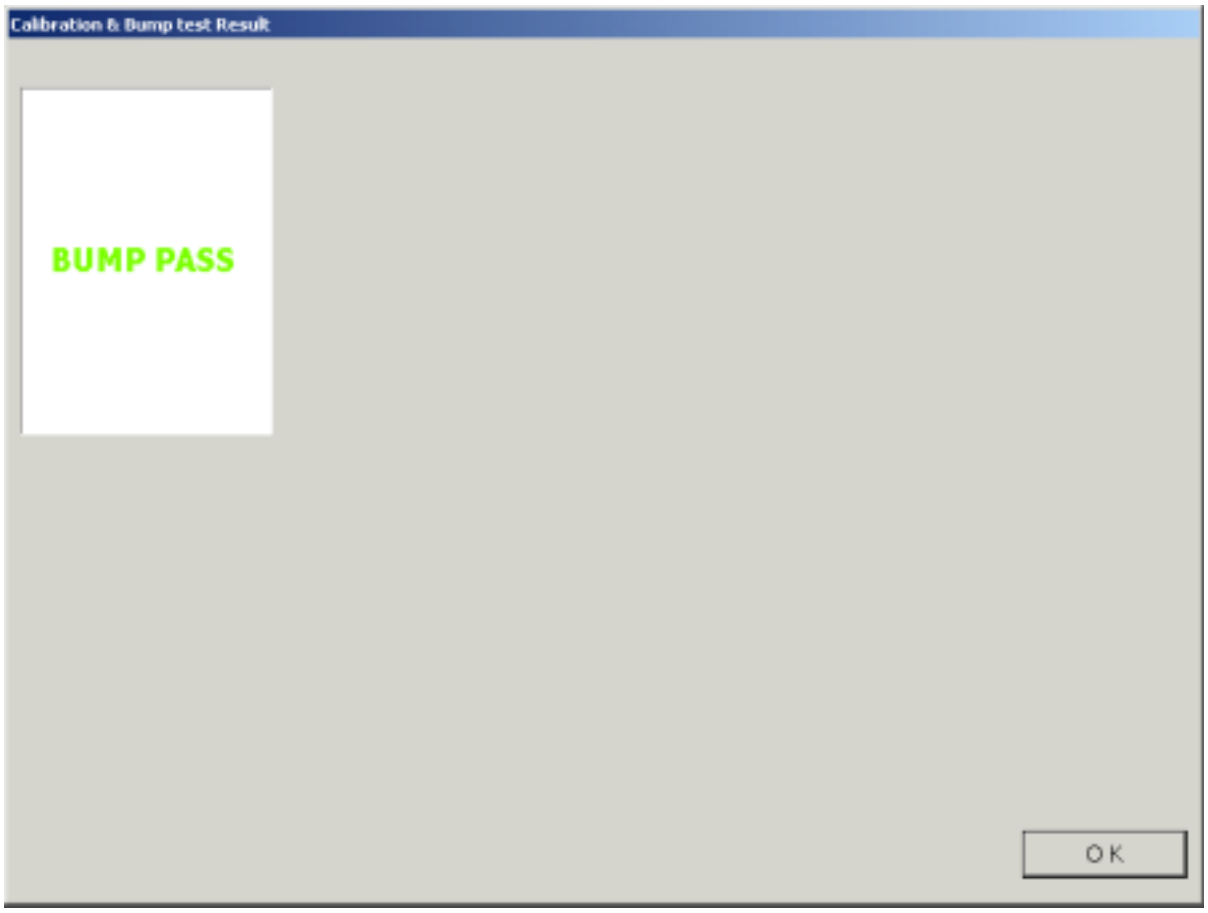


Figure 20: Bump Test Pass Indication

If the instrument or instruments failed the bump test, then the following indication is given.

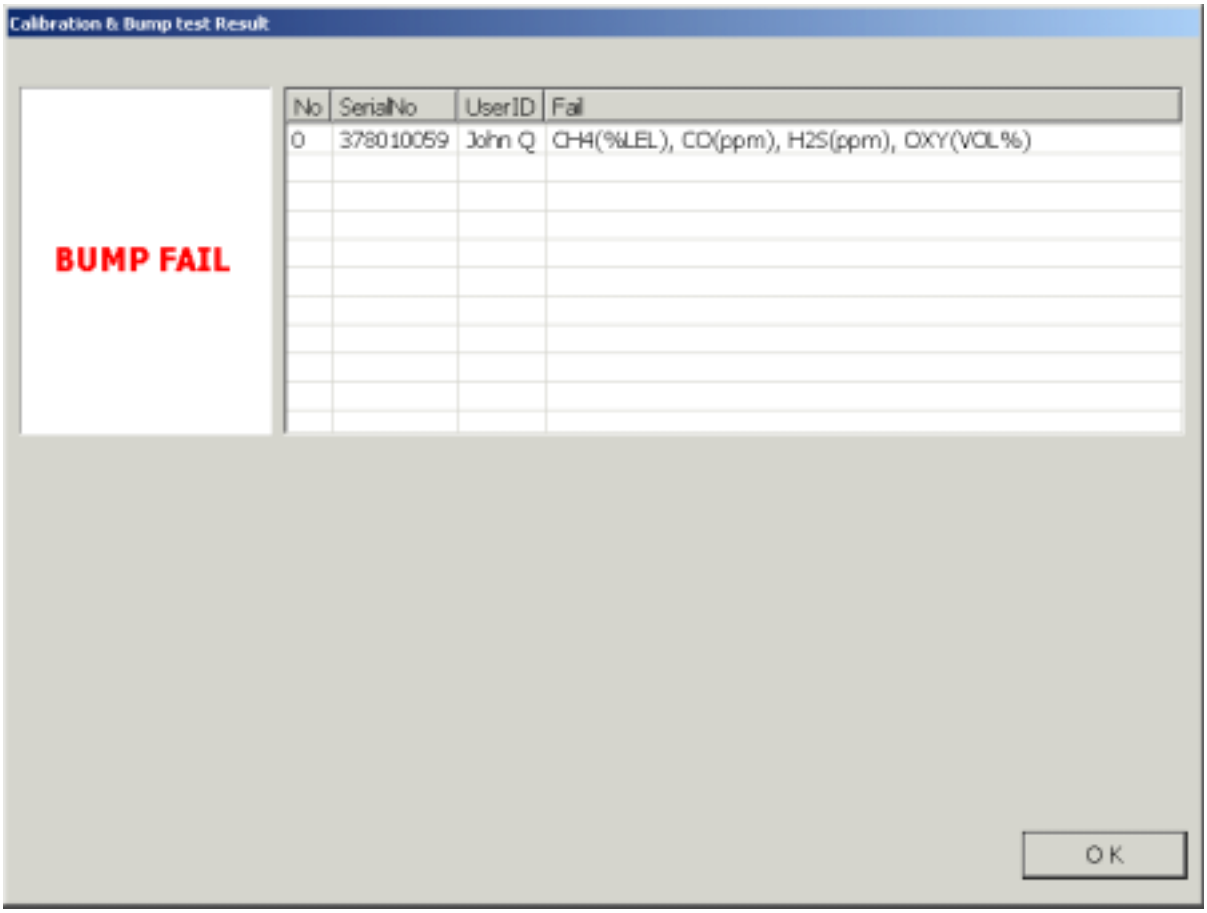


Figure 21Bump Test Fail Indication

5. If the Force Calibration box is checked, then the Data Cal 2000 will automatically calibrate any instrument or instruments that failed the bump test.
6. To close the result window, click the **OK** button. For a failed bump test, if you want to view the test results for each channel, double click on an instrument in the result window and the software will take you to the Bump Test area of the Logs window where the data for this bump test is saved.
7. After a bump test, the docking modules and instruments will be automatically displayed in detail format.

Calibrating Instruments

The Data Cal 2000 is capable of performing a calibration both manually and automatically on an instrument connected to it. When a calibration is performed, the Data Cal 2000 performs an air adjust operation on an instrument and then applies calibration gas to the instrument. The Data Cal 2000 analyzes the calibration results and determines if the instrument passed the calibration.

To perform a manual calibration on an instrument that is connected to the software:

1. Verify that the appropriate calibration gas cylinder or cylinders are connected to the appropriate fitting or fittings on the back panel of the Data Cal 2000. See “Setting up the Solenoids” on page 38.
2. From the main program window, select the instrument you want to calibrate by clicking on it in the docking module/instrument window.

   To select additional instruments, hold down the Shift key while clicking each additional instrument. All selected instruments will be calibrated.
3. Click the **Calibration** button. The Data Cal 2000 will initiate a calibration. During the calibration, the Data Cal 2000 will perform the following functions:
   - It will apply fresh air to the instrument for 45 seconds.
   - It will perform a zero operation on the instrument.
   - It will apply the necessary calibration gas to the unit for 90 seconds. If more than one cylinder is required for a calibration, such as a %volume CH4 cylinder and a 4-gas mix cylinder for a 5 sensor GX-2003, then gas from each cylinder will by applied for 90 seconds each.
   - After each gas application, a calibration operation will be performed on the instrument that appropriate for that cylinder.

4. When the calibration is completed, the software will analyze the results and display the Calibration & Bump test Result window which shows the calibration results. If the instrument or instruments passed the calibration then the following indication is given.

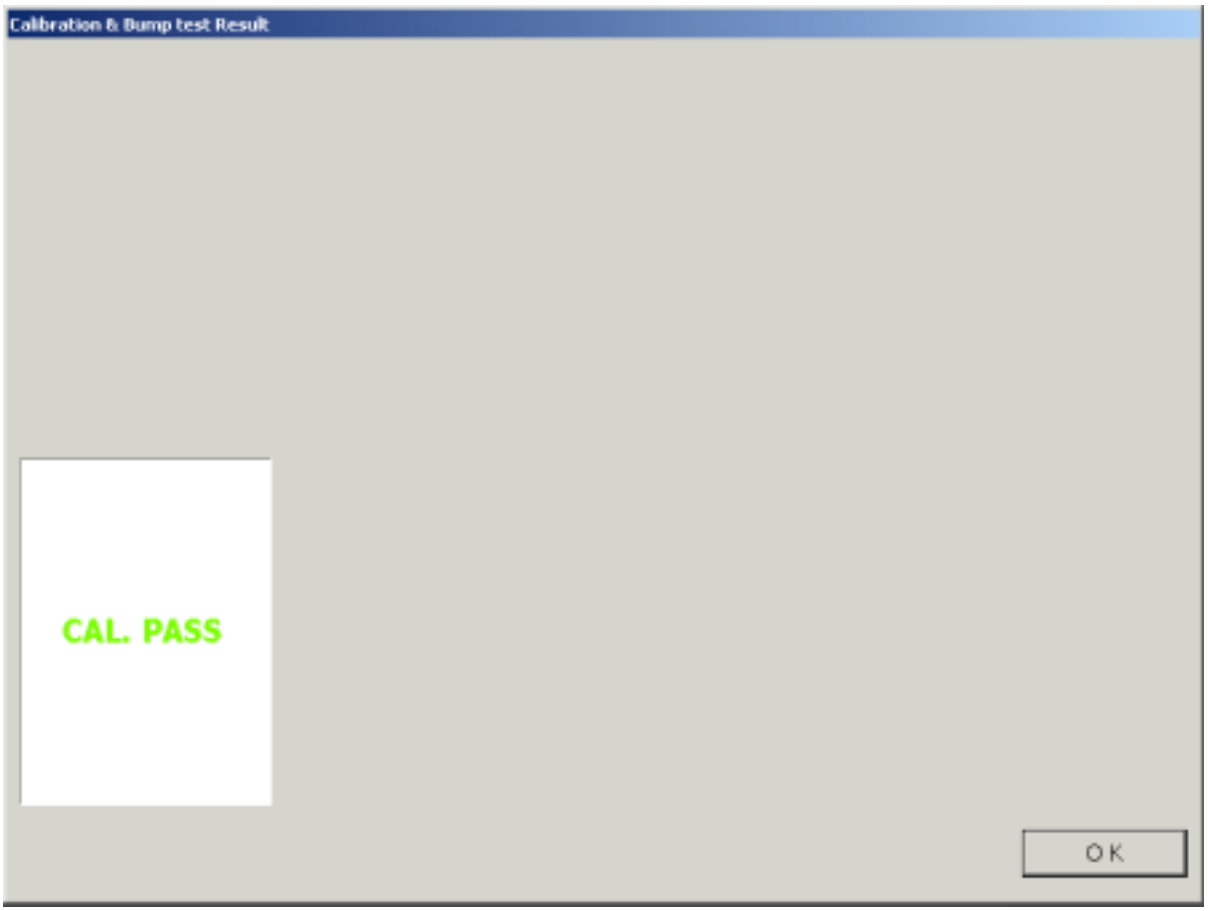


Figure 22: Calibration Pass Indication

If the instrument or instruments failed the calibration, then the following indication is given.

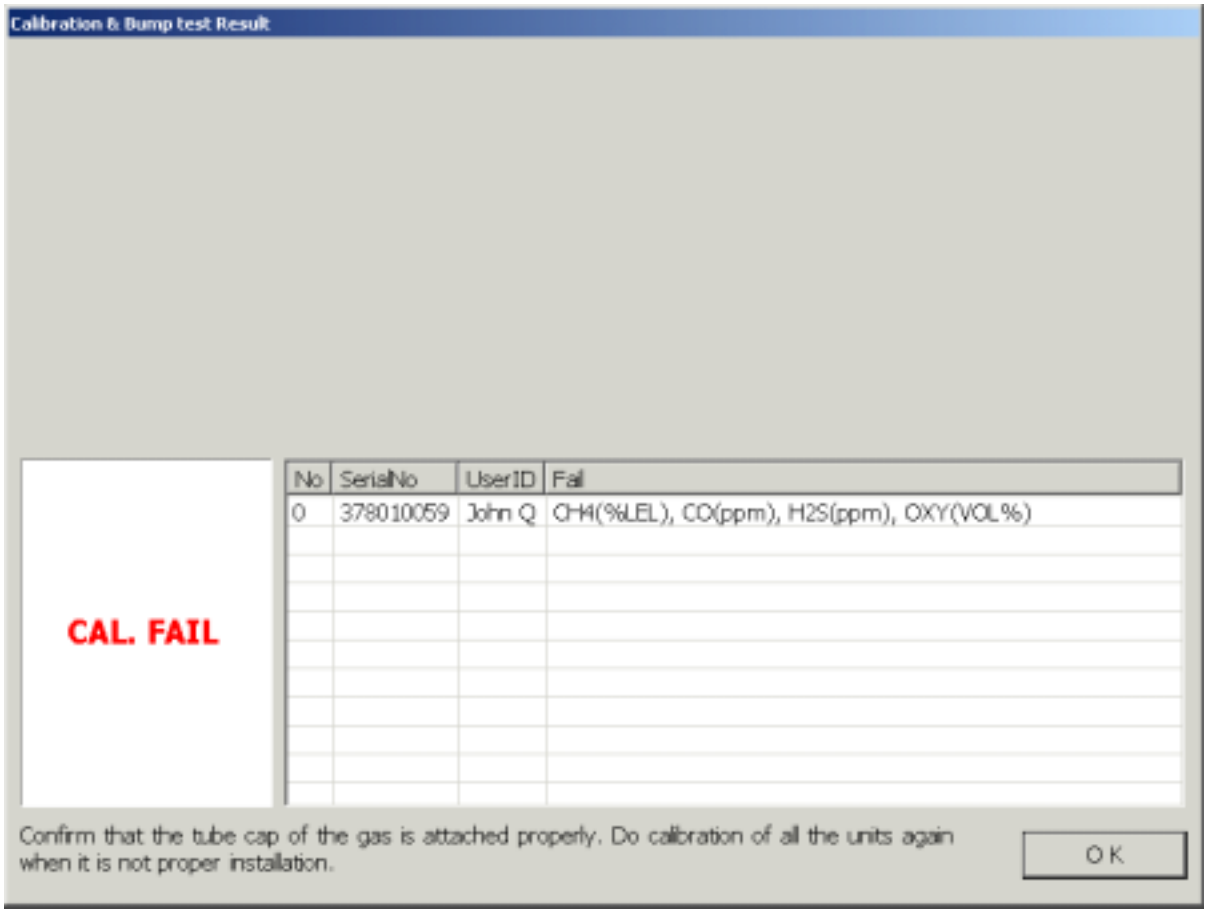


Figure 23: Calibration Fail Indication

5. To close the result window, click the **OK** button. For a failed calibration, if you want to view the test results for each channel, double click on an instrument in the result window and the software will take you to the Calibration area of the Logs window where the data for this calibration is saved.
6. After a calibration, the docking modules and instruments will be automatically displayed in detail format.

Deleting Instruments From the Main Window

An instrument, along with all it's associated data, can be deleted from the database from the main program window. This funciton is password protected to prevent accidental deletion of an instrument from the database. To delete an instrument from the database from the main program window, perform the following:

1. From the main program window, click on the instrument you want to delete so that it is highlighted.
2. Press the "Delete" key on the keyboard. A password entry window will appear.
3. Enter the password and click **OK**. The default password is "ABCDE" and is case sensitive. A confirmation window will appear.
4. Click **OK** to complete the deletion of the selected item.

NOTE: Instruments can also be deleted from the database in the Database tab of the Configuration window. See "Database Tab" on page 79.

Charging Instruments With The Data Cal 2000

The Data Cal 2000 can be used to charge the rechargeable battery pack in a GX-2001 or GX-2003. The Data Cal 2000 will not recharge the batteries in an alkaline version of the GX-2003. An instrument's battery pack can be recharged after functions such as data downloading or bump testing are performed on it. It can also be charged without the Data Cal 2000 Docking Station Software being launched. To maximize the battery pack run time and the battery pack life, make sure the battery pack's charge is as low as possible before recharging it.

To recharge the batteries in an instrument after it is connected to the Data Cal 2000 and the software has performed functions such as data downloading or bump testing on it:

1. After all functions have been completed, turn off the instrument.

2. The LED on the left front of the docking module will turn off. The LED on the right front of the module will start blinking yellow.
3. If the battery pack is fully charged, then the blinking yellow LED will turn solid green in a few minutes.

   If the battery pack is drained enough for the module to charge it, the right LED will continue to blink yellow while charging is taking place. Both the GX-2001 and GX-2003 will take approximately 90 minutes to fully charge.

To recharge the batteries in an instrument without launching the Data Cal 2000 Docking Station Software:

1. Turn on the docking station. The right LED on the docking module will start blinking green.
2. Install the instrument into the docking module. If only charging is being performed, it is not necessary to install the sample adapter to a GX-2001 or the sample tubes to a GX-2003.The right LED on the docking module will start blinking yellow.
3. If the battery pack is fully charged, then the blinking yellow LED will turn solid green in a few minutes.

   If the battery pack is drained enough for the module to charge it, the right LED will continue to blink yellow while charging is taking place. Both the GX-2001 and GX-2003 will take approximately 90 minutes to fully charge.

Logs Window

Viewing Data

You can view alarm trend data, calibration data, event data, interval trend data, memos, and bump test information in the Logs window. To enter the Logs window, click the **Logs** button from the main program window. When viewing the data, it can be organized in two ways:

1. Base View Format

   Neither of the Serial No, Station ID, or User ID selection boxes in the lower left of the window are selected and the Base box appears next to these selection boxes. The data can be organized by either

the data type or by the month and year.

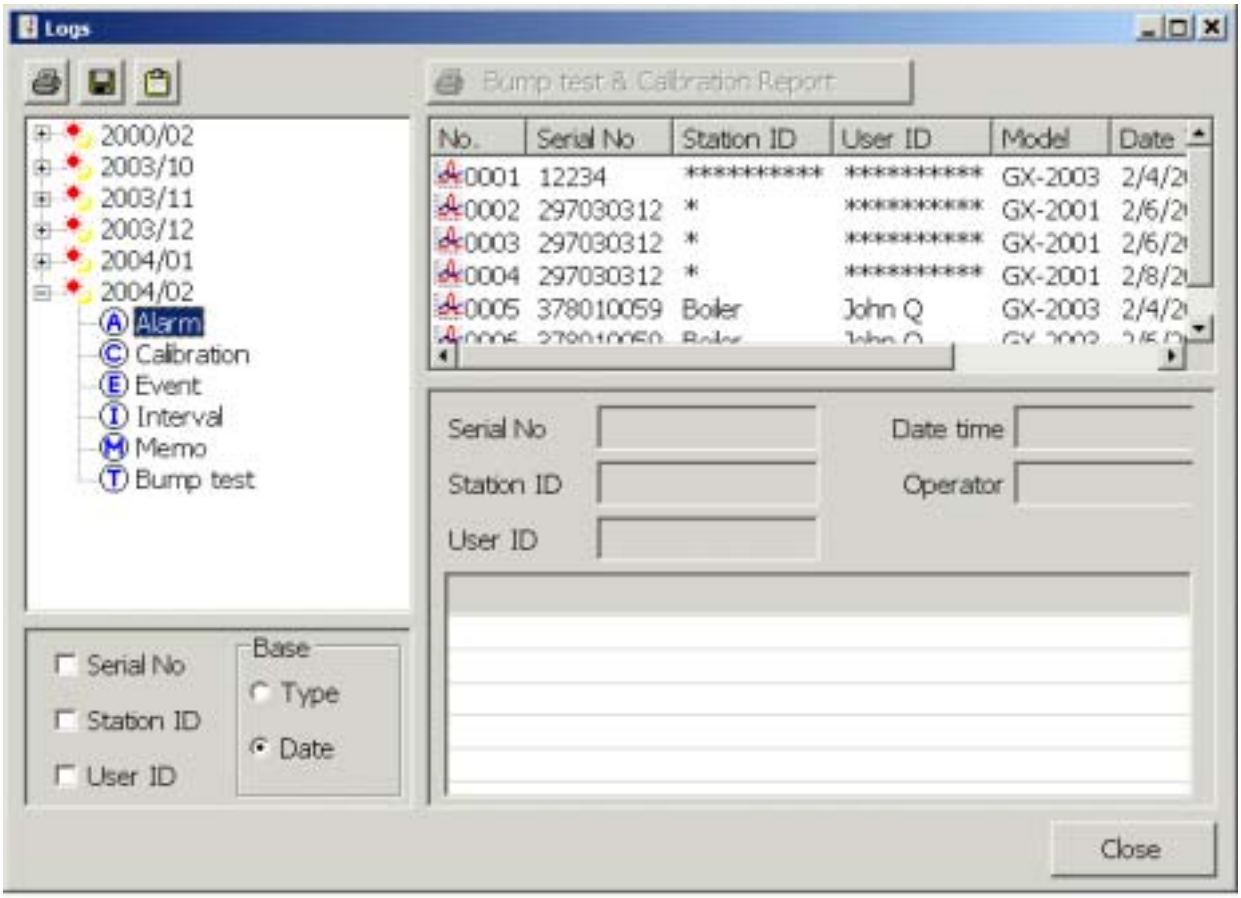


Figure 24: Logs Window in Base Viewing Format

2. ID View Format

   The data can be organized by one or more of the following items depending on which selection box or boxes in the lower left of the window are selected:

   - Serial Number
   - Station ID
   - User ID

If any of these boxes is selected, the Base box disappears.

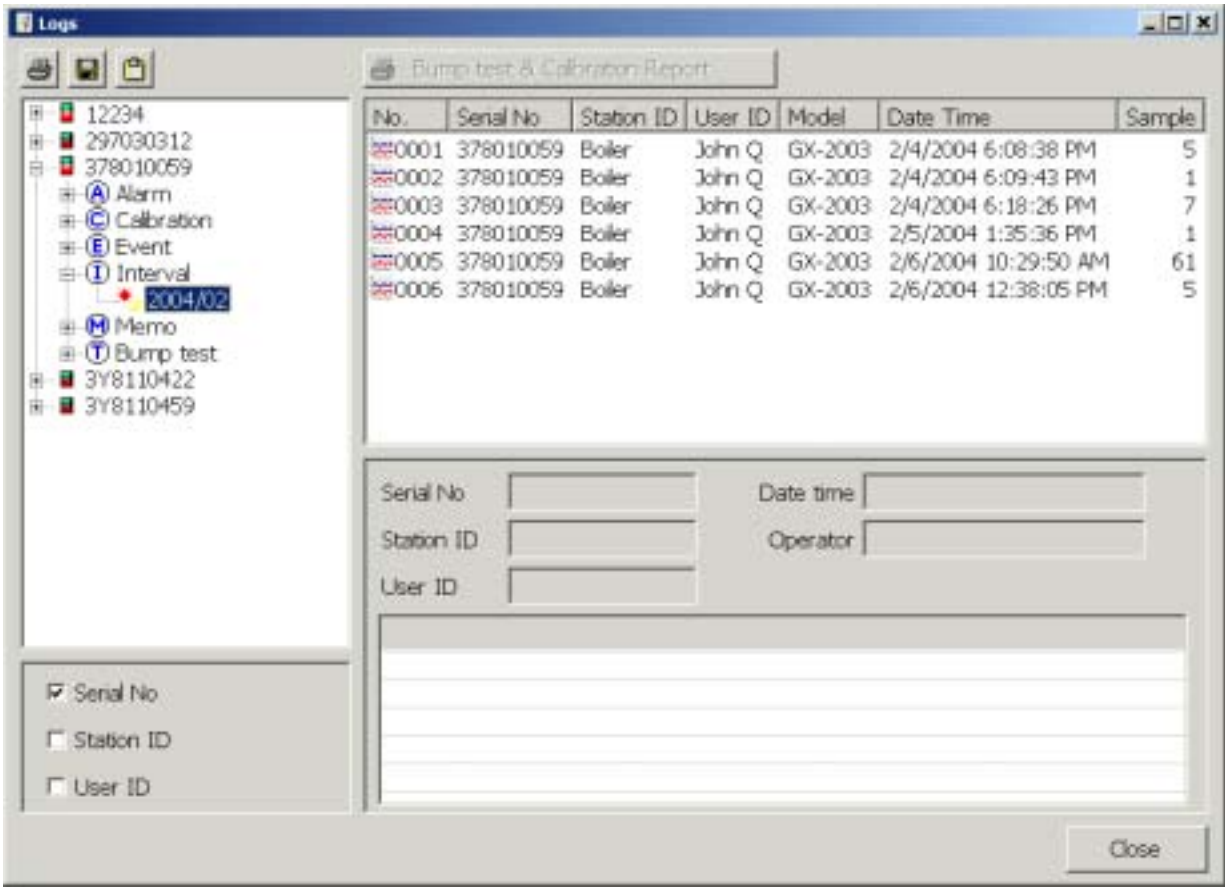


Figure 25: Logs Window in ID Viewing Format

Once you have selected how you want to organize the data:

1. Click the expanded view symbol (+) next to a folder in the left side of the Logs window or double click the folder to view the contents below it.

   Single click on the folder to view the contents in the right side 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. When a folder no longer has a (+) or (-) symbol next to it, single click it and the contents of the folder will be shown on the right side of the Logs window. The various types of data and information are described below.

Deleting Data

You can delete an instrument, alarm trend data, calibration data, event data, interval trend data, and bump test information in the Logs window. Memos cannot be deleted unless the instrument to which the memos are attached is deleted from the database. The delete function is password protected to avoid accidental deletion of data or instruments. Deleting data can only be done while the DataCal 2000 is not performing operations that require communication with instruments such as bump testing or downloading data. To delete an instrument or data, enter the Logs window and perform the following:

1. Find the item you wish to delete and right click it. A window will appear that says “Delete(D)”.
2. Click on “Delete(D)”. A password entry window will appear.
3. Enter the password and click **OK**. The default password is “ABCDE” and is case sensitive. A confirmation window will appear.
4. Click **OK** to complete the deletion of the selected item.

Alarm Trend Data

If a gas alarm event occurs, then an alarm trend file that is centered around the event is saved in both the GX-2001 and GX-2003. The GX-2001 saves one alarm trend file for the most recent gas alarm event. The Model GX-2003 saves up to 8 alarm trend files for the 8 most recent gas alarm events. An alarm trend file shows the readings up to 15 minutes before and 15 minutes after the event, with the log interval time every five seconds for the GX-2001 and up to 30 minutes before and 30 minutes after the event, with the log time every 5 seconds for the GX-2003. The gas readings logged at the alarm event time are the highlighted in red and the gas readings logged every 5 seconds around the alarm event are the peak (minimum for oxygen) readings for the previous five seconds. If a GX-2001 has not been on for 15 minutes before an alarm event or is not on for 15 minutes after the alarm event, only the time that the unit was on is shown in the alarm trend file. If a GX-2003 has not been on for 30 minutes before the alarm event or is not on for 30 minutes after the alarm event, only the time that the unit was on is shown in the alarm trend file.

Once the maximum number of alarm trend files are already saved in the an instrument’s memory (one for the GX-2001 and 8 for the GX-2003), the oldest alarm trend file is overwritten when a new alarm trend file is saved. If an alarm trend file is overwritten before data is downloaded to

the Data Cal 2000, that file is lost. At least two data points must be saved for the alarm trend file to be viewable in both table and graph format.

To view and perform desired operations with the alarm trend files:

1. While in the Logs window, open folders in the left side of the window until the Alarm folder you wish to open is visible.
2. If you are viewing data in base view format with the data organized by type, expand the Alarm folder. Folders organized by year/month will appear below the Alarm folder. Click on the folder whose contents you wish to see. The alarm trend files in the folder will be shown in the upper right side of the Logs window.

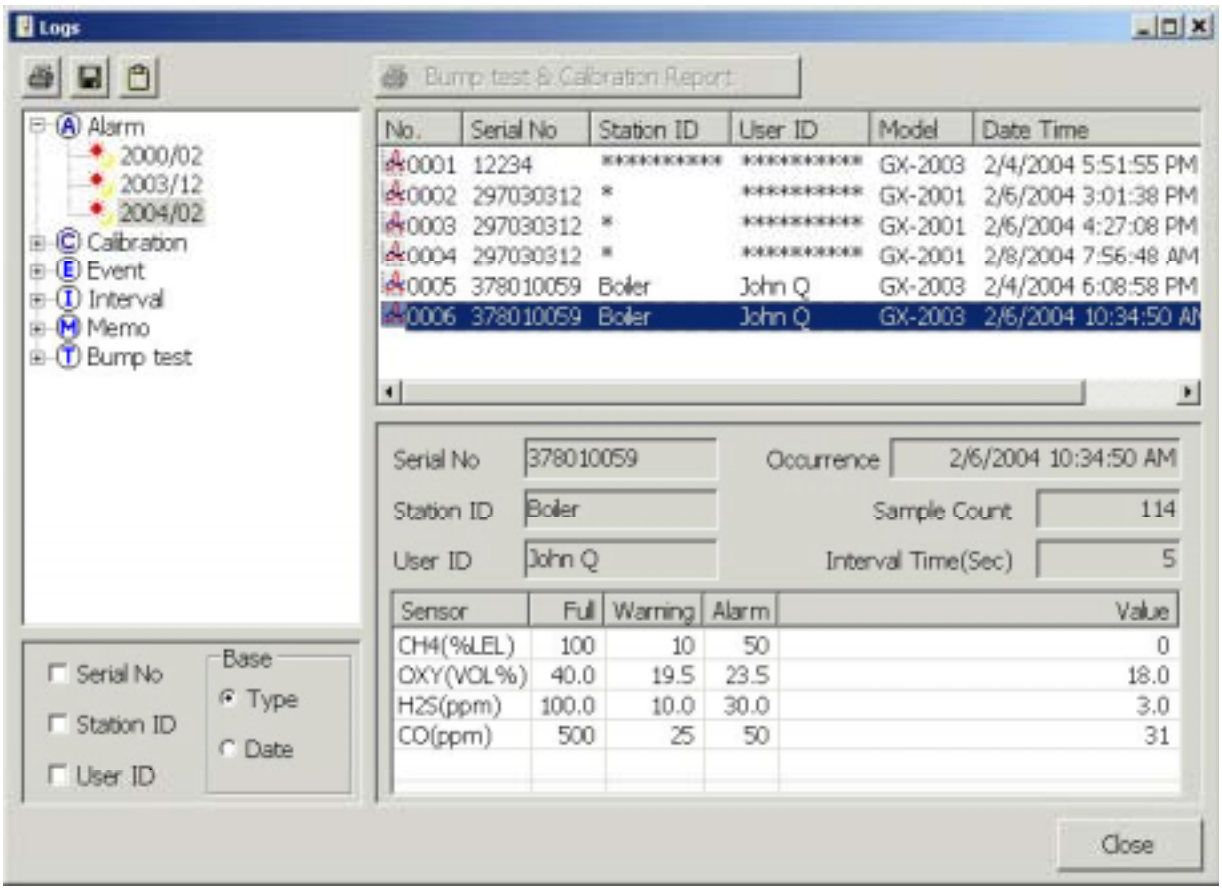


Figure 26: Alarm Trend Files in Base View Format

If you organize the data by date, then folders organized by year/month appear in the left side of the window. Expand the folder you want to see and click on the Alarm folder. The alarm trend files will appear in the upper right side of the window.

If you are viewing data in ID view format, expand folders in the left side of the window until the Alarm folder you wish to view is visible. Expand the Alarm folder. Folders organized by year/month will be listed below the alarm folder. Click the folder whose contents you want to view and the alarm trend files in it will be shown in the upper right side of the Logs window.

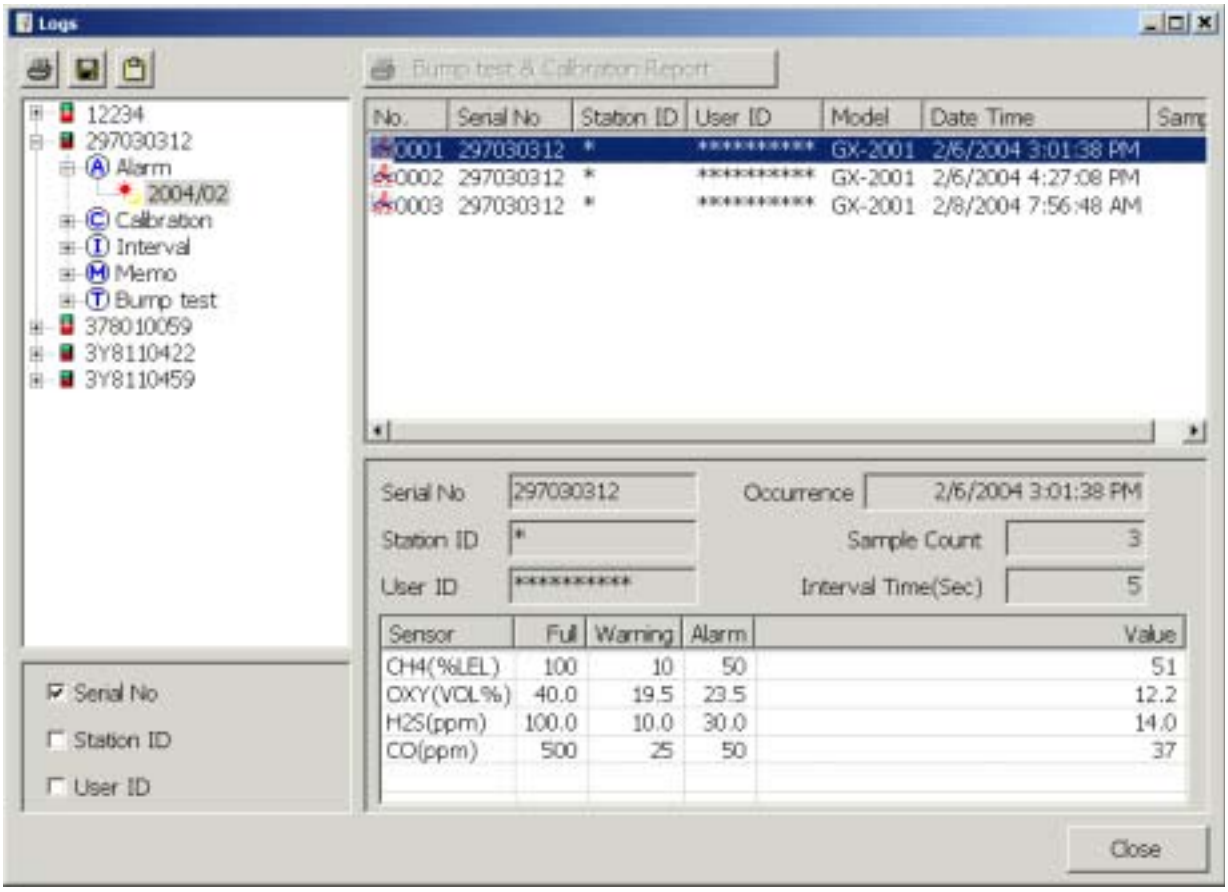


Figure 27: Alarm Trend Files in ID View Format

3. To view summary information about the alarm file, select it in the right side of the window. A summary of the file will appear in the area below the file list.
4. To open the file and see the data and a graph of the data, double click on the file. The Data Sample (Alarm Trend) window will appear with a table of the data on the left side of the window and a graph of the data on the right side.

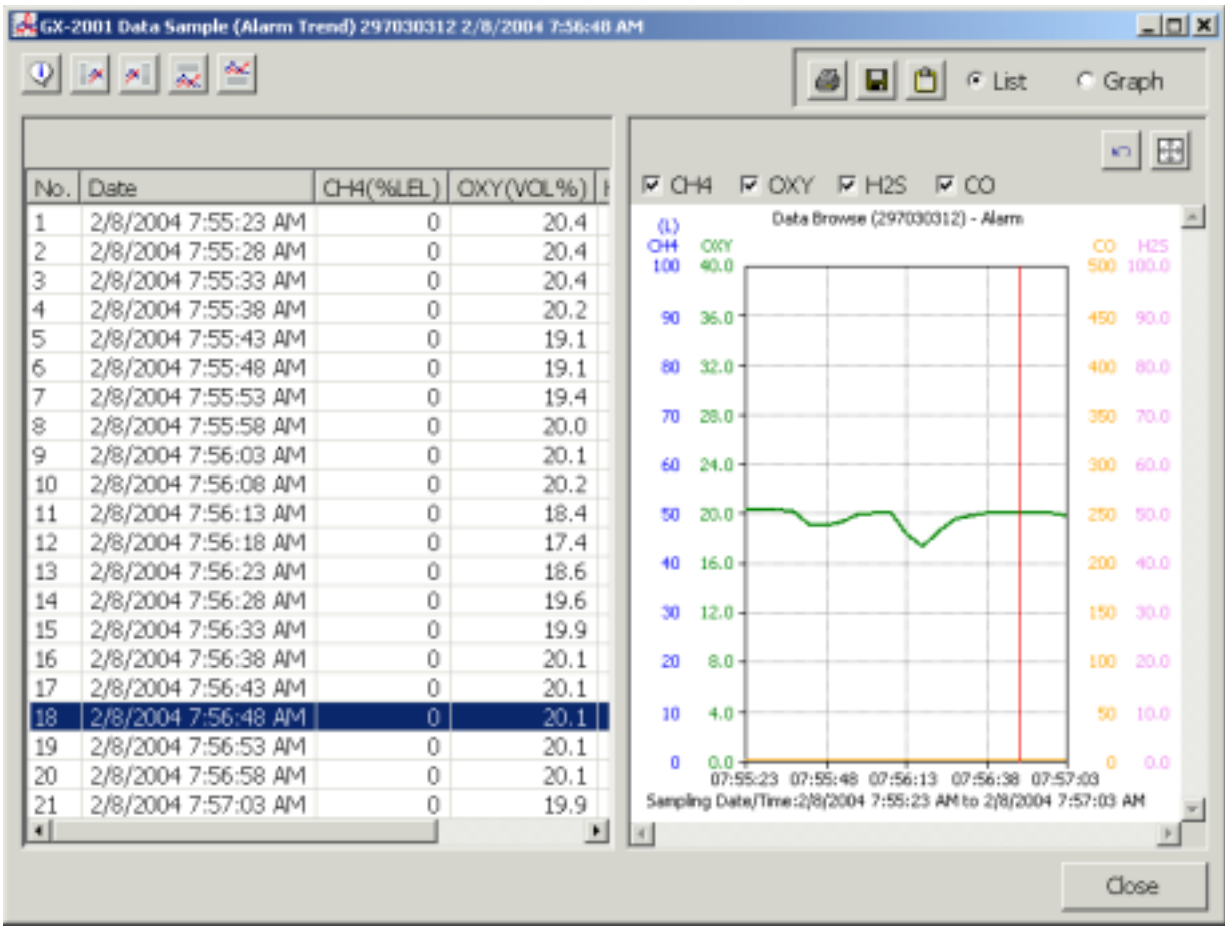


Figure 28: Alarm Trend File Data & Graph

5. You can choose to view the data in a variety of arrangements, such as data on the left and graph on the right, by clicking the appropriate **Data Arrangement** button in the upper left of the window. Each **Data Arrangement** button has a table and graph symbol inside of it.

6. To display the summary information for a file along with the data and graph, click the **Summary Information** button in the upper left corner of the window, to the left of the **Data Arrangement** buttons.The **Summary Information** button has an “i” in it.

7. To print the data, select either List or Graph in the upper right corner of the window and then click the **Print** button in the upper right corner of the window. The **Print** button has a printer icon in 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 and if List is

selected, the data will print as a table.

8. 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** button. The **Save To File** button has a floppy disk icon in it. A “Save As” dialog box will appear for you to specify the filename, file location, and file type.

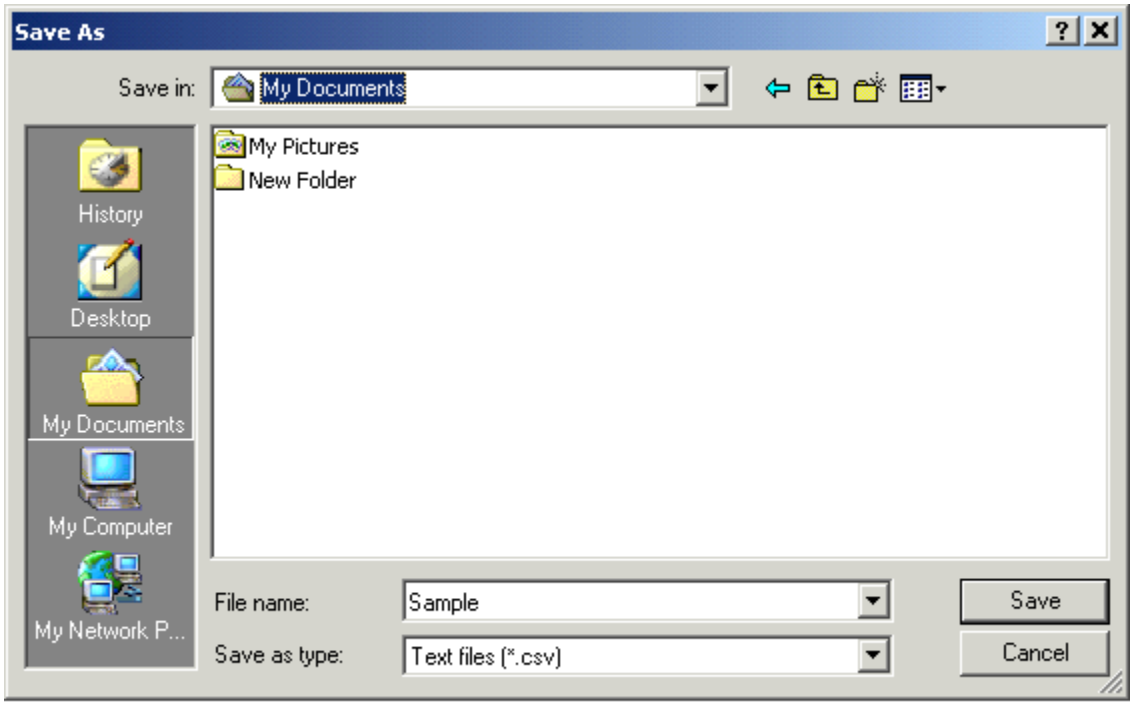


Figure 29: Save As Dialog Box

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

9. 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** button. The **Copy To Clipboard** button has a clipboard icon in 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.

10. To go back and view other data, click the **Close** button to return to the Logs window.

Calibration Data

The GX-2003 saves the calibration information for the last 20 calibrations. When an autocalibration is performed, the calibration results are saved as a file. When single calibration is used, the GX-2003 considers each time you calibrate a channel a calibration and a file is saved for that calibration. Once a GX-2003 has saved 20 calibration files, the oldest calibration file is overwritten when a new one is saved.

When a GX-2003 is connected to the Data Cal 2000, the calibration files in it are retrieved and stored by the software. In addition, all calibrations performed by the Data Cal 2000 on a GX-2003 are stored by the software.

A GX-2001 only saves calibration information for the most recent successful calibration for each channel. When a GX-2001 is connected to the Data Cal 2000, this information is not retrieved by the Data Cal 2000. However, all calibrations performed by the Data Cal 2000 on a GX-2001 are stored by the software.

To view and perform desired operations with the calibration files:

1. While in the Logs window, open folders in the left side of the window until the Calibration folder you wish to view is visible.
2. If you are viewing data in base view format with the data organized by type, expand the Calibration folder. Folders organized by year/month will appear below the Calibration folder. Click on the folder whose contents you wish to see. The calibration files in the folder will be shown in the upper right side of the Logs window.

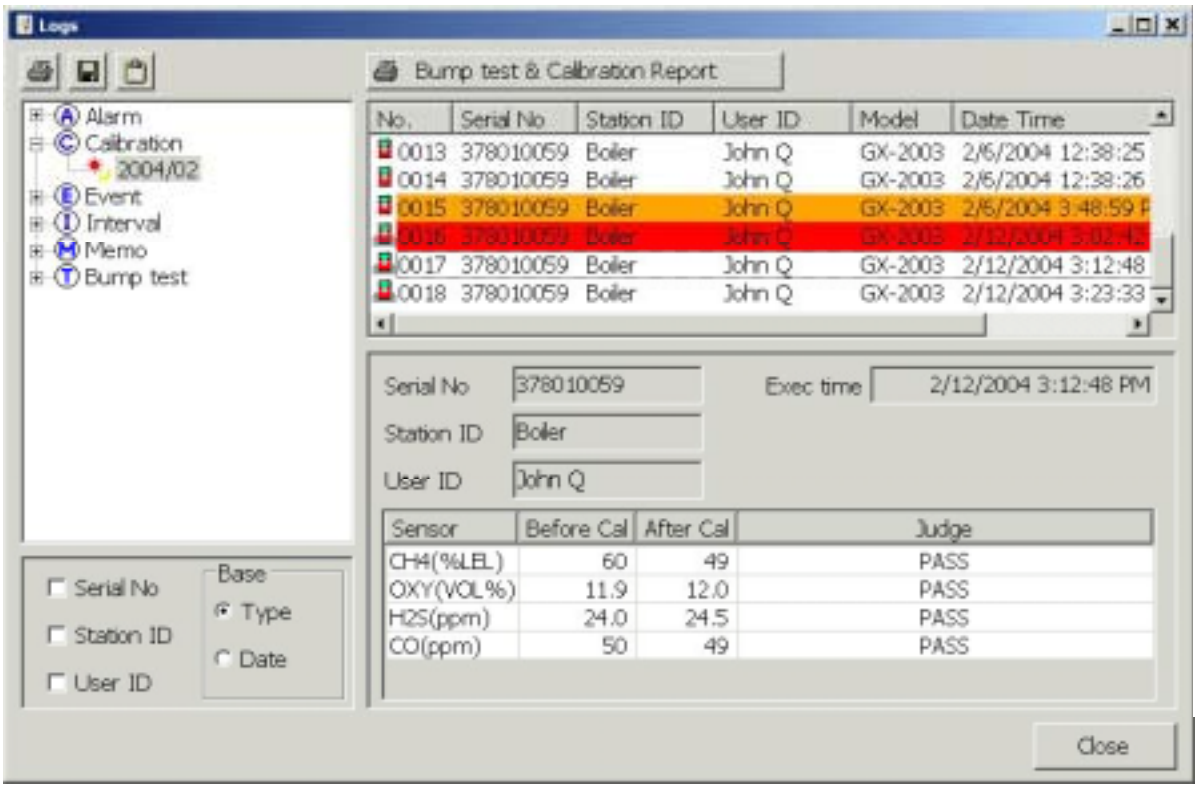


Figure 30: Calibration Files in Base View Format

If you organize the data by date, then folders organized by year/ month appear in the left side of the window. Expand the folder you want to see and click on the Calibration folder. The calibration files will appear in the upper right side of the window.

If you are viewing data in ID view format, expand the folders in the left side of the window until the Calibration folder you wish to view is visible. Expand the Calibration folder. Folders organized by year/ month will be listed below the Calibration folder. Click the folder whose contents you want to view and the calibration files in it will be shown in the upper right side of the Logs window.

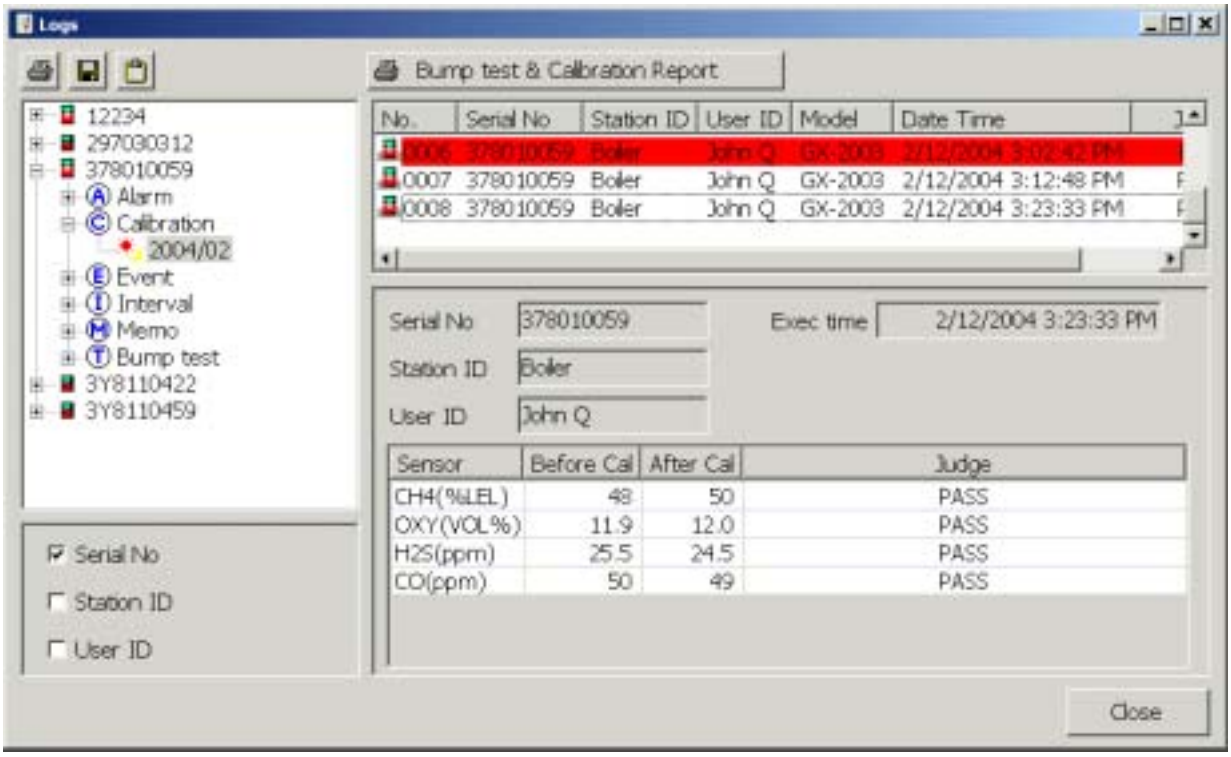


Figure 31: Calibration Files in ID View Format

3. 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.
4. To view the file in summary format, click on the calibration file in the upper right part of the Logs window that you wish to view. The calibration information in the file will appear in the lower right part of the window in summary format. It includes the instrument's serial number, station ID, user ID, calibration time, and gas readings during the calibration.
5. To print all the calibration files in the upper right window, click the **Bump test & Calibration Report** button above the files. A dialog box will appear confirming if you want to print. Click **OK**.
6. To go back and view other data, click the **Close** button to return to the Logs window.

Event Data

The GX-2003 saves events such as gas alarms, flow failures, and sensor failures. These events are saved as files in the Logs window.The files indicate the instrument, time of the event, and event type. The Data Cal software does not save event data separately for GX-2001's, but the events saved by a GX-2001 are viewable in the interval trend data. To view and perform desired operations with the event files:

1. While in the Logs window, open folders in the left side of the window until the Event folder you wish to view is visible.
2. If you are viewing data in base view format with the data organized by type, expand the Event folder. Folders organized by year/month will appear below the Event folder. Click on the folder whose contents you wish to see. The event files in the folder will be shown in the upper right side of the Logs window.

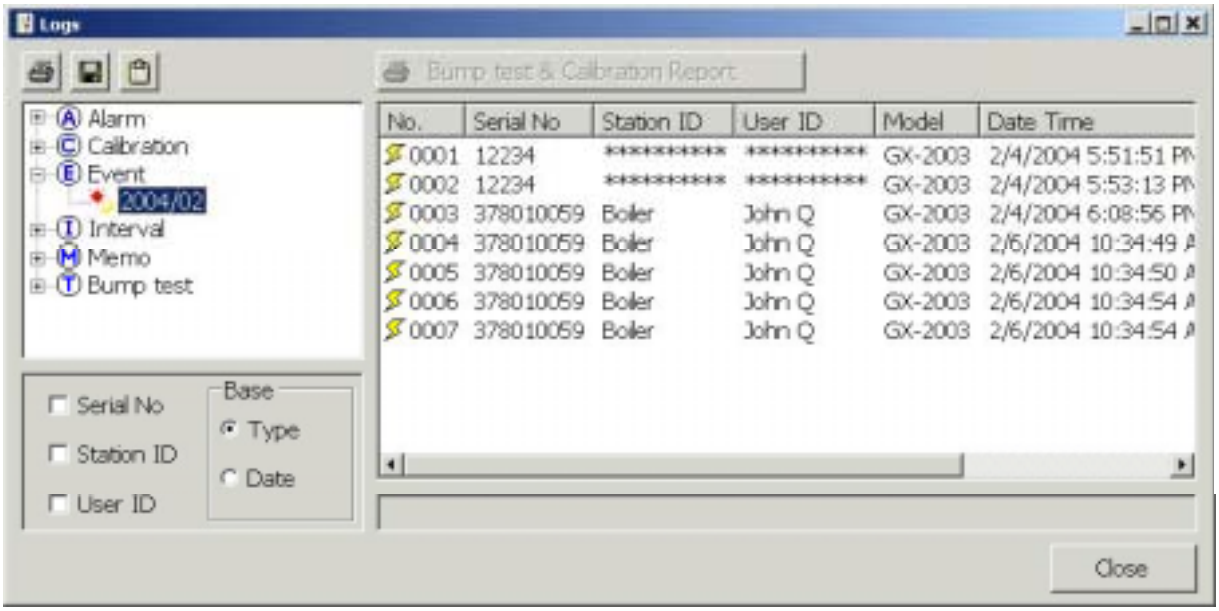


Figure 32: Event Files in Base View Format

If you organize the data by date, then folders organized by year/month appear in the left side of the window. Expand the folder you want to see and click on the Event folder. The event files will appear in the upper right side of the window.

If you are viewing data in ID view format, expand the files in the left side of the window until the Event folder you wish to view is visible. Expand the Event folder. Folders organized by year/month will be

listed below the Event folder. Click the folder whose contents you want to view and the event files in it will be shown in the upper right side of the Logs window.

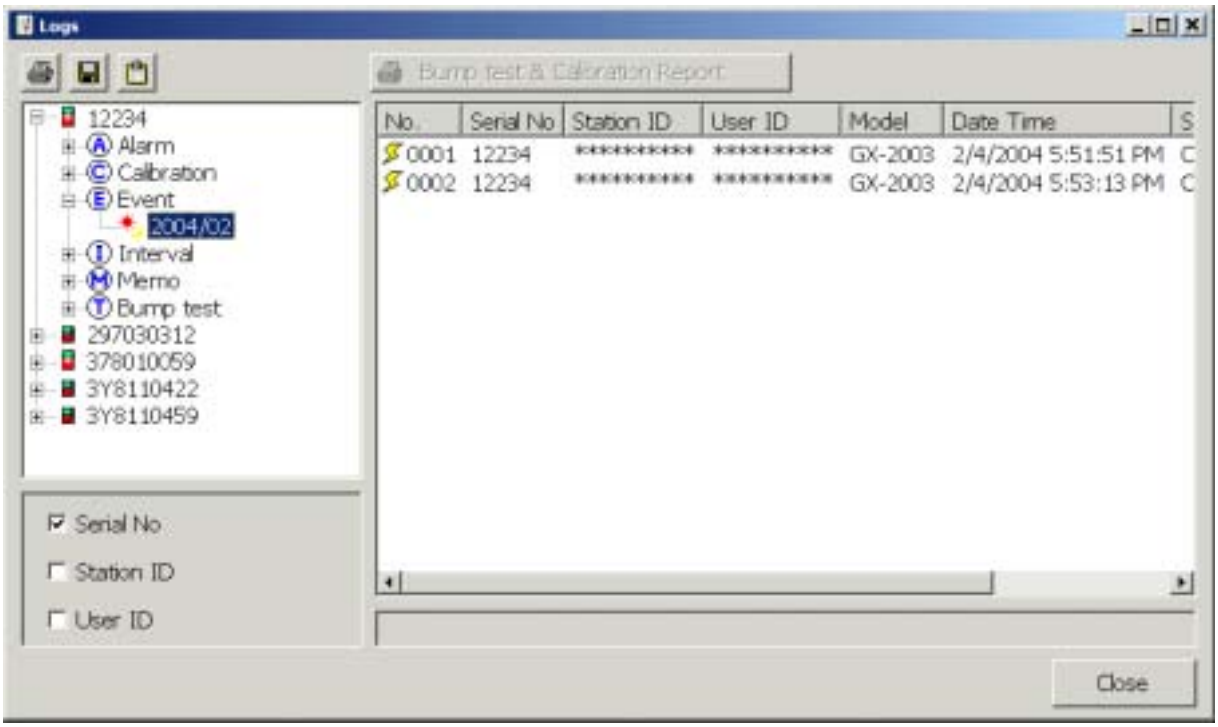


Figure 33: Event Files in ID View Format

3. To print all the event files in the upper right window, click the **Print** button in the upper left corner of the Logs window. The **Print** button has a printer icon in it. A dialog box will appear confirming if you want to print. Click **OK**.
4. To go back and view other data, click the **Close** button to return to the Logs window.

Interval Trend Data

The GX-2001 saves data every 5 minutes. It saves the average reading of the previous 5 minutes for each channel and can log up to 40 hours of data depending on how many times the instrument is turned on and off and how many events such as gas alarms occur.

The GX-2003's data logging interval is user adjustable. See the GX-2003 Operator's Manual for instructions on how to adjust the data logging interval. At the scheduled log time, the GX-2003 also saves the average readings of the previous interval period. The log time will depend on how

many times the GX-2003 is turned on and off and how many events such as gas alarms occur.

To view and perform desired operations with the interval trend files:

1. While in the Logs window, open folders in the left side of the window until the Interval folder you wish to open is visible.
2. If you are viewing data in base view format with the data organized by type, expand the Interval folder. Folders organized by year/ month will appear below the Interval folder. Click on the folder whose contents you wish to see. The interval trend files in the folder will be shown in the upper right side of the Logs window.

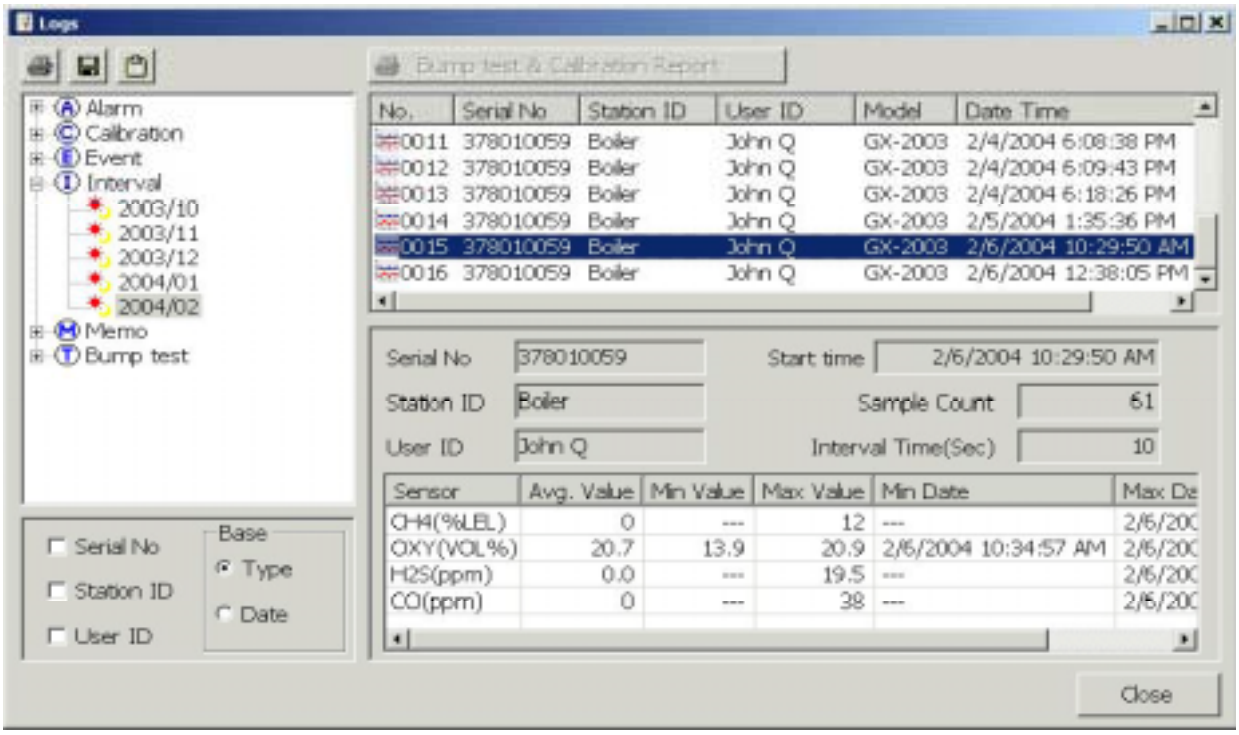


Figure 34: Interval Trend Files in Base View Format

If you organize the data by date, then folders organized by year/ month appear in the left side of the window. Expand the folder you want to see and click on the Interval folder. The interval trend files will appear in the upper right side of the window.

If you are viewing data in ID view format, expand the folders in the left side of the window until the Interval folder you wish to view is visible. Expand the Interval folder. Folders organized by year/month will be listed below the Interval folder. Click the folder whose contents you want to view and the interval trend files in it will be shown in the upper right side of the Logs window.

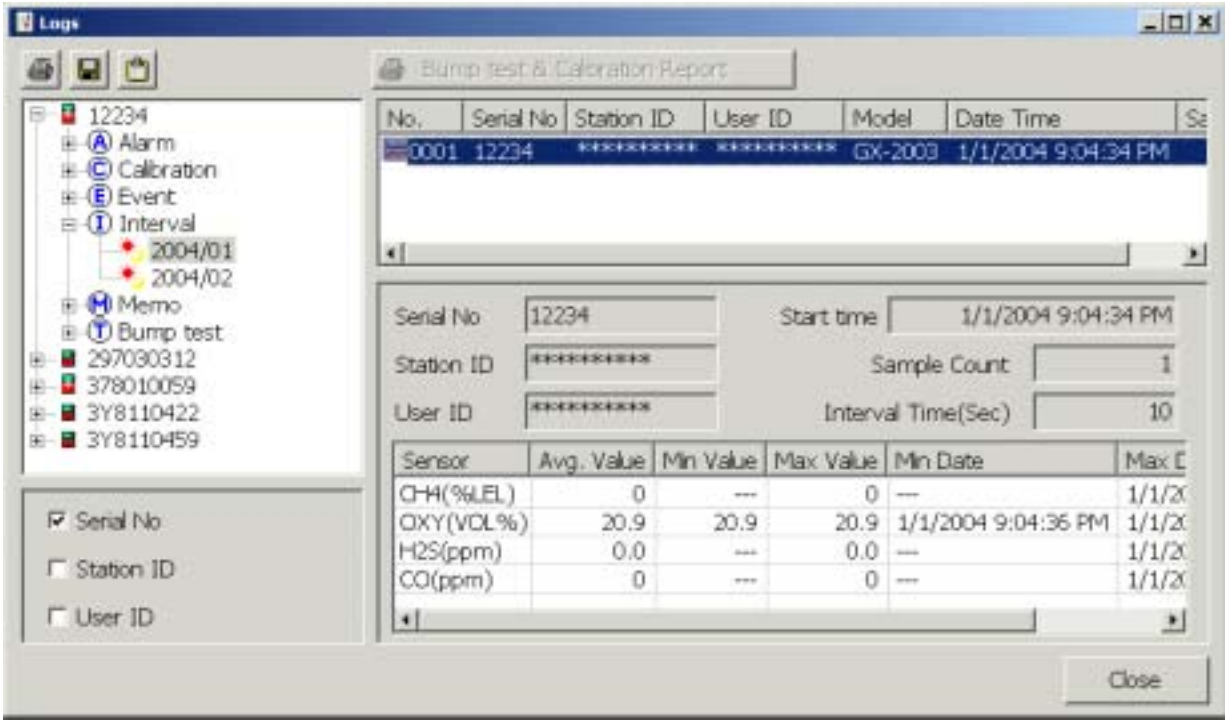


Figure 35: Interval Trend Files in ID View Format

3. To view summary information about an interval trend file, select it in the right side of the window. A summary of the file will appear in the area below the file list.
4. To open the file and see the data and a graph of the data, double click on the file. The Data Sample (Interval Trend) window will appear with a table of the data on the left side of the window and a graph of the data on the right side. If less than two data points are saved, only the data table will appear.

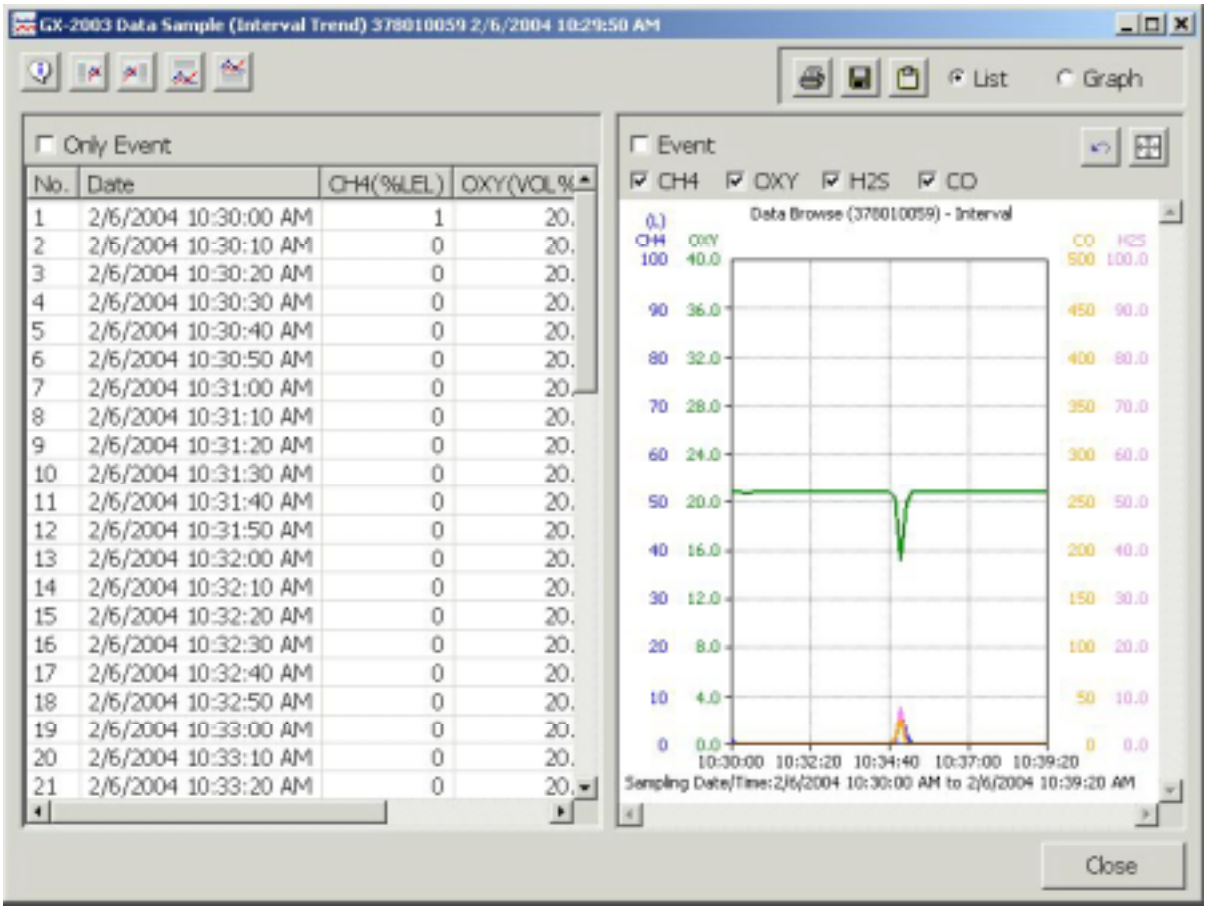


Figure 36: Interval Trend File Data & Graph

5. You can choose to view the data in a variety of arrangements, such as data on the left and graph on the right, by clicking the appropriate **Data Arrangement** button in the upper left of the Logs window. Each **Data Arrangement** button has a table and graph symbol inside of it.
6. To display the summary information for the file along with the data and graph, click the **Summary Information** button in the upper left corner of the Logs window, to the left of the **Data Arrangement** buttons.
7. To print the data, select either List or Graph in the upper right corner of the window and then click the **Print** button in the upper right corner of the window. The **Print** button has a printer icon in 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 and if List is selected, the data will print as a table.

8. 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** button. The **Save To File** button has a floppy disk icon in it. A “Save As” dialog box will appear for you to specify the filename, file location, and file type.

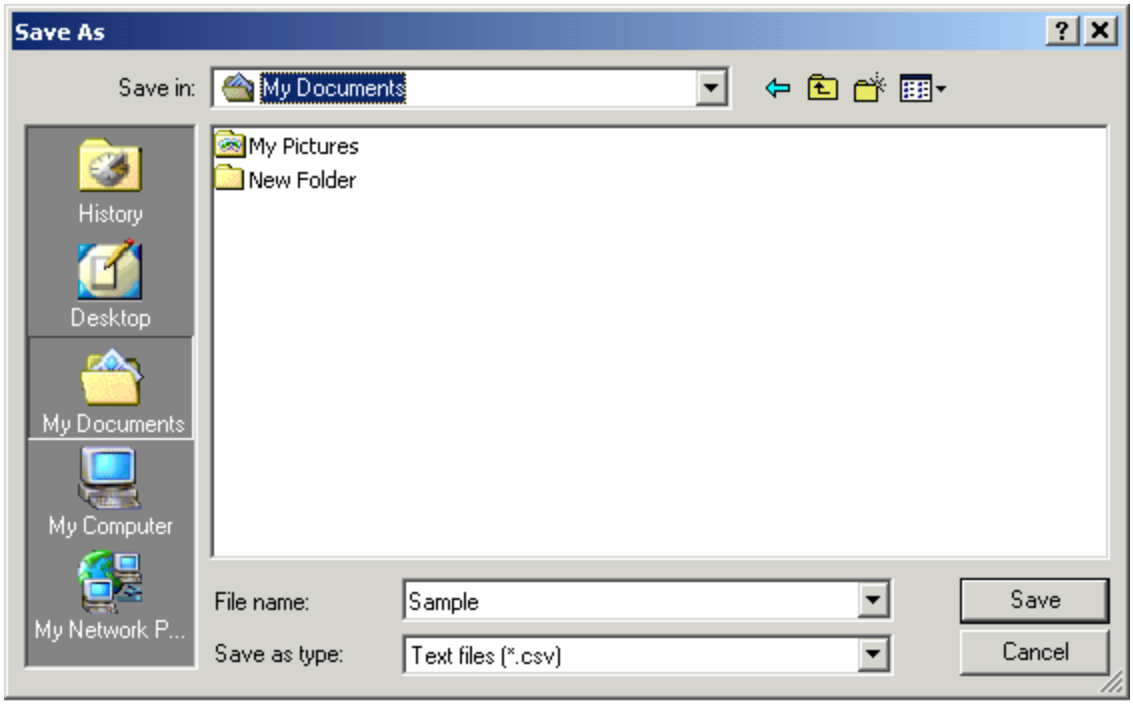


Figure 37: Save As Dialog Box

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

9. 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** button. The **Copy to Clipboard** button has a clipboard icon in 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.

10. To go back and view other data, click the **Close** button to return to the Logs window.

Memo Feature

Memos can be created in the Instrument Information window. See “Edit Function, Memo Entry” on page 75. Memos can be used to record information or comments about an instrument. To view and perform desired operations with the memo files:

1. While in the Logs window, open folders in the left side of the window until the Memo folder you wish to view is visible.
2. If you are viewing data in base view format with the data organized by type, expand the Memo folder. Folders organized by year/month will appear below the Memo folder. Click on the folder whose contents you wish to see. The memo files in the folder will be shown in the upper right side of the Logs window.

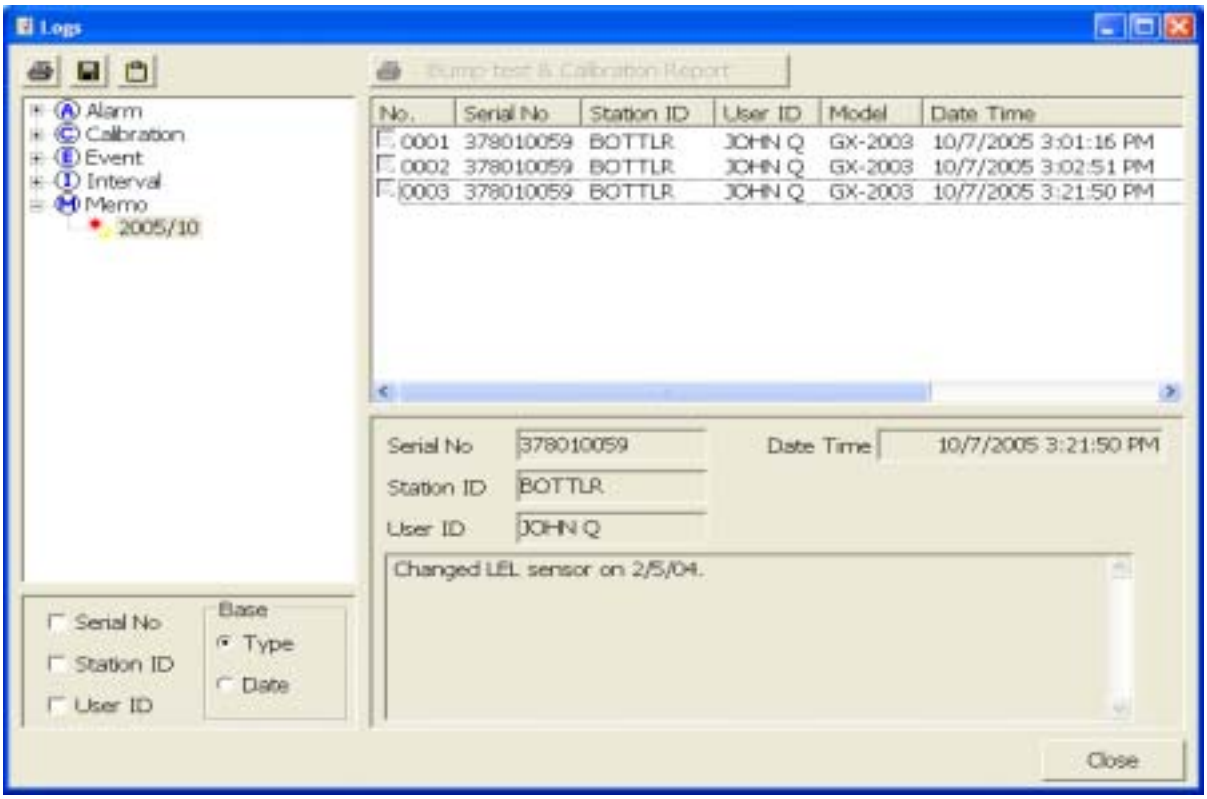


Figure 38: Memo Files in Base View Format

If you organize the data by date, then folders organized by year/month appear in the left side of the window. Expand the folder you want to see and click on the Memo folder. The memo files will appear in the upper right side of the window.

If you are viewing data in ID view format, expand the files in the left side of the window until the Memo folder you wish to view is visible. Expand the Memo folder. Folders organized by year/month will be listed below the Memo folder. Click the folder whose contents you want to view and the memo files in it will be shown in the upper right side of the Logs window.

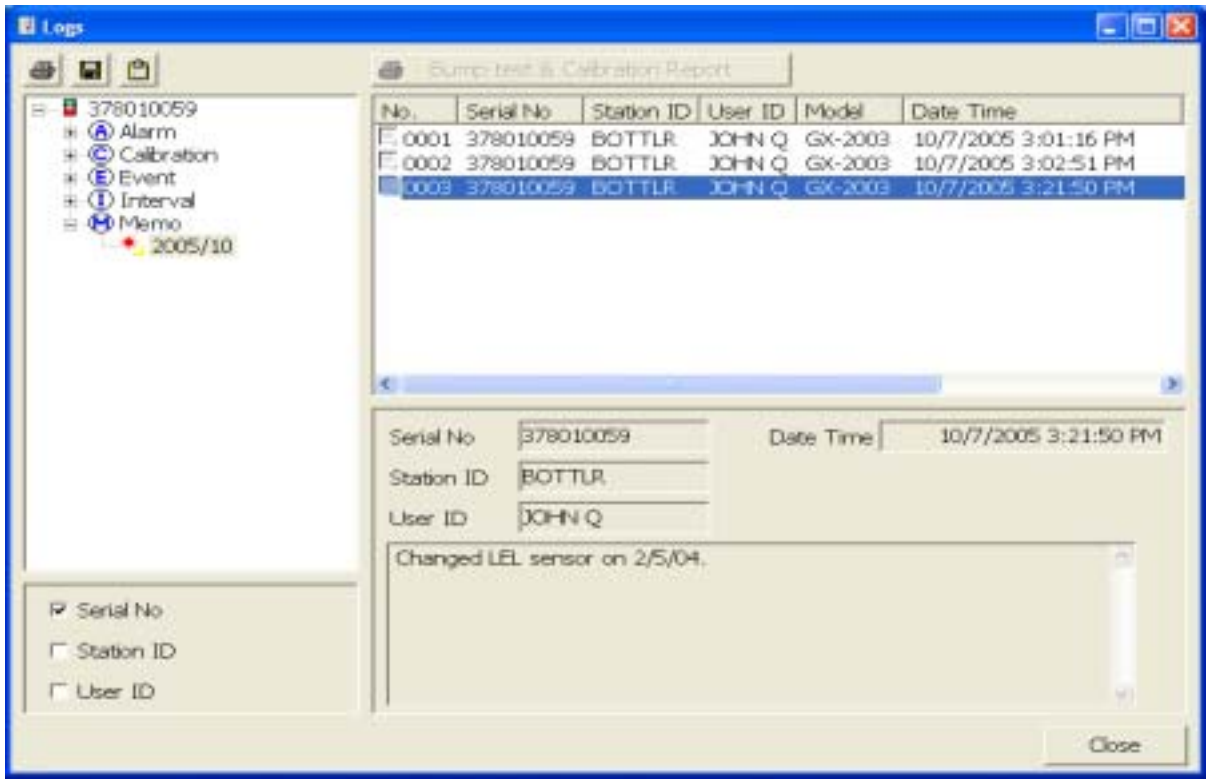


Figure 39: Memo Files in ID View Format

3. To print all the memo files in the upper right window, click the **Print** button in the upper left corner of the Logs window. The **Print** button has a printer icon in it. A dialog box will appear confirming if you want to print. Click **OK**.
4. To go back and view other data, click the **Close** button to return to the Logs window.

Bump Test Files

The results of all bump tests performed by the Data Cal 2000 are saved in the Logs window. To view and perform desired operations with the bump test files:

1. While in the Logs window, open folders in the left side of the window until the Bump test folder you wish to view is visible.
2. If you are viewing data in base view format with the data organized by type, expand the Bump test folder. Folders organized by year/ month will appear below the Bump test folder. Click on the folder whose contents you wish to see. The bump test files in the folder will be shown in the upper right side of the Logs window.

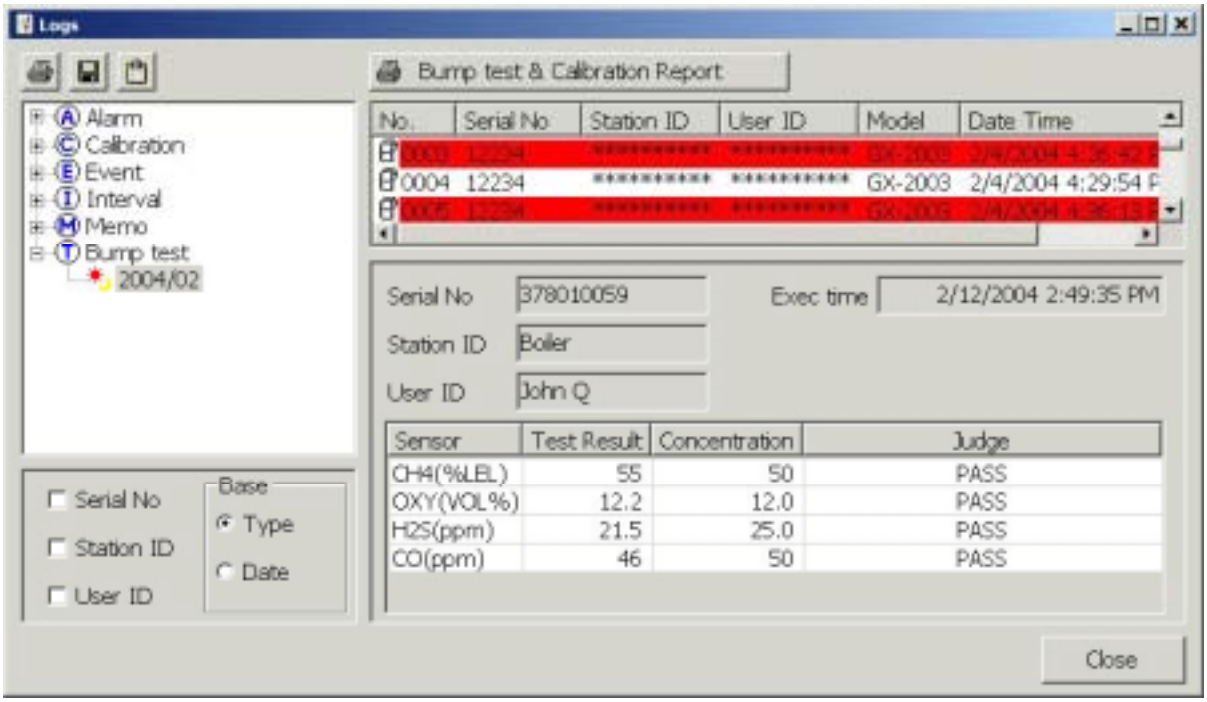


Figure 40: Bump Test Files in Base View Format

If you organize the data by date, then folders organized by year/ month appear in the left side of the window. Expand the folder you want to see and click on the Bump test folder. The bump test files will appear in the upper right side of the window.

If you are viewing data in ID view format, expand the folders on the left side of the window until the Bump test folder you wish to view is visible. Expand the Bump test folder. Folders organized by year/ month will be listed below the Bump test folder. Click the folder whose contents you want to view and the bump test files in it will be shown in the upper right side of the Logs window.

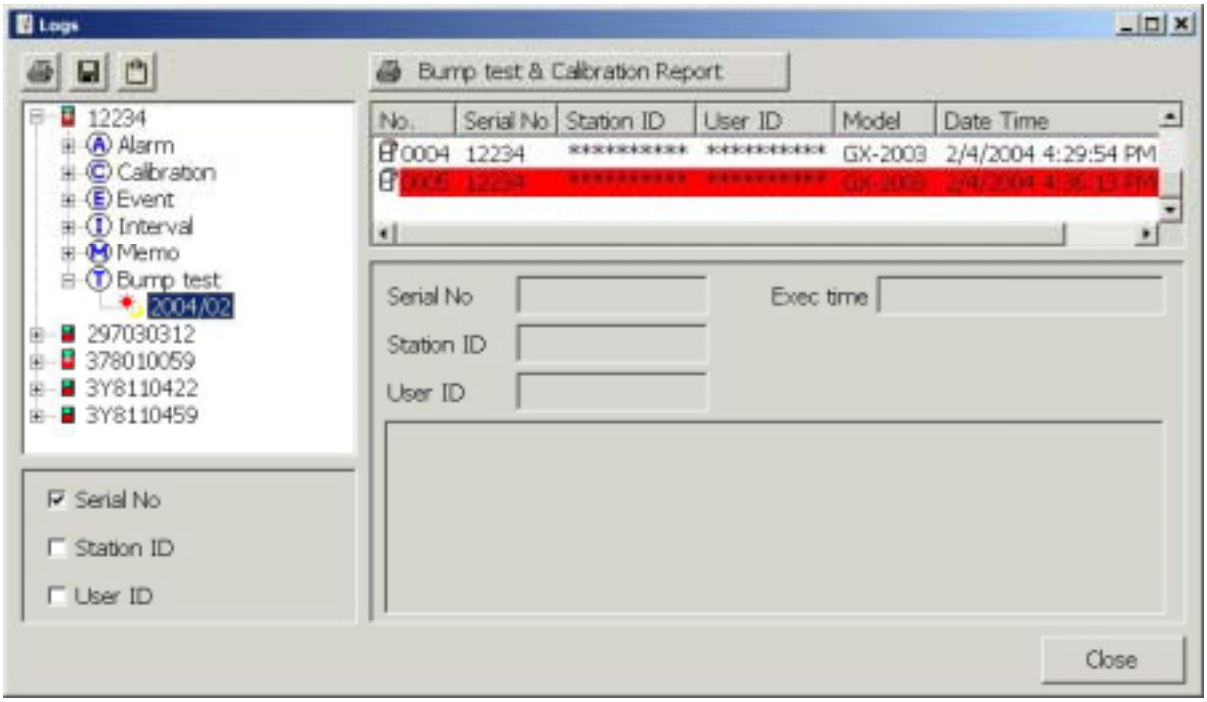


Figure 41: Bump Test Files in ID View Format

3. 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.
4. To view the file in summary format, click on the bump test file in the upper right part of the Logs window that you wish to view. The bump test information in the file will appear in the lower right part of the window in summary format. It includes the instrument's serial number, station ID, user ID, bump test time, and gas readings during the bump test.
5. To print all the bump test files in the upper right window, click the **Bump test & Calibration Report** button above the files. A dialog box will appear confirming if you want to print. Click **OK**.
6. To go back and view other data, click the **Close** button to return to the Logs window.

Instrument/Module Function Menu

When you are in the main program window, if you right click on an instrument or a docking module, the Instrument/Module Function menu appears.

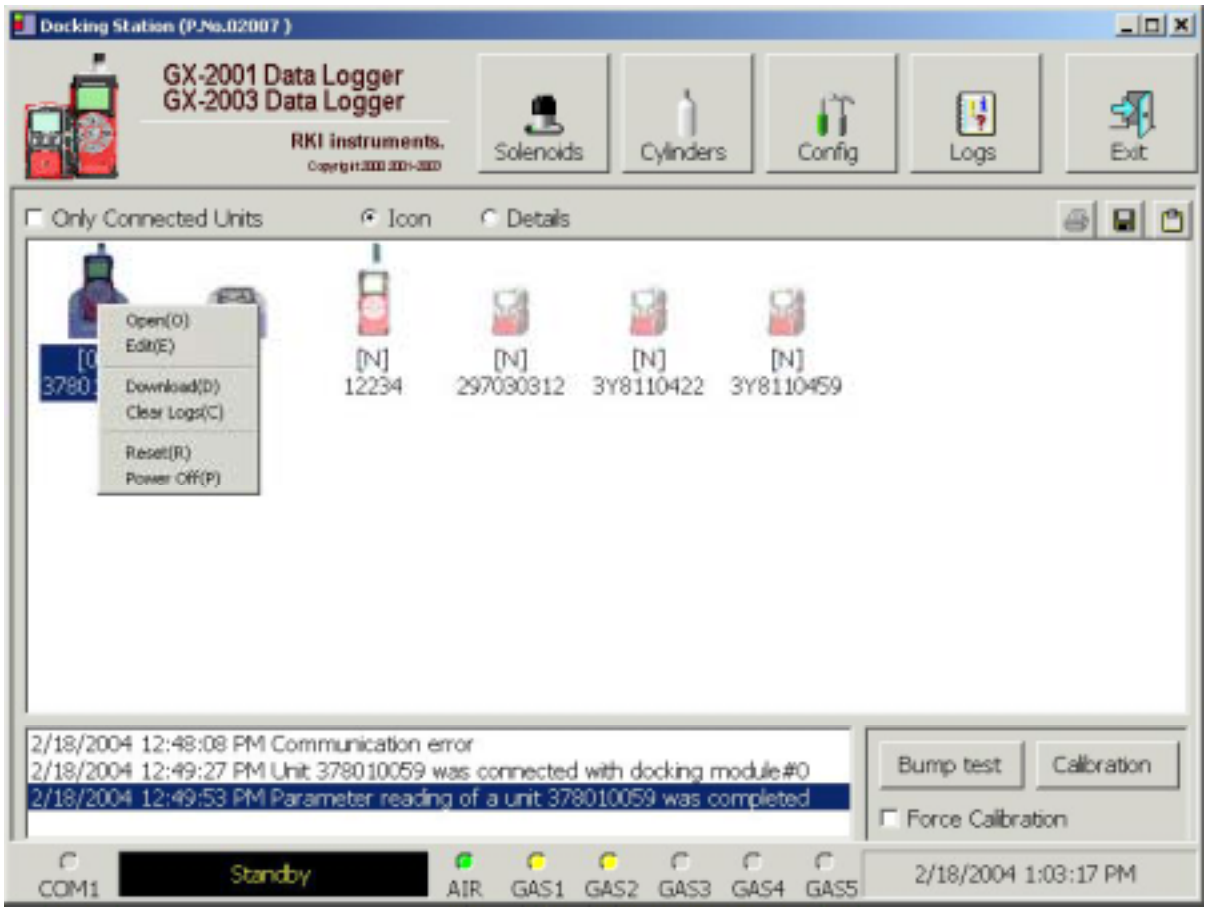


Figure 42: Instrument/Module Function Menu

The functions in the Instrument/Module Function menu are Open, Edit, Download, Clear Logs, Reset, and Power Off. If you right click on an instrument that is currently connected to a module, all items in the Instrument/Module Function menu are selectable as shown above in Figure 42 if the Change Parameter selection box in the Instrument Information section of the Configuration window Parameter tab is selected. If it is not selected, the Edit function is not selectable. If you right click on an instrument that is not currently connected to the Data Cal 2000, only the Open function is active. If you right click on a module that does not have an instrument in it that is connected to the Data Cal 2000, only the Reset function is active.

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 the 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 Setting tab and the Sensor Setting tab. The Parameter Setting tab shows various instrument parameters such as serial number, station ID, user ID and calibration interval. It also includes a Memo field.

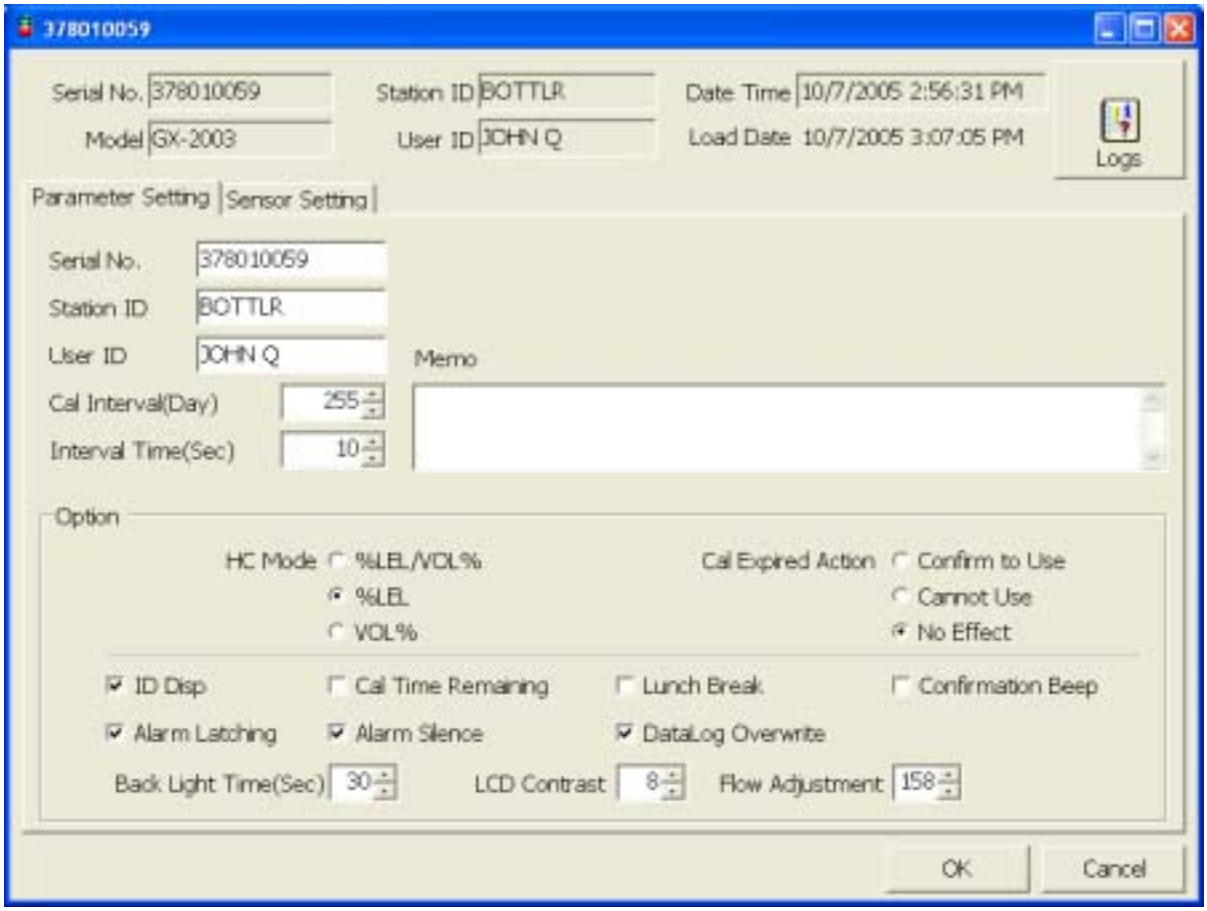


Figure 43: Instrument Information Window, Parameter Setting Tab

The Sensor Setting tab includes various channel parameters such as the alarm points for each channel, the autocal gas concentration, and the last calibration date. There are also two buttons that are not selectable in Open mode, the **Load Factory Defaults** and **Load User Defaults** buttons. These buttons become selectable in Edit

mode (see below).

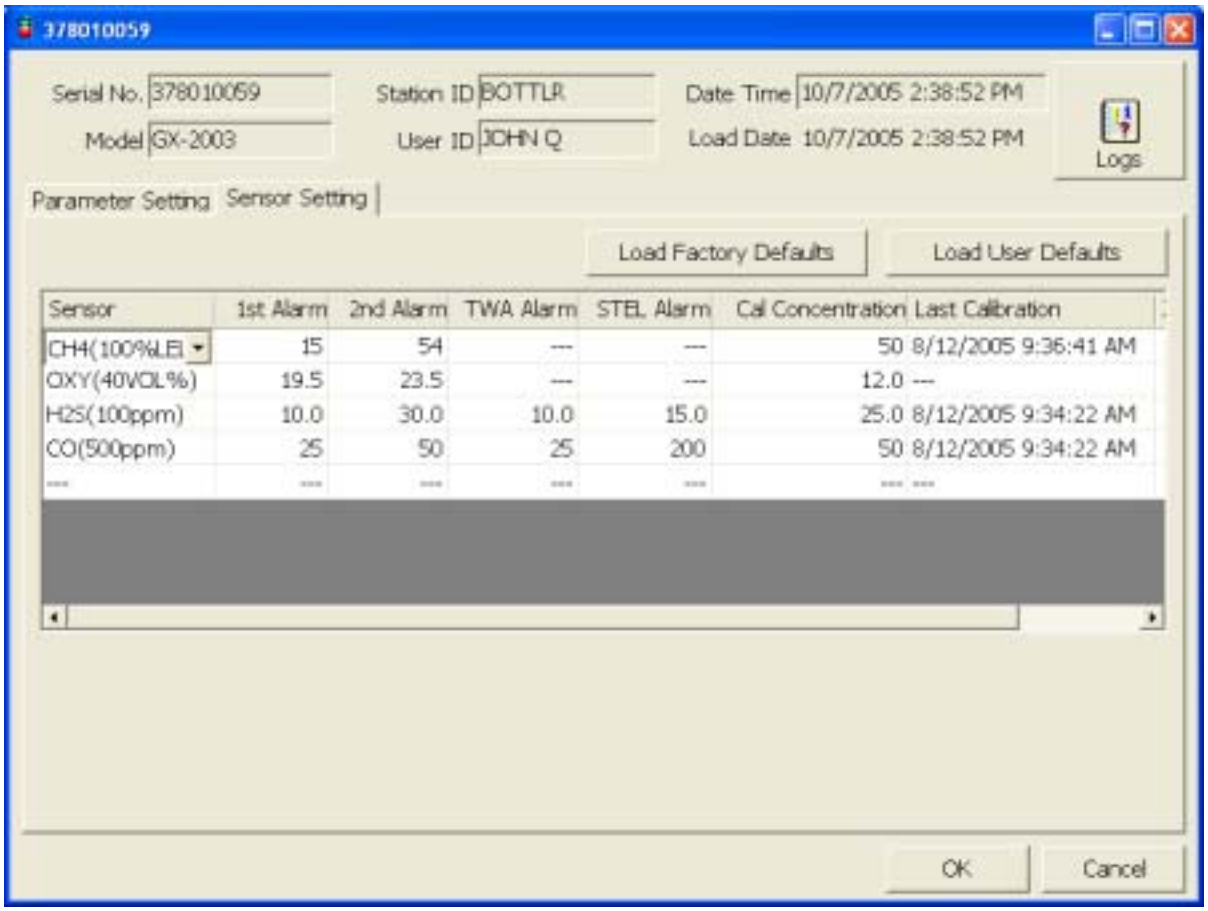


Figure 44: Instrument Information Window, Sensor Setting Tab

Edit Function

This function can be activated by either right clicking an instrument that is connected to the Data Cal 2000 and selecting Edit(E) when the pull down menu appears or by selecting an instrument that is connected to the Data Cal 2000 and the 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 Configuration window Parameter tab is not selected.

The Edit function brings up the Instrument Information window and makes the items in the Parameter Setting and Sensor Setting tabs available for updating. It also activates the **Load Factory Defaults** and

Load User Defaults buttons in the Sensor Setting tab. To change any of the items in either of the two tabs' fields:

1. Put the cursor in the field you want to update and change the setting. Repeat this for any additional fields you want to update.

   To deactivate or activate a sensor, click in the right side of the desired sensor field and a pull-down arrow will appear as shown in Figure 44 (CH4 channel shown) which will allow you to select a gas name or "---". If you select "---", the channel will be deactivated if you save the change.

   If you want to automatically load the factory default values or the user default values in the Sensor Setting tab, click either the **Load Factory Defaults** or **Load User Defaults** button. See "Configuration Window", "Parameter Tab" on page 78 for a description of these defaults and how to edit the user defaults.

2. Click the **OK** button in the lower right corner of the Instrument Information window.

3. A confirmation box will appear. Click the **Yes** button.

4. The software will make the change or changes in the connected instrument and return to the main program window.

To load the factory or user default values for the items in the Sensor Setting tab, click the **Load Factory Defaults** or **Load User Defaults** button. The values loaded for each button are defined in the Sensor tab of the Configuration window (see "Sensor Tab" on page 80)

Edit Function, Memo Entry

The Data Cal 2000 includes a memo feature that allows you to enter remarks for an instrument that is connected to the software. The memo may be used to document anything of interest, such as maintenance records (noting when a sensor was changed or a battery pack changed). To enter a memo, activate the Edit function to bring up the Parameter Setting tab as described above in "Edit Function" and perform the following:

1. Place the cursor in the Memo field. If a memo has been previously entered, it will still appear in the Memo field.

2. If necessary delete the old memo. Enter the information you wish to

document.

3. Click the **OK** button in the lower right corner of the Instrument Information window.
4. A confirmation box will appear. Click the **Yes** button.
5. The software will save the memo in the instrument's Memo folder in the Logs Window and return to the main program window.

Download Function

This function can be activated by either right clicking an instrument that is connected to the Data Cal 2000 and selecting Download(D) when the pull down menu appears or by selecting an instrument that is connected to the Data Cal 2000 and the using the alt/D key combination. The Download function downloads all logged data and calibration information from a GX-2003 and all logged data from a GX-2001 connected to the Data Cal 2000. 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 that is connected to the Data Cal 2000 and selecting Clear Logs(C) when the pull down menu appears or by selecting an instrument that is connected to the Data Cal 2000 and the using the alt/C key combination. The Clear Logs function clears all logged data and calibration files from an instrument connected to the Data Cal 2000. If you select Clear Logs(C), a confirmation box appears. Click the OK button to proceed with clearing all the data from the instrument.

Reset Function

This function can be activated by either right clicking an instrument that is connected to the Data Cal 2000 or a docking module and selecting Reset(R) when the pull down menu appears. It can also be activated by selecting an instrument that is connected to the Data Cal 2000 or a docking module and the using the alt/R key combination. The Reset function resets the selected docking module. This is useful if communication errors occur with the docking module or the module does not communicate with the Data Cal 2000. If you select Reset(R), a confirmation box appears. Click the OK button to proceed with resetting the selected docking module.

NOTE: If communication errors for a module or improper operation of a module continue after resetting the module, verify that the terminator switch has been set properly in the down position for the last module in the system and that all the other modules have the terminator switch set to the up position.

Power Off Function

This function can be activated by either right clicking an instrument that is connected to the Data Cal 2000 and selecting Power Off(P) when the pull down menu appears or by selecting an instrument that is connected to the Data Cal 2000 and the 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 the OK button to proceed with clearing all the data from the instrument.

Configuration Window

The Configuration window is accessible from the main program window by clicking on the **Config** button. The Configuration window is password protected. It includes four tabs, the Parameter tab, the Database tab, the Sensor tab, and the Password tab, which allow you to do the following:

- Configure system parameters for the Data Cal 2000 in the Parameter tab.
- Create a new database, import data, export data, and delete data in the Database tab.
- View the factory defaults and update the user defaults for sensor settings in the Sensor tab.
- Change the password in the Password tab.

To enter the Configuration window:

1. From the main window, click on the **Config** button located along the top of the window.

2. Enter the password and click **OK**. The factory set password is “ABCDE” and is case sensitive. After clicking OK, the Configuration window appears.

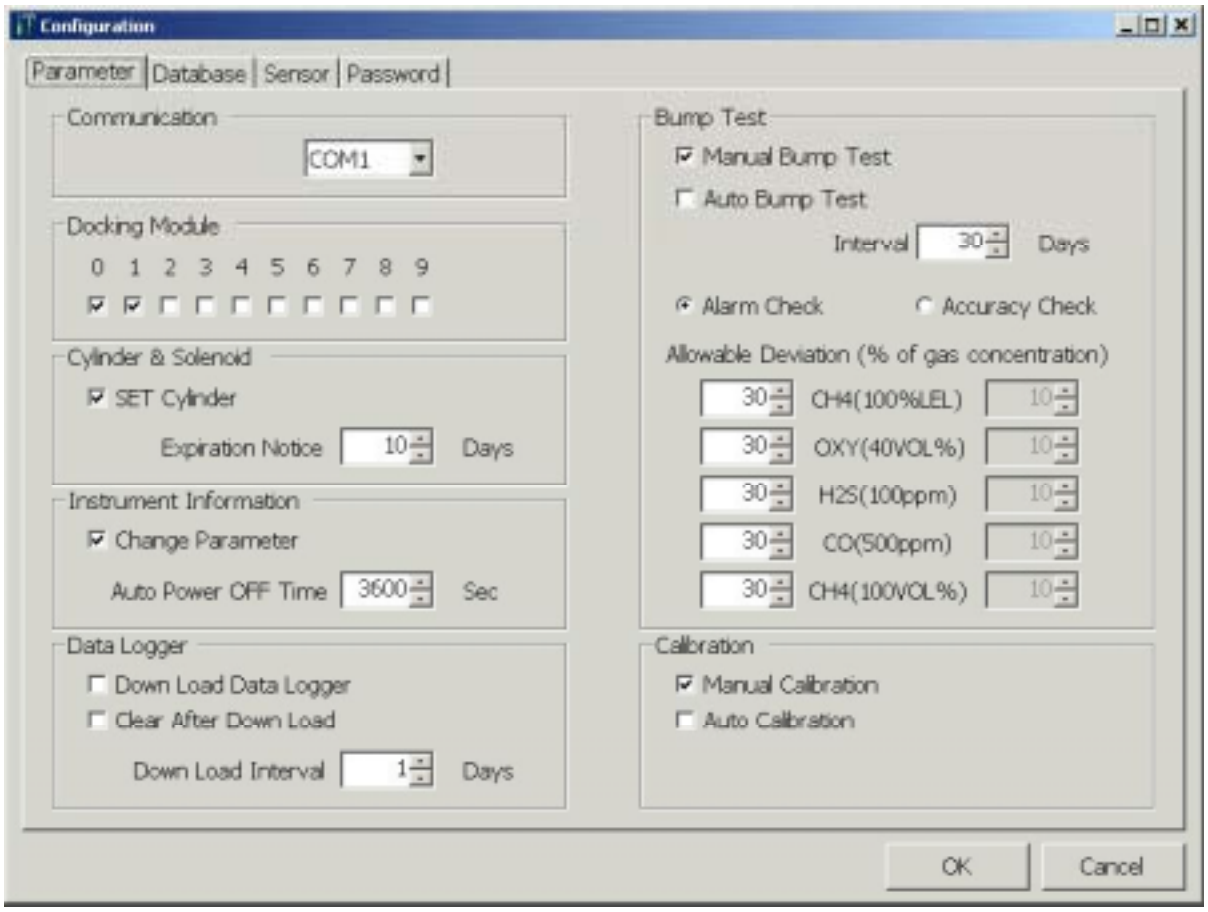


Figure 45: Configuration Window

Parameter Tab

See “Setting Up the Configuration” on page 30 for a description of the Parameter tab.

Database Tab

1. From the Configuration window, click on the Database tab to view it.

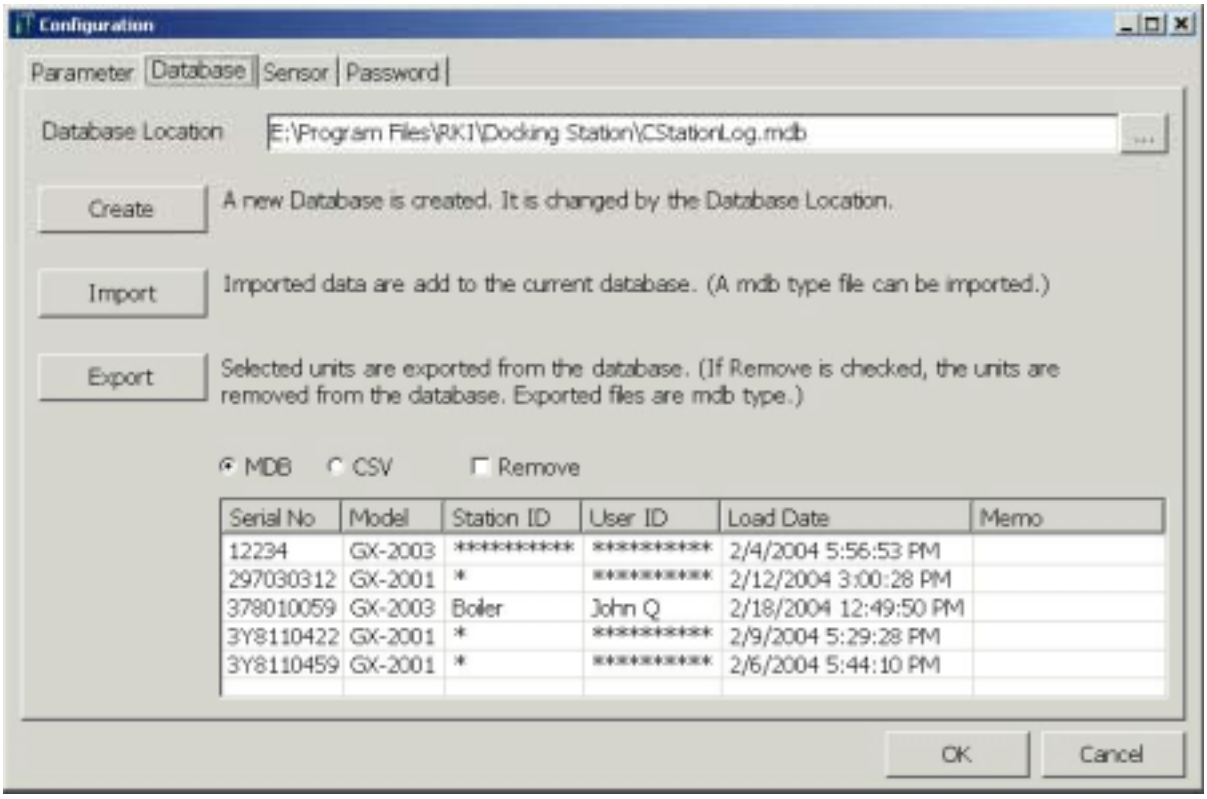


Figure 46: Database Tab

2. To create a new database that is a copy of the existing one, click the **Create** button. A Save As dialog box will appear and prompt you for a file name. Enter the file name and click the **Save** button.
3. To import data into the database, click the **Import** button. An Open dialog box will appear and prompt you for the file name of the file you wish to import. It must me an MDB (Microsoft Access Database) type of file. Generally, this is a file that was exported from the Data Cal 2000 Software on another computer. Enter the file name and click **Open**. The file will be imported.
4. To Export selected data, select MDB (Microsoft Access Database) or CSV (Comma Separated Value) as the file type to be exported and select the instruments in the database list you want to export. If you also want to remove these units from the current database, click the Remove selection box. When you have made all

selections, click the **Export** button. A Save As dialog box will appear and prompt you for the file name. Enter the file name and click the **Save** button.

5. Click the **OK** button to return to the main program window.

Sensor Tab

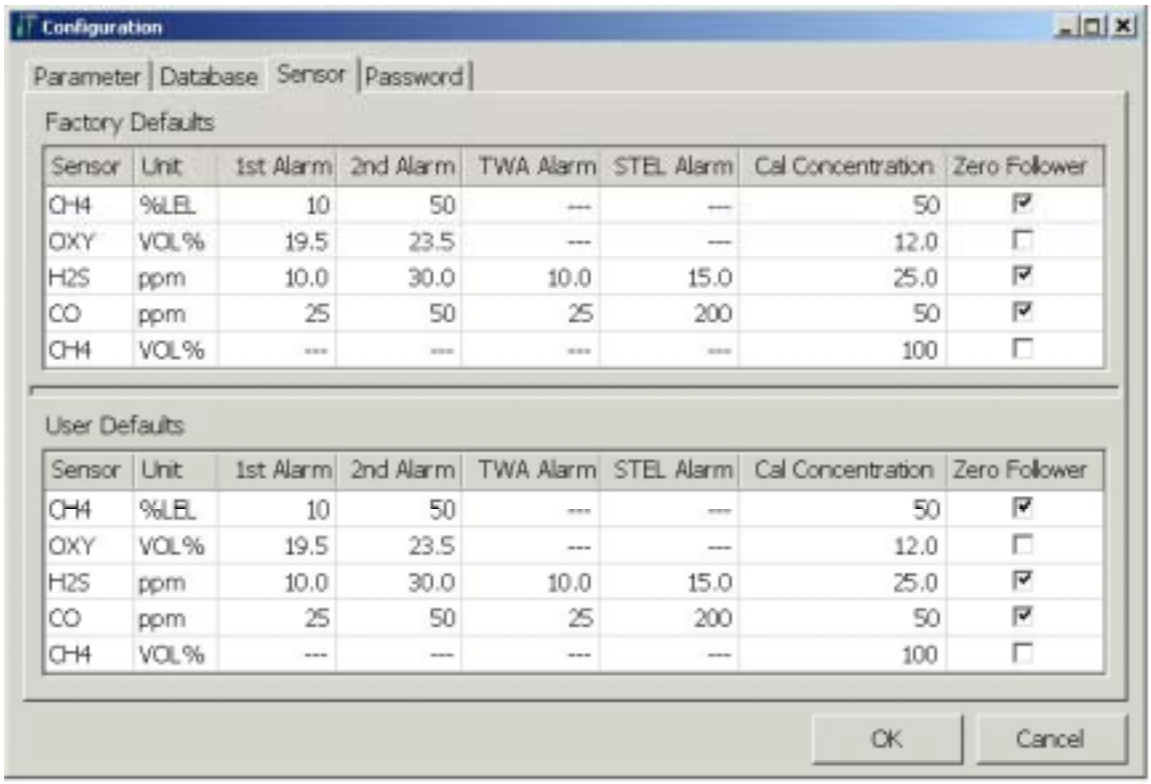


Figure 47: Sensor Tab

The values in the Factory Defaults window in the sensor tab cannot be changed. They include the alarm points, autocalibration concentrations, and zero follower settings. The values in the Factory Defaults window can be loaded to an instrument if desired by using the Instrument/Module Function menu as described in “Edit Function” on page 74.

The values in the User Defaults window in the sensor tab can be customized for special applications. To change the user default settings:

1. From the Configuration window, click the Sensor tab.
2. Place the cursor in the fields you wish to change and update them.
3. RKI Instruments, Inc. does not recommend changing the Zero Follower setting from the factory default settings. Do not change the

Zero Follower settings.

4. To save any changes made in the User Defaults window, click the **OK** button and you will return to the main program window.

   To cancel any changes made in the User Defaults window, click the **Cancel** button and you will return to the main program window.

Password Tab

The Data Cal 2000 Software password is case sensitive, so be careful to type in the appropriate upper or lower case characters when entering the password. The factory set password is “ABCDE”. Once the software is installed on a computer, the password can be change using the Password Tab. To change the password:

1. From the Configuration window, click on the Password tab to view it.

Figure 48: Password Tab

2. Type the new password in the New Password field.
3. Type the new password in the Confirm New Password field.
4. Click the **OK** button.

5. A confirmation window appears. Click the **Yes** button. You will return to the main program window.

Optimizing the Database

It is possible to optimize the database so that it requires a minimum amount of computer memory. To optimize the database, press the “F12” key on while in the main program screen.

Spare Parts List

Table 3: Spare Parts List

Part Number	Description
06-0200RK	Cal gas fitting plug, DataCal 2000 module
06-0201RK	Exhaust fitting plug, DataCal 2000 module
06-1248RK	Polyurethane tubing, 5/16-inch OD x 3/16-inch ID
06-1254RK	Polyurethane tubing, 7/16-inch OD x 5/16-inch ID, for exhaust tube, 10 feet maximum
43-4167RK	Fuse, 5 x 20 mm, 5A, 250V
47-1013RK	Power cord
47-5006RK	Downloading cable, DB-9 receptacle to DB-9 receptacle, straight through, 6 foot
47-5046RK	Data cable, DB-15 plug to DB-15 plug,
81-0013RK-05	Cylinder, methane, 50% volume in N2, 58 liter steel
81-0090RK-03	Three-gas calibration cylinder, 50% LEL CH_4/12% O_2/ 50 ppm CO, 103 liter steel
81-0154RK-02	Four-gas calibration cylinder, 50% LEL CH_4/12% O_2/50 ppm CO/25 ppm H_2S, 58 liter aluminum
81-1054RK	Demand flow regulator, 50/103 liter
83-0008RK	Data Cal 2000 software
DM-2001	Docking module for GX-2001
DM-2003	Docking module for GX-2003