



INSTRUMENTS

SDM-3R Docking Station PC Controlled Configuration Operator's Manual

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

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.

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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 SDM-3R. Also read and understand the GX-3R (Pro) Operator’s Manual.*

Chapter 1: Introduction

Manual Overview

The SDM-3R Docking Station is an advanced, reliable system that can charge, bump test, calibrate, alarm check, and provide test records for up to 10 GX-3R (Pro) portable gas monitors at once. It is designed for desktop or benchtop use (standalone functionality) or to be connected directly to a computer (PC controlled functionality).

When used in the standalone configuration, test records are stored in the SDM-3R's memory. The records can be saved to a USB drive and imported into the PC Program.

If you are using the PC Program while operating in the PC Controlled configuration, you may retrieve instrument data, bump test, calibrate, and alarm check instruments. Instrument information and data for each instrument can be viewed directly using the PC Program and can be printed from the PC Program. For instructions to use the SDM-3R in the Standalone configuration, see the *SDM-3R Docking Station Standalone Configuration Operator's Manual*.

The purpose of this manual is to explain how to set up and use the SDM-3R in PC Controlled configuration. It also explains how to use the SDM-3R Docking Station PC Controller Program. You will learn how to:

- install and launch the SDM-3R Docking Station PC Controller Program
- setup the PC Program for use with the SDM-3R
- prepare the SDM-3R for use
- bump test and calibrate up to 10 GX-3R (Pro)s using the PC Controlled configuration
- use the SDM-3R to charge a GX-3R (Pro)
- view, print, and export calibration, bump test, and alarm check records
- view instrument information and data using the PC Program
- update instrument parameters using the PC Program

CAUTION: *The GX-3R (Pro) detects oxygen deficiency and elevated levels of oxygen, combustible gases, carbon monoxide, hydrogen sulfide, and other toxic gases, all of which can be dangerous or life threatening. When using the GX-3R (Pro), you must follow the instructions and warnings in the GX-3R (Pro) Operator's Manual to assure proper and safe operation of the GX-3R (Pro) and to minimize the risk of personal injury.*

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

System Requirements

To use the SDM-3R Docking Station PC Controller Software, your personal computer must meet the following requirements:

- **Operating Systems:** Windows 7, Windows 8, Windows 10, Windows 11
- **Processor:** IBM® compatible PC running Pentium® 2 processor or equivalent minimum
- **Memory:** 32 MB RAM minimum
- **Hard Disk Space:** 32 MB minimum
- **Available USB Port**

About this Manual

The *SDM-3R Docking Station PC Controlled Configuration Operator's Manual* uses the following conventions for notes, cautions, and warnings.

NOTE: Describes additional or critical information.

CAUTION: *Describes potential damage to equipment.*

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

Cautions & Safety Information

- Use only polyurethane sample tubing with the SDM-3R. Consult RKI Instruments, Inc. for other materials.
- Do not subject the SDM-3R to infrared or intense light. This may cause communication errors.
- Do not expose the SDM-3R to water.
- Do not subject the SDM-3R to any hard impact.

Specifications

Table 1: SDM-3R Specifications

Input Power	5.99 VDC
Environmental Conditions	<ul style="list-style-type: none"> • For Indoor Use Only • 0° C to 40° C, below 95% Relative Humidity, Non-Condensing
Applicable Instrument	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro
Memory Capacity	150 KB
Record Size	<ul style="list-style-type: none"> • Bump test: 698 bytes • Calibration: 749 bytes • Alarm check: 320 bytes
Maximum Number of Records Saved	<ul style="list-style-type: none"> • Bump test: 214 OR <ul style="list-style-type: none"> • Calibration: 200 OR <ul style="list-style-type: none"> • Alarm check: 468
Number of Calibration Gas Cylinders	Infinite if you change cylinders during a test.
Standard Accessories	<ul style="list-style-type: none"> • Instruction Manual* • SDM-3R Docking Station PC Controller Software* • Inlet Air Filter • 10-Foot Long Exhaust Tube • 3-Foot Long Calibration Tube • USB Cable, Type A to Type B • Ethernet Cable • Single-Station AC Adapter • USB Drive

Table 1: SDM-3R Specifications

Available Accessories	<ul style="list-style-type: none">• USB Hub• Connection Brackets• Wall Mounting Brackets• Cylinder Holder• Demand Flow Regulator• Calibration Cylinder• CO₂ Scrubber
* <i>Not sent with SDM-3R. Download from www.rkiinstruments.com/sdm3r.</i>	

Building a System

Solenoid Valves

The SDM-3R is sold with 1, 2, or 3 solenoid valves.

NOTE: If 2 or more calibration cylinders are required for calibration, the SDM-3R (PC-Controlled) must have 2 or more solenoid valves installed.

1 Solenoid Valve (1XX Versions): For instruments that will only use 1 calibration cylinder

- 4-gas (LEL/O₂/H₂S/CO) calibrated with a 4-gas cylinder
- 5-gas (LEL/O₂/H₂S/CO/SO₂) calibrated with a 5-gas cylinder

2 and 3 Solenoid Valves (2XX and 3XX Versions): For instruments that will use 2 or more calibration cylinders

- 3-gas (LEL/O₂/H₂-compensated CO) and CO₂ calibrated with a 3-gas cylinder, H₂ cylinder, CO₂ cylinder, and N₂ cylinder
- 4-gas (LEL/O₂/H₂S/H₂-compensated CO) calibrated with a 4-gas cylinder and an H₂ cylinder
- 5-gas (LEL/O₂/H₂S/CO/SO₂) calibrated with a 4-gas cylinder and an SO₂ cylinder
- 5-gas (LEL/O₂/H₂S/CO/CO₂) calibrated with a 4-gas cylinder, N₂ cylinder, and CO₂ cylinder

Bundles

Various accessories are included with the SDM-3R depending on the bundle. See the table below for what's included with each basic bundle. Other bundles are available that include different calibration gas cylinders than the 4-gas mix included in the 81-SDM3R-X03 and 81-SDM3R-X04. The accessories are described in more detail in “Chapter 2: Description” on page 12.

	81-SDM3RX01	81-SDM3RX02	81-SDM3RX03	81-SDM3RX04
Docking Station	X	X	X	X
Exhaust Tube, 10 ft.	X	X	X	X
Calibration Tubing, 3 ft.	X	X	X	X
USB Cable	X	X	X	X
Ethernet Cable, 5 ft.	X	X	X	X
Single-Station AC Adapter	X	X	X	X
USB Drive	X	X	X	X
Demand Flow Regulator		X	X	X
Calibration Cylinder Holder			X	X
58 Liter Aluminum 4-Gas Calibration Cylinder			X	
34 Liter 4-Gas Calibration Cylinder				X

Chapter 2: Description

Overview

This section describes the SDM-3R docking station's components, standard accessories, and optional accessories.

SDM-3R

Instrument Cradle

The instrument cradle is a recessed area in the middle of the SDM-3R that is designed to accept the GX-3R or the GX-3R Pro. The yellow lever in the cradle must be up for GX-3R operation and down for GX-3R Pro operation. Insert the GX-3R (Pro) in the instrument cradle with the display facing up and close the red door before you perform a bump test, calibration, alarm check or charge a GX-3R (Pro). An infrared (IR) port at the rear of the cradle lines up with the GX-3R (Pro)'s IR port when it is inserted in the cradle and is used to communicate with the instrument. A charging jack engages with the GX-3R (Pro) when you close the red door.

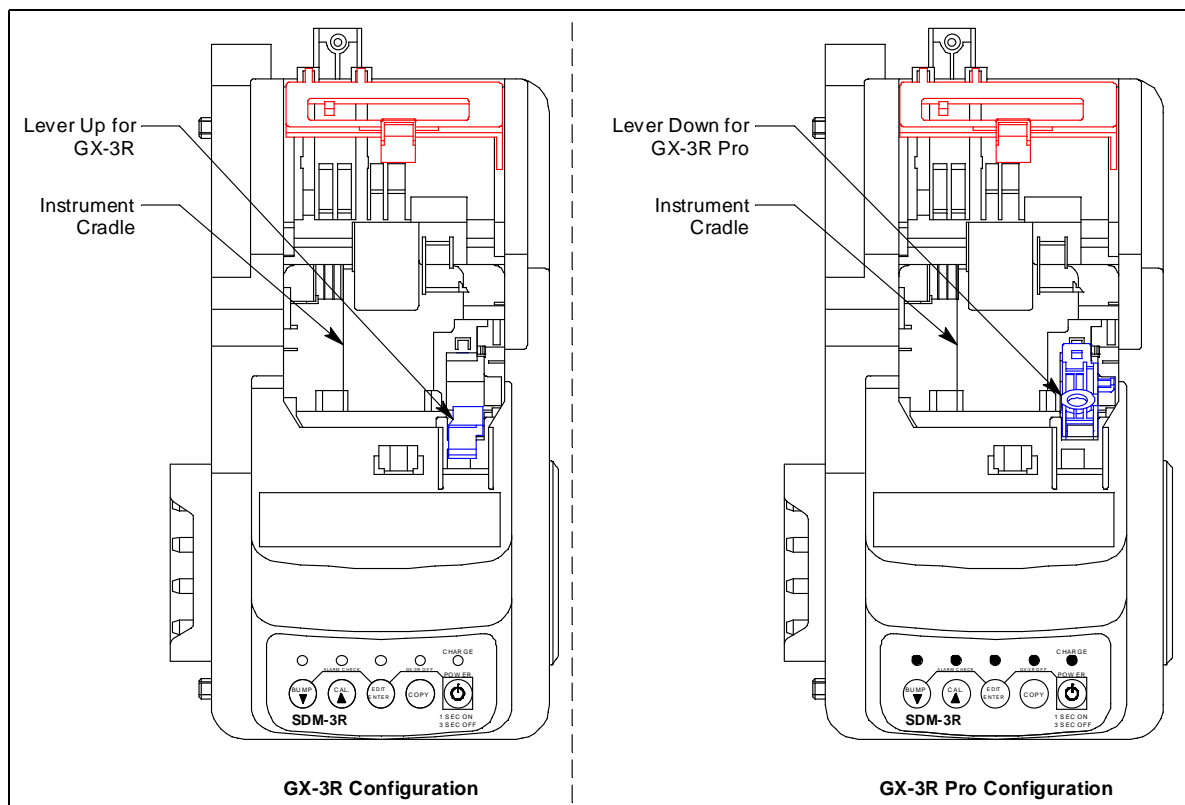


Figure 1: Instrument Cradle

Control Buttons and LEDs

The SDM-3R's control buttons have no function during PC Controlled operation but the LEDs above the buttons still indicate that operations are in process and indicate the pass/fail status for those processes.

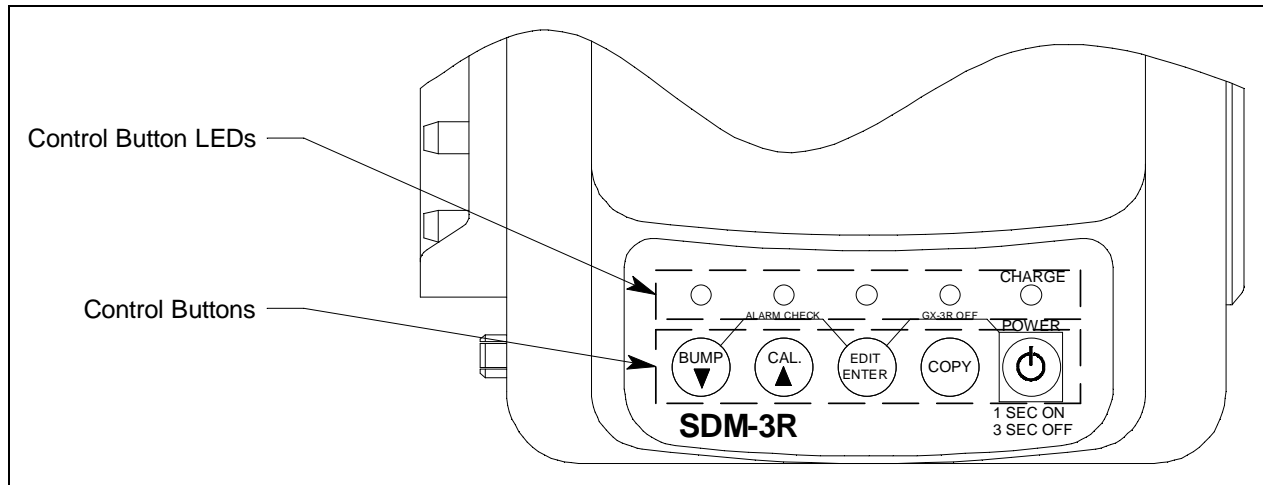


Figure 2: Control Buttons and LEDs

Control Button	Function	LED Meaning
BUMP ▼	none	<u>Flashing</u> : bump test in process <u>Green</u> : bump test passed <u>Red</u> : bump test failed
CAL ▲	none	<u>Flashing</u> : calibration in process <u>Green</u> : calibration passed <u>Red</u> : calibration failed
EDIT ENTER	none	<u>Green</u> : alarm check passed <u>Red</u> : alarm check failed
COPY	none	<u>Off</u> : no records saved <u>Green</u> : More than 20% of SDM-3R memory remains <u>Orange</u> : Less than 20% of SDM-3R memory remains <u>Red</u> : No memory available. Oldest records will be deleted as new records are created.
POWER	Turns SDM-3R on/off	(POWER button's LED is labelled "CHARGE") <u>Solid green</u> : GX-3R (Pro) fully charged <u>Flashing orange</u> : GX-3R (Pro) charging <u>Solid red</u> : SDM-3R problem detected

Cylinder Connections (Side Panels)

Four gas fittings are located on the left side of the SDM-3R. Three are for gas cylinders and one is for the particle filter or a zero air cylinder. The left to right order is GAS 3, GAS 2, GAS 1, AIR. All four fittings accept 3/16 inch ID tubing. The number of active gas fittings depends on how many solenoid valves are installed in your docking station. The AIR and GAS 1 fittings are always active. The GAS 2 and GAS 3 fittings are only active if the docking station was ordered with 2 or 3 solenoid valves, respectively.

The right side of the SDM-3R is shipped from the factory with a small panel attached to it with two screws. That panel should remain in place if the SDM-3R is being used alone or if it is the right-most station in a bank of connected stations. The panel needs to be removed in order to connect another SDM-3R to it. Beneath the panel are plugged fitting connections that mate to the stubs on the left side of another SDM-3R.

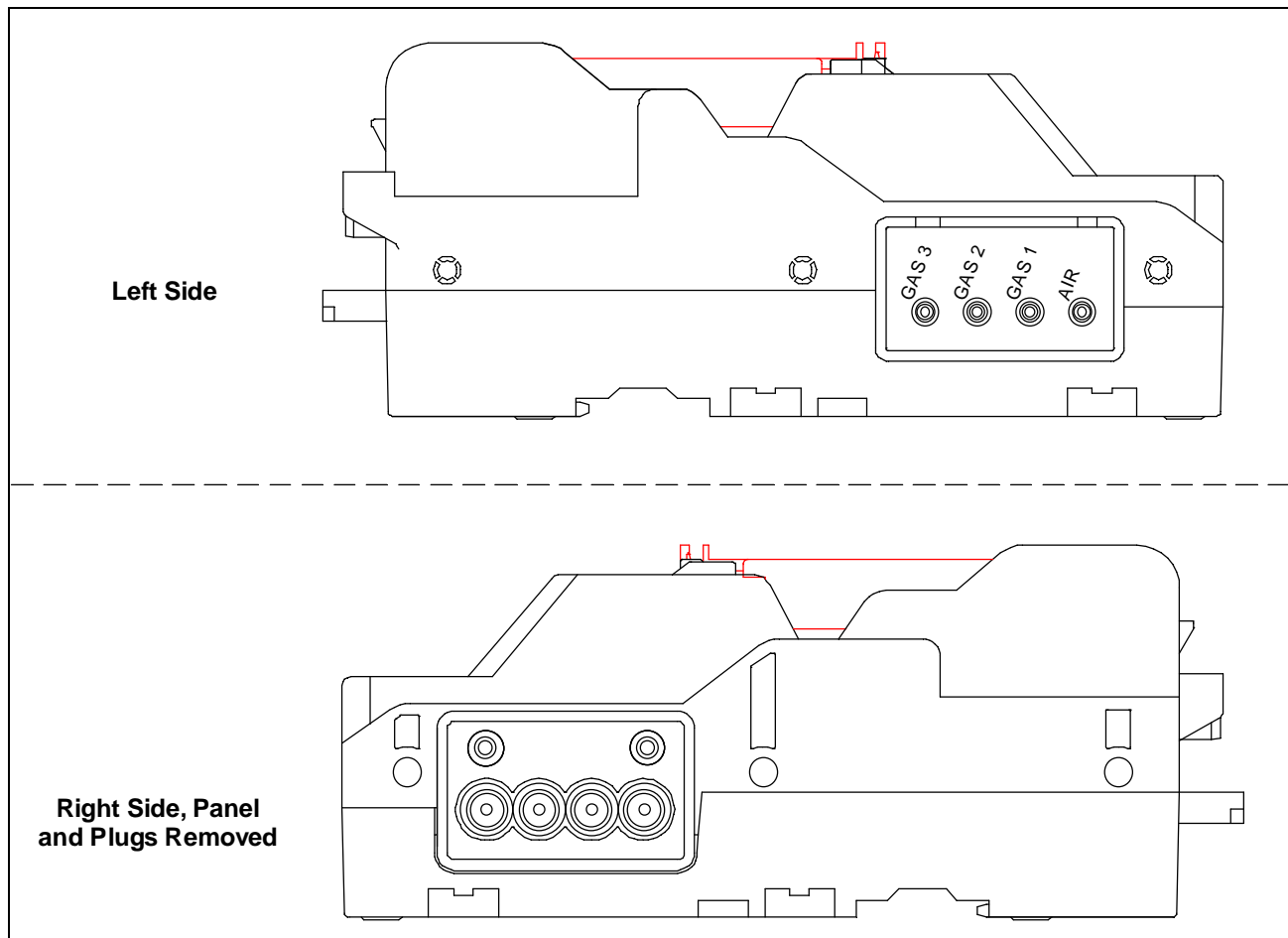


Figure 3: Cylinder Connection

Standard Accessories

Air Filter and Exhaust Tubing

A cylindrical particle filter with a short length of tubing is supplied with the SDM-3R for installation to the AIR fitting on the back panel. The filter keeps particulate contamination out of the docking station.

A 10 foot length of 5/16 inch ID polyurethane tubing is provided for connection to the exhaust fitting on the back panel to allow routing of the exhaust to a location such as an open window where the exhaust can disperse.

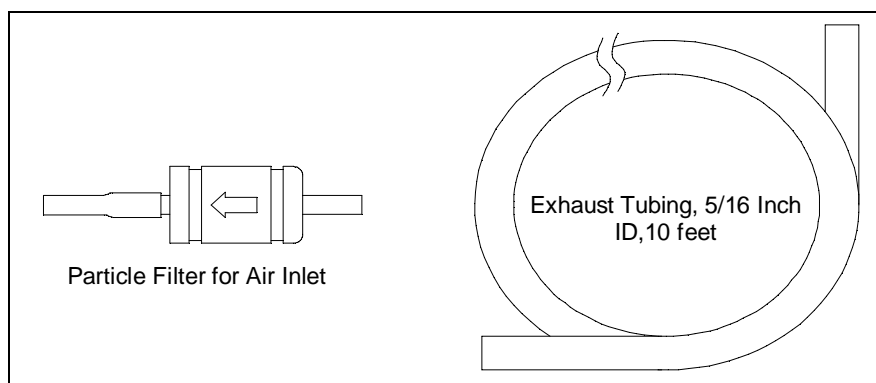


Figure 5: Air Filter & Exhaust Tubing

WARNING: Do not use an exhaust tube that is longer than 15 feet. The increased flow restriction caused by a longer tube may affect gas response and cause inaccurate calibration and bump test results.

Calibration Tubing

A 3-foot 3/16 inch ID tube is included for connecting a demand flow regulator to an SDM-3R gas inlet fitting.

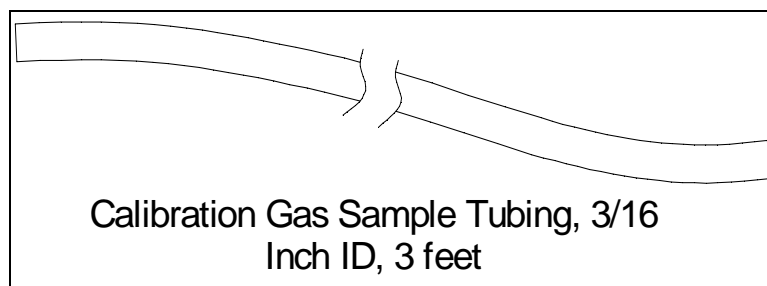


Figure 6: Air Filter & Exhaust Tubing

Single-Station AC Adapter

The single-station AC adapter is a wall plug style adapter with a 4 foot cable. The end of the cable has a plug that connects to the SDM-3R's power jack. A screw included with the SDM-3R allows you to secure the plug to the SDM-3R's jack if desired. The AC adapter is rated 100 - 240 VAC input, 5.99 VDC 2 A output.

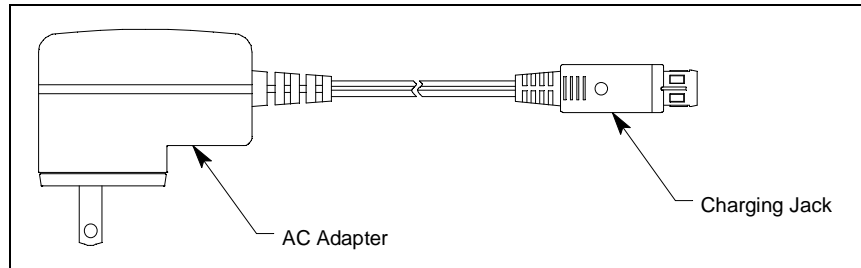


Figure 7: Single-Station AC Adapter

USB Cable

A Type A to Type B USB cable is used to connect the SDM-3R to a PC which is required for using the SDM-3R in the PC Controlled configuration. If you have a multi-station system, each SDM-3R must have its own USB connection.

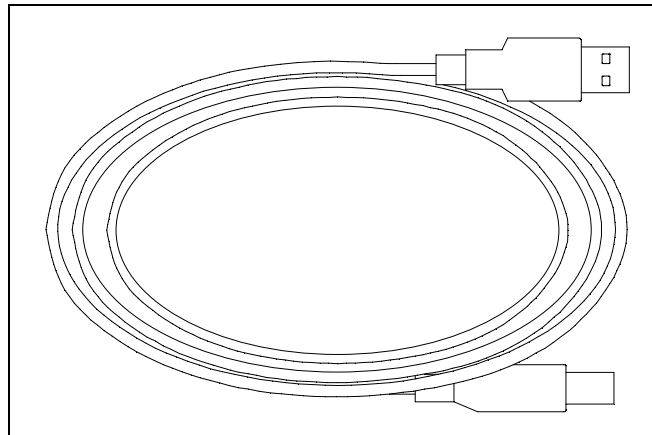


Figure 8: USB Cable

Ethernet Cable

A 5 foot length of black Ethernet cable allows for the LAN connectivity function of the SDM-3R to be used. One end of the cable is plugged into the LAN port on the left side of the SDM-3R and the other end is plugged into one of the building's network ports. If you have a multi-station system, each SDM-3R must have its own Ethernet connection.

USB Drive

A USB drive is used for copying data from the SDM-3R's memory and importing it into the PC Program.

Optional Accessories

USB Hub

If you have more docking stations than you have available USB ports, you will need a USB hub. RKI offers both a 4-port hub and a 7-port hub. If you have more than 7 docking stations, you will need to purchase one of each hub. Do not connect one hub to the other. Make sure that each USB hub has its own USB port on your computer.

If your USB hub has an AC adapter, it does not need to be plugged in for SDM-3R operation.

Connection Brackets

Each SDM-3R is provided with 2 connection brackets that are used to mechanically connect one SDM-3R to another.

Wall Mounting Brackets

The SDM-3R can be mounted to the wall, if desired, using 2 mounting brackets. See “Wall Mounting the SDM-3R, Optional” on page 24 for a description of how many wall mounting brackets are needed depending on how many SDM-3Rs are in your system.

Cylinder Holder

A cylinder holder allows a calibration cylinder to securely sit on a desktop or benchtop.

Demand Flow Regulator

A demand flow regulator installs on a calibration cylinder to allow the SDM-3R to draw calibration gas.

Calibration Cylinder

A cylinder with a known gas concentration must be used for bump testing and calibration.

CO₂ Scrubber

A CO₂ scrubber can be used in place of a N₂ cylinder for zeroing the CO₂ sensor. The scrubber has a flow direction and needs to be installed correctly when used.

A single piece of tubing connects both ends of the scrubber when not in use. To prolong the life of the scrubber, be sure the tubing is connected to both ends of the scrubber while the scrubber is not in use or while it is being stored.

Replace the scrubber when you notice the pellets in the scrubber tube beginning to break down into powder.

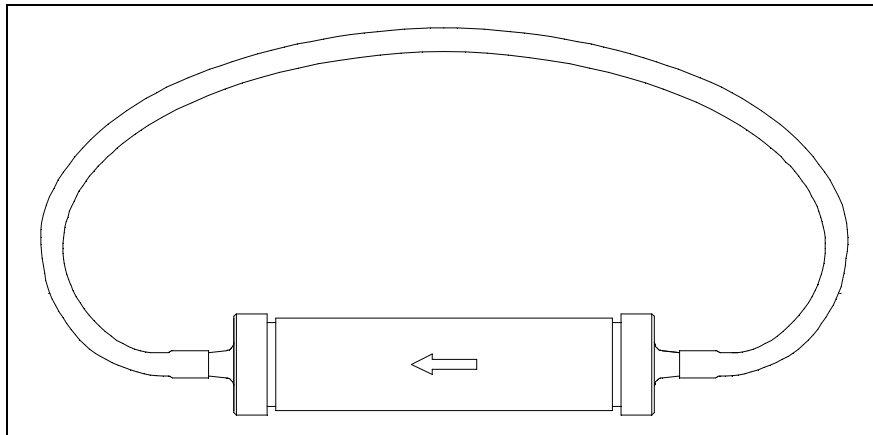


Figure 9: CO₂ Scrubber

Chapter 3: Hardware Setup

Overview

Setting up the SDM-3R for use in its PC Controlled Mode includes: connecting multiple SDM-3Rs together (optional), connecting the AC adapter, air filter, and exhaust tubing, wall mounting the station (optional), and connecting calibration gas. Instructions to complete each of these tasks is in this section.

Connecting Multiple SDM-3Rs Together

Up to 10 SDM-3Rs can be connected together.

1. Be sure that the SDM-3Rs are not connected to power.
2. For every station except the one that will be located on the far right side of the bank:
 - a. Unscrew the two screws that retain the panel on the right side of the station. The screws are not captive. Be sure not to lose them.
 - b. Use needle nosed pliers to remove the clear plugs that are installed in the four mating sample fittings.
 - c. Save the panel, the screws, and the four plugs in a safe place.

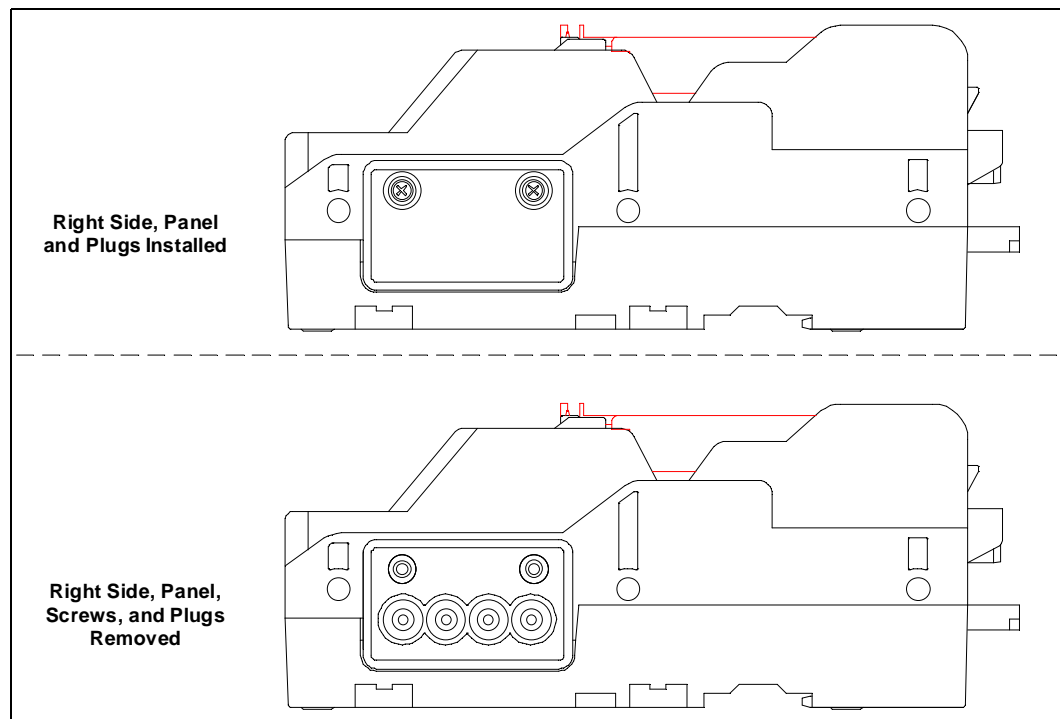


Figure 10: Panel and Plug Removal

3. Starting with the two left-most stations, line up the sample fitting connections and push the two stations together until the housings are touching.

4. Add stations to the right side of the bank using the same procedure. The last station installed should be the one that still has a panel on the right side.
5. (Optional) Use the metal connection brackets and screws (sold separately) to secure the two connection points on the bottom of the SDM-3R to each other.

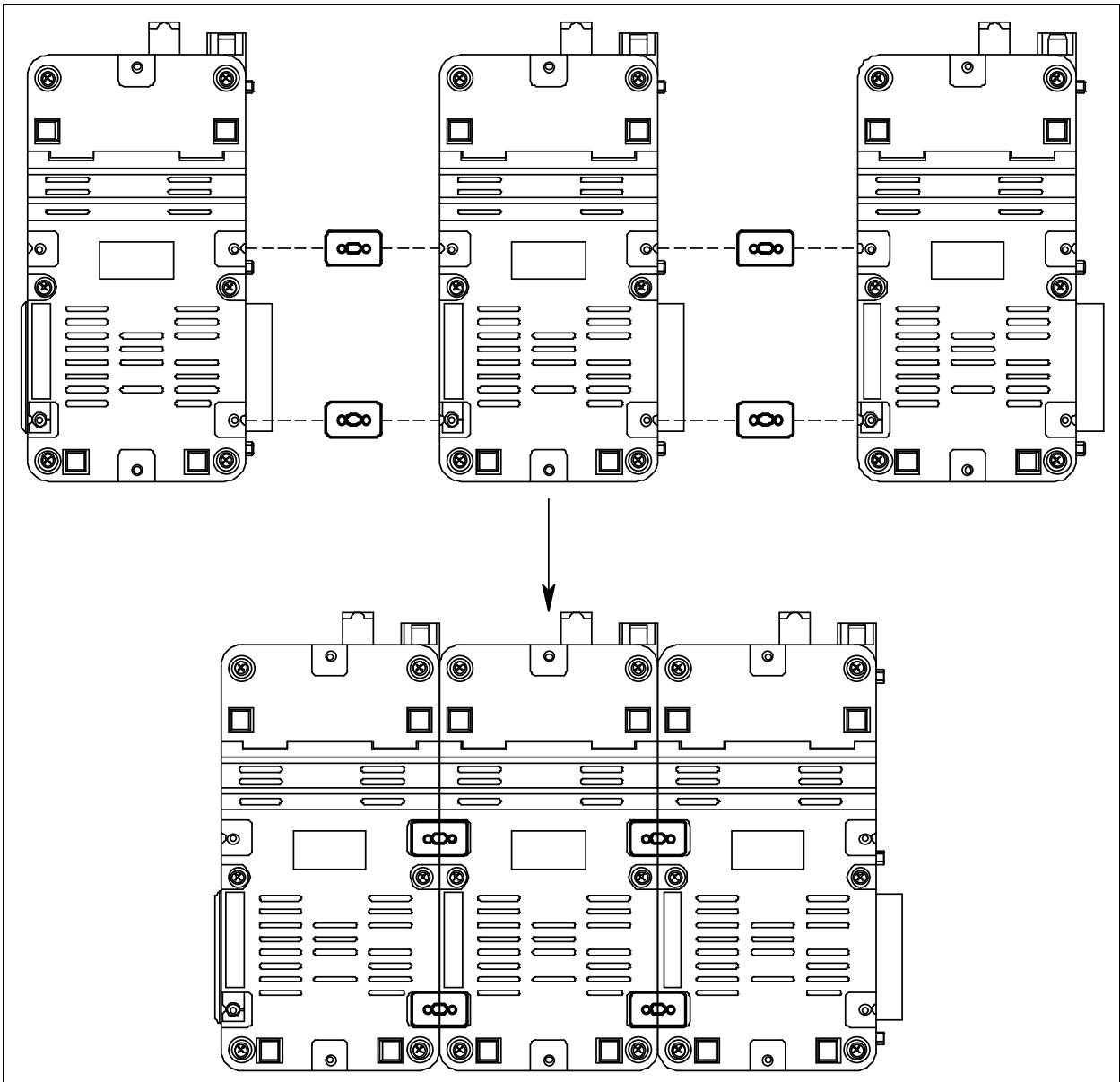


Figure 11: Connecting SDM-3Rs Together

Hardware Assembly

Perform the following to connect the AC adapter, install the air filter, and connect the exhaust tubing.

1. Place the SDM-3R(s) on a convenient table top near an AC wall socket in a well ventilated area. A location near a window that can be opened is best so that the exhaust can be routed to the window.
2. Connect the AC adapter's wall plug into a wall AC socket.
3. Insert the plug on the end of the AC adapter's output cable into the power jack on the left side of the SDM-3R. If desired, use the screw provided in the bag with the particle filter to secure the AC adapter to the SDM-3R.

NOTE: If you have multiple SDM-3Rs connected to each other, each SDM-3R needs its own power.

4. Install the air filter so that the arrow on the filter that indicates direction of flow is pointing towards the AIR fitting.
5. Install the 10 foot long 5/16 inch ID flexible tube that is included with the SDM-3R on the exhaust fitting. Route the tube to an area where the exhaust can be safely dispersed, such as an open window.

Exhaust tubing from multiple SDM-3Rs can be daisy chained together in a manifold for more convenient operation. If you wish to manifold the exhaust, you must order 1 T-fitting (17-0611RK) and 1 check valve (32-0504RK) per SDM-3R. See "Assembling a Manifold for Multiple SDM-3Rs" for instructions.

CAUTION: *The maximum recommended length for the exhaust tube is 15 feet. Using tubing longer than 15 feet or with an ID smaller than 5/16 inch may adversely affect bump test and calibration accuracy.*

6. Connect the provided USB cord from the type B USB port on the back of the SDM-3R to an available USB port on your computer or to a USB hub that is connected to your computer.

Assembling a Manifold for Multiple SDM-3Rs

Up to 10 SDM-3Rs can be manifolded together. The exhaust lines can also be manifolded together and be routed away from the docking stations with only one 10 foot long 5/16 inch piece of tubing.

Each SDM-3R is shipped with exhaust tubing. If you wish to manifold the exhaust, you must order 1 T-fitting (17-0611RK) and 1 check valve (32-0504RK) per SDM-3R.

Exhaust Tubing

Reference Figure 12 for the instructions below.

1. Cut a 1-2 inch piece of 5/16 inch tubing for each SDM-3R and connect it to each unit's exhaust fitting.

2. Connect the check valves to the short pieces of tubing already installed at the exhaust fittings. Be sure that the arrows that appear on the check valve are pointing **away** from the exhaust fitting.
3. Cut a 2-3 inch piece of 5/16 inch tubing for every SDM-3R except the first one and connect it to the other end of the check valve.
4. Insert the T-fittings into the tubing so that the remaining two ports on the T-fitting are perpendicular to the exhaust tube and check valve.
5. For the first SDM-3R, cut a 9-10 inch piece of 5/16 inch tubing and connect it from the check valve on the first SDM-3R to the closest port on the second SDM-3R's exhaust T-fitting.
6. Use one of the provided 10 foot lengths of tubing and connect it to the T-fitting on the last SDM-3R. The maximum recommended exhaust tube length is 10 feet.
7. For the remaining SDM-3Rs, cut 6-7 inch pieces of 5/16 inch tubing and connect the remaining T-fittings.

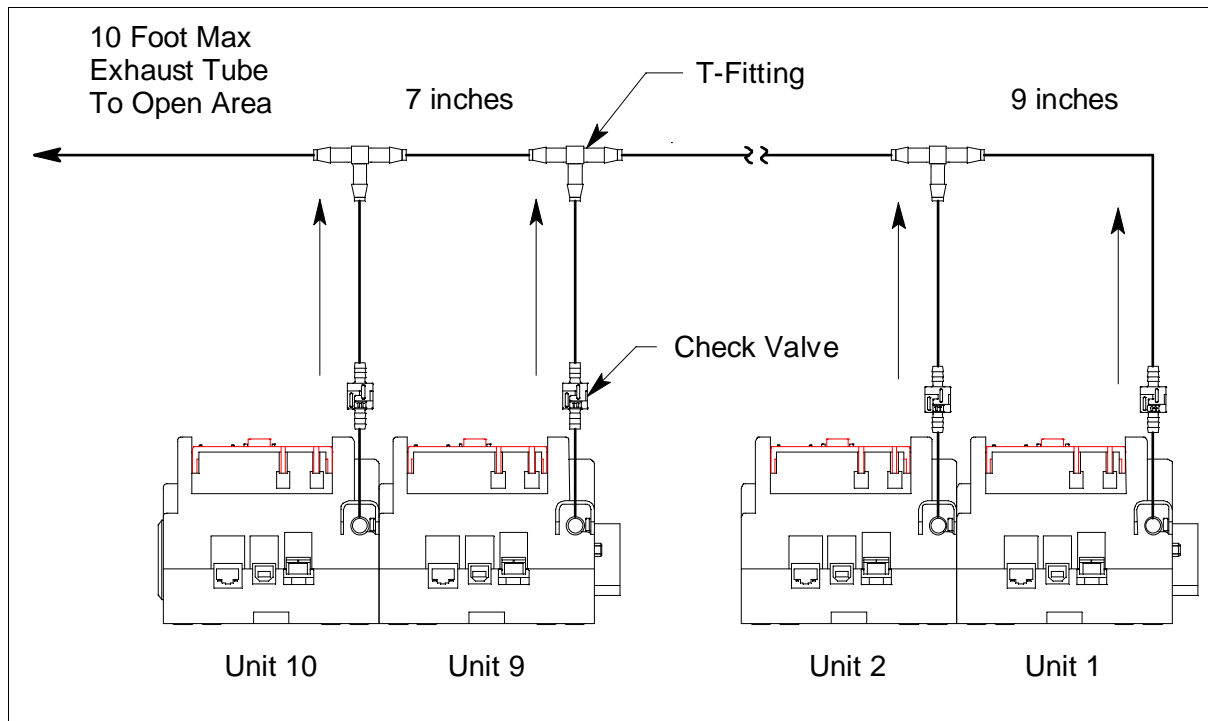


Figure 12: Exhaust Tubing Connections

Wall Mounting the SDM-3R, Optional

Single SDM-3Rs or multiple SDM-3Rs connected together as described in “Connecting Multiple SDM-3Rs Together” on page 20 can be mounted to the wall using mounting brackets. The wall mounting brackets are not supplied as standard with the SDM-3R. If you are wall mounting a bank of SDM-3Rs, see the figure below to determine how many wall mounting brackets you need to order.

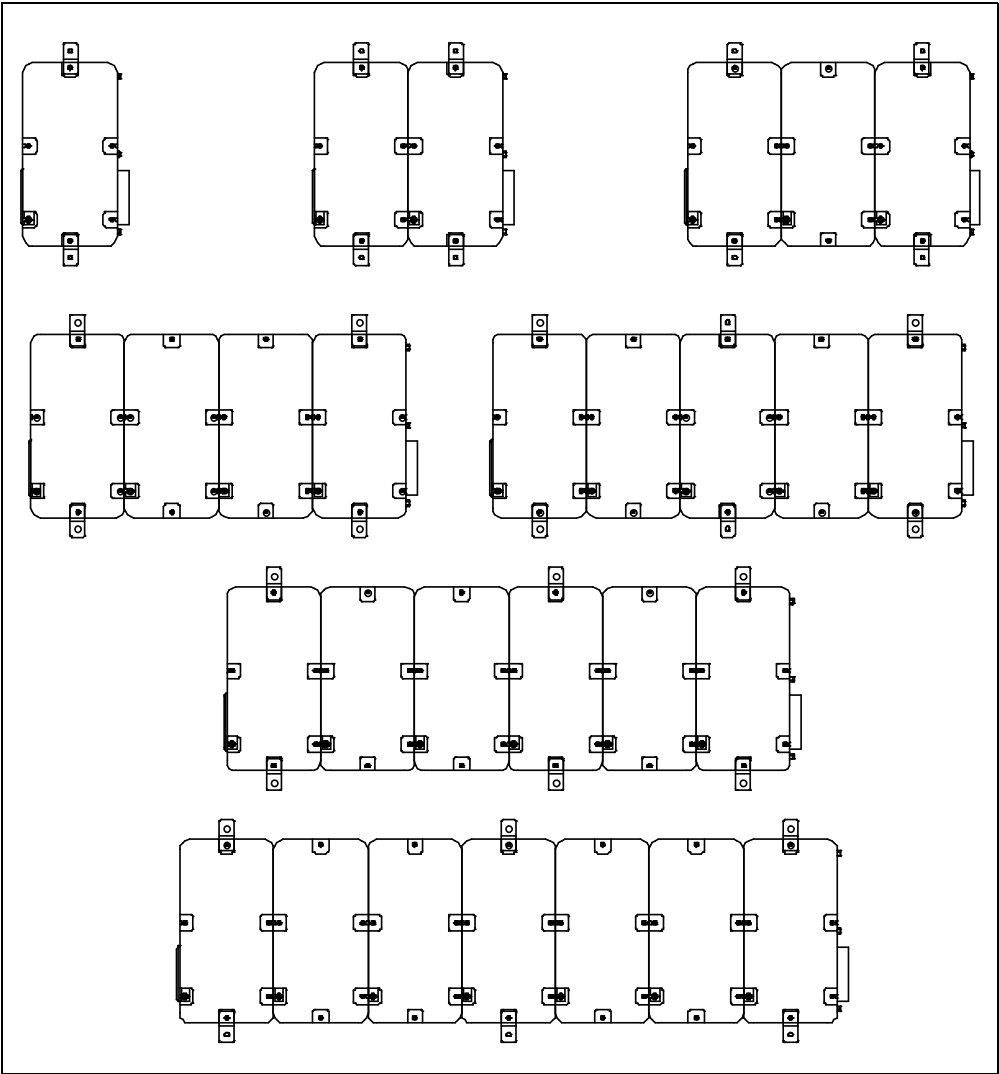


Figure 13: Wall Mounting 1-7 SDM-3Rs

# of SDM-3Rs	Total # of wall mounting brackets necessary
1 SDM-3R	2 wall mounting brackets
2-4 SDM-3Rs	4 wall mounting brackets
5-7 SDM-3Rs	6 wall mounting brackets

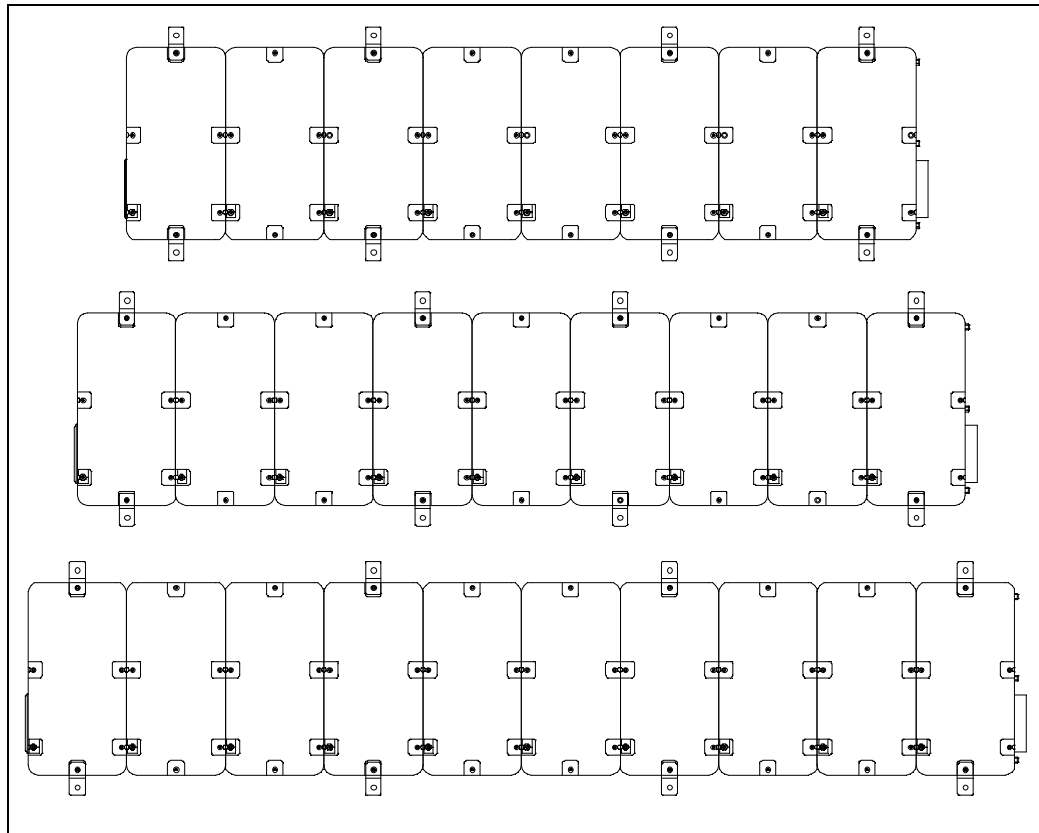


Figure 14: Wall Mounting 8-10 SDM-3Rs

# of SDM-3Rs	Total # of wall mounting brackets necessary
8-10 SDM-3Rs	8 wall mounting brackets

1. If you are mounting multiple SDM-3Rs, be sure your SDM-3Rs are properly connected and secured to each other.
2. Connect the wall mounting brackets to the SDM-3R(s) using the provided screws. The wall mounting brackets are not straight. They have a short section and a long section. The short section has a smaller hole than the long section. Screw the short section into the SDM-3R making sure that the long section goes away from the station and is flush with the back of the SDM-3R.

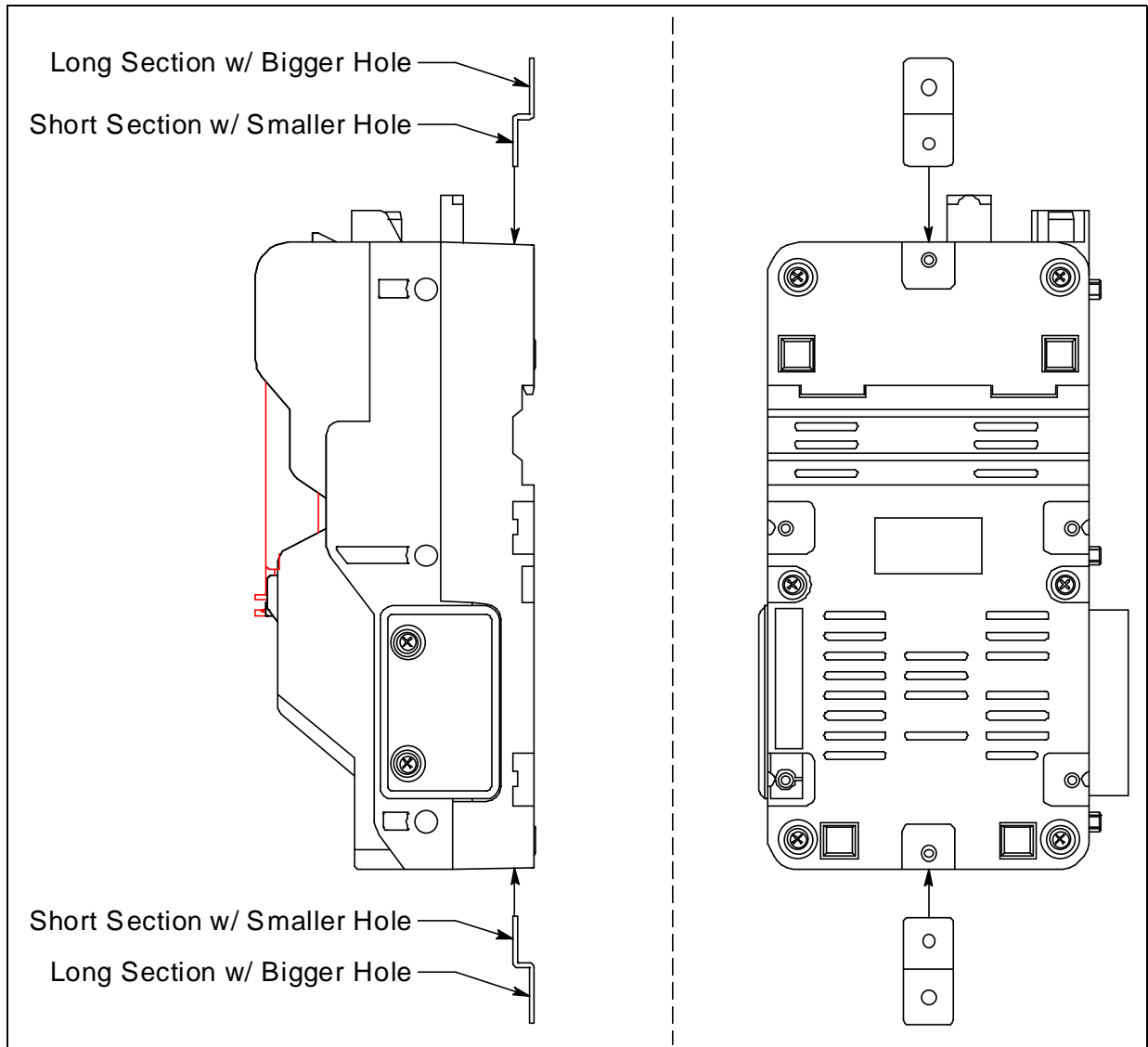


Figure 15: Wall Mounting Bracket Installation

3. Position the SDM-3R(s) on the wall where you intend to mount them.
4. Screw the wall mounting brackets into the wall. Make sure the mounting screws and the material they are screwed into are appropriate to support the weight of the system.

Installing the Cylinder Holder, Optional

1. Choose a location for the calibration cylinders that is close to the SDM-3R.
2. 4 pads with adhesive on each side are included with each cylinder holder.
3. Remove the backing from one side of each pad and stick it to a corner on the bottom of the cylinder holder. If desired and/or practical, 2 pads can be used for the bottom and 2 pads can be used for the back.
4. Remove the backing from each of the installed pads and press the cylinder holder firmly into position.

Connecting Calibration Gas

The GAS 1, GAS 2, and GAS 3 fittings on the left side of the docking station are designed to be used with a calibration gas cylinder that is fitted with a demand flow regulator. See page 152 for part numbers of available cylinders.

The number of active gas fittings depends on how many solenoid valves are installed in your docking station. The AIR and GAS 1 fittings are always active. The GAS 2 and GAS 3 fittings are only active if the docking station was ordered with 2 or 3 solenoid valves, respectively.

AIR

The AIR fitting needs one of the following:

- a. A cylinder of zero emissions air

OR

- b. A fresh air area

GAS 1 - GAS 3 Cylinders

See the tables below for information about necessary calibration cylinders and what inlet to connect them to.

If the SDM-3R has 2 or 3 solenoid valves and a GX-3R (Pro) combination requires more cylinders than the number of installed solenoid valves, you can assign the remaining channel(s) to the last solenoid valve during bump test and/or calibration setup. The PC program will prompt you to change cylinders during bump testing and/or calibration. You can change cylinders as many times as needed as long as 2 or 3 solenoid valves are installed in the SDM-3R. Changing cylinders is NOT an option when only 1 solenoid valve is installed.

NOTE: A GX-3R Pro with a CO₂ sensor installed must be used with an SDM-3R that has a least 2 solenoid valves installed. If the GX-3R Pro is used with an SDM-3R that only has 1 solenoid valve, only the standard 4 gases will be tested.

NOTE: If 2 or more calibration cylinders are required for calibration, the SDM-3R intended for PC controlled operation must have 2 or more solenoid valves installed.

Table 2: Instrument Types and Cylinder Assignment Combinations

Instrument Types		Gas Inlet: Calibration Cylinder
All Instruments: 3-gas (LEL/Oxy/CO)		GAS 1: 3-gas mix with LEL/Oxy/CO
All Instruments: 3-gas (LEL/Oxy/H2-compensated CO)		GAS 1: 3-gas mix with LEL/Oxy/CO GAS 2: H2 (only needed if calibrating an H2-compensated CO sensor)
All Instruments: 3-gas (LEL/Oxy/CO) + CO2	Option 1	GAS 1: 3-gas mix with LEL/Oxy/CO GAS 2: N2 (or CO2 scrubber) GAS 3: CO2
	Option 2	GAS 1: 3-gas mix with LEL/Oxy/CO GAS 1: N2* GAS 2: CO2
All Instruments: 3-gas (LEL/Oxy/H2-compensated CO) + CO2	Option 1	GAS 1: 3-gas mix with LEL/Oxy/CO GAS 2: H2 (only needed if calibrating an H2-compensated CO sensor) GAS 3: N2 (or CO2 scrubber) CHG 3: CO2
	Option 2	GAS 1: 3-gas mix with LEL/Oxy/CO GAS 1: N2* GAS 2: H2 (only needed if calibrating an H2-compensated CO sensor) GAS 3: CO2
	Option 3	GAS 1: 3-gas mix with LEL/Oxy/CO GAS 1: N2* GAS 2: H2 (only needed if calibrating an H2-compensated CO sensor) CHG 2: CO2
All Instruments: 3-gas (LEL/Oxy/CO) + SO2		GAS 1: 3-gas mix with LEL/Oxy/CO GAS 2: SO2
All Instruments: 4-gas (LEL/Oxy/CO/H2S)		GAS 1: 4-gas mix with LEL/Oxy/CO/H2S

* To zero the CO₂ sensor with background gas from a 3-gas or 4-gas mix, assign LEL, O₂, CO, H₂S, **and** N₂ to the GAS 1 inlet.

Table 2: Instrument Types and Cylinder Assignment Combinations

Instrument Types		Gas Inlet: Calibration Cylinder
All Instruments: 4-gas (LEL/Oxy/CO/H2S) + CO2	Option 1	GAS 1: 4-gas mix with LEL/Oxy/CO/H2S GAS 2: N2 (or CO2 scrubber) GAS 3: CO2
	Option 2	GAS 1: 4-gas mix with LEL/Oxy/CO/H2S GAS 1: N2* GAS 2: CO2
All Instruments: 4-gas (LEL/Oxy/CO/H2S) + SO2	Option 1	GAS 1: 5-gas mix with LEL/Oxy/CO/H2S/ SO2
	Option 2	GAS 1: 4-gas mix with LEL/Oxy/CO/H2S GAS 2: SO2
Instrument 1: 3-gas (LEL/Oxy/CO) + SO2 Instrument 2: 3-gas (LEL/Oxy/CO) + CO2	Option 1	GAS 1: 3-gas mix with LEL/O2/CO GAS 2: SO2 GAS 3: N2 (or CO2 scrubber) CHG 3: CO2
	Option 2	GAS 1: 3-gas mix with LEL/O2/CO GAS 1: N2* GAS 2: SO2 GAS 3: CO2
Instrument 1: 4-gas (LEL/Oxy/CO/H2S) + SO2 Instrument 2: 4-gas (LEL/Oxy/CO/H2S) + CO2	Option 1	GAS 1: 5-gas mix with LEL/Oxy/CO/H2S/ SO2 GAS 2: N2 (or CO2 scrubber) GAS 3: CO2
	Option 2	GAS 1: 4-gas mix with LEL/Oxy/CO/H2S GAS 2: SO2 GAS 3: N2 (or CO2 scrubber) CHG 3: CO2
	Option 3	GAS 1: 4-gas mix with LEL/Oxy/CO/H2S GAS 1: N2* GAS 2: SO2 GAS 3: CO2

* To zero the CO₂ sensor with background gas from a 3-gas or 4-gas mix, assign LEL, O₂, CO, H₂S, **and** N₂ to the GAS 1 inlet.

Table 2: Instrument Types and Cylinder Assignment Combinations

Instrument Types		Gas Inlet: Calibration Cylinder
Instrument 1: 4-gas + SO ₂ Instrument 2: 4-gas (H ₂ -compensated CO)	Option 1	GAS 1: 5-gas mix with LEL/Oxy/CO/H ₂ S/SO ₂ GAS 2: H ₂ (only needed if calibrating an H ₂ -compensated CO sensor)
	Option 2	GAS 1: 4-gas mix with LEL/Oxy/CO/H ₂ S GAS 2: SO ₂ GAS 3: H ₂ (only needed if calibrating an H ₂ -compensated CO sensor)

* To zero the CO₂ sensor with background gas from a 3-gas or 4-gas mix, assign LEL, O₂, CO, H₂S, **and** N₂ to the GAS 1 inlet.

Connecting Calibration Cylinders

1. If the area around the docking station is not considered a fresh air area (an area free of combustible and toxic gases and of normal oxygen content, 20.9%) install a tube not longer than 10 feet on the filter attached to the AIR fitting on the left side of the docking station and route it to a fresh air area or connect a cylinder of zero air with a demand flow regulator to the AIR fitting.
2. Install the demand flow regulator(s) on the calibration gas cylinder(s).

NOTE: Do not connect pressurized gas directly to the SDM-3R. Be sure to install a demand flow regulator on the cylinder before connecting it to the SDM-3R.

3. Connect the demand flow regulator to the appropriate inlet fitting using 3/16 inch ID sample tubing.
4. If you plan to use a CO₂ scrubber to zero the CO₂ sensor, do not connect the CO₂ scrubber yet. Prolong the life of the CO₂ scrubber by only connecting it to the SDM-3R when you need to use it. Store the CO₂ scrubber with the tubing connected to both ends.

Chapter 4: Program Setup

Overview

This chapter describes how to install the SDM-3R Docking Station PC Controller Program, set up cylinders in the Cylinders Window, and set up the PC Program operation in the Config Window.

See “Chapter 5: Operation” on page 52 for a description of program operation.

Installing the SDM-3R PC Controller Program

1. Launch Windows®.
2. Exit from all applications and open windows.
3. Go to www.rkiinstruments.com/sdm3r.
4. Click on the **Download** tab.
5. Click the **SDM-3R PC Controller Software** link.
6. A .zip file will begin to download. Save the .zip file.
7. Extract the contents of the .zip file.
8. Double click the setup.exe file.
9. The SDM-3R Docking Station PC Controller InstallShield Wizard comes up to guide you through installation. Follow the InstallShield Wizard instructions.
10. A Device Driver Window will appear prompting you to install necessary drivers. You cannot continue the installation without installing the drivers.

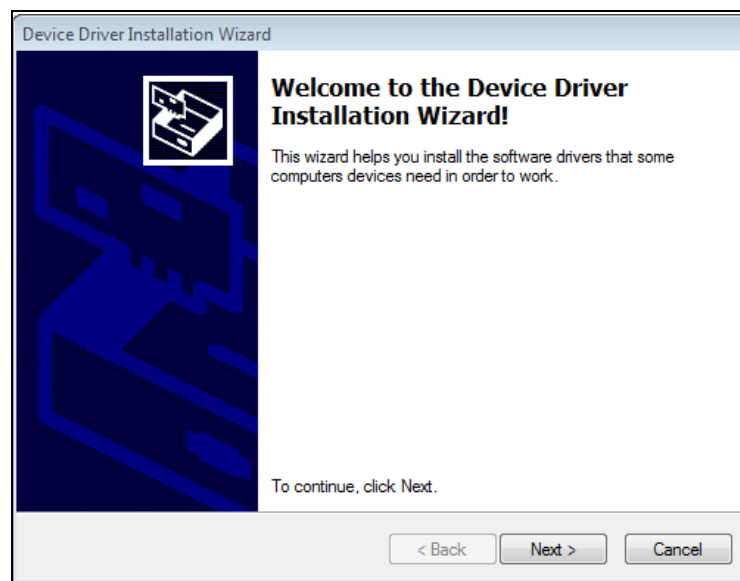


Figure 16: Device Driver Installation

11. Click **Next** to install the drivers. The Wizard will find the appropriate drivers.
12. Click **Finish** once the drivers are successfully installed.

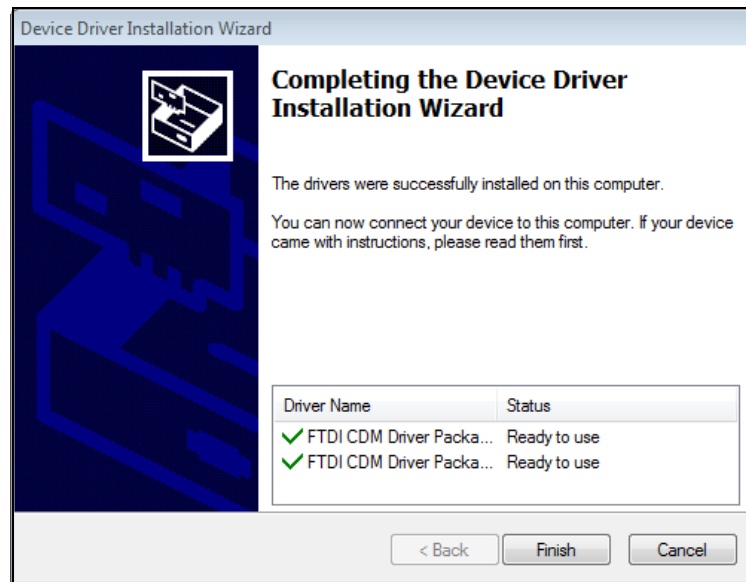


Figure 17: Finish Device Driver Installation

The installation will continue.

13. Follow the on-screen instructions to complete software installation.
14. To complete the driver installation, ensure that your docking station (or the master docking station if you plan to have a bank of them) are connected to your computer.
15. Turn on the docking station by flipping the power switch to the ON position.
16. The first time an SDM-3R is turned on after being connected to the computer, the SDM-3R needs some time to be recognized by the computer. The status bar will indicate that the drivers are being configured and will alert you when the SDM-3R is ready to use.

Setting Up Cylinders

The Cylinders Window allows you to keep track of cylinders that are in use and the expiration date for those cylinders. If a cylinder's expiration date is nearing or has passed, the PC Program will alert you in the message area of the main program window.

The Cylinders Window shows the cylinder name, part number, expiration date, and active status, for each cylinder. It comes with a list of predefined cylinders that are fairly common. If a cylinder that you need to use is not on this list, you can define your own cylinder.

Selecting a Cylinder from the Predefined List

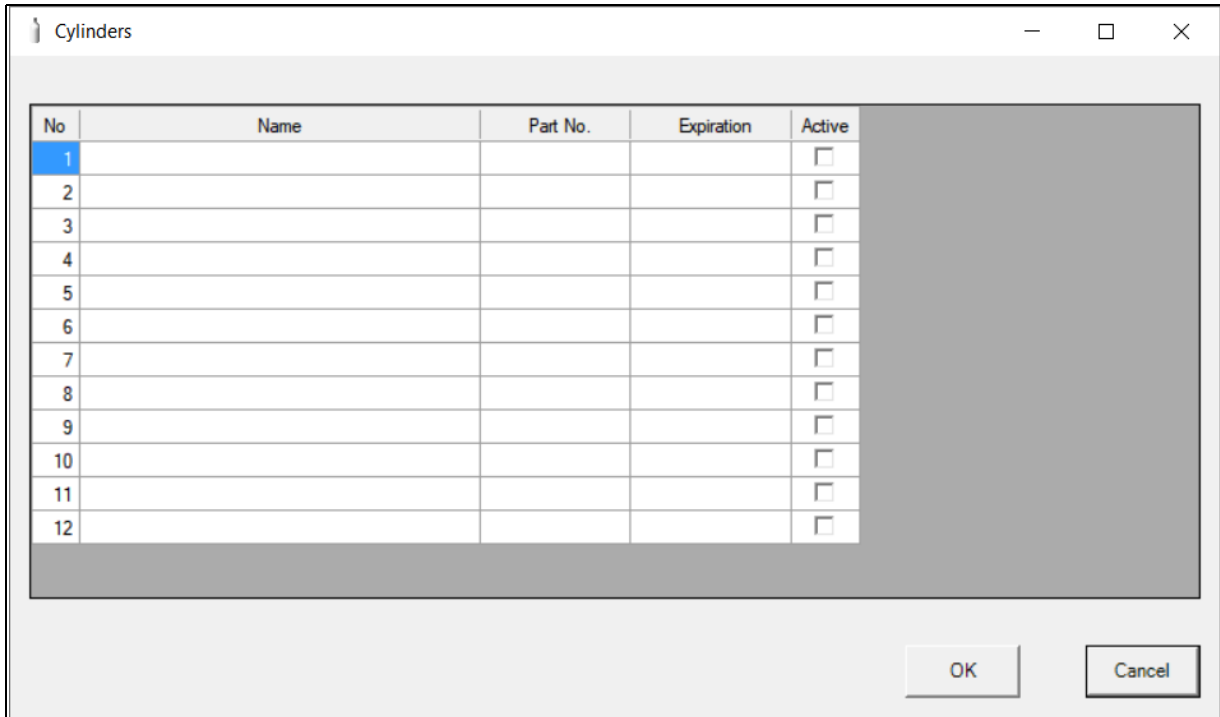
The Cylinders Window comes with several predefined cylinders that you can choose from.

1. Click **Start** on the Windows Icon Tray, then select **Programs/SDM-3R**. You may also double click the shortcut created on your desktop.

2. If you are starting the software for the first time, a message window appears informing you that a database has been created. Click **OK**.
3. Click **Cylinders** along the top of the main program window.



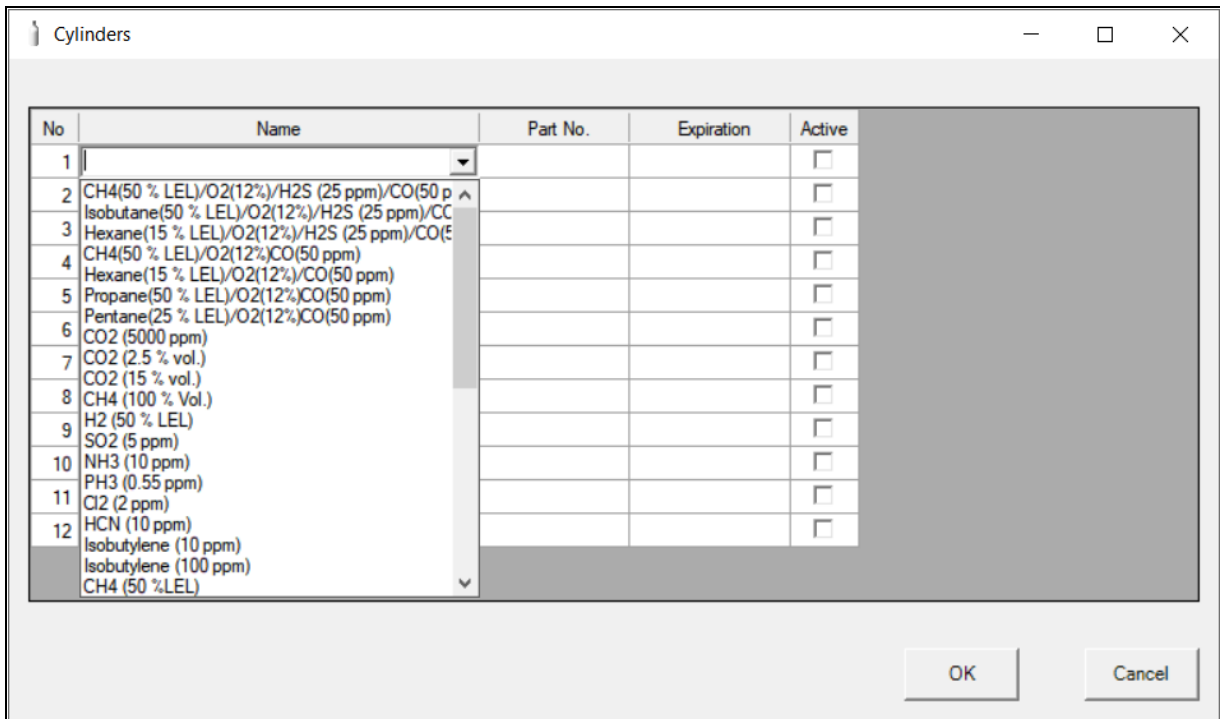
4. The Cylinders Window will appear.

A screenshot of a software window titled "Cylinders". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. The main content area contains a table with five columns: "No", "Name", "Part No.", "Expiration", and "Active". The "No" column contains numbers 1 through 12, with the first row (1) highlighted in blue. The "Active" column contains checkboxes, all of which are currently unchecked. To the right of the table is a large, empty gray rectangular area. At the bottom right of the window are two buttons: "OK" and "Cancel".

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

Figure 18: Cylinders Window

- Click the **Name** field, click the drop down menu icon, and select a cylinder.



The screenshot shows a window titled "Cylinders" with a table of predefined cylinders. The table has five columns: "No", "Name", "Part No.", "Expiration", and "Active". The "Active" column contains checkboxes. A list of cylinder names is shown in a dropdown menu on the left side of the table.

No	Name	Part No.	Expiration	Active
1				<input type="checkbox"/>
2	CH4(50 % LEL)/O2(12%)/H2S (25 ppm)/CO(50 p			<input type="checkbox"/>
3	Isobutane(50 % LEL)/O2(12%)/H2S (25 ppm)/CC			<input type="checkbox"/>
4	Hexane(15 % LEL)/O2(12%)/H2S (25 ppm)/CO(5			<input type="checkbox"/>
5	CH4(50 % LEL)/O2(12%)CO(50 ppm)			<input type="checkbox"/>
6	Hexane(15 % LEL)/O2(12%)/CO(50 ppm)			<input type="checkbox"/>
7	Propane(50 % LEL)/O2(12%)CO(50 ppm)			<input type="checkbox"/>
8	Pentane(25 % LEL)/O2(12%)CO(50 ppm)			<input type="checkbox"/>
9	CO2 (5000 ppm)			<input type="checkbox"/>
10	CO2 (2.5 % vol.)			<input type="checkbox"/>
11	CO2 (15 % vol.)			<input type="checkbox"/>
12	CH4 (100 % Vol.)			<input type="checkbox"/>
	H2 (50 % LEL)			<input type="checkbox"/>
	SO2 (5 ppm)			<input type="checkbox"/>
	NH3 (10 ppm)			<input type="checkbox"/>
	PH3 (0.55 ppm)			<input type="checkbox"/>
	Cl2 (2 ppm)			<input type="checkbox"/>
	HCN (10 ppm)			<input type="checkbox"/>
	Isobutylene (10 ppm)			<input type="checkbox"/>
	Isobutylene (100 ppm)			<input type="checkbox"/>
	CH4 (50 %LEL)			<input type="checkbox"/>

At the bottom right of the window are "OK" and "Cancel" buttons.

Figure 19: Predefined Cylinder List

- When you press the Tab key on your keyboard or click in another field, the **Part No.** field automatically populates. To edit the part number, double click in the **Part No** field and type in a part number.
- Set the expiration date by clicking in the **Expiration** field and clicking the drop down menu that appears. Use the calendar to choose an expiration date. The expiration date box will be highlighted in orange if the expiration date of the cylinder is less than 10 days away. The expiration date box will be highlighted in red if the expiration date has passed.
- Select or deselect the **Active** box. If **Active** is selected, the PC Program will alert you at start up if the cylinder has passed its expiration date. If **Active** is deselected, the program will not alert you.
- Make any other changes to other cylinders.
- Click **OK** and then click **Yes** in the window that comes up to return to the Main Window.

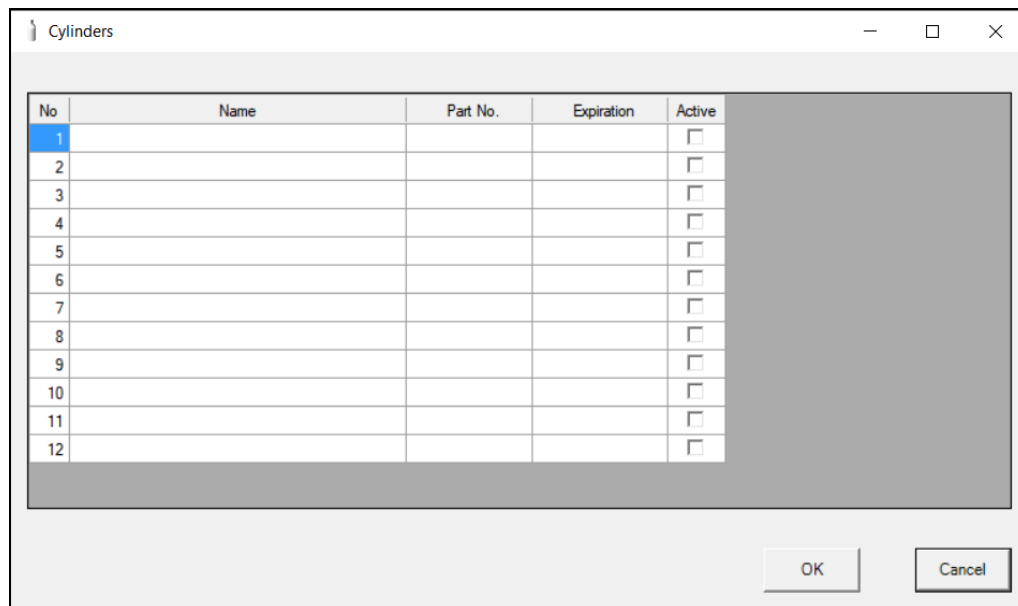
Defining New Cylinders

If your GX-3R (Pro) configuration requires the use of a cylinder that is not in the predefined list, you can add that cylinder by either typing in the information for the cylinder or by editing the information for an existing cylinder.

1. Click **Cylinders** along the top of the main program window.



2. The Cylinders Window will appear.

A screenshot of the "Cylinders" window. The window has a title bar with the text "Cylinders" and standard minimize, maximize, and close buttons. The main area contains a table with five columns: "No", "Name", "Part No.", "Expiration", and "Active". The "No" column has a list of numbers from 1 to 12, with the number 1 highlighted in blue. The "Active" column has checkboxes, all of which are currently unchecked. To the right of the table is a large, empty gray rectangular area. At the bottom right of the window are two buttons: "OK" and "Cancel".

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

Figure 20: Cylinders Window

3. Double click in the **Name** field and type in a name for the cylinder. Use something descriptive that will help you distinguish it from other cylinders. You can also select a pre-defined cylinder and then edit the name that is automatically generated.
4. If you want to enter a part number for the cylinder, double click in the **Part No** field and type in a part number. This field is normally used for an RKI part number.
5. Set the expiration date by clicking in the **Expiration** field and clicking the drop down menu that appears. Use the calendar to choose an expiration date. The expiration date box will be highlighted in orange if the expiration date of the cylinder is less than 10 days away. The expiration date box will be highlighted in red if the expiration date has passed.

6. Select or deselect the **Active** box for the cylinder. If the cylinder is active, the PC Program will alert you at start up if the cylinder has passed its expiration date and will include the associated inlet in testing. If it is not active, the program will not alert you if the cylinder has passed its expiration date and will not include the associated inlet in testing.
If the **Active** box is deselected, the program will not consider it a cylinder being used and will give you an inlet error if you connect an instrument that requires that cylinder for bump testing or calibration.
7. Make any other changes to other cylinders.
8. Click **OK** and then click **Yes** in the window that comes up to return to the Main Window.

Defining PC Program Operation in the Config Window

The Configuration Window allows you to update parameters that only affect PC Program operation, view database information, and change the password to enter the Configuration Window.

Parameter Tab

The Parameter Tab allows you to view or change bump test and calibration settings that only apply to the PC Program operation. Changing anything in the Parameter Tab of the Config Window does not change any settings in the SDM-3R and, therefore, does not affect Standalone Mode operation.

1. While in the main program window, click the **Config** button.
2. Enter the password and click **OK**. The default password is **ABCDE** (case sensitive).

3. The **Parameter** tab is displayed.

Figure 21: Config Window Parameter Tab

4. Change parameters, as necessary.
5. Click **OK** and then click **Yes** in the window that comes up to save the settings and return to the Main Window.

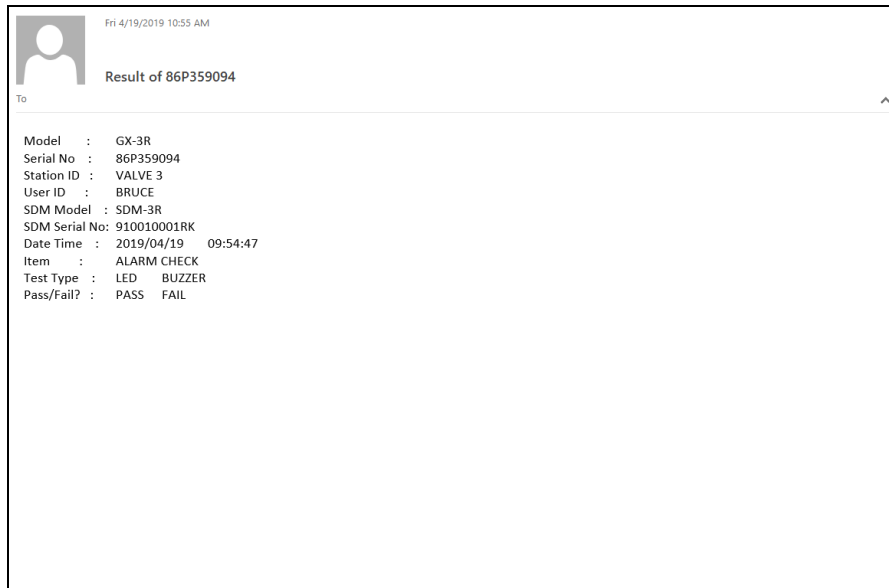
H2-Compensated CO Sensor

Selected: When performing a calibration on a H₂-compensated CO sensor, both the CO and the H₂ response appear calibration gas choices that can be selected or deselected for calibration. The H₂-response needs to be set both monthly and after a new sensor is installed.

Deselected (factory setting): When performing a calibration on a H₂-compensated CO sensor, the H₂ response does not appear as a calibration gas and cannot be calibrated. The CO response for the sensor can still be calibrated.

Email

The PC Program can be configured to send emails out whenever an instrument is bump tested, calibrated, or alarm checked. An example of an alarm check email is shown below.



1. Click **Email**.

A screenshot of the 'Mail' setup window. The window has a title bar labeled 'Mail'. Inside, there are two checkboxes: 'Send Email' and 'Send only on FAIL'. Below these are input fields for 'Server Domain Name', 'Server IP Address' (with '0.0.0.0' entered), 'Address From', and 'Address To'. At the bottom right are 'OK' and 'Cancel' buttons.

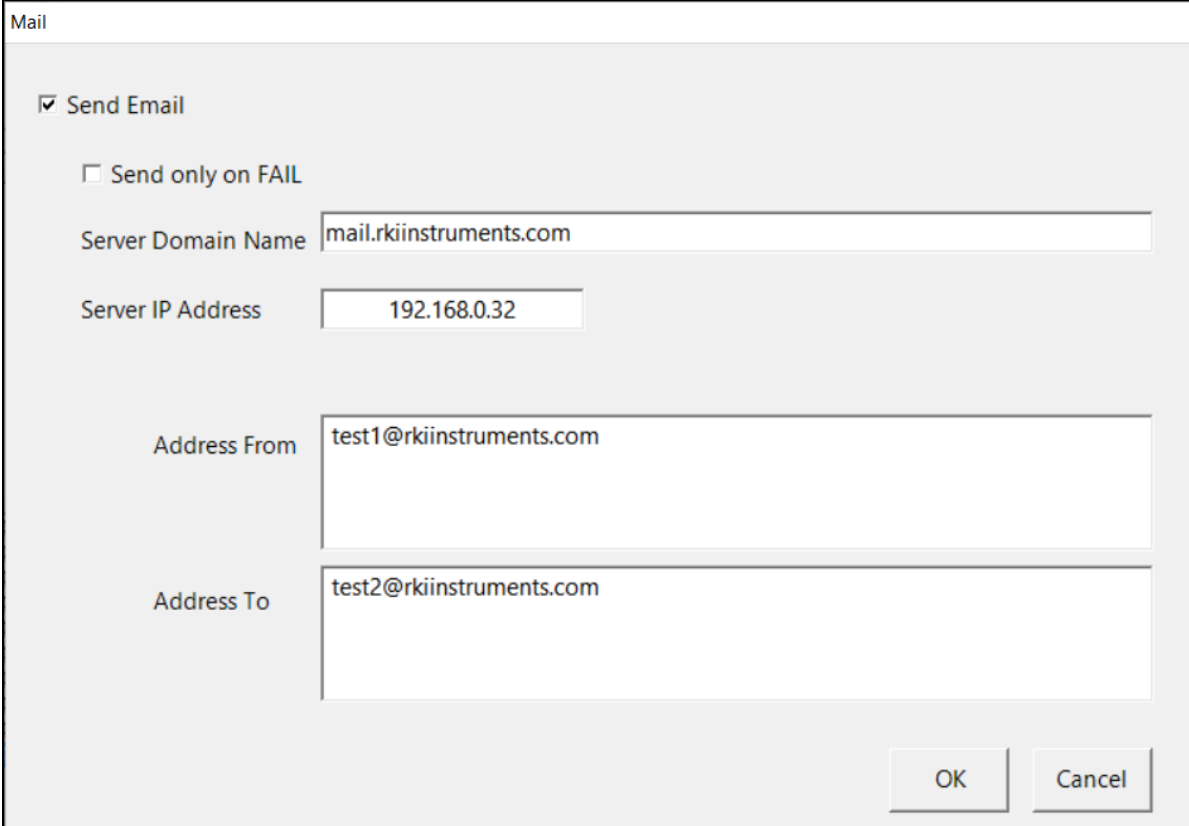
Figure 22: Email Setup Window, Blank

2. Select **Send Email**.

3. If you only want an email to send when a test fails and don't want an email to send when a test passes, select **Send only on FAIL**.
4. Type in the domain name and IP address of your mail server. This information will likely need to be obtained from your IT department.
5. **Address From:** Type in the email address that you want to use to send emails. This address doesn't have to be an address that's currently used on the computer but it does have to be an address on the server.
6. **Address To:** Type in the email address where you want to receive emails. You can only send an email to one email address. This address does not need to be associated with the server information entered in **Server Domain Name** and **Server IP Address** but some servers may block an email to an outside address (such as an @gmail address).

If your server blocks emails to an outside address, you will need to get help from your IT department. In general, ensure the following:

- a. Your computer's IP address is static.
- b. In the server configuration, allow non-exchange servers to relay email from exchange servers by creating a new Receive Connector on the Hub Transport server.
- c. Change the default remote network's IP address to the computer's static IP address.



The screenshot shows a 'Mail' configuration window. It has a title bar 'Mail'. Inside, there is a section with a checked checkbox 'Send Email' and an unchecked checkbox 'Send only on FAIL'. Below these are two text input fields: 'Server Domain Name' containing 'mail.rkiinstruments.com' and 'Server IP Address' containing '192.168.0.32'. Further down are two more text input fields: 'Address From' containing 'test1@rkiinstruments.com' and 'Address To' containing 'test2@rkiinstruments.com'. At the bottom right are 'OK' and 'Cancel' buttons.

Figure 23: Email Setup Window, Filled In

7. Click **OK** to return to the Parameter tab.

Instrument Information Section

Change Parameter

Selected (factory setting): The **Edit** function is active, allowing you to change parameters in connected GX-3R (Pro)s. See page 94 for information about instrument parameters.

Deselected: The **Edit** function is not active and GX-3R (Pro) parameters cannot be edited.

Auto Power OFF Time

This is the length of time that will pass after the last operation is finished before the program will automatically shut off the GX-3R (Pro). It is defined in seconds with a maximum setting of **3600** seconds. The factory setting is **3600** seconds. If a successful bump test, calibration, or alarm check is performed, the program will automatically shut off the GX-3R (Pro) in the time defined in **Power Off After Pass** regardless of the **Auto Power Off** setting.

Power Off After Pass

This is the length of time that will pass after a successful bump test, calibration, or alarm check before the program will automatically shut off the GX-3R (Pro). It is defined in seconds with a maximum setting of **3600** seconds. The factory setting is **15** seconds. If this parameter is set to **0** seconds, the GX-3R (Pro) will not be turned off after a successful bump test, calibration, or alarm check.

Data Logger Section

Down Load Data Logger

Selected: Instrument data is automatically downloaded based on the **Down Load Interval** setting.

Deselected (factory setting): Instrument data is not automatically downloaded. Instrument data can always be manually downloaded.

Clear After Down Load

Selected: The GX-3R (Pro)'s data will be cleared after a data download.

Deselected (factory setting): The GX-3R (Pro)'s data will not be cleared after a data download.

Down Load Interval

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

SDM Section

Initialize Display Order

Selecting **Initialize Display Order** resets the numbers assigned to specific SDM-3Rs and reassigns the numbers as you connect SDM-3Rs to the PC Program.

1. Select **Initialize Display Order**.
2. Click **OK** and then click **Yes** in the window that appears.
3. A window will appear informing you that you need to turn off all SDMs and restart the program. Click **OK**.

4. Click the **Exit** button in the upper right corner of the main program window to exit the program.
5. Turn off all SDM-3Rs.
6. Open the PC Program again.
7. Turn on your SDM-3Rs in the order that you wish for them to appear on the main program window. Typically the order in which the docking stations appear on the screen corresponds to their left to right arrangement on the tabletop.
8. Your SDM-3Rs should all appear on the screen in numerical order. The program will remember each SDM-3R's number. Once the display order is set, if fewer than all of the docking stations are turned on, the stations will still appear in numerical order on the main window, but the stations which are off will not be shown.
9. If you need to reorder the docking stations, repeat steps 1 through 8.

Waiting Time for Auto Process

This parameter defines the time between the instrument connecting to the PC Program and the start of an automatic calibration or automatic bump test. You can set the delay from **0** seconds to **3600** seconds (factory setting is **60** seconds).

Calibration Section

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

Manual Calibration

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

Deselected: A manual calibration cannot be performed.

Auto Calibration

Auto Calibration selected and **Every Time** deselected (factory setting): An automatic calibration is performed only if the instrument is due for calibration.

Auto Calibration selected and **Every Time** selected: An automatic calibration is performed every time an instrument is connected to the PC program regardless of whether a calibration is due or not.

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

Standard GAS/All GAS

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

All GAS: All installed sensors will be calibrated during an automatic calibration as long as:

- A cylinder change is not required. If a cylinder change is required on GAS 2 or GAS 3, no GAS 2 or GAS 3 testing will be done.
- More than one solenoid valve is installed in the SDM-3R. If only one solenoid valve is installed, then only the standard sensors (catalytic LEL, O₂, CO, and H₂S) will be tested.

Gas Exposure Times (GAS1, GAS2, GAS3)

Each gas fitting (GAS1, GAS2, and GAS3) has a corresponding drop down menu where the **Gas Exposure Time** can be adjusted. Each **Gas Exposure Time** can be set to **20, 25** (factory setting), **30, 45, 60, 90, or 120** seconds.

NOTE: A calibration sample time of 120 seconds is recommended for instruments with an ammonia (NH₃) sensor.

Alarm Check

Selected (factory setting): A vibrator, LED, and buzzer test is automatically done on the GX-3R (Pro) at the end of the calibration.

Deselected: A vibrator, LED, and buzzer test is not automatically done on the GX-3R (Pro) at the end of the calibration. A manual alarm check can still be done by selecting the instrument and clicking **Alarm Check** in the lower right-hand corner of the main window.

Bump Test Section

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

Manual Bump Test

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

Deselected: A manual bump test cannot be performed.

Auto Bump Test

Selected: An automatic bump test is performed only if the instrument is due for bump testing.

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

Standard GAS/All GAS

Standard GAS selected (factory setting): Only the standard sensors (catalytic LEL, O₂, CO, and H₂S) will be bump tested during an automatic bump test.

All GAS selected: All installed sensors will be bump tested during an automatic bump test as long as:

- A cylinder change is not required. If a cylinder change is required on GAS 2 or GAS 3, no GAS 2 or GAS 3 testing will be done.
- More than one solenoid valve is installed in the SDM-3R. If only one solenoid valve is installed, then only the standard sensors (catalytic LEL, O₂, CO, and H₂S) will be tested.

Fast Bump

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

Selected (factory setting): If the gas reading for the sensor(s) being tested is within the factory-defined fast bump tolerance (37% for O₂ channels and 50% for all other channels) at the end of a 15-second gas application and a 10-second wait period, then the sensor(s) will pass bump testing, the gas application will be stopped, and the test will move on to the next sensor(s) or to the fresh air purge.

If the gas reading on any of the tested channels is outside of the factory-defined fast bump tolerance (37% for O₂ channels and 50% for all other channels) at the end of the 15-second gas application and a 10-second wait period, then the bump test will fail, and the next step will depend on the **Auto Cal if Bump Fails** setting.

Turning Fast Bump on conserves calibration gas when the tested sensors respond quickly and accurately.

Consider the following scenario as an example:

- 50% LEL methane used for bump testing the combustible gas channel
- **Fast Bump is Selected**
- Factory-set fast bump tolerance is set to $\pm 50\%$, which means that the acceptable reading range is 25% LEL - 75% LEL

Table 3 shows possible readings after the 15 second gas application and the 10 second stabilization period and the effect on the gas application.

Table 3: Example Fast Bump Scenarios

Gas Reading After 15 Seconds of Gas Application and a 10 Second Wait Period	Outcome
15% LEL (-70% of 50% LEL)	<ul style="list-style-type: none">• Bump test fails• Next step depends on AUTO CAL setting
30% LEL (-40% of 50% LEL)	<ul style="list-style-type: none">• Gas application stops• Sensor passes bump testing
60% LEL (+20% of 50% LEL)	<ul style="list-style-type: none">• Gas application stops• Sensor passes bump testing
80% LEL (+60% of 50% LEL)	<ul style="list-style-type: none">• Bump test fails• Next step depends on AUTO CAL setting

Interval

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

Gas Exposure Times (GAS1, GAS2, GAS3)

Each gas fitting (**GAS1**, **GAS2**, and **GAS3**) has a corresponding drop down menu where the **Gas Exposure Time** can be adjusted. Each **Gas Exposure Time** can be set to **20**, **25** (factory setting), **30**, **45**, **60**, **90**, or **120** seconds.

Tolerance

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

NOTE: The **Fast Bump** feature has its own factory-set tolerances: $\pm 37\%$ for oxygen (O₂) and $\pm 50\%$ for all other gases. The **Tolerance** setting has no effect on the fast bump feature.

Alarm Check

Selected (factory setting): A vibrator, LED, and buzzer test is automatically done on the GX-3R (Pro) at the end of the bump test.

Deselected: A vibrator, LED, and buzzer test is not automatically done on the GX-3R (Pro) at the end of the bump test. A manual alarm check can still be done by selecting the instrument and clicking **Alarm Check** in the lower right-hand corner of the main window.

Auto Cal if Bump Fails

Selected (factory setting): If a bump test fails, a calibration will automatically begin.

Deselected: If a bump test fails, a calibration will not automatically begin.

Database Tab

The **Database** tab allows you to perform the following actions:

- view or change the database location
- create a brand new database
- import data from another database
- export saved data

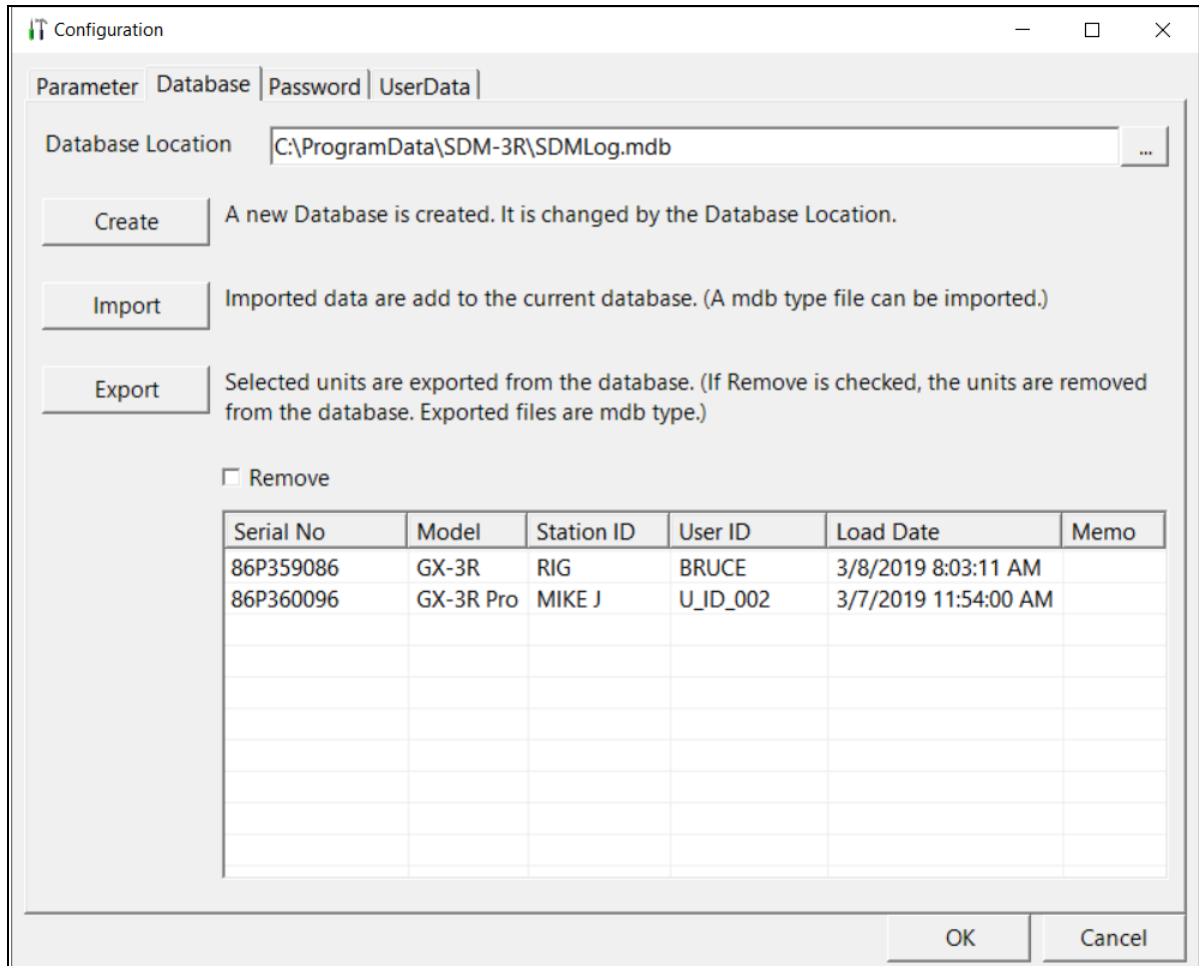


Figure 24: Config Window Database Tab

Changing the Database Location

1. While in the main program window, click the **Config** button.
2. Enter the password and click **OK**. The default password is **ABCDE** (case sensitive).
3. Click the **Database** tab.
4. The default database location is displayed at the top of the **Database** tab. The default database file name is SDMLog.mdb.
5. Click the button to the right of the current location. It has three dots on it.

6. Navigate to a new location where a database exists, click on the database to select it, and click **Open**. The new database location will be displayed in the **Database Location** field.
7. Click **OK** in the lower right corner of the screen and **Yes** in the window that appears.
8. Another window will appear telling you to restart the PC Program. Click **OK**.
9. Click the **Exit** control button in the upper right corner of the main program window and **OK** in the window that appears.
10. Reopen the PC Program.

Creating a New Database

1. While in the main program window, click the **Config** button.
2. Enter the password and click **OK**. The default password is **ABCDE** (case sensitive).
3. Click the **Database** tab.
4. Click the **Create** button located along the left side of the **Database** tab.
5. Choose a database location, enter a database name, and click **Save**. The file will have a .mdb extension.
6. Click **OK** to confirm that a log database was created.
7. Change the database location as described above.

Importing a .mdb File Into the Database

1. While in the main program window, click the **Config** button.
2. Enter the password and click **OK**. The default password is **ABCDE** (case sensitive).
3. Click the **Database** tab.
4. Click the **Import** button located along the left side of the **Database** Tab.
5. Select an existing .mdb file that you wish to import. You can import a .mdb file that was created on another computer and moved to your computer, you can select a file that was generated on your computer using the **Create** button, or you can navigate to another network computer's .mdb file.

The default location for the .mdb file is C:\Program Data\SDM-3R\SDMLog.mdb. Hidden folders must be visible on the computer in order to locate the .mdb file.

6. Click **Open**.
7. The data from the .mdb file will be added to your current data. New data will be visible in the **Logs** window.
8. Make any other desired changes in the **Parameter** and **Password** tabs.
9. Click **OK** and then click **Yes** in the window that comes up to save the settings and return to the Main Window.

Exporting Data to a .mdb File

1. While in the main program window, click the **Config** button.
2. Enter the password and click **OK**. The default password is **ABCDE** (case sensitive).
3. Click the **Database** tab.
4. Select the desired GX-3R (Pro)s from the list on the bottom of the **Database** tab.
5. If you want a GX-3R (Pro)'s information removed from the database after export, be sure the instrument is not currently connected to the PC Program, then select **Remove**.
6. Click **Export**.
7. Select where you would like to save the file, and click **Save**.
8. The program will indicate that it is exporting the data and will confirm that it has finished. Click **OK** in the window that comes up.
9. Make any other desired changes in the **Parameter**, **Password**, and **UserData** tabs.
10. Click **OK** and then click **Yes** in the window that comes up to save the settings and return to the Main Window.

Password Tab

The password Tab allows you to change 3 passwords:

- **Config Window:** Allows access to the Configuration Window. The password can be up to 12 characters long and contain any letter, number, or symbol. It is case sensitive. Factory setting is **ABCDE**.
- **Open/Edit Maintenance Access:** Allows access to User Mode and Maintenance Mode items in **Open** or **Edit**. Factory set password is **0000**.
- **Open/Edit User Access:** Allows access to User Mode items in **Open** or **Edit**. Factory set password is **1939**.

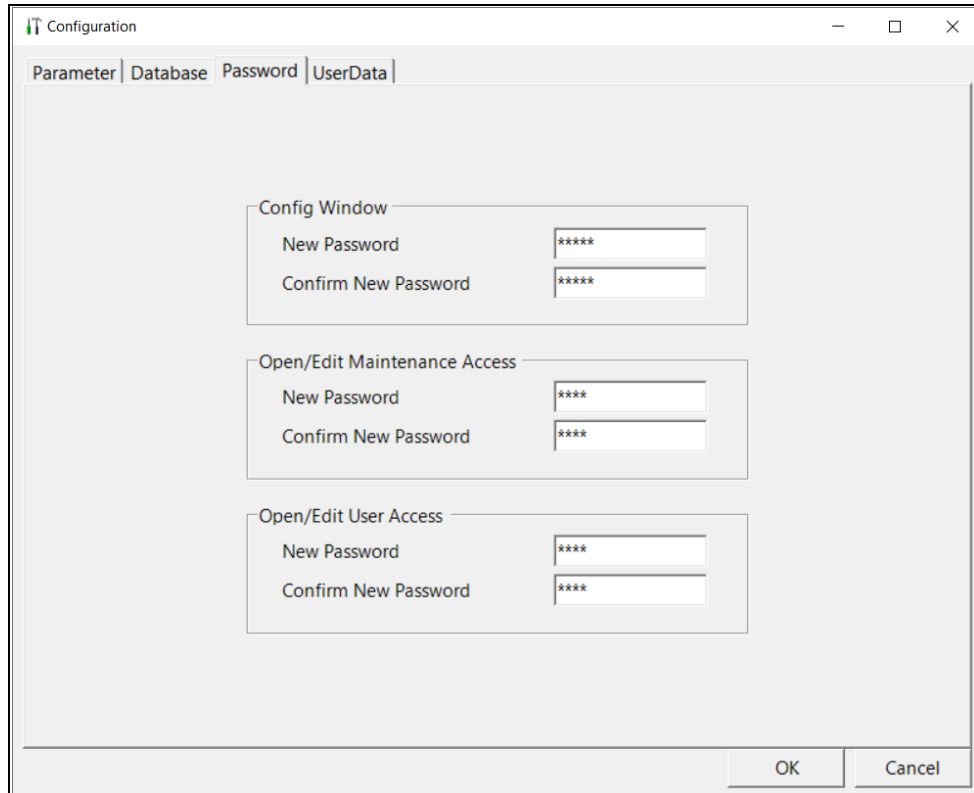
The image shows a software window titled "Configuration" with four tabs: "Parameter", "Database", "Password", and "UserData". The "Password" tab is selected. It contains three distinct sections, each with a title and two password input fields. The first section is titled "Config Window" and contains "New Password" and "Confirm New Password" fields, both showing "*****". The second section is titled "Open/Edit Maintenance Access" and contains "New Password" and "Confirm New Password" fields, both showing "****". The third section is titled "Open/Edit User Access" and contains "New Password" and "Confirm New Password" fields, both showing "****". At the bottom right of the window are "OK" and "Cancel" buttons.

Figure 25: Config Window Password Tab

1. While in the main program window, click the **Config** button.
2. Enter the password and click **OK**. The default password is **ABCDE** (case sensitive).
3. Click on the **Password** tab.
4. For each password, enter the new password in the top box and confirm it in the bottom.
5. Make any other desired changes in the **Parameter**, **Database**, or **UserData** tabs.
6. Click **OK** and then **Yes** to confirm the changes and return to the Main Window.


UserData Tab

The UserData Tab contains settings for calibration certificates:

- **Certificate Number prefix:** Each calibration certificate generated by the PC Program is assigned a prefix and a number starting with “1”. Both items can be edited before you print a certificate but if you’d like all certificates to have a certain numbering scheme, it can be defined here.
- **Logo Location:** If desired, a logo or some other picture can be printed in the bottom left corner of the calibration certificate.

8. Calibration Result	Range	0-100 %LEL	0-40.0 %	0-200.0 ppm	0-2000 ppm
	Applied gas concentration	50 %LEL	12.0 %	25.0 ppm	50 ppm
	Reading before calibration	50 %LEL	12.0 %	25.5 ppm	50 ppm
	Reading after calibration	50 %LEL	12.0 %	25.0 ppm	50 ppm
	Result	Pass	Pass	Pass	Pass
9. Alarm	Pass				
10. Buzzer	Fail				
11. Environmental Condition					
12. Observation					
13. Replacement part					
14. Next Calibration Date					

☐ This calibration certificate results that the inspection and calibration was carried out in accordance with the operation manual or the maintenance manual officially published by the manufacturer Riken Keiki Co., Ltd.



Issued Date : 15 August 2019

Company Name :

Diploma No. :

Signature :

Logo Location

Figure 26: Calibration Certificate Logo Location

- **Printer:** You can select a printer for the calibration certificate. You can also select “AdobePDF” and create a PDF file instead of printing a hard copy of a certificate.

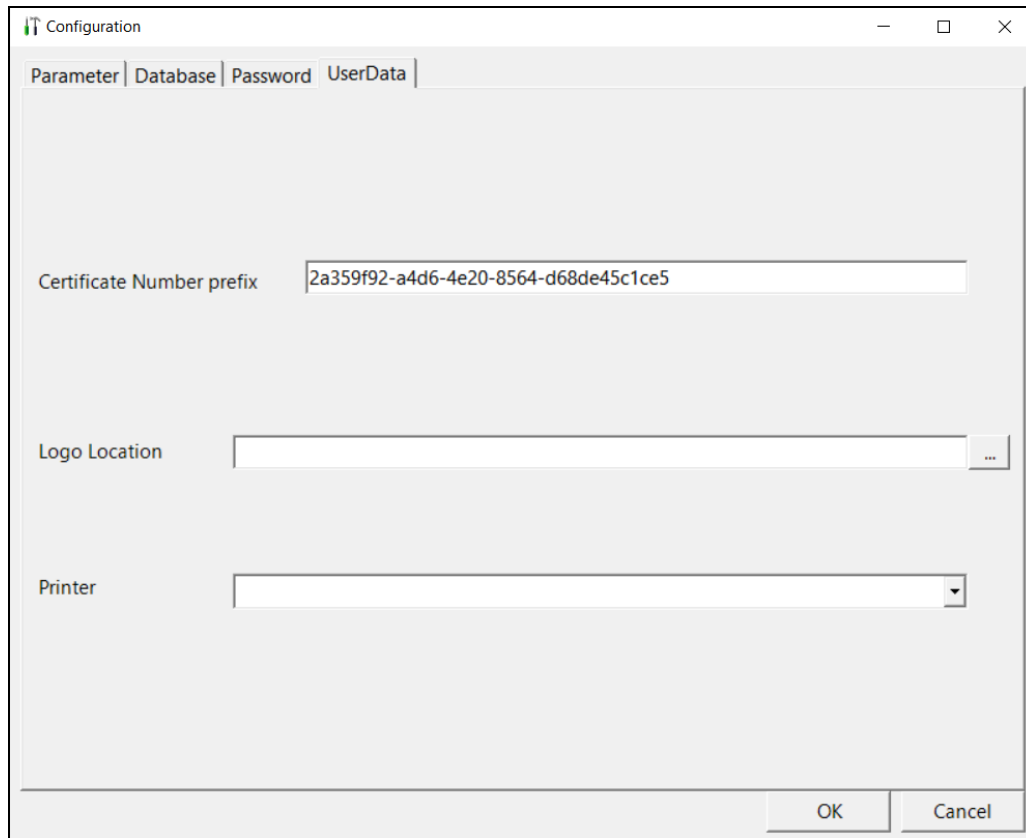


Figure 27: Config Window UserData Tab

1. While in the main program window, click the **Config** button.
2. Enter the password and click **OK**. The default password is **ABCDE** (case sensitive).
3. Click on the **UserData** tab.

4. Enter a certificate prefix, navigate to a logo location, and/or select a printer.

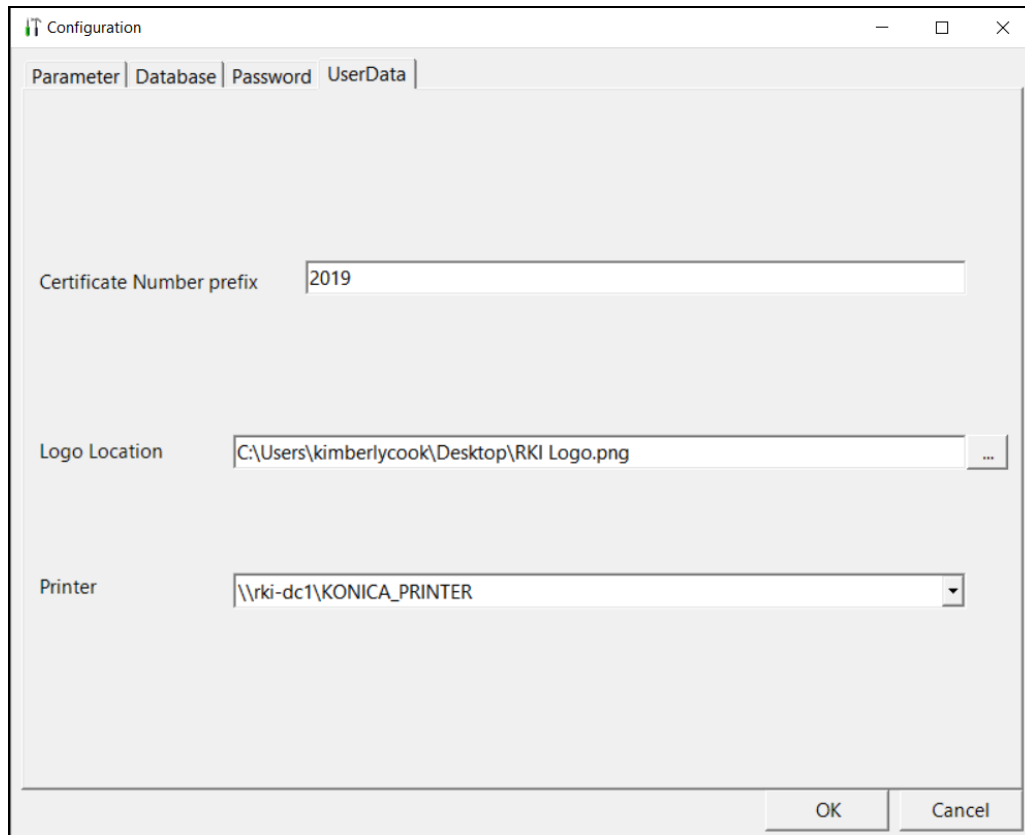


Figure 28: Config Window UserData Tab with User-Defined Data

5. Make any other desired changes in the **Parameter**, **Database**, or **Password** tabs.
6. Click **OK** and then **Yes** to confirm the changes and return to the Main Window.

Chapter 5: Operation

Overview

This chapter provides a brief overview of the PC Program and describes how to perform a bump test, calibration, and alarm check. It also contains troubleshooting information and instructions for instrument charging.

NOTE: When the SDM-3R is connected to the PC Program, the date and time of the docking station are automatically updated to the current date and time on the PC Program's screen.

GX-3R (Pro), GX-6000, EAGLE 2 and Other GX Type Instrument Connection

There are 4 different PC Programs for different RKI products:

- SDM-3R: for use with SDM-3R docking stations and GX-3R and GX-3R Pro instruments
- SDM-PC2: for use with SDM-6000 docking stations and GX-6000 instruments
- SDM-E2: for use with SDM-E2 docking stations and EAGLE 2 instruments
- SDM-GX: for use with other GX type docking stations and GX type instruments (GX-2012, GX-2009, and 03 Series)

Bump tests and calibrations can be performed on multiple GX-3R (Pro)s, GX-6000s, EAGLE 2s, and other GX type instruments simultaneously. Follow all instructions in the appropriate docking station manuals as well as the instructions in this manual.

Overview of the SDM-3R PC Controller Program

This section provides a brief overview of the program and a description of the main program window. Instructions for using the program 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 program, make sure to perform the program setup as described in "Setting Up Cylinders" on page 32 and "Defining PC Program Operation in the Config Window" on page 36.

PC Program Functions

The PC Program has the following basic functions accessed or controlled by buttons in the main program screen.

- Gas cylinder setup accessed by the **Cylinders** control button
- Program and system configuration accessed by the **Config** control button (this function is password protected)

- Data viewing accessed by the **Logs** control button
- GX-3R (Pro) bump testing controlled by the **Bump test** control button
- GX-3R (Pro) calibration controlled by the **Calibration** control button
- GX-3R (Pro) alarm checking controlled by the **Alarm check** control button

Main Program Window

The main program window is where the current status of the program operation is shown. Any SDM-3Rs and GX-3R (Pro)s that are currently connected to it and any GX-3R (Pro)s that have previously 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 program window.

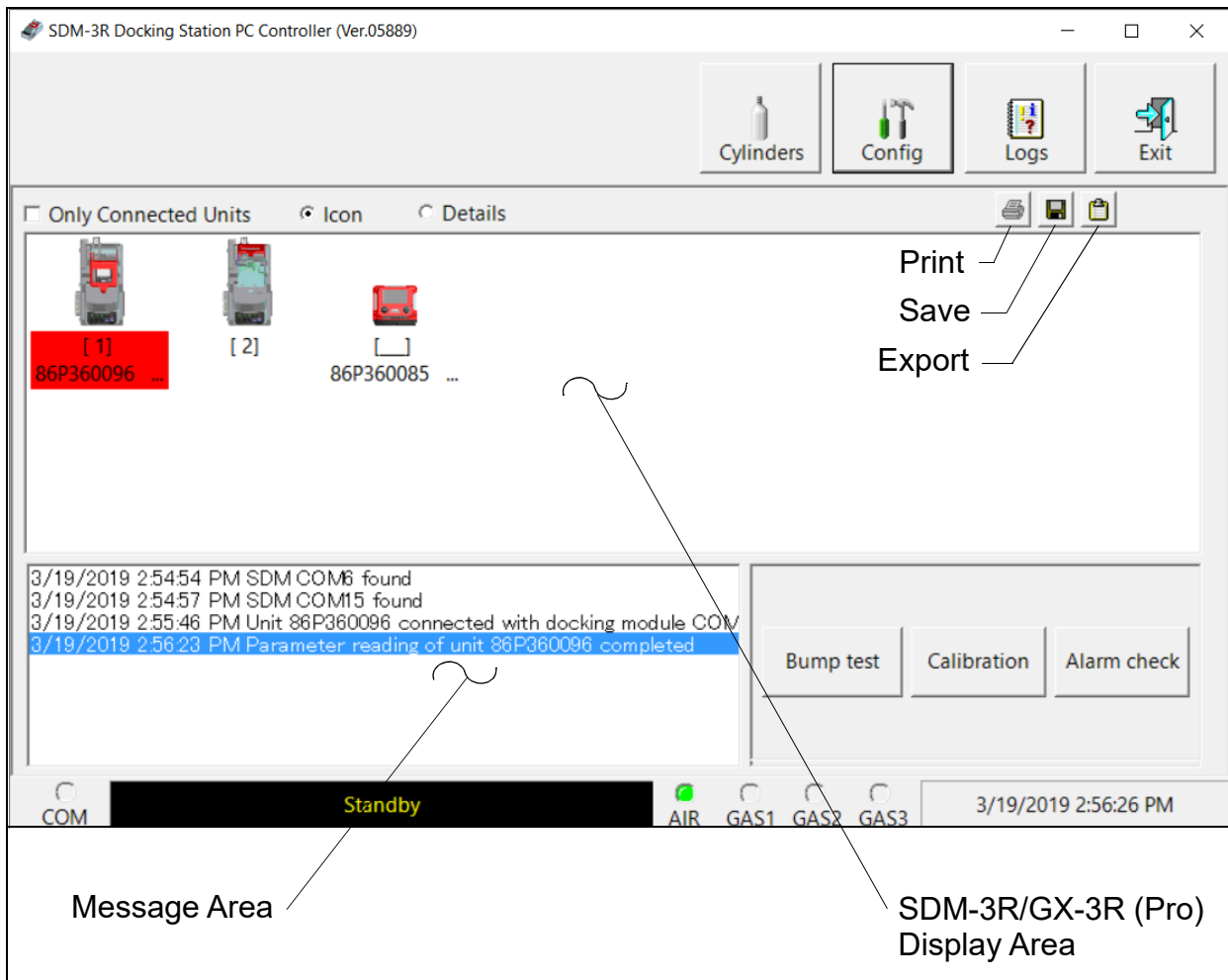


Figure 29: Parts of the Main Program Window

Control Buttons

The **Cylinders**, **Config**, **Logs**, and **Exit** control buttons are located along the top right of the window. The **Bump test**, **Calibration**, and **Alarm check** control buttons are located in the lower right of the window. The use of these control buttons is described in other parts of this manual.

SDM-3R/GX-3R (Pro) Display Area

The large middle portion of the main program window displays SDM-3Rs and GX-3R (Pro)s that are currently connected to the PC Program and GX-3R (Pro)s that are in the database. The SDM-3Rs are identified by a number. The GX-3R (Pro)s are identified by their serial number.

By selecting either the **Icon** radio button or the **Details** radio button, the SDM-3Rs and GX-3R (Pro)s can be displayed either as icons or in a table format that shows various GX-3R (Pro) 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 GX-3R (Pro)s that are currently connected to the PC Program will be shown.

Program Status

Three areas of the main program window indicate the program status. The smaller area in the lower left below the SDM-3R/GX-3R (Pro) display area is the message area. It displays messages that indicate actions and status of the program.

Below this area is the communications port indicator which shows when the program is communicating with the docking station(s).

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

Fitting Indicators

To the right of the status field are 4 round fitting indicators. They correspond to the AIR and GAS fittings on the left side of the SDM-3R. They indicate whether the corresponding solenoid is activated so it can allow gas to flow through the fitting it controls. When the indicator is green, the fitting is active. When the indicator is blank, the fitting is not active.

Connecting GX-3R (Pro)s

1. Confirm that the AC adapter is connected to the SDM-3R and to an AC wall socket.
2. Connect the Type A to Type B USB cable to the SDM-3R and to an available USB port on your computer or to a USB hub that is connected to your computer.
3. Click **Start** on the Windows Icon Tray, then select **Programs/SDM-3R**. You may also double click the shortcut created on your desktop.
4. If you are starting the software for the first time, a message window appears informing you that a database has been created. Click **OK**.
5. Press the SDM-3R's POWER button.
6. The SDM-3R's CHARGE LED will be solid green if it is operating properly or solid red if there is a system failure.

- When a connection is established between the PC Program and all of the SDM-3Rs, the main program window appears as shown below.

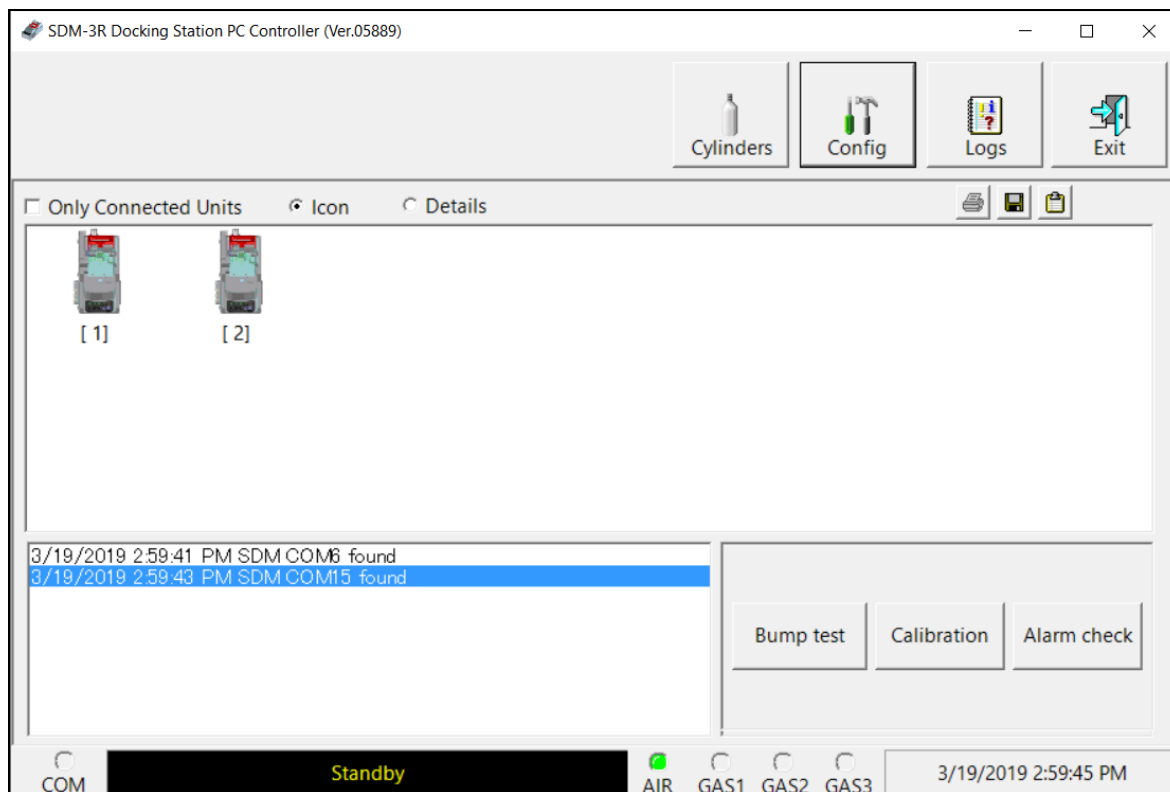


Figure 30: SDM-3R Connection

- When the SDM-3R is connected to the PC Program, the date and time of the docking station are automatically updated to the current date and time on the PC Program's screen.
- Install the GX-3R (Pro) into the SDM-3R's instrument cradle. Be sure the yellow lever is up for a GX-3R and down for a GX-3R (Pro).
- Close the red door. The GX-3R (Pro) will automatically turn on and connect to the SDM-3R.

CH4	%LEL	CO	ppm	H2S	ppm
	50		50		25.0
O2	%	CO2			vol%
	12.0				2.50
TRANSMIT					

- Repeat step 1 - step 10 for any additional SDM-3Rs and GX-3R (Pro)s.
- For each GX-3R (Pro), the PC Program will indicate that a GX-3R (Pro) was found and it will download the instrument's basic parameters.

NOTE: Turn each GX-3R (Pro) on 10-15 seconds after the previous instrument to minimize the possibility of the GX-3R (Pro) not connecting to the PC Program. If a GX-3R (Pro) does not connect, use the instrument's POWER MODE button to turn it off and turn it back on again.

13. When all GX-3R (Pro)s have been turned on, connected, and downloaded, the main program window will appear as shown below. When the GX-3R (Pro) is connected to the PC Program, the date and time of the instrument are automatically updated to the current date and time on the PC Program's screen.

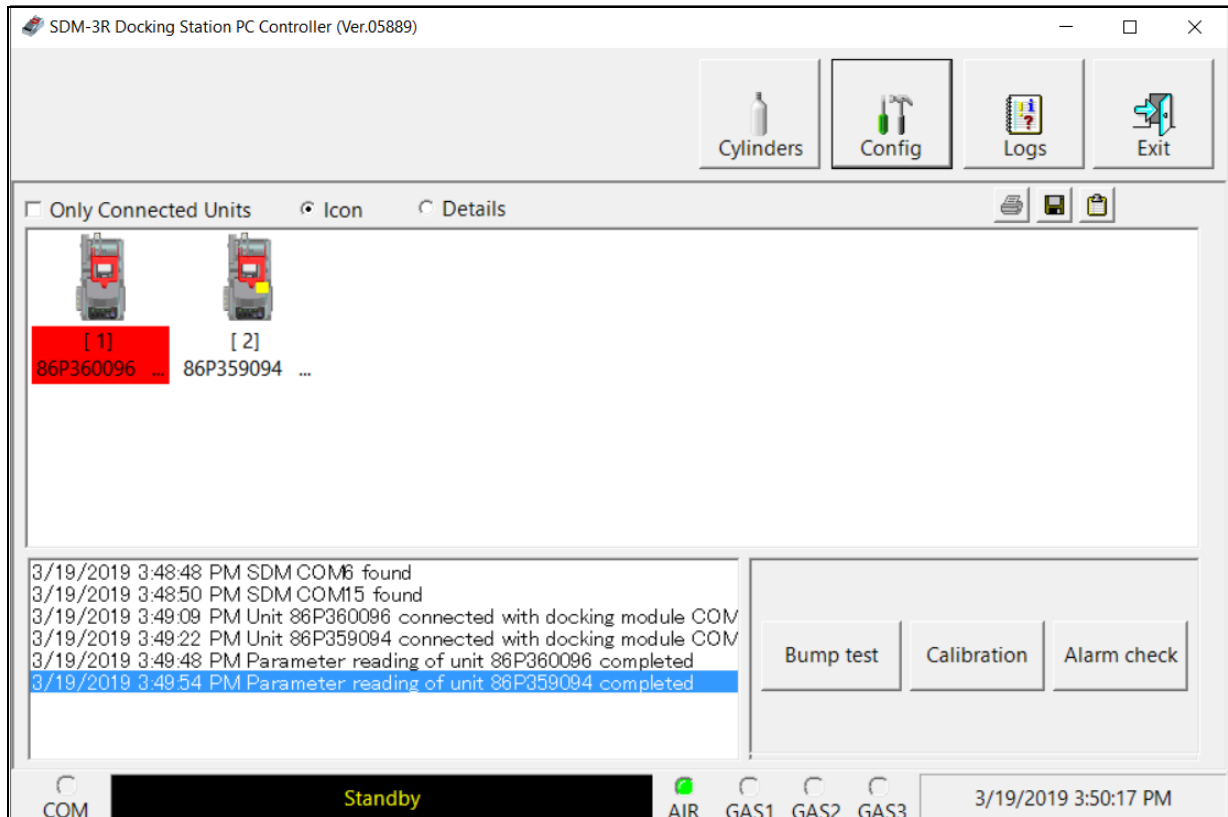


Figure 31: GX-3R (Pro)s Connected and Downloaded

14. If a GX-3R (Pro) is due for calibration, the docking station number and instrument serial number will be highlighted in red.
15. If a GX-3R (Pro) is due for calibration within the next 10 days, the docking station number and instrument serial number will be highlighted in orange.
16. If a GX-3R (Pro)'s basic parameters could not be downloaded properly, a red triangle will appear over the GX-3R (Pro)/SDM-3R icon.

Icon View vs. Details View

GX-3R (Pro)s that are currently connected or have been previously connected can be viewed in either Icon View or Details View. Choose Icon or Details View by clicking the **Icon** or **Details** radio button below the control buttons.

Icon View

Icon View allows you to view connected GX-3R (Pro)s and previously connected GX-3R (Pro)s in an icon configuration. Connected GX-3R (Pro)s are shown as a GX-3R (Pro) inserted in an SDM-3R icon. Previously connected GX-3R (Pro)s are shown as GX-3R (Pro) icons. Right clicking a GX-3R (Pro) causes the Instrument Function Menu to appear.

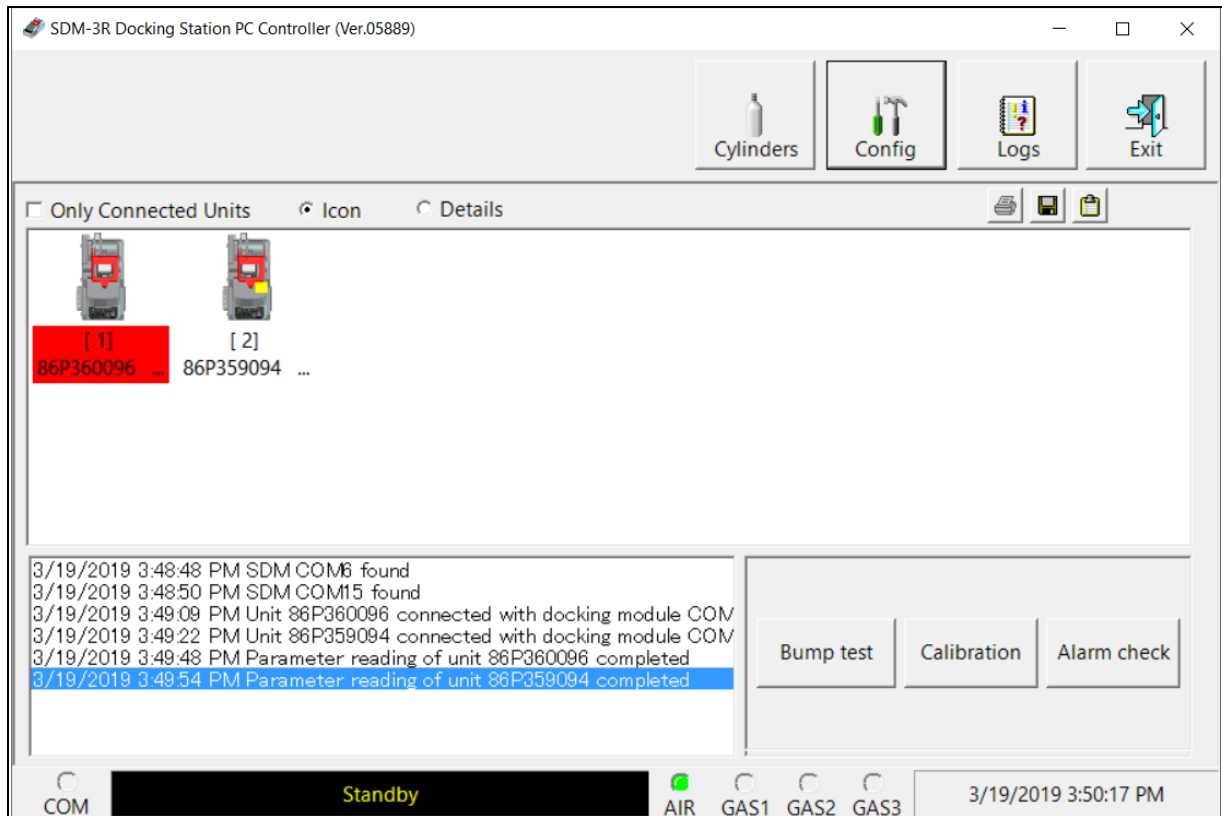


Figure 32: Main Program Window, Icon View

Details View allows you to view connected GX-3R (Pro)s and previously connected GX-3R (Pro)s in a table format. Scrolling to the right in Details View allows you to view existing GX-3R (Pro) parameters. For a description of these parameters and instructions to change them, see page 94.



Printing and Exporting an Instrument List from the Main Program Window

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

Printing the Instrument List

1. Select the **Details** radio dot near the top of the Main Window.

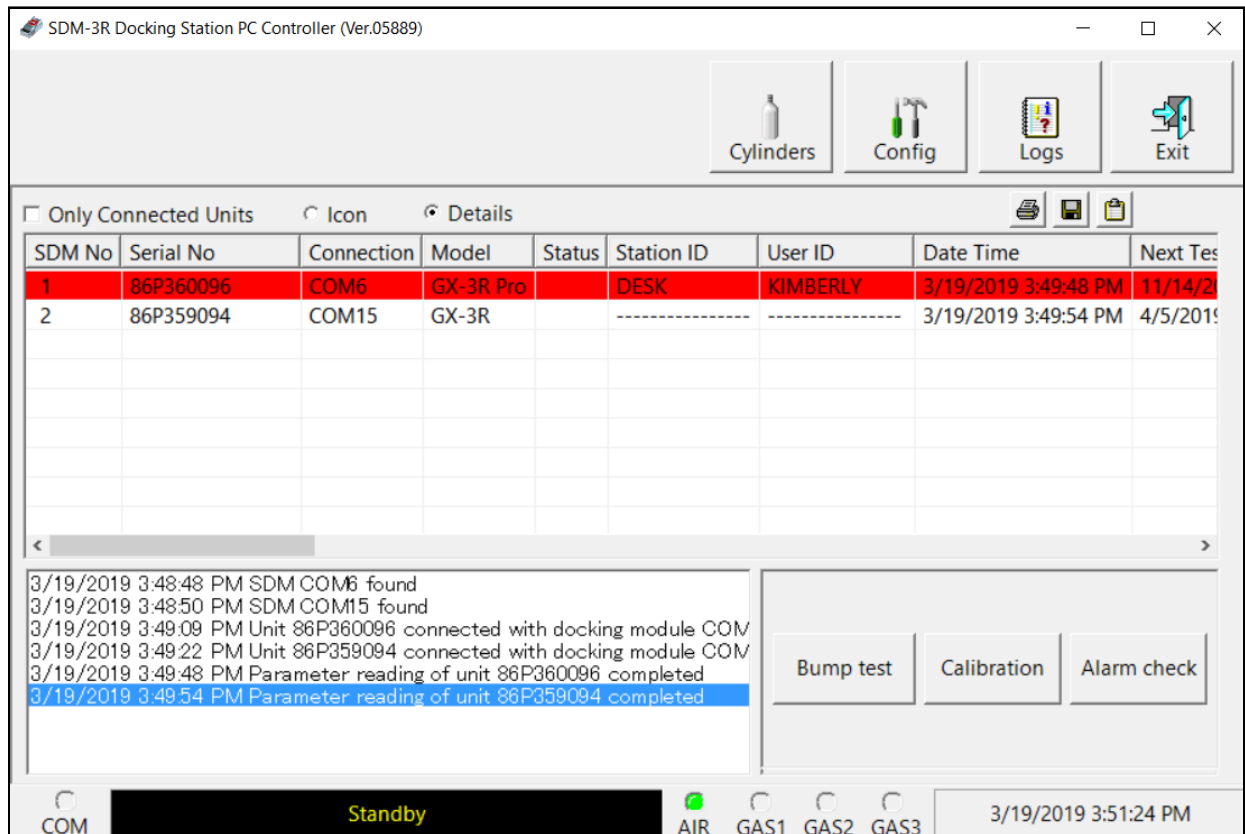


Figure 34: Details View

2. Click the **Print** icon located just below the **Logs** button.
3. Click **OK** in the window that appears.

Saving the Instrument List to a .csv File

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

Saving the Instrument List to the Clipboard

1. Click the **Clipboard** button located just below the **Exit** button. The serial number, model, station ID, user ID, next bump test date, next calibration date, the calibration interval, and the data logging interval time for each GX-3R (Pro) in the main program window will be saved to the clipboard in a table format.

2. Open a spreadsheet program such as Excel or a word processing program such as Word and paste the clipboard data into it.

Automatic Procedures

This section briefly describes the automatic procedures that may begin once the GX-3R (Pro) is turned on and connected to the PC Program.

Automatic Data Download

The PC Program will automatically start a download of the instrument's logged data if **Down Load Data Logger** in the **Config** window is **Selected**. The download will begin as soon as the instrument is connected to the PC Program and the basic parameters are downloaded. An automatic data download will occur first before any other setup automatic process such as an automatic bump test.

NOTE: A data download will take approximately 2 minutes to complete.

Automatic Bump Test or Calibration

If **Auto Bump Test** or **Auto Calibration** is selected in the Parameter Tab of the Configuration Window, the PC Program will automatically bump test or calibrate a connected GX-3R (Pro) as long as a bump test or calibration is due on that instrument. See "Parameter Tab" on page 36 for a description of these parameters. The use of this feature allows the user to launch the PC Program, turn on the GX-3R (Pro) and walk away. No oversight of the bump test or calibration is needed. For this reason, the calibration cylinders need to already be in place and the **Cylinders** Window needs to be set up appropriately. The bump test or calibration will begin in the time defined by the **Waiting Time for Auto Process** parameter in the Parameter Tab of the **Config** Window after the instrument is connected to the PC Program and the basic parameters have been downloaded.

Performing a Bump Test

Bump test parameters are defined in the **Config** Window. See page 36 for a description of the bump test configuration setup.

1. Establish a connection between the SDM-3R, GX-3R (Pro) and the PC Program as described on page 54.

NOTE: The instrument cradle's yellow lever needs to be up for GX-3Rs and down for GX-3R Pros.

2. Verify that all of the bump test parameters are set correctly as described on page 36.
3. Verify that the appropriate calibration gas cylinders are connected to the gas fittings on the left side of the SDM-3R. See page 27 for calibration gas cylinder options and calibration gas connection procedures.

4. If you are using a CO₂ scrubber instead of a N₂ cylinder to zero the CO₂ sensor:
 - a. Remove the tubing from the side of the scrubber that does not have an arrow pointing to it.
 - b. Connect the tubing to the SDM-3R gas inlet that is assigned to N₂ (generally GAS2). Be sure the arrow on the filter is pointing toward the gas inlet.

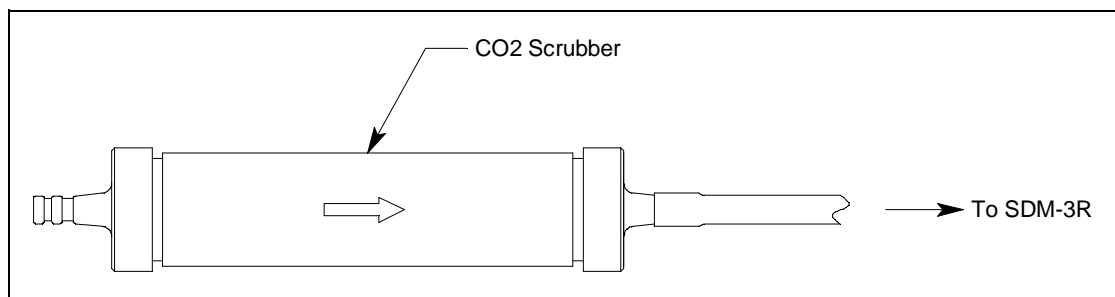


Figure 35: Connecting CO₂ Scrubber to SDM-3R Gas Inlet

5. Highlight the GX-3R (Pro)(s) you wish to bump test.

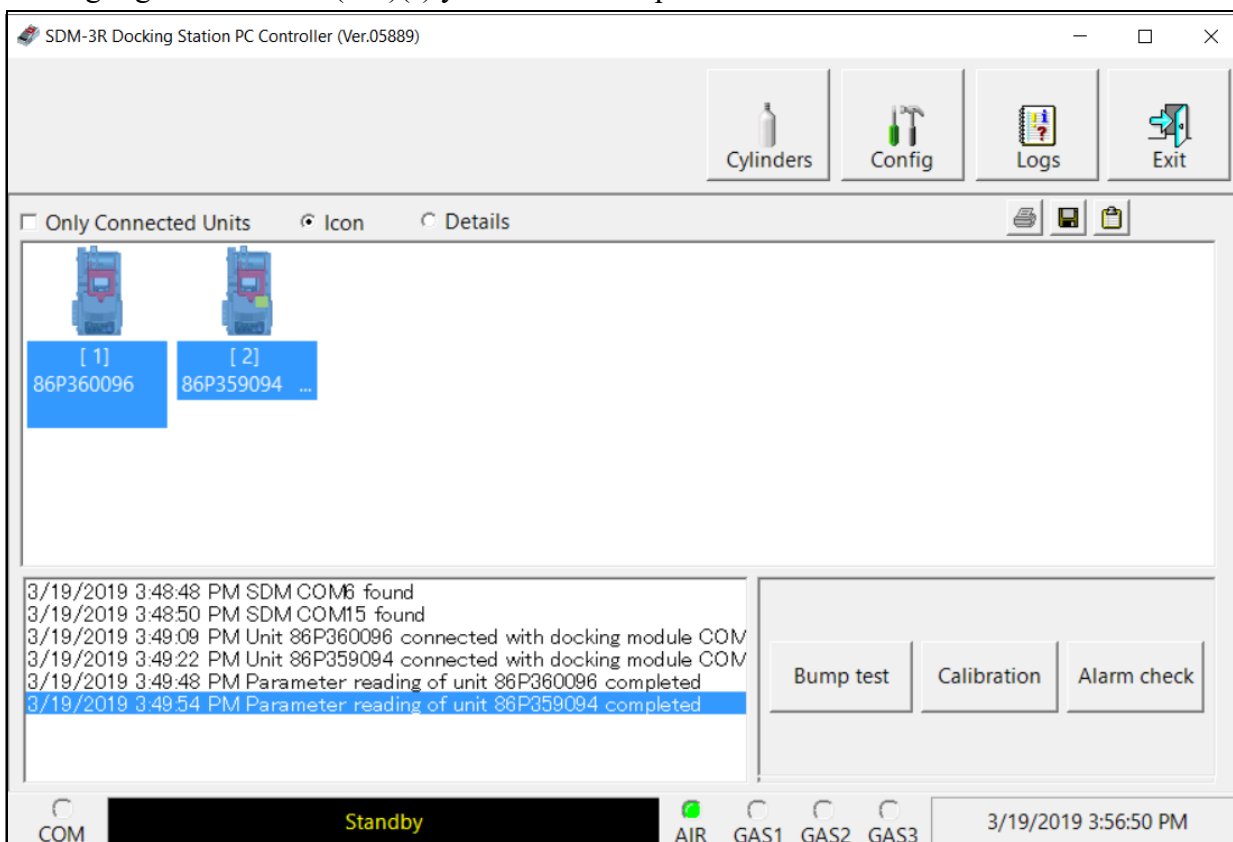


Figure 36: Instrument Selection

6. Click **Bump test** in the lower right corner of the main program window.

NOTE: A bump test cannot be started if a GX-3R is installed with the yellow lever down.

7. You are asked to confirm which gases will use the GAS 1 fitting for the bump test. Each gas will only appear once, even if multiple instruments with the same target gas are being bump tested.

The gas concentration shown next to each gas name is the auto calibration value for that gas. If it does not match the gas concentration listed on the cylinder, change the auto calibration value for the instrument(s) associated with that gas. See page 112 for instructions.

NOTE: If the SDM-3R has only 1 solenoid valve installed, all target gases will be assigned to GAS1. If you need to utilize separate cylinders while using the SDM-3R in PC controlled mode, the SDM-3R must have more than 1 solenoid valve installed.

NOTE: If your instrument is a GX-3R Pro with a CO₂ sensor installed, and if your SDM-3R only has 1 solenoid valve installed, only the standard 4 channels (catalytic LEL, O₂, CO, and H₂S) will appear as gases available for testing. To test all gases in a CO₂ GX-3R Pro, you need an SDM-3R with at least 2 solenoid valves installed.

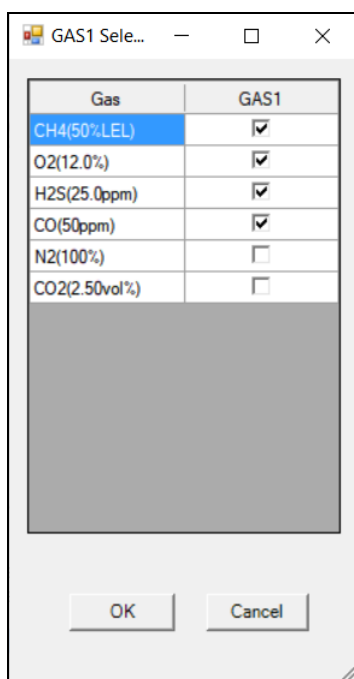


Figure 37: GAS 1 Selection

8. Select the gases that will use GAS1 and click **OK**. Generally, only the standard 4 channels (catalytic LEL, O₂, CO, and H₂S) are assigned to GAS1, but some exceptions are listed below:
- SO₂ (if using a 5-gas [LEL, O₂, CO, H₂S, SO₂] cylinder)
 - N₂ (if using a 3-gas [LEL, O₂, CO] or 4-gas [LEL, O₂, CO, H₂S] mix in N₂)

9. The gas order confirmation screen appears. This screen shows you GX-3R (Pro) serial numbers and the gas combinations.

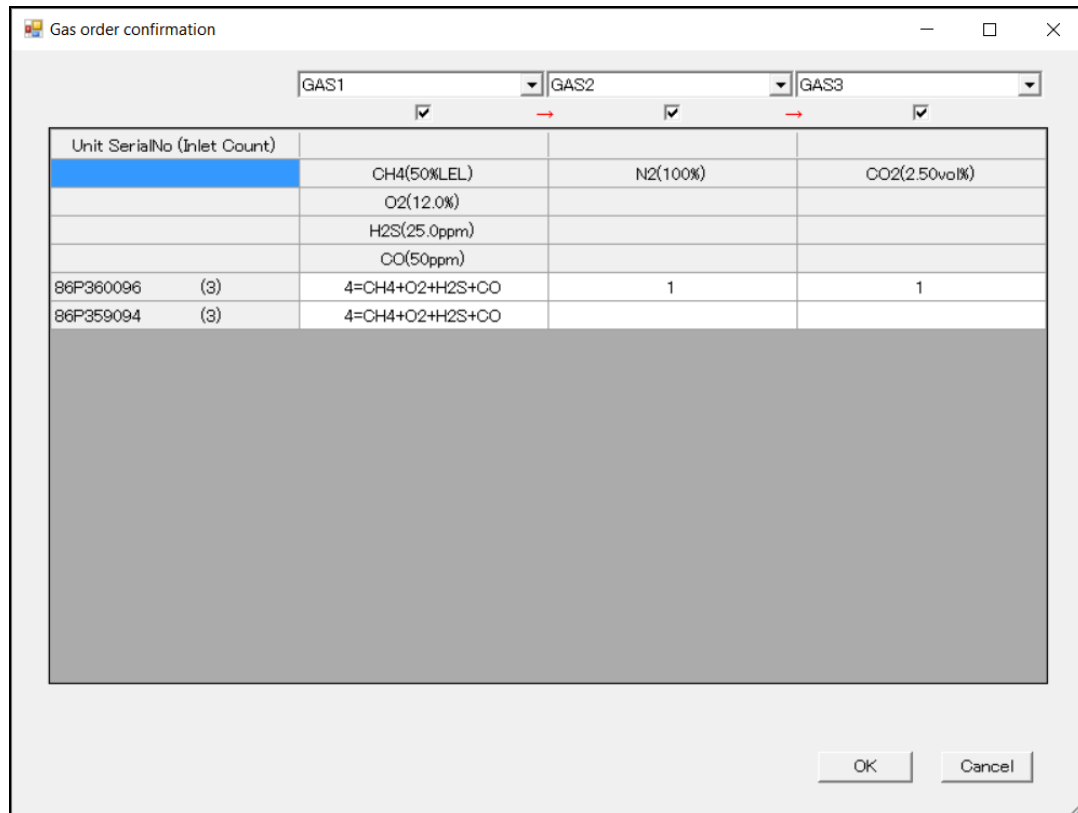


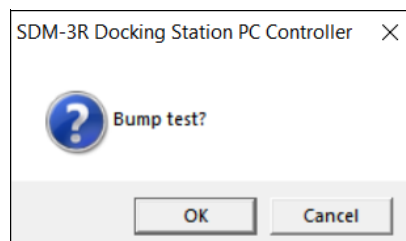
Figure 38: Instrument/Gas Confirmation Screen

10. Use the drop down menus to assign each gas to an inlet. If there are 2 or 3 solenoid valves installed in your SDM-3R and if you have more gases than installed solenoids, assign the remaining gases all to the last inlet. The program will prompt you to change the cylinder during the bump test. Use the selection box below each inlet assignment to select or deselect that gas for bump testing.

For CO2 sensors: You cannot deselect N2 and leave CO2 selected. N2 and CO2 must both either be selected or deselected.

NOTE: Your SDM-3R will only have as many gas inlet choices as it has solenoid valves. For example, an SDM-3R with only one solenoid valve will only have GAS1 as a choice.

11. Click **OK**.
12. You will be asked if you want to bump test the instrument(s). Click **OK** to proceed.



13. The SDM-3R pump(s) start and the program indicates that air is flowing. The AIR indicator on the program screen is solid green. Air is applied to the GX-3R (Pro)(s) for 15 seconds.

NOTE: If the GX-3R (Pro) was not on for 40 seconds before the bump test was initiated, air will flow until the GX-3R (Pro) has been on for 40 seconds.

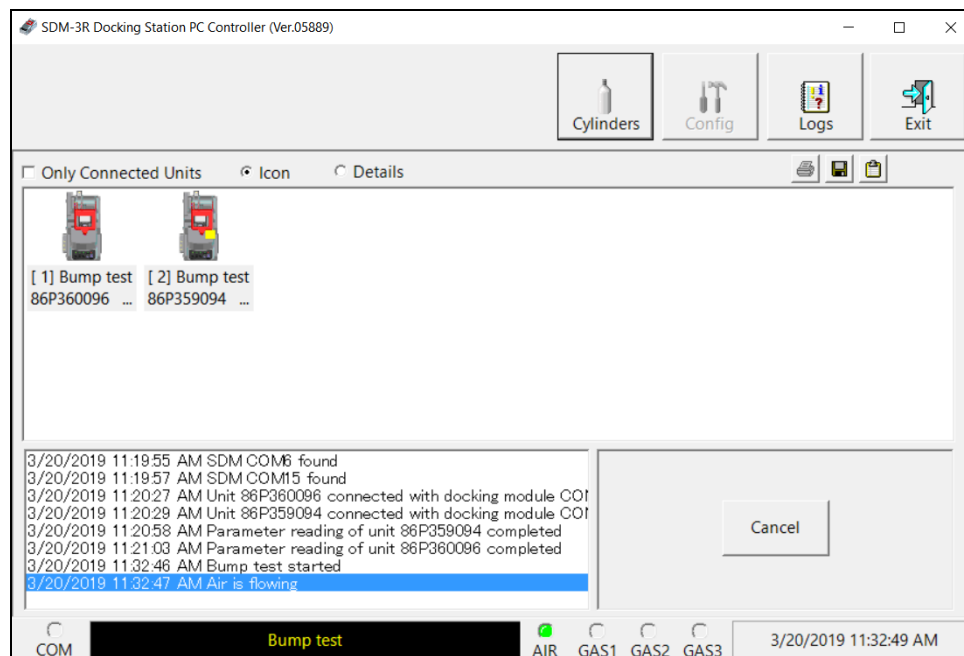


Figure 39: Air Flowing

14. The PC Program performs a zero adjustment and analyzes the results. If any sensors failed the zero adjustment, the bump test for that instrument is aborted.
15. The SDM-3R then applies calibration gas in the order of the gas inlets. The **Gas Exposure Time** for each gas inlet is determined by the GAS1, GAS2, and GAS3 parameters in the **Bump Test** section of the **Config** window's **Parameter** tab.

If **Fast Bump** is selected in the **Config** window, gas is applied for 15 seconds, then the pump stops and the station goes through a 10 second stabilization period. The highest (lowest for oxygen) reading during this stabilization period is saved as the reading for the bump test.

NOTE: N₂ is always applied before CO₂, regardless of its inlet assignment.

16. If the test requires a cylinder change, the pump will stop and the PC Program will prompt you to change the cylinder. Change the cylinder and click **OK** to continue with the bump test.

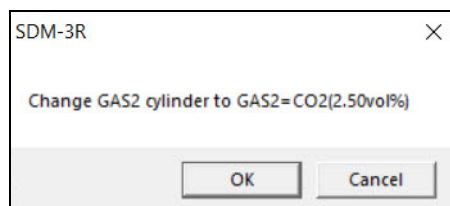


Figure 40: Cylinder Change

17. The SDM-3R analyzes the results after the end of each gas application. If the bump test fails and **Auto Cal If Bump Fails** is selected in the **Config** window, the gas keeps flowing and a calibration automatically begins.

NOTE: If the CO₂ sensor is calibrated after a failed bump test, N₂ gets reapplied first to get an accurate zero.

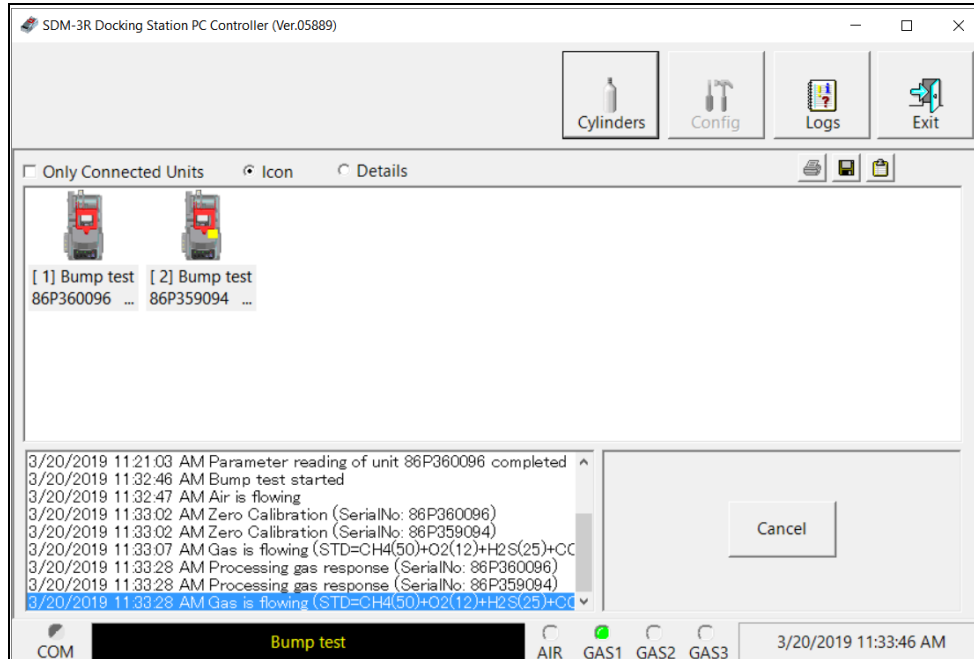


Figure 41: Calibration Gas Flowing

18. Once the calibration is over, the SDM-3R continues with the next gas application.
19. After calibration gas is applied, the docking station purges with fresh air for 15 seconds.

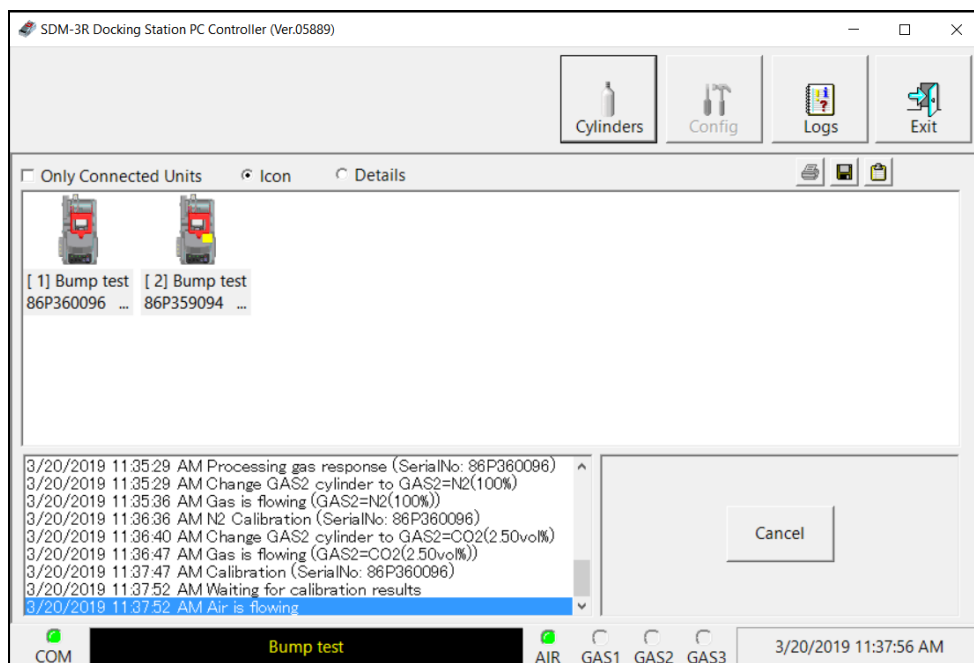


Figure 42: Fresh Air Purge

20. A pop-up window shows the bump test results. If the bump test failed and **Auto Cal If Bump Fails** was selected in the **Config** window, the screen shows calibration results, too.

Calibration & Bump test Result

No	SerialNo	UserID	Fail
910010001RK	86P360096	KIMBERLY	CH4(50%LEL), O2(12.0%), H2S(25
910010003RK	86P359094	-----	CH4(50%LEL), O2(12.0%), H2S(25

< >

No	SerialNo	UserID	Fail
910010001RK	86P360096	KIMBERLY	CH4(50%LEL), O2(12.0%), H2S(25
910010003RK	86P359094	-----	CH4(50%LEL), O2(12.0%), H2S(25

< >

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

OK

Figure 43: Bump Test/Calibration Result Screen

21. Click **OK** to return to the main program window or double click an instrument information line to view the bump test and/or calibration results in the **Logs** window.
22. For all bump test result outcomes, the GX-3R (Pro)s are displayed in the main program window in Details View. To return the main program window to Icons View, click the **Icons** radio button.
23. All bump test results can be viewed in the **Logs** window. See “Bump Test Data” on page 142 for instructions for viewing bump test data.

24. If you are using a CO₂ scrubber instead of a N₂ cylinder to zero the CO₂ sensor:
- Remove the scrubber from the gas inlet.
 - Reattach the tubing to the open end of the scrubber.

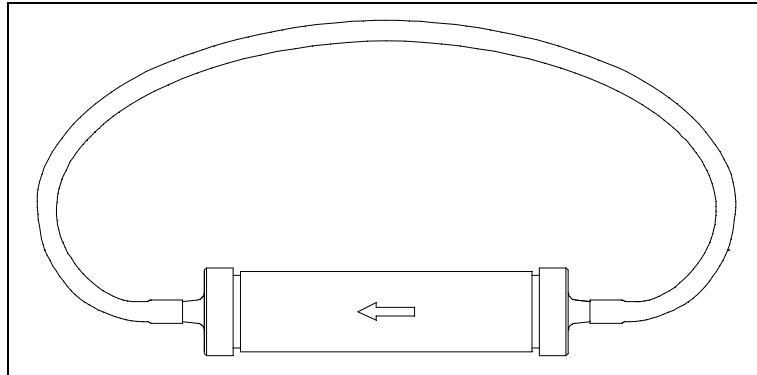


Figure 44: Reattaching CO₂ Scrubber Tubing for Storage

Performing a Calibration

- Establish a connection between the SDM-3R, GX-3R (Pro) and the PC Program as described on page 54.

NOTE: The instrument cradle's yellow lever needs to be up for GX-3Rs and down for GX-3R Pros.

- Verify that all of the calibration parameters are set correctly. See page 36 for instructions.
- Verify that the appropriate calibration gas cylinders are connected to the gas fittings on the left side of the SDM-3R. See page 27 for calibration gas cylinder options and calibration gas connection procedures.
- If you are using a CO₂ scrubber instead of a N₂ cylinder to zero the CO₂ sensor:
 - Remove the tubing from the side of the scrubber that does not have an arrow pointing to it.
 - Connect the tubing to the SDM-3R gas inlet that is assigned to N₂ (generally GAS2). Be sure the arrow on the filter is pointing toward the gas inlet.

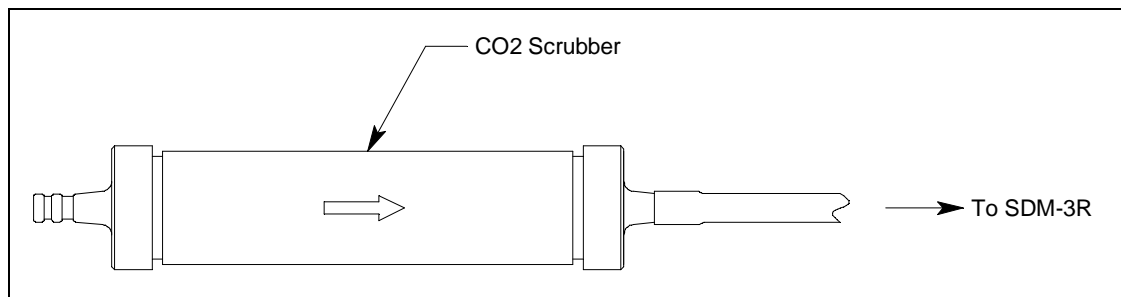


Figure 45: Connecting CO₂ Scrubber to SDM-3R Gas Inlet

5. Highlight the GX-3R (Pro)(s) you wish to calibrate.

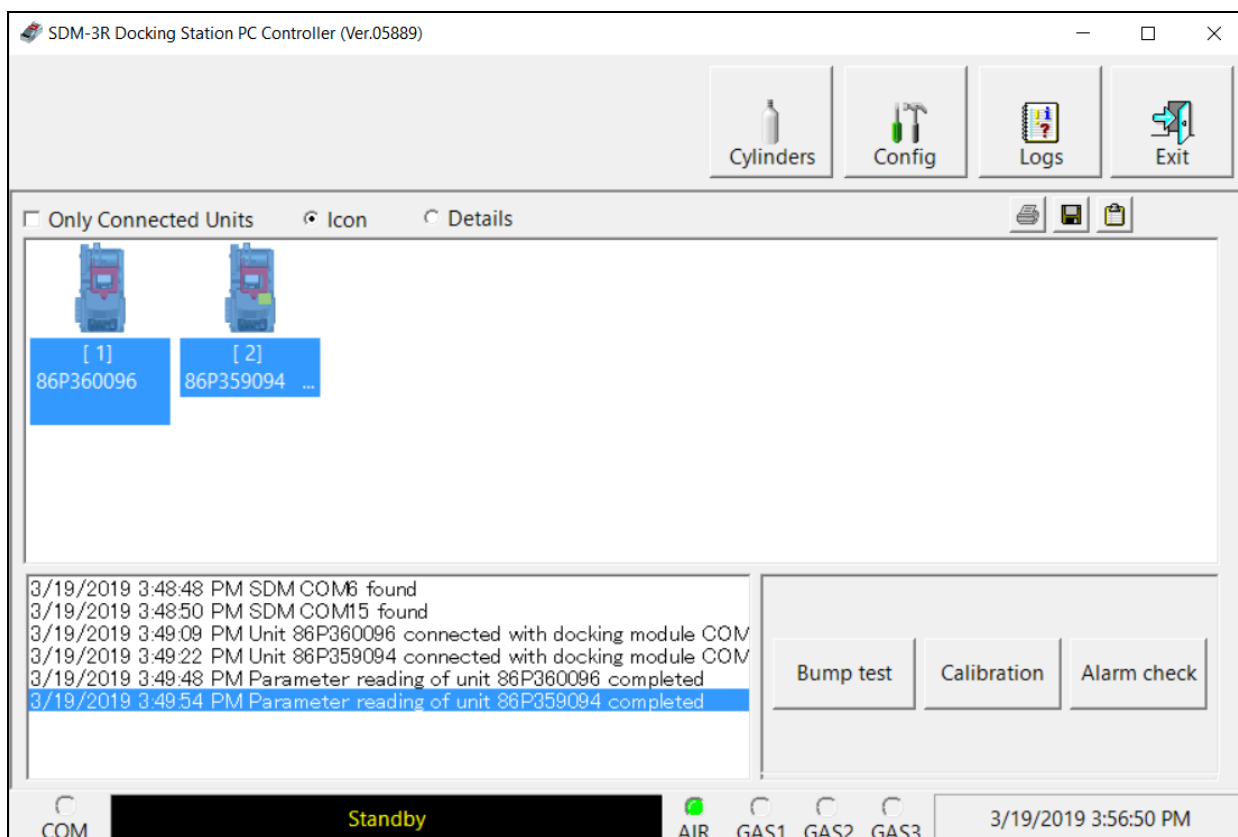


Figure 46: Instrument Selection

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

NOTE: A calibration cannot be started if a GX-3R is installed with the yellow lever down.

7. You are asked to confirm which gases will use the GAS 1 fitting for the calibration. Each gas only appears once, even if multiple instruments with the same target gas are being calibrated. The gas concentration shown next to each gas name is the auto calibration value for that gas. If it does not match the gas concentration listed on the cylinder, change the auto calibration value for the instrument(s) associated with that gas. See “Sensor Tab” on page 112 for instructions.

NOTE: If the SDM-3R has only 1 solenoid valve installed, all target gases will be assigned to GAS1. If you need to utilize separate cylinders while using the SDM-3R in PC controlled mode, the SDM-3R must have more than 1 solenoid valve installed.

NOTE: If your instrument is a GX-3R Pro with a CO₂ sensor installed, and if your SDM-3R only has 1 solenoid valve installed, only the standard 4 channels (catalytic LEL, O₂, CO, and H₂S) will appear as gases available for testing. To test all gases in a CO₂ GX-3R Pro, you need an SDM-3R with at least 2 solenoid valves installed.

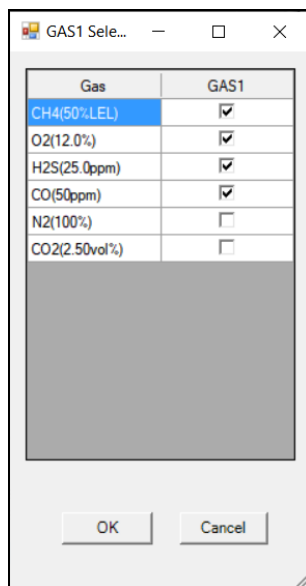


Figure 47: GAS 1 Selection

8. Select the gases that will use GAS1 and click **OK**. Generally, only the standard 4 channels (catalytic LEL, O₂, CO, and H₂S) are assigned to GAS1 but some exceptions are listed below:
- SO₂ (if using a 5-gas [LEL, O₂, CO, H₂S, SO₂] cylinder)
 - N₂ (if using a 3-gas [LEL, O₂, CO] or 4-gas [LEL, O₂, CO, H₂S] mix in N₂)

H2_CO-H2 only appears if **Display H2_CO-H2 on calibration gas selection** is selected (default is deselected) in the Config Window. The H₂-response needs to be set both monthly and after a new sensor is installed. 200 ppm H₂ is recommended for calibrating the hydrogen response. **H2_CO-H2** should be deselected in this screen.

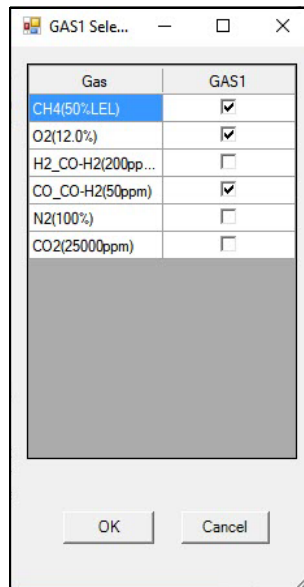


Figure 48: GAS 1 Selection for H₂-Compensated CO Sensor

9. The gas order confirmation screen appears. This screen shows you GX-3R (Pro) serial numbers and the gases associated with each instrument.

Unit	SerialNo (Inlet Count)	GAS1	GAS2	GAS3
		CH4(50%LEL)	N2(100%)	CO2(2.50vol%)
		O2(12.0%)		
		H2S(25.0ppm)		
		CO(50ppm)		
86P360096	(3)	4=CH4+O2+H2S+CO	1	1
86P359094	(3)	4=CH4+O2+H2S+CO		

Figure 49: Instrument/Gas Confirmation Screen

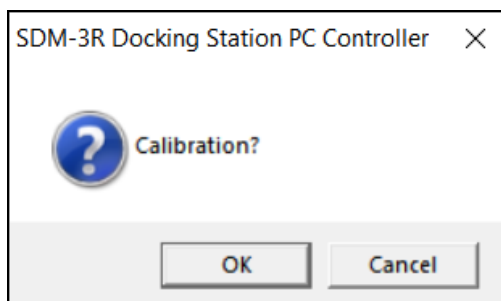
10. Use the drop down menus to assign each gas to an inlet. If there are 2 or 3 solenoid valves installed in your SDM-3R and if you have more gases than installed solenoids, assign all of the remaining gases to the last inlet. The program will prompt you to change the cylinder during the calibration. Use the selection box below each inlet assignment to select or deselect that gas for calibrating.

For CO₂ sensors: You cannot deselect N₂ and leave CO₂ selected. N₂ and CO₂ must both either be selected or deselected.

NOTE: Your SDM-3R will only have as many gas inlet choices as it has solenoid valves. For example, an SDM-3R with only one solenoid valve will only have GAS1 as a choice.

11. Click **OK**.

12. You are asked if you want to calibrate the GX-3R (Pro)(s). Click **OK** to proceed.



13. The SDM-3R pump(s) start and the program indicates that air is flowing. The AIR indicator on the program screen is solid green. Air is applied to the GX-3R (Pro)(s) for 15 seconds.

NOTE: If the GX-3R (Pro) was not on for 40 seconds before the bump test was initiated, air will flow until the GX-3R (Pro) has been on for 40 seconds.

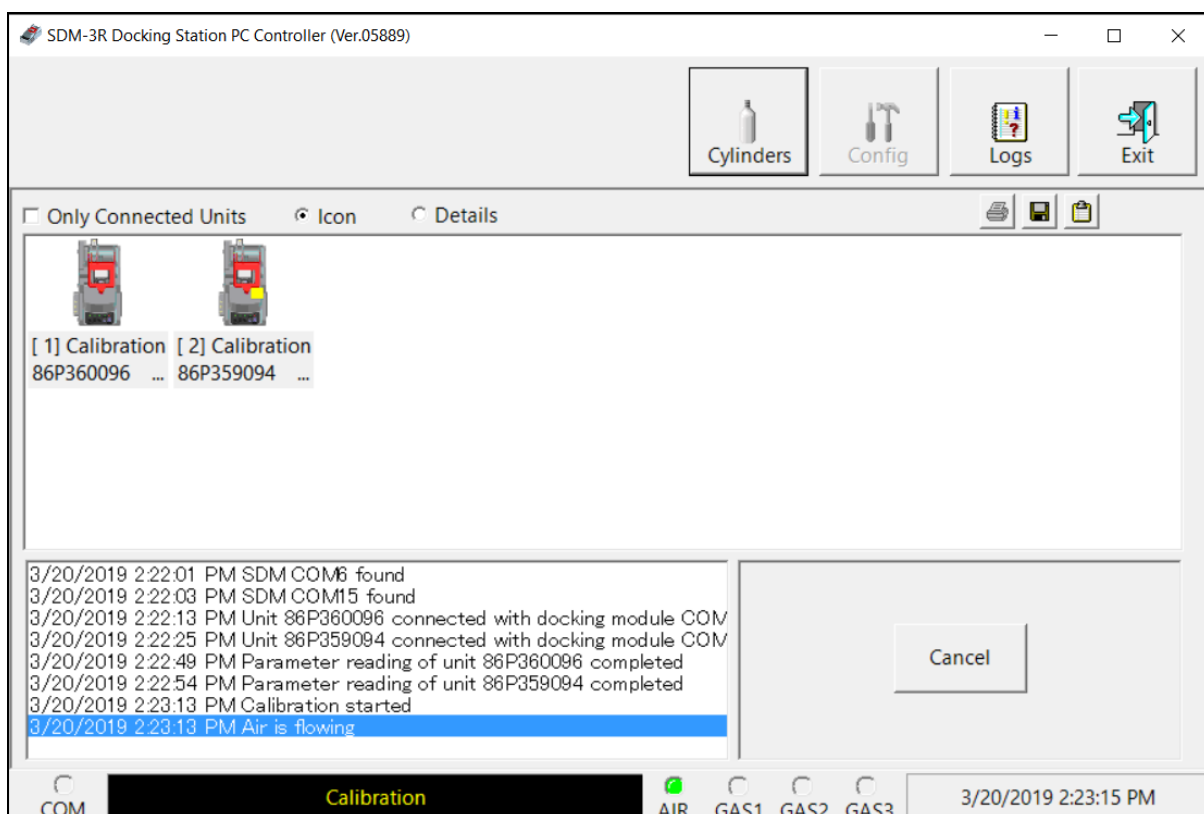


Figure 50: Air Flowing

14. The PC Program performs a zero adjustment and analyzes the results.

15. If any sensors failed the zero adjustment, the calibration for that instrument is aborted.

16. The SDM-3R then applies calibration gas in the order of the gas inlets. The **Gas Exposure Time** for each gas inlet is determined by the GAS1, GAS2, and GAS3 parameters in the **Calibration** section of the **Config** window's **Parameter** tab.

NOTE: N₂ is always applied before CO₂, regardless of its inlet assignment.

17. If the test requires a cylinder change, the pump will stop and the PC Program will prompt you to change the cylinder. Change the cylinder and click **OK** to continue with the calibration.

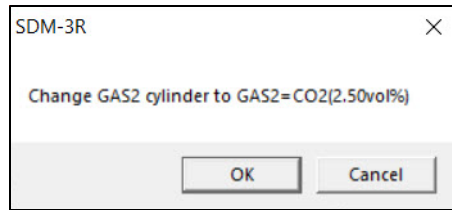


Figure 51: Cylinder Change

18. The SDM-3R analyzes the results after the end of each gas application.

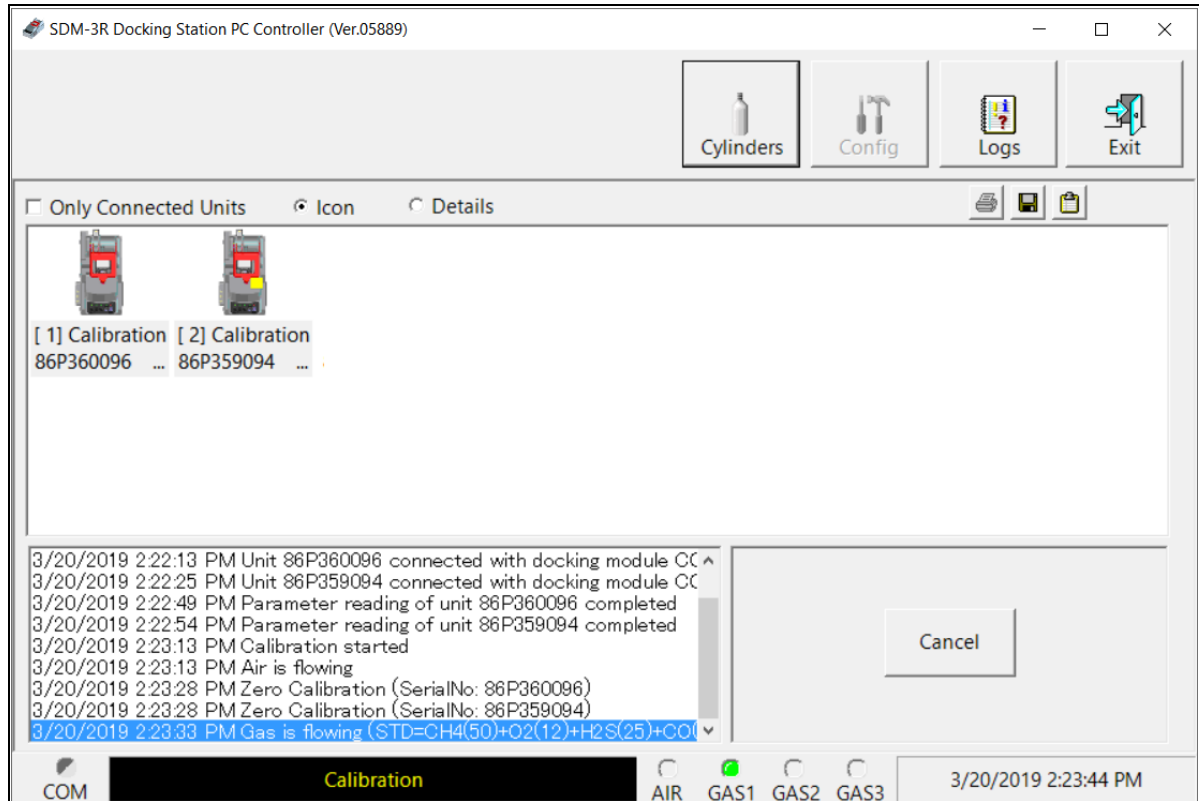


Figure 52: Calibration Gas Flowing

19. After calibration gas is applied, the docking station purges with fresh air for 15 seconds.

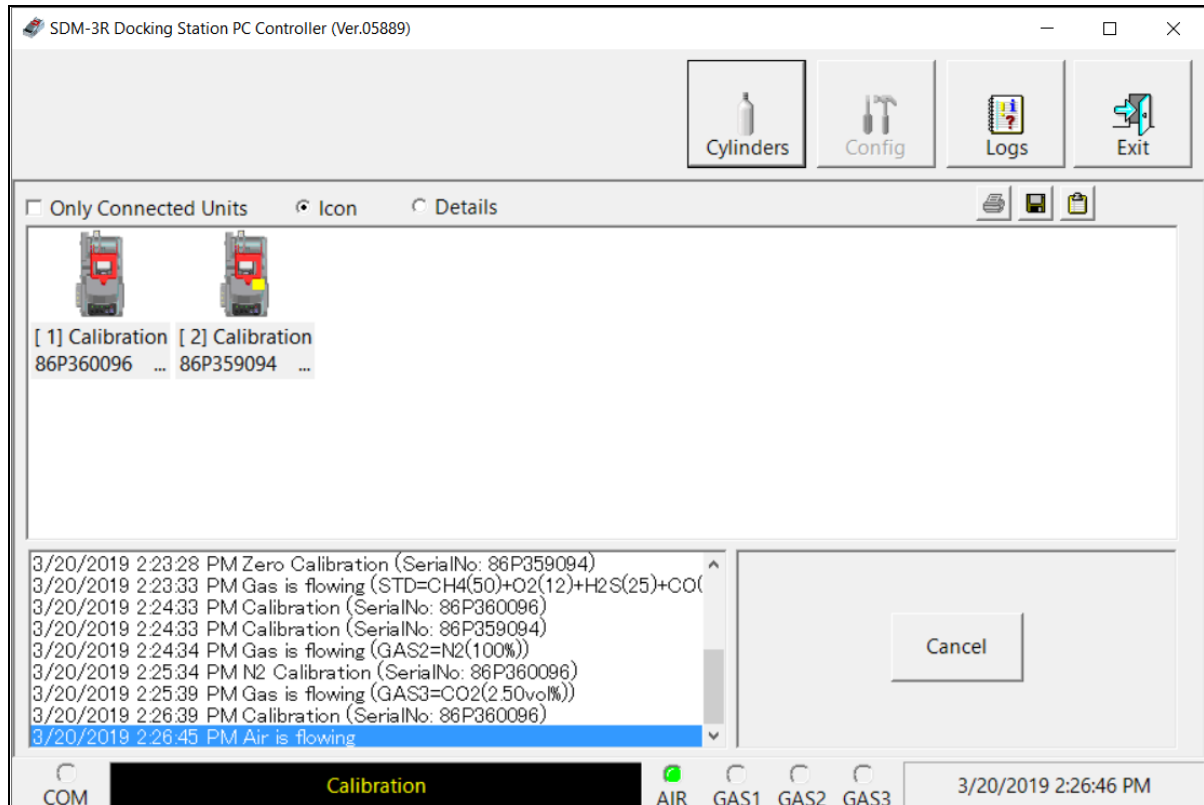


Figure 53: Fresh Air Purge

20. A pop-up window shows the calibration results.

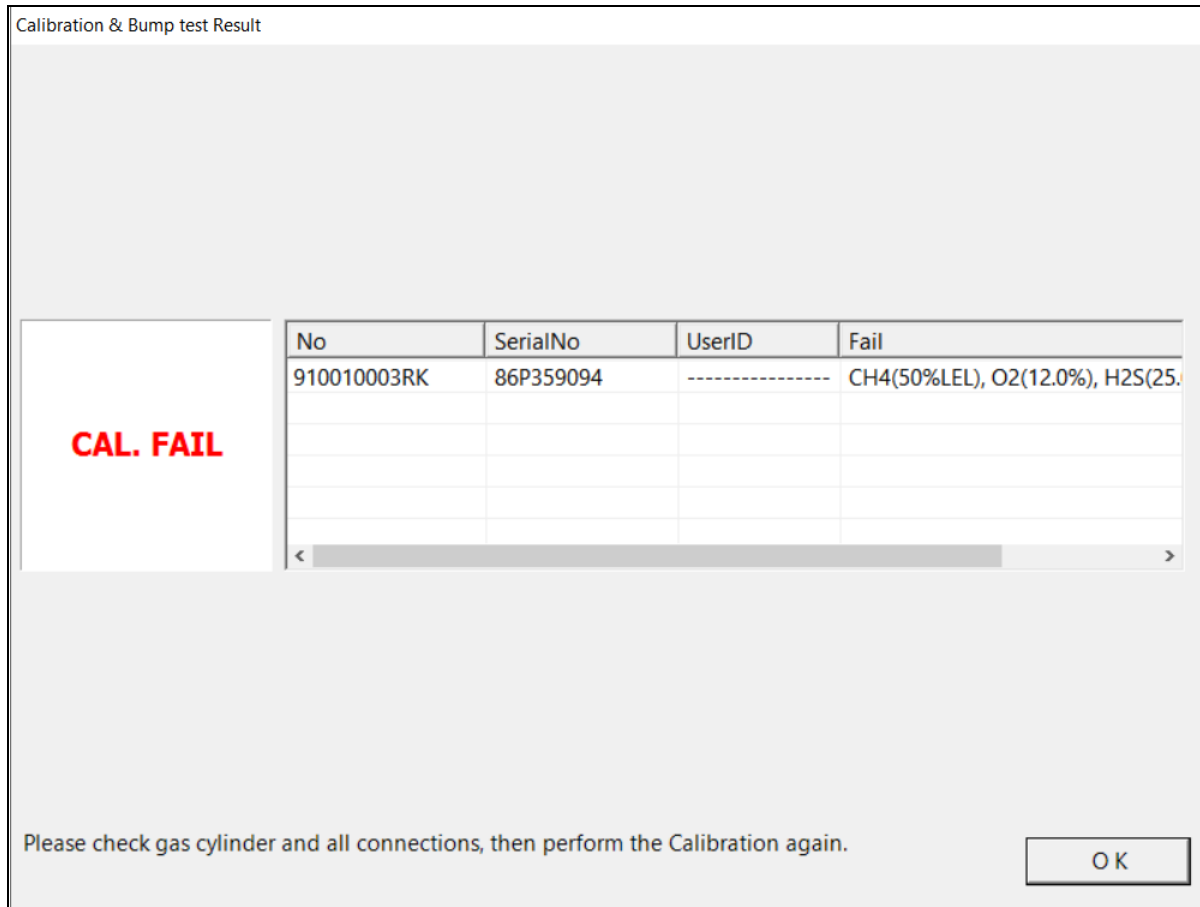


Figure 54: Calibration Result Screen

21. Click **OK** to return to the main program window or double click an instrument information line to view the calibration results in the **Logs** window.
22. For all calibration result outcomes, the GX-3R (Pro)(s) are displayed in the main program window in Details View. To return to Icons View, click the **Icons** radio button.
23. All calibration results can be viewed in the **Logs** window. See page 129 for instructions for viewing calibration data.

24. If you are using a CO₂ scrubber instead of a N₂ cylinder to zero the CO₂ sensor:
- Remove the scrubber from the gas inlet.
 - Reattach the tubing to the open end of the scrubber.

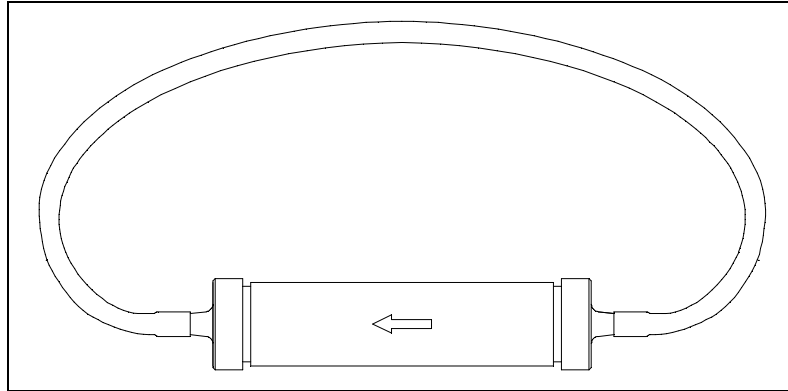


Figure 55: Reattaching CO₂ Scrubber Tubing for Storage

Performing an Alarm Check

The PC Program is capable of performing an alarm check both manually and automatically on a GX-3R (Pro). When an alarm check is performed, the PC Program checks the operation of the instrument's LEDs and buzzer. The PC Program analyzes the alarm check results and determines if the GX-3R (Pro) passed the alarm check.

1. Establish a connection between the SDM-3R, GX-3R (Pro) and the PC Program as described on page 54.

NOTE: The instrument cradle's yellow lever needs to be up for GX-3Rs and down for GX-3R Pros.

2. Highlight the GX-3R (Pro)(s) you wish to alarm check.

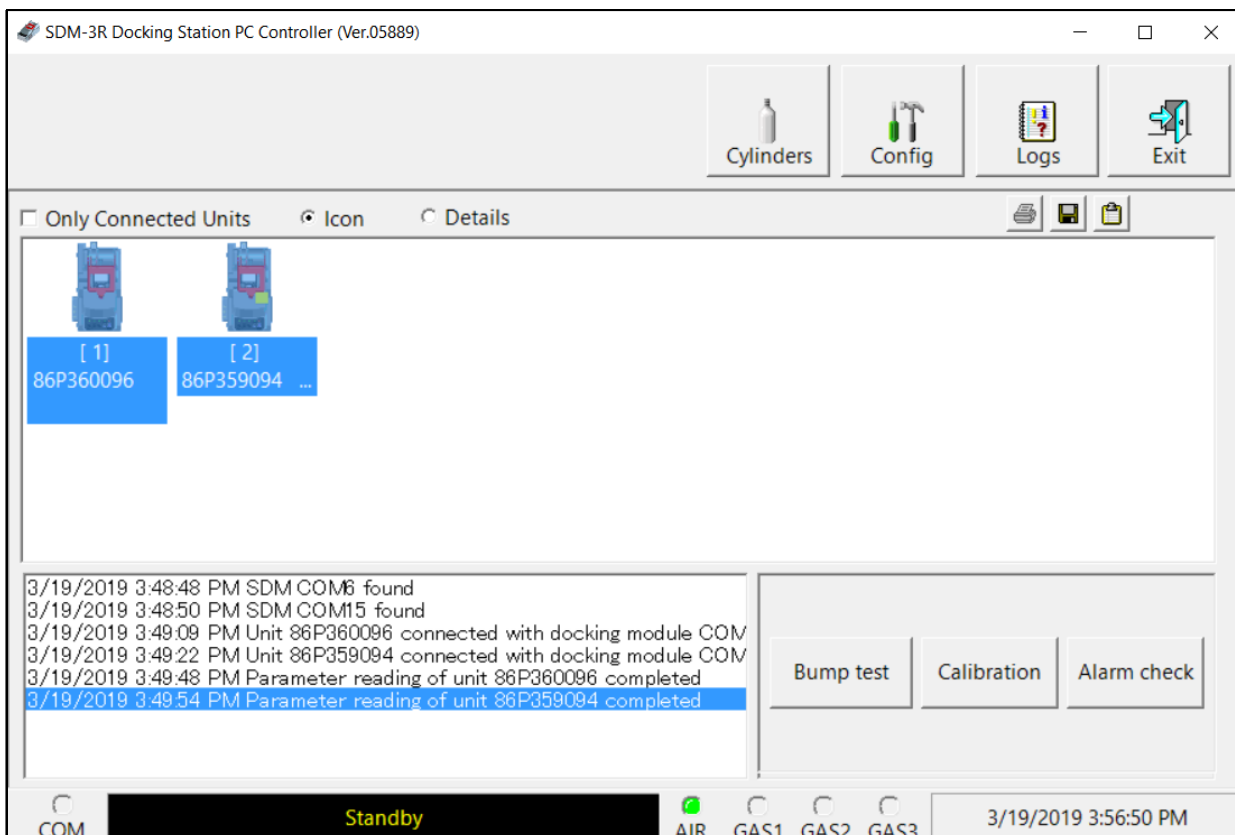
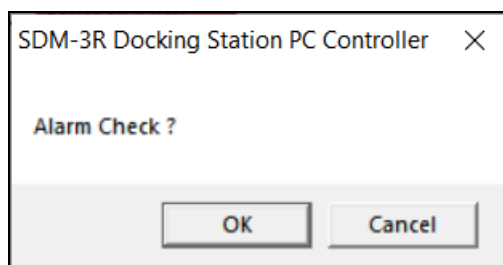


Figure 56: Instrument Selection

3. Click **Alarm Check** in the lower right corner of the main program window.
4. Click **OK** to proceed.



5. The instrument's LEDs and buzzer are checked.

6. A pop-up window shows the alarm check results.

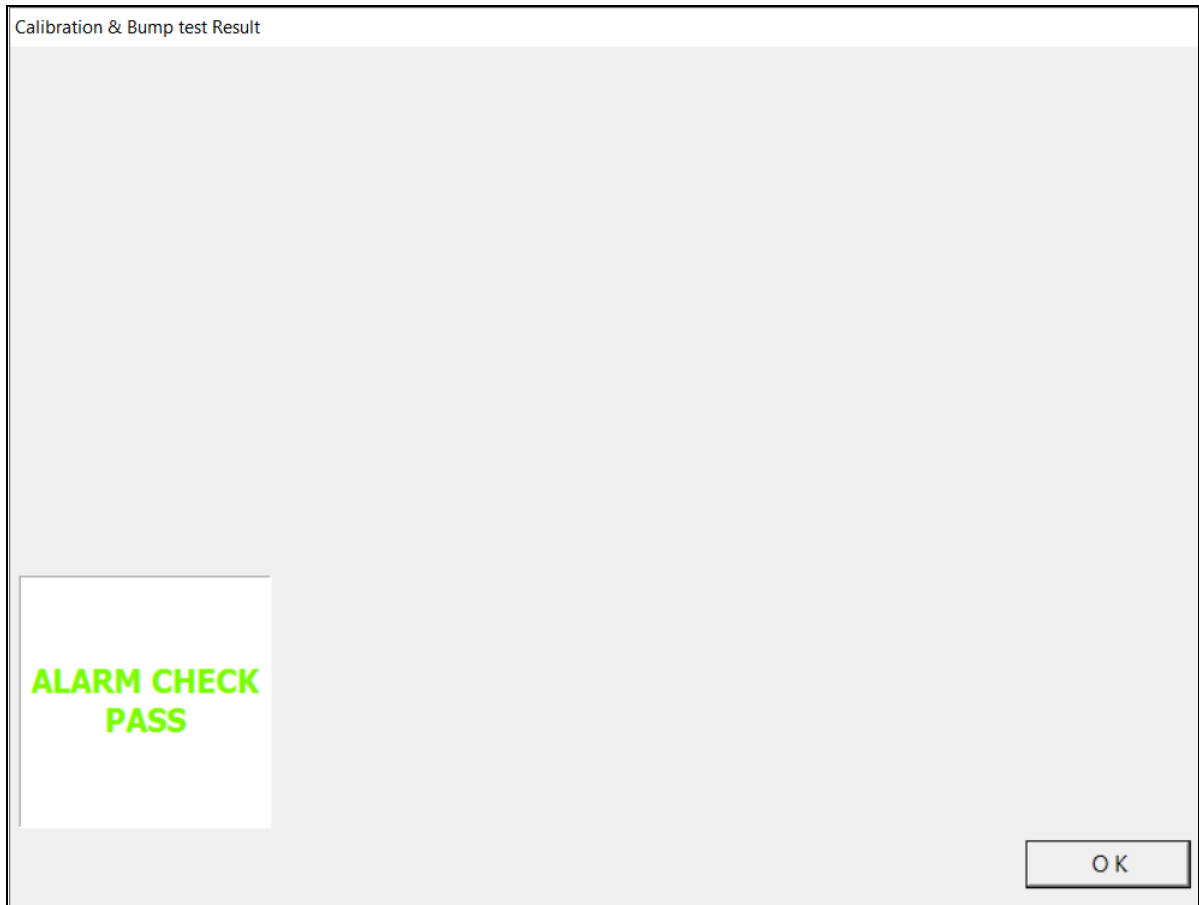


Figure 57: Alarm Check Result Screen

7. Click **OK** to return to the main program window or double click an instrument information line to view the alarm check results in the **Logs** window.
8. For all alarm check result outcomes, the GX-3R (Pro)(s) are displayed in the main program window in Details View. To return to Icons View, click the **Icons** radio button.
9. All alarm check results can be viewed in the **Logs** window. See page 146 for instructions for viewing alarm check data.

Chapter 6: Changing SDM-3R Parameters for Standalone Operation

The parameters available for editing in the **SDM** Window are parameters that are saved in the SDM-3R. *These parameters do not affect PC Program operation but they will affect Standalone operation.*

See “Chapter 4: Program Setup” on page 31 for a description of parameters that affect only operation of the PC Program.

The SDM Window has 4 tabs:

- Bump & Cal 1
- Bump & Cal 2
- Internal
- Automatic

A station’s settings can be saved to a file and a file can be imported using this window.

Entering the SDM Window

1. Open the PC Program.
2. Confirm that the AC adapter is connected to the SDM-3R and to an AC wall socket.
3. Connect the Type A to Type B USB cable to the SDM-3R and to an available USB port on your computer.
4. Press the SDM-3R’s POWER button. When the SDM-3R connects to the PC Program, it appears in the SDM-3R/GX-3R Pro Display Area.

NOTE: When the SDM-3R is connected to the PC Program, the date and time of the docking station are automatically updated to the current date and time on the PC Program’s screen.

5. Right click on the SDM icon.

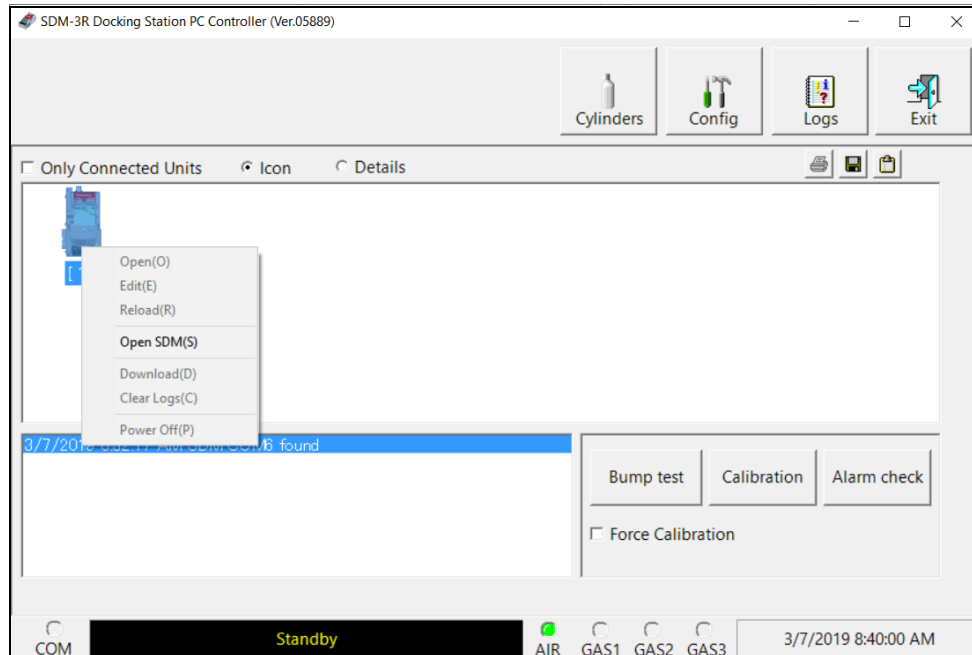


Figure 58: Instrument Function Menu

6. Click **Open SDM(S)**.
7. If the **Password** parameter in the **Bump & Cal 2** Tab of the **SDM Window** is selected (factory setting is deselected), the program prompts you for a password to enter the **SDM Window**. Enter the password and click OK.

8. The **SDM** Window opens and the **Bump & Cal 1** Tab is displayed. Each tab in the **SDM** Window is described in the sections that follow.

SDM Configuration

Bump & Cal 1 | Bump & Cal 2 | Internal | Automatic

☐ Auto Bump

Bump

AIR Flush: 15 sec

Gas Exposure Time (sec): 20 (GAS1), 20 (GAS2), 20 (GAS3)

AIR Purge: 15 sec

Tolerance: 50 %

☐ Alarm Check

☐ Fast Bump

☐ Auto bump if past due

☐ Auto Cal if Bump Fails

☐ Auto Calibration

Calibration

AIR Flush: 15 sec

Gas Exposure Time (sec): 60 (GAS1), 60 (GAS2), 60 (GAS3)

AIR Purge: 15 sec

☐ Alarm Check

☒ Manual Calibration

☐ Auto cal if past due

Import file

Export file

SDM Update

Cancel

Figure 59: Bump & Cal 1 Tab

Bump & Cal 1 Tab

This section describes the **Bump & Cal 1** Tab of the **SDM Window**.

SDM Configuration

Bump & Cal 1

Bump & Cal 2

Internal

Automatic

☐ Auto Bump

Bump

AIR Flush

15

sec

Gas Exposure Time

(sec)

GAS1

20

GAS2

20

GAS3

20

AIR Purge

15

sec

Tolerance

50

%

☐ Alarm Check

☐ Fast Bump

☐ Auto bump if past due

☐ Auto Cal if Bump Fails

☐ Auto Calibration

Calibration

AIR Flush

15

sec

Gas Exposure Time

(sec)

GAS1

60

GAS2

60

GAS3

60

AIR Purge

15

sec

☐ Alarm Check

☒ Manual Calibration

☐ Auto cal if past due

Import file

Export file

SDM Update

Cancel

Figure 60: Bump & Cal 1 Tab

The parameters available for editing are in Table 4 along with their available options and factory settings.

Table 4: Bump & Cal 1 Tab Parameters

	Parameter Name	Available Choices	Factory Setting
Bump Parameters	Auto Bump	<ul style="list-style-type: none"> • Selected (On) • Deselected (Off) 	Deselected (Off)
	AIR Flush	15 - 120 seconds	15 seconds
	GAS1	20 - 120 seconds	20 seconds
	GAS2	20 - 120 seconds	20 seconds
	GAS3	20 - 120 seconds	20 seconds
	AIR Purge	5 - 120 seconds	15 seconds
	Tolerance ¹	10 - 50%	50%
	Fast Bump	<ul style="list-style-type: none"> • Selected (On) • Deselected (Off) 	Selected (On)
	Auto Cal if Bump Fails	<ul style="list-style-type: none"> • Selected (On) • Deselected (Off) 	Selected (On)
	Alarm Check	<ul style="list-style-type: none"> • Selected (On) • Deselected (Off) 	Selected (On)
	Auto bump if past due	<ul style="list-style-type: none"> • Selected (On) • Deselected (Off) 	Deselected (Off)

Table 4: Bump & Cal 1 Tab Parameters

	Parameter Name	Available Choices	Factory Setting
Calibration Parameters	Auto Calibration	<ul style="list-style-type: none"> Selected (On) Deselected (Off) 	Deselected (Off)
	AIR Flush	15 - 120 seconds	15 seconds
	GAS1	20 - 120 seconds	60 seconds
	GAS2	20 - 120 seconds	60 seconds
	GAS3	20 - 120 seconds	60 seconds
	AIR Purge	5 - 120 seconds	15 seconds
	Alarm Check	<ul style="list-style-type: none"> Selected (On) Deselected (Off) 	Selected (On)
	Manual Calibration	<ul style="list-style-type: none"> Selected (On) Deselected (Off) 	Selected (On)
	Auto cal if past due	<ul style="list-style-type: none"> Selected (On) Deselected (Off) 	Deselected (Off)

¹ The **Fast Bump** feature has its own factory-set tolerances: $\pm 37\%$ for oxygen (O_2) and $\pm 50\%$ for all other gases. The **Tolerance** setting has no effect on the fast bump feature.

Auto Bump (for bump only)

Selected: A bump test automatically begins whenever a GX-3R (Pro) is connected to SDM-3R, whether the instrument is due for a bump test or not.

Deselected (factory setting): A bump test will not automatically begin whenever a GX-3R (Pro) is connected to the SDM-3R.

AIR Flush (for bump and calibration)

The pre-sample flush time is the length of time that the SDM-3R draws air through the AIR fitting before performing an air adjust operation. It can be set from **15** to **120** seconds. The factory setting for bump test and calibration is **15** seconds.

NOTE: If the GX-3R (Pro) was not on for 40 seconds before the bump test was initiated, air will flow until the GX-3R (Pro) has been on for 40 seconds regardless of the AIR Flush setting.

GAS1, GAS2, GAS3 (for bump and calibration)

The gas sample time is the length of time that the SDM-3R draws calibration gas through each of the gas fittings. Each fitting can be individually set from **20** to **120** seconds. The factory setting for bump test is **20** seconds. The factory setting for calibration is **60** seconds.

NOTE: A calibration sample time of 120 seconds is recommended for instruments with an ammonia (NH₃) sensor.

AIR Purge (for bump and calibration)

The post-sample purge time is the length of time that the SDM-3R draws air through the AIR fitting to purge calibration gas from the system. It can be set from **5** to **120** seconds. The factory setting is **15** seconds.

Tolerance (for bump only)

The bump test check tolerance determines how close the GX-3R (Pro) gas reading must be to the calibration gas concentration for each channel during a bump test in order to pass the bump test. It is defined as a percentage of the calibration gas concentration. The amount that the GX-3R (Pro) gas reading differs from the calibration gas concentration must be equal to or less than this percentage of the calibration gas concentration.

For example, if the tolerance is set to 50%, and the %LEL calibration gas concentration is 50% LEL, then the bump test gas reading for the LEL channel on the GX-3R (Pro) must be 50% LEL \pm 25% LEL.

The available options are **10%, 20%, 30%, 40%, 50%** (factory setting).

NOTE: The **Fast Bump** feature has its own factory-set tolerances: \pm 37% for oxygen (O₂) and \pm 50% for all other gases. The **Tolerance** setting has no effect on the fast bump feature.

Fast Bump (for bump only)

Turning on **Fast Bump** allows calibration gas to be saved when the tested sensors respond quickly and accurately. The **Fast Bump** feature has its own factory-set tolerances: \pm 37% for oxygen (O₂) and \pm 50% for all other gases. SDM-3Rs with firmware older than 07607 have a tighter factory-set fast bump tolerance.

If **Fast Bump** is **deselected**, the gas application during a bump test continues for the time period defined by the **GAS** bump test parameter regardless of the sensor reading(s).

If **Fast Bump** is **selected** (factory setting) and the gas reading for the sensor(s) being tested is above the lower tolerance and below the upper tolerance within a 15 second gas application and a 10 second stabilization period, the sensor(s) pass bump testing, the gas application is stopped, and the test moves on to the next sensor(s) or to the fresh air purge.

If **Fast Bump** is **selected** (factory setting) and the gas reading on any of the tested channels is below the lower tolerance or above the upper tolerance within a 15 second gas application and a 10 second stabilization period, the bump test fails. The next step depends on the **Auto Cal If Bump Fails** setting.

Consider the following scenario as an example:

- 50% LEL methane used for bump testing the combustible gas channel
- **Fast Bump** selected
- Factory-set fast bump tolerance is set to $\pm 50\%$, which means that the acceptable reading range is 25% LEL - 75% LEL

Table 5 shows possible readings after the 15 second gas application and the 10 second stabilization period and the effect on the gas application.

Table 5: Example Fast Bump Scenarios

Gas Reading After 15 Seconds of Gas Application and a 10 Second Stabilization Period	Outcome
15% LEL (-70% of 50% LEL)	<ul style="list-style-type: none">• Bump test fails• Next step determined by Auto Cal If Bump Fails setting
30% LEL (-40% of 50% LEL)	<ul style="list-style-type: none">• Gas application stops• Sensor passes bump testing
60% LEL (+20% of 50% LEL)	<ul style="list-style-type: none">• Gas application stops• Sensor passes bump testing
80% LEL (+60% of 50% LEL)	<ul style="list-style-type: none">• Bump test fails• Next step determined by Auto Cal If Bump Fails setting

Auto Cal If Bump Fails (for bump only)

Selected (factory setting): The docking station automatically performs a calibration if a bump test fails.

Deselected: The docking station will not automatically perform a calibration if a bump test fails.

Alarm Check (for bump and calibration)

Selected (factory setting): A GX-3R (Pro) LED and buzzer test is done at the end of the bump test or calibration. The LEDs turn on for a few seconds, the buzzer sounds, and the SDM-3R determines if these actions were completed successfully.

Deselected: An LED and buzzer test is not done at the end of a bump test or calibration.

Auto bump if past due (for bump only)

Selected: If the connected GX-3R (Pro) is due for a bump test, the SDM-3R automatically performs a bump test on all channels immediately after the GX-3R (Pro) is connected.

Deselected (factory setting): An automatic bump test is not performed, even if the GX-3R (Pro) is due for one.

Auto Calibration (for calibration only)

Selected: A calibration on all channels automatically begins whenever a GX-3R (Pro) is connected to SDM-3R, whether the instrument is due for a calibration or not.

Deselected (factory setting): A calibration does not automatically begin whenever a GX-3R (Pro) is connected to the SDM-3R.

Manual Calibration (for calibration only)

Selected (factory setting): A calibration can be manually initiated using the SDM-3R's CAL ▲ button.

Deselected: A calibration cannot be manually initiated using the SDM-3R's CAL ▲ button.

Auto cal if past due (for calibration only)

Selected: If the connected GX-3R (Pro) is due for a calibration, the SDM-3R automatically performs a calibration on all channels immediately after the GX-3R (Pro) is connected.

Deselected (factory setting): An automatic calibration is not performed, even if the GX-3R (Pro) is due for one.

Bump & Cal 2 Tab

This section describes the **Bump & Cal 2** Tab of the **SDM** Window.

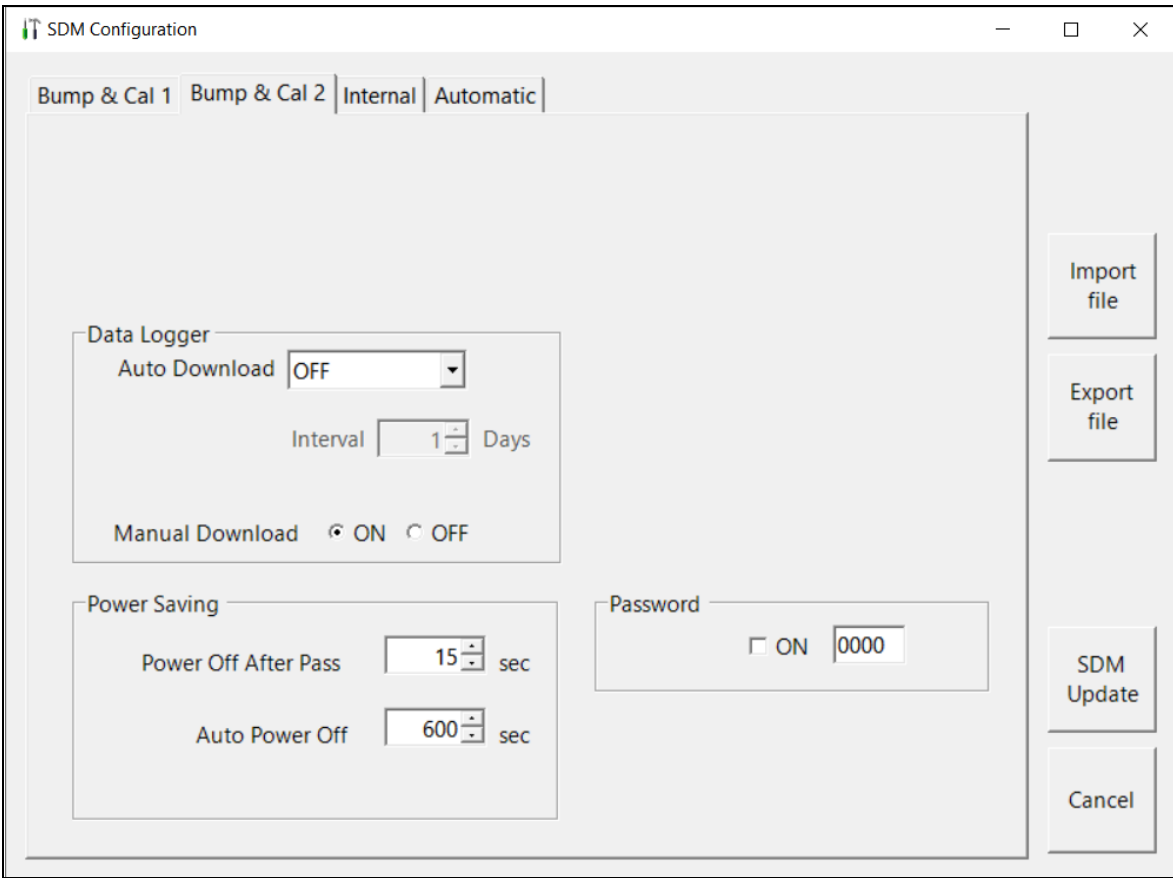


Figure 61: Bump & Cal 2 Tab

The parameters available for editing are shown in Table 6 along with their available options and factory settings.

Table 6: Bump & Cal 2 Tab Parameters

	Parameter	Available Choices	Factory Setting
Data Logger	Data Logger Auto Download	<ul style="list-style-type: none"> • OFF • Every Time • Interval 	OFF
	Data Logger Interval NOTE: Only active if “Interval” is selected for Data Logger Auto Download.	1 - 60 days	1 day
	Manual Download	<ul style="list-style-type: none"> • ON • OFF 	ON

Table 6: Bump & Cal 2 Tab Parameters

	Parameter	Available Choices	Factory Setting
Power Saving	Power Off After Pass	0 - 99,999 seconds	15 seconds
	Auto Power Off	0 - 99,999 seconds	600 seconds
Password	Password	<ul style="list-style-type: none"> • Selected (On) • Deselected (Off) 	Deselected (Off) (0000)

Data Logger Auto Download

This parameter allows you to turn on an automatic download of a connected GX-3R (Pro)'s saved data. A manual data download can be performed at any time.

- **OFF** (factory setting): No data download is performed when a GX-3R (Pro) is connected to the SDM-3R.
- **Every Time**: A data download automatically occurs every time a GX-3R (Pro) is connected to the SDM-3R and a USB drive is installed in the USB port on the front of the SDM-3R.
- **Interval**: A data download is performed once per interval when a GX-3R (Pro) is connected to the SDM-3R and a USB drive is installed in the USB port on the front of the SDM-3R. If this option is selected, the **Data Logger Interval** parameter becomes active and needs to be set. The **Data Logger Interval** parameter is described below.

NOTE: A data download takes approximately 2 minutes to complete.

Data Logger Interval

The **Data Logger Interval** is the length of time, in days, that will pass before data is automatically downloaded from a GX-3R (Pro) if **Data Logger Auto Download** is set to **Interval**. It can be set anywhere from **1** to **60** days. The factory setting is **1** day. Use the arrows to the right of the current setting to change the interval or highlight the current setting and type in the desired value.

If the GX-3R (Pro) is connected to an SDM-3R before the interval has passed, a data download will not automatically occur.

Manual Download

ON (factory setting): GX-3R (Pro) data can be manually downloaded to a USB drive.

OFF: GX-3R (Pro) data cannot be manually downloaded to a USB drive.

Power Off After Pass

This is the length of time that passes after a successful bump test, calibration, or alarm check before the program will automatically shut off the GX-3R (Pro). Use the arrows to the right of the current setting to change the value or highlight the current setting and type in the desired value. It is defined in seconds with a maximum setting of **99,999** seconds. The factory setting is **15** seconds. If this parameter is set to **0** seconds, the GX-3R (Pro) will not be turned off after a successful bump test, calibration, or alarm check.

Auto Power Off

This is the length of time that passes after the last operation is finished before the program will automatically shut off the GX-3R (Pro). If a successful bump test, calibration, or alarm check is performed, the program will automatically shut off the GX-3R (Pro) in the time defined in **Power Off After Pass** regardless of the **Auto Power Off** setting. Use the arrows to the right of the current setting to change the value or highlight the current setting and type in the desired value. It is defined in seconds with a maximum setting of **99,999** seconds. The factory setting is **600** seconds.

Password

Turning the password on (factory setting is off) adds password protection to the SDM Window and to the Configuration Menu if the SDM-3R is used in Standalone Mode. The factory set password is **0000** but a user selected password can be entered in the space to the right of the **ON** selection box.

Internal Tab

The **Internal** Tab is used for setting up a LAN connection on a non-DHCP network and does not have any function in the SDM-3R's PC Controlled Configuration. Instructions for using the **Internal** Tab can be found in the SDM-3R Standalone Configuration Manual.

The screenshot shows the 'SDM Configuration' window with the 'Internal' tab selected. The window has a title bar with standard minimize, maximize, and close buttons. Below the title bar are four tabs: 'Bump & Cal 1', 'Bump & Cal 2', 'Internal' (which is active), and 'Automatic'. The main area of the window is divided into a 'Network' section on the left and a right-hand sidebar. The 'Network' section contains a 'DHCP' checkbox which is checked, and three input fields for 'IP Address', 'SubNet Mask', and 'Default Gateway', all containing the value '000.000.000.000'. Below these fields are two buttons: 'Email' and 'Net Time'. The right-hand sidebar contains four buttons: 'Import file', 'Export file', 'SDM Update', and 'Cancel'.

Network	
<input checked="" type="checkbox"/> DHCP	
IP Address	000.000.000.000
SubNet Mask	255.255.255.000
Default Gateway	000.000.000.000

Buttons: Email, Net Time, Import file, Export file, SDM Update, Cancel

Figure 62: Internal Tab

Automatic Tab

This section describes the **Automatic** Tab of the **SDM** Window.

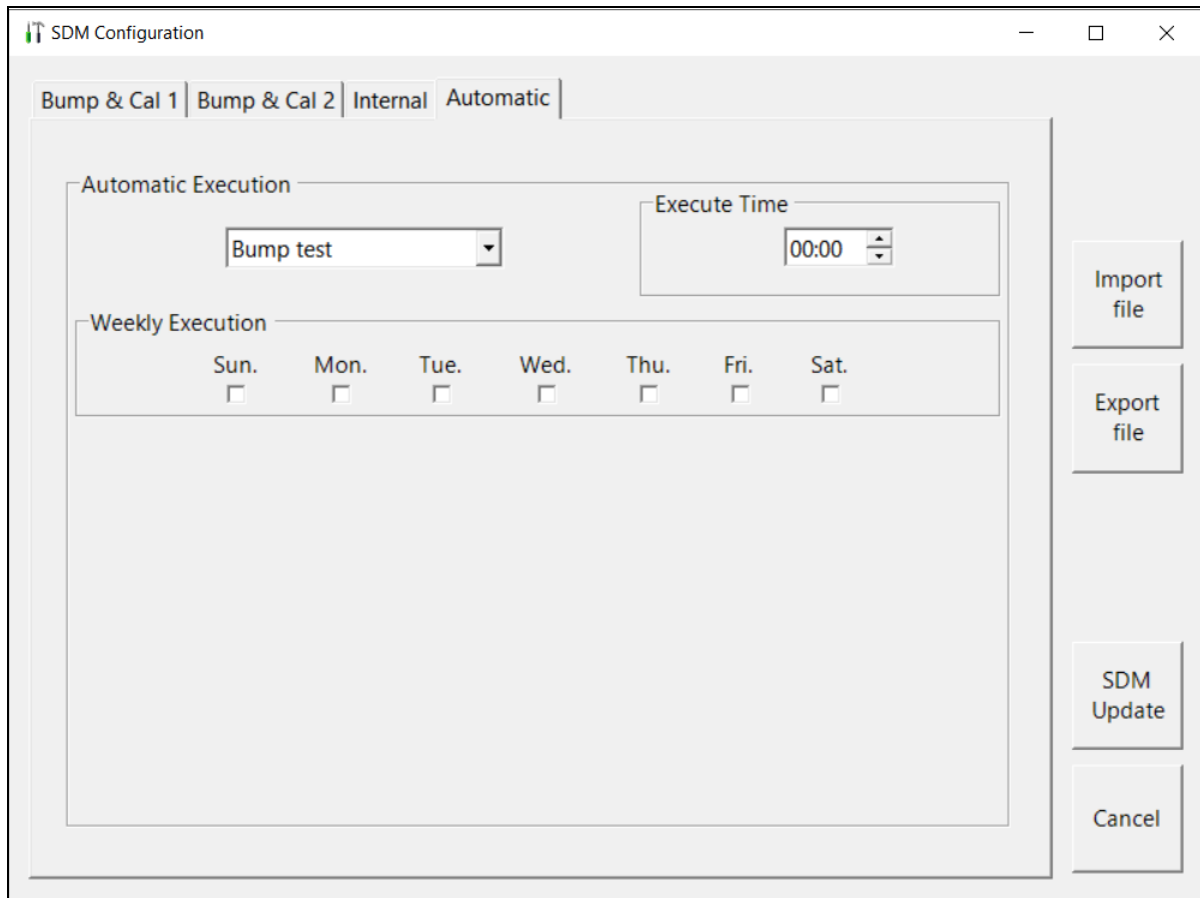


Figure 63: Automatic Tab

The **Automatic** Tab allows you to set up a bump test, calibration, or alarm check to automatically occur at a specific time on the desired day(s). If a GX-3R (Pro) is installed in an SDM-3R at the specified day/time, the SDM-3R will turn the GX-3R (Pro) on, perform the test, then turn the GX-3R (Pro) off.

1. Use the drop down menu to select **Bump Test**, **Calibration**, or **Alarm Check**. Only 1 test can be selected. Multiple tests cannot be done automatically.
2. Highlight the hours or minutes portion of the **Execute Time** and then use the arrows to change the selection or type in the desired value.
3. Select what day(s) you would like the test to occur.

Exporting an SDM File

Use the **Export File** button on the right side of the **SDM** Window to save a parameter configuration file based on a connected SDM-3R's parameter settings. The file can then be uploaded at a later time to another SDM-3R to make its parameter settings match the original SDM-3R's parameter settings or to restore the parameter settings of the original SDM-3R if they have been changed.

1. Be sure that all of the parameters in the **Bump & Cal 1**, **Bump & Cal 2**, and **Automatic** tabs are appropriately set for your application.
2. Click **Export File**.
3. Choose a destination for the file and type in a file name. The storage location should be somewhere convenient. The name should be indicative of the setup or SDM-3R that the file came from. The file type is .sdm.
4. Click **Save**.

Importing an SDM File

Use the **Import File** button on the right side of the **SDM** Window to load a parameter configuration file that can be uploaded to the SDM-3R. The parameter configuration files have a .sdm extension and are only readable by the PC Program. See "Exporting an SDM File" on page 93 for a description of how to create and save a parameter configuration file.

When you upload a parameter configuration file, you are uploading SDM-3R parameters to the SDM-3R. GX-3R (Pro) parameters are not affected.

1. Click **Import File**.
2. Navigate to the location of your stored .sdm file.
3. Click **Open**.
4. The parameters in the **SDM** Window's tabs will automatically be changed, if necessary, to agree with the parameters in the imported .sdm file.

Returning to the Main Window

1. Click **SDM Update**.
2. If you want to save the changes, click **Yes** in the window that comes up. If you do not want to save the changes, click **No** in the window that comes up.
3. To exit the SDM Window and return to the main program window without saving any changes, click **Cancel** in the SDM Window and click **OK** in the confirmation screen that comes up.

Chapter 7: Changing GX-3R (Pro) Parameters

All of the parameters that can be changed in the Edit function tabs are GX-3R (Pro) parameters only. Any changes made do not affect operation of the SDM-3R or the PC Program.

1. Establish a connection between the SDM-3R, GX-3R (Pro) and the PC Program as described on 54.

NOTE: The instrument cradle's yellow lever needs to be up for GX-3Rs and down for GX-3R Pros.

2. Right click a GX-3R (Pro).
3. Select **Edit(E)**. The password is **1939**.
4. Change parameters in the **Parameter**, **Sensor**, and **Station & User** tabs.
5. Click **OK** and then click **Yes** in the window that comes up to save the changes.

Parameter Tab

This tab allows you to view and change various instrument parameters and settings and has information in four sub tabs: the **Disp Mode** Tab, the **User Mode 1** Tab, the **User Mode 2** Tab, and the **Maintenance Mode** Tab.

Table 7 lists the instrument parameters shown in the **Parameter** Tab along with the parameter's available choices and the factory setting.

Table 7: Parameter Tab Items

Location	Parameter Tab Name (pg. # of description)	Applicable Instrument	Available Choices	Factory Setting
Common	Serial No. (pg. 100)	<ul style="list-style-type: none">• GX-3R• GX-3R Pro		
	Station ID (pg. 100)	<ul style="list-style-type: none">• GX-3R• GX-3R Pro		
	User ID (pg. 100)	<ul style="list-style-type: none">• GX-3R• GX-3R Pro		
	Cal Interval (Day) (pg. 100)	<ul style="list-style-type: none">• GX-3R• GX-3R Pro	1 - 365 days	90 days

Table 7: Parameter Tab Items

Location	Parameter Tab Name (pg. # of description)	Applicable Instrument	Available Choices	Factory Setting
Common (cont'd)	Interval Time (Sec) (pg. 100)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • 10 sec • 20 sec • 30 sec • 60 sec • 180 sec • 300 sec • 600 sec 	300 sec
Disp Mode Tab	HC Gas List (pg. 103)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 		
	Invert Select (pg. 103)	<ul style="list-style-type: none"> • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	LCD Background (pg. 103)	<ul style="list-style-type: none"> • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Buzzer Volume (pg. 103)	<ul style="list-style-type: none"> • GX-3R Pro 	<ul style="list-style-type: none"> • Low • High 	High
	Data Log Overwrite (pg. 103)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected
User Mode 1 Tab	Backlight Time (pg. 104)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	0 - 255 seconds	30 seconds
	Beep Time (pg. 104)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	0.5 minutes and 1-99 minutes in 1 minute increments	5 minutes
	Beep Select (pg. 104)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • OFF • LED • Buzzer • LED+Buzzer • BUMP/CAL • ALARM ALERT • BUMP/CAL/ALARM 	OFF
	Need to get Bump Log (pg. 105)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected

Table 7: Parameter Tab Items

Location	Parameter Tab Name (pg. # of description)	Applicable Instrument	Available Choices	Factory Setting
User Mode 1 Tab (cont'd)	BLE auto shutoff when idle (pg. 105)	• GX-3R Pro	• selected • deselected	selected
	Language (pg. 105)	• GX-3R Pro	• English • Japanese • Spanish • German • French • Portuguese • Russian • Korean • Italian	English
	Date Format (pg. 105)	• GX-3R Pro	• DD/MM/YYYY • MM/DD/YYYY • YYYY/MM/DD	MM/DD/YYYY
	Auto Backlight (pg. 105)	• GX-3R Pro	• selected • deselected	selected
	Key Tone (pg. 106)	• GX-3R • GX-3R Pro	• selected • deselected	selected
	Lunch Break (pg. 106)	• GX-3R • GX-3R Pro	• selected • deselected	deselected
	User Mode Password (pg. 106)	• GX-3R • GX-3R Pro	• selected • deselected	deselected
	IR Air Zero (pg. 106)	• GX-3R Pro	• selected • deselected	deselected
	Alarm Silence (pg. 106)	• GX-3R • GX-3R Pro	• selected • deselected	deselected
	IR Unit (pg. 106)	• GX-3R Pro	• vol% • %LEL • ppm • ppb	vol%

Table 7: Parameter Tab Items

Location	Parameter Tab Name (pg. # of description)	Applicable Instrument	Available Choices	Factory Setting
User Mode 1 Tab (cont'd)	D Mode Setting (pg. 106)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected
	Cal Reminder (pg. 107)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected
	Cal Past Due Act (pg. 107)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • Confirm to Cal • Must Calibrate • Notification Only 	Confirm to Cal
	Cal Check Gas (pg. 107)	<ul style="list-style-type: none"> • GX-3R Pro 	<ul style="list-style-type: none"> • 4GAS • ALL 	ALL
	Man Down (pg. 107)	<ul style="list-style-type: none"> • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Panic (pg. 107)	<ul style="list-style-type: none"> • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Warning 1 Time (pg. 107)	<ul style="list-style-type: none"> • GX-3R Pro 	10 - 240 sec	60 sec
	Warning 2 Time (pg. 107)	<ul style="list-style-type: none"> • GX-3R Pro 	10 - 240 sec	75 sec
	Alarm Time (pg. 107)	<ul style="list-style-type: none"> • GX-3R Pro 	10 - 240 sec	90 sec

Table 7: Parameter Tab Items

Location	Parameter Tab Name (pg. # of description)	Applicable Instrument	Available Choices	Factory Setting
User Mode 2 Tab	Bump Reminder (pg. 108)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Bump Test Interval (Day) (pg. 108)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	0 - 30 days	30 days
	Bump Test Past Due Act (pg. 108)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • Confirm to Bump Test • Must Bump Test • Notification Only 	Confirm to Bump Test
	Bump Check Gas (pg. 109)	<ul style="list-style-type: none"> • GX-3R Pro 	<ul style="list-style-type: none"> • 4GAS • ALL 	ALL
	Bump Test Time (Sec) (pg. 109)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • 30 sec • 45 sec • 60 sec • 90 sec 	30 sec
	Calibration After Bump Test Failed (pg. 109)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected
	Bump Test Threshold (%) (pg. 109)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • 10% • 20% • 30% • 40% • 50% 	50%
	Calibration Time (sec) After Bump Test Failed (pg. 109)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • 90 sec • 120 sec 	90 sec

Table 7: Parameter Tab Items

Location	Parameter Tab Name (pg. # of description)	Applicable Instrument	Available Choices	Factory Setting
Maintenance Mode Tab	ID Display (pg. 110)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Disp Suppress (pg. 110)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Disp Follower (pg. 111)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Restore Def (pg. 111)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	n/a	n/a
	Automatic Start After Successful Bump Test (pg. 111)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected
	Automatic Start After Successful Calibration (pg. 111)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected
	Alarm Latching (pg. 111)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected
	Auto Fresh Air Adj (pg. 111)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Zero Adjustment on Demand (pg. 111)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected
	LCD Contrast (pg. 111)	<ul style="list-style-type: none"> • GX-3R Pro 	1 - 50	20
	Password Protection (pg. 112)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	deselected
	Maintenance Password (pg. 112)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	<ul style="list-style-type: none"> • selected • deselected 	selected (8102)
	Battery Change (pg. 112)	<ul style="list-style-type: none"> • GX-3R • GX-3R Pro 	Any date	

Common Parameters

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

Serial No.

To change the current GX-3R (Pro) serial number, place the cursor in the Serial No. field and enter the desired serial number. If you change the serial number, once you upload the changes to the GX-3R (Pro) and return to the main program window, the PC Program will indicate that the GX-3R (Pro) with the old serial number was disconnected. A GX-3R (Pro) with the new serial number will then connect to the PC Program.

Station ID

The current station ID will display. If you want to select a new station ID:

1. Go to the **Station & User** tab.
2. Click **Read** for the station ID.
3. Go back to the **Parameter** tab. and use the drop-down menu to select the desired station ID.
4. To change the station ID list, see “Station & User Tab” on page 115.

User ID

The current user ID will display. If you want to select a new user ID:

1. Go to the **Station & User** tab.
2. Click **Read** for the user ID.
3. Go back to the **Parameter** tab. and use the drop-down menu to select the desired user ID.
4. To change the user ID list, see “Station & User Tab” on page 115.

Cal Interval (Day)

The calibration interval is the length of time between scheduled calibrations. To change the calibration interval, use the arrows to the right of the current value to increase or decrease the interval. You may also highlight the current setting and type in the new desired setting. It can be set anywhere between **1** and **365** days. The factory setting is **90** days.

Interval Time (Sec)

The interval time is how often the GX-3R (Pro) will log interval trend readings. It can be set to **10**, **20**, **30**, **60**, **180**, **300** (factory setting), or **600** seconds. To change the interval time, use the arrows to the right of the current value to increase or decrease it. You may also highlight the current setting and type in the new desired setting. The value that you type in must match the allowable interval settings. If it does not, when you save your changes, your entered value will be shifted to the closest match. For example, if you enter 90 seconds, when you save the changes, the interval will adjust itself to **60** seconds.

Memo Section

The Memo section allows the user to enter remarks for a GX-3R (Pro) that is connected to the program. The Memo may be used to document anything of interest, such as maintenance records (noting when a sensor or a battery pack was changed). The Memo section is empty until the user enters information.

The first time information is entered, a Memo file is created in the Logs window. If the Memo is changed in the same operating session, that Memo file is updated. When the GX-3R (Pro) is disconnected from the PC Program and connected again, a new Memo file is created with the current memo. If you edit the memo field in that operating session, the new Memo file is updated. If you clear the Memo field for a GX-3R (Pro), the Memo file that was created when the GX-3R (Pro) was connected to the PC Program will be deleted since it is now empty. All memos from previous operating sessions will always be available in the Logs window. They cannot be deleted.

To enter information into the Memo section,

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 **OK** to save the changes.

Disp Mode Sub Tab

The screenshot shows a software window titled "86P360096" with a standard Windows-style title bar (minimize, maximize, close buttons). The window is divided into several sections. At the top, there are three columns of information: "Serial No." (86P360096), "Station ID" (DESK), "Date Time" (4/4/2019 10:18:31 AM), "Model" (GX-3R Pro), "User ID" (KIMBERLY), and "Load Date" (4/4/2019 10:18:30 AM). To the right of this information is a "Logs" button with a document icon. Below this is a tabbed interface with three tabs: "Parameter", "Sensor", and "Station & User". The "Parameter" tab is active. It contains a "Memo" text area and a "Disp Mode" section. The "Disp Mode" section has four sub-tabs: "Disp Mode", "User Mode 1", "User Mode 2", and "Maintenance Mode". The "Disp Mode" sub-tab is active. It contains a "HC Gas List" dropdown menu set to "CH4(100%LEL)", a checkbox for "HC Long Energy" (unchecked), a checkbox for "Invert Select" (unchecked), a checkbox for "LCD Background" (unchecked), a "Buzzer Volume" section with "Low" and "High" radio buttons ("High" is selected), and a checkbox for "Data Log Overwrite" (checked). At the bottom of the window, there is a status bar with the text "(Left space 20)" and two buttons: "OK" and "Cancel".

86P360096

Serial No. 86P360096 Station ID DESK Date Time 4/4/2019 10:18:31 AM
Model GX-3R Pro User ID KIMBERLY Load Date 4/4/2019 10:18:30 AM

Logs

Parameter Sensor Station & User

Serial No. 86P360096
Station ID DESK
User ID KIMBERLY

Cal Interval(Day) 90
Interval Time(Sec) 300

Memo

Disp Mode User Mode 1 User Mode 2 Maintenance Mode

HC Gas List CH4(100%LEL) ☐ HC Long Energy

☐ Invert Select ☐ LCD Background

Buzzer Volume
☐ Low ☒ High

☒ Data Log Overwrite

(Left space 20) OK Cancel

Figure 64: Parameter Tab, Disp Mode Sub Tab

HC Gas List

This parameter allows you to set one of the following target gases for the % LEL sensor.

- | | |
|---|--|
| • CH ₄ (methane) | • C ₆ H ₆ (benzene) |
| • i-C ₄ H ₁₀ (isobutane) | • n-C ₆ H ₁₄ (hexane) |
| • H ₂ (hydrogen) | • C ₇ H ₈ (toluene) |
| • CH ₃ OH (methanol) | • n-C ₇ H ₁₆ (heptane) |
| • C ₂ H ₂ (acetylene) | • C ₈ H ₁₀ (xylene) |
| • C ₂ H ₄ (ethylene) | • n-C ₉ H ₂₀ (nonane) |
| • C ₂ H ₆ (ethane) | • EtAc (ethyl acetate) |
| • C ₂ H ₅ OH (ethanol) | • IPA (isopropyl alcohol) |
| • C ₃ H ₆ (propylene) | • MEK (methyl ethyl ketone) |
| • C ₃ H ₆ O (acetone) | • MMA (methyl methacrylate) |
| • C ₃ H ₈ (propane) | • DME (dimethyl ether) |
| • C ₄ H ₆ (butyne) | • MIBK (methyl isobutyl ketone) |
| • C ₅ H ₁₀ (cyclopentane) | • THF (tetrahydrofuran) |

Invert Select (GX-3R Pro Only)

Selected: The LCD flips to remain readable while the instrument is right side up or upside down.

Deselected (factory setting): The LCD stays in the same position relative to the instrument.

LCD Background (GX-3R Pro Only)

Selected: LCD has a black background with white characters.

Deselected (factory setting): LCD has a white background with black characters.

Buzzer Volume (GX-3R Pro Only)

Low: Buzzer volume is low.

High (factory setting): Buzzer volume is high.

Data Log Overwrite

Selected (factory setting): The GX-3R (Pro) writes over the oldest data with new data when the data logger memory is full.

Deselected: The GX-3R (Pro) stops saving data to the data logger when the data logger memory is full.

User Mode 1 Sub Tab

The screenshot shows the 'User Mode 1 Sub Tab' of the GX-3R Pro parameter settings window. The window title is '86P360079'. At the top, there are fields for 'Serial No.' (86P360079), 'Station ID' (RIG 4), 'Date Time' (11/7/2022 4:48:34 PM), 'Model' (GX-3R Pro), 'User ID' (KIMBERLY), and 'Load Date' (11/7/2022 4:48:33 PM). A 'Logs' icon is in the top right. Below these are tabs for 'Parameter', 'Sensor', and 'Station & User'. The 'Parameter' tab is active, showing fields for 'Serial No.', 'Station ID', 'User ID', and a 'Memo' text area. Below these is an 'Interval Time(Sec)' field set to 300. A row of tabs includes 'Disp Mode', 'User Mode 1' (selected), 'User Mode 2', and 'Maintenance Mode'. Under 'User Mode 1', there are several settings: 'Backlight Time(Sec)' (30), 'Beep Time(Min)' (5.0), 'Beep Select' (Off), 'Need to get Bump Log' (unchecked), 'BLE auto shutoff when idle' (checked), 'Language' (English), 'Date Format' (MM/DD/YYYY), 'Auto Backlight' (unchecked), 'Key Tone' (unchecked), 'Lunch Break' (unchecked), 'User Mode Password' (0000), 'IR Air Zero' (checked), 'Alarm silence' (unchecked), 'Man down' (unchecked), 'Panic' (unchecked), 'Warning 1 time' (15 Sec), 'Warning 2 time' (25 Sec), 'Alarm time' (35 Sec), 'IR Unit' (vol%), and 'D Mode Setting' (checked). At the bottom, there is a '(Left space 20)' label and 'OK' and 'Cancel' buttons.

Figure 65: Parameter Tab, User Mode 1 Sub Tab

Backlight Time(Sec)

The **Backlight Time** is how long the backlight stays on after the last button push. It can be set anywhere from **0** to **255** seconds or **OFF**. The factory setting is **30** seconds. Use the arrows to the right of the value to make your selection or highlight the existing value and enter the desired value.

Beep Time(Min)

The **Beep Time(Min)** parameter defines how often the confirmation alert or non-compliance indicator occurs. It can be set at any time but it only applies if the **Beep Select** parameter is set to something other than **OFF**. The available choices are **0.5** minutes and **1-99** minutes in 1 minute increments. The factory setting is **5** minutes.

Beep Select

OFF (factory setting): The instrument does not provide a confirmation alert or non-compliance indicator.

LED: The instrument's LEDs double flash as often as defined in **Beep Time(Min)**.

Buzzer: The instrument's buzzer double beeps as often as defined in **Beep Time(Min)**.

LED+Buzzer: The instrument's LEDs double and the buzzer double beeps as often as defined by the **Beep Time(Min)** parameter.

BUMP/CAL: If a bump test of a calibration is due and if **Bump Test Time Remaining** or **Cal Reminder** is set to **Confirm to Bump/Cal** or **Notification Only**, the instrument's LEDs double flash as often as defined in **Beep Time(Min)** to indicate a non-compliance. Once a bump test or calibration (depending on which is due) is done, the LEDs will stop flashing.

ALARM: If the instrument goes into any gas alarm, the instrument's LEDs double flash as often as defined in **Beep Time(Min)** to indicate a non-compliance. Requirements for clearing the non-compliance depends on the setting of **Need to get Bump Log**.

BUMP/CAL/ALARM: A non-compliance indication can occur if any of the following happens:

- Bump test is due and **Bump Test Time Remaining** is set to **Confirm to Bump** or **Notification Only**.
- Calibration is due and **Cal Reminder** is set to **Confirm to Cal** or **Notification Only**.
- Instrument goes into any gas alarm.

The instrument's LEDs will double-flash as often as defined in **Beep Time(Min)**. To clear a bump non-compliance, you must perform a successful bump test. To clear a calibration non-compliance, you must perform a successful calibration. The requirements for clearing an alarm non-compliance depend on the setting of **Need to get Bump Log**.

Need to get Bump Log

Selected: In order to clear an alarm non-compliance, you must perform a successful bump test or calibration and download the instrument data. Instrument data can be downloaded being either a) connecting to the PC Program and performing a **Download** operation or b) connecting to the GX-3R Datalogging program and performing a **Complete Download**.

Deselected (factory setting): In order to clear an alarm non-compliance, you must only perform a successful bump test or calibration.

BLE auto shutoff when idle

Selected (factory setting): If the GX-3R Pro does not pair to a phone in the first 5 minutes after startup, the GX-3R Pro's Bluetooth gets shut off to conserve battery life.

Deselected: If the GX-3R Pro does not pair to a phone, the GX-3R Pro's Bluetooth stays on indefinitely.

Language (GX-3R Pro Only)

You may change the instrument language to **English** (factory setting), **Japanese**, **Spanish**, **Italian**, **Spanish**, **German**, **French**, **Portuguese**, **Russian**, **Korean**, or **Chinese**.

Date Format (GX-3R Pro Only)

MM/DD/YYYY (factory setting): month/day/year

YYYY/MM/DD: year, month, day

DD/MM/YYYY: day, month, year

Auto Backlight (GX-3R Pro Only)

Selected (factory setting): The instrument's backlight automatically turns on in a low light environment.

Deselected: The instrument's backlight will not automatically turn on in a low light environment.

Key Tone

Selected (factory setting): The instrument will beep every time a button is pressed.

Deselected: The instrument will not beep when a button is pressed.

Lunch Break

Selected: The Lunch Break Screen displays during startup. From this screen, you can choose to continue accumulating TWA and PEAK readings and the time in operation from the last time the GX-3R (Pro) was used or start collecting new readings and reset the time in operation.

Deselected (factory setting): The GX-3R (Pro) automatically starts new TWA and PEAK reading collection and resets the time in operation at startup.

User Mode Password

Selected: The GX-3R (Pro) prompts you for a password when you enter User Mode. The box to the right of this selection allows the user to change the password required if **User Mode Password** is selected (factory set password is 0405).

Deselected (factory setting): No password is required to enter User Mode.

IR Air Zero (GX-3R Pro Only)

Selected: CO₂ channel is set to 400 ppm (0.04% volume) when performing a demand zero, auto zero, or **AIR CAL**.

Deselected (factory setting): CO₂ channel is not adjusted during a demand zero, auto zero, or **AIR CAL**.

IR Air Zero (GX-3R Pro Only)

Selected: CO₂ channel is set to 400 ppm (0.04% volume) when performing a demand zero, auto zero, or **AIR CAL**.

Deselected (factory setting): CO₂ channel is not adjusted during a demand zero, auto zero, or **AIR CAL**.

Alarm Silence

Selected: The GX-3R (Pro)'s buzzer can be silenced during an alarm condition by pressing the **POWER MODE** or **AIR** buttons.

Deselected (factory setting): The GX-3R (Pro)'s buzzer cannot be silenced during an alarm condition.

IR Unit (GX-3R Pro Only)

vol% (factory setting): CO₂ readings displayed in percent volume

ppm: CO₂ readings displayed in parts per million

D Mode Setting

Selected (factory setting): **LIST** and **LONG.BATT** items do appear in Display Mode. **USER ID** and **STATION ID** screens appear in Display Mode if **ID DISPLAY** in the instrument's Maintenance Mode is also set to **ON** (factory setting is **OFF**).

Deselected: **LIST**, **LONG.BATT**, **USER ID**, and **STATION ID** items do not appear in Display Mode.

Cal Reminder

Selected (factory setting): The GX-3R (Pro) will give an indication at start up if it is due for calibration. The type of indication will depend on the **Cal Past Due Act** setting.

Deselected: There will be no indication at start up if the instrument is due for calibration.

Cal Past Due Act

Confirm to Cal (factory setting): The GX-3R (Pro) will sound an alarm and the user will have to press and release the AIR button to continue.

Must Calibrate: The GX-3R (Pro) cannot be used until a calibration has been performed.

Notification Only: The GX-3R (Pro) will display that a calibration is due but will continue with the warm up sequence.

Cal Check Gas (GX-3R Pro Only)

4 GAS: The calibration dates for only the standard 4 sensors (LEL, O₂, H₂S, and CO) are used to determine if a calibration is due.

ALL (factory setting): The calibration dates for the standard 4 sensors along with the IR CO₂ or super toxic sensor are used to determine if a calibration is due.

Man Down (GX-3R Pro Only)

Selected: The Man Down Alarm can be triggered if the instrument detects no motion for the period of time defined in **Warning 1 Time**, **Warning 2 Time**, and **Alarm Time**.

Deselected (factory setting): The Man Down Alarm cannot be triggered.

Panic (GX-3R Pro Only)

Selected (factory setting): A Panic Alarm can be initiated by firmly tapping the instrument twice in a row.

Deselected: A Panic Alarm cannot be initiated.

Warning 1 Time (GX-3R Pro Only)

The **Warning 1 Time** is the amount of time will pass between a Man Down detection and the first preliminary alarm. It can be set in 1 second increments from **10 - 240** seconds. The factory setting is **60** seconds. Alarm Time ≥ Warning 2 Time ≥ Warning 1 Time.

Warning 2 Time (GX-3R Pro Only)

The **Warning 2 Time** is the amount of time will pass between a Man Down detection and the second preliminary alarm. It can be set in 1 second increments from **10 - 240** seconds. The factory setting is **75** seconds. Alarm Time ≥ Warning 2 Time ≥ Warning 1 Time.

Alarm Time (GX-3R Pro Only)

The **Alarm Time** is the amount of time will pass between a Man Down detection and the main alarm. It can be set in 1 second increments from **10 - 240** seconds. The factory setting is **90** seconds. Alarm Time ≥ Warning 2 Time ≥ Warning 1 Time.

User Mode 2 Sub Tab

Figure 66: Parameter Tab, User Mode 2 Sub Tab

Bump Reminder

Selected: The GX-3R (Pro) will give an indication at start up if it is due for bump testing. The type of indication will depend on the **Bump Test Past Due Act** setting.

Deselected (factory setting): The GX-3R (Pro) will not give an indication at start up if it is due for bump testing.

Bump Test Interval (Day)

The **Bump Test Interval** defines the amount of time between bump tests. The time can be set between **0** and **30** days in 1 day increments. The factory setting is **30** days.

Bump Test Past Due Act

Confirm to Bump Test (factory setting): The GX-3R (Pro) will sound an alarm and the user will have to press and release the AIR button to continue.

Must Bump Test: The GX-3R (Pro) cannot be used until a bump test has been performed.

Notification Only: The GX-3R (Pro) will display that a bump test is due but will continue with the warm up sequence. See the GX-3R (Pro) Operator's Manual for a description of the start up sequence.

Bump Check Gas (GX-3R Pro Only)

4 GAS: The bump test dates for only the standard 4 sensors (LEL, O₂, H₂S, and CO) are used to determine if a bump test is due.

ALL (factory setting): The bump test dates for the standard 4 sensors along with the IR CO₂ or super toxic sensor are used to determine if a bump test is due.

Bump Test Time (Sec)

The **Bump Test Time** parameter is the amount of time that the GX-3R (Pro) is exposed to gas during a bump test. The available choices are **30** (factory setting), **45**, **60**, and **90** seconds.

Calibration After Bump Test Failed

Selected (factory setting): If a bump test fails, the GX-3R (Pro) will automatically begin a calibration.

Deselected: When a bump test fails, nothing will happen.

Bump Test Threshold (%)

The **Bump Test Threshold** parameter is the bump test tolerance value and is represented as a percentage. It is the percentage that the bump test reading can differ from the actual gas concentration. If the bump test reading differs more, the bump test will fail. The available values are **10%**, **20%**, **30%**, **40%**, and **50%** (factory setting).

Calibration Time (sec) After Bump Test Failed

The **Calibration Time After Bump Test Failed** parameter is the total time the GX-3R (Pro) is exposed to calibration gas when a bump test fails if **Calibration After Bump Test Failed** is selected. The bump test time is deducted from the calibration time. For example, if **Calibration Time After Bump Test Failed** is set to 90 seconds and the **Bump Test Time** is set to 30 seconds, if the bump test fails, the GX-3R (Pro) will only be exposed to gas for an additional 60 seconds. The available values are **90** seconds (factory setting), and **120** seconds.

Maintenance Mode Sub Tab

86P360079

Serial No. 86P360079 Station ID RIG 4 Date Time 11/7/2022 4:48:34 PM
 Model GX-3R Pro User ID KIMBERLY Load Date 11/7/2022 4:48:33 PM

Parameter Sensor Station & User

Serial No. 86P360079
 Station ID RIG 4
 User ID KIMBERLY

Interval Time(Sec) 300

Memo

Disp Mode User Mode 1 User Mode 2 Maintenance Mode

☐ ID Display ☒ Alarm Latching ☐ Password Protection
☐ Disp Suppress ☐ Auto Fresh Air Adj ☒ Maintenance Password 8102
☐ Disp Follower ☒ Zero Adjustment on demand

Restore Def LCD Contrast 20 Battery Change 1/ 1/2018

☐ Automatic start after successful bump test ☐ Maintenance Notice Interval(Day) 365
☐ Automatic start after successful calibration

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

Check Gas ALL

(Left space 20) OK Cancel

Figure 67: Parameter Tab, Maintenance Mode Sub Tab

ID Display

Selected: The User ID and Station ID screens appear in startup sequence. If D MODE SETTING in User Mode 1 Sub Tab is also set to ON, then the IDs can be changed in Display Mode.

Deselected (factory setting): The User ID and Station ID screens do not appear in startup sequence and the IDs cannot be changed in Display Mode.

Disp Suppress

Selected: Zero suppression menu item appears in User Mode.

Deselected (factory setting): Zero suppression menu item does not appear in User Mode. Zero suppression menu item is always available in Maintenance Mode.

It is not normally necessary to have the zero suppression menu item appear in User Mode. Contact RKI Instruments before turning this setting on.

Disp Follower

Selected: Zero follower menu item appears in User Mode.

Deselected (factory setting): Zero follower menu item does not appear in User Mode. Zero follower menu item is always available in Maintenance Mode.

It is not normally necessary to have the zero follower menu item appear in User Mode. Contact RKI Instruments before turning this setting on.

Restore Def

Performing a default operation in Maintenance Mode returns all parameters to their RKI factory settings.

Automatic Start After Successful Bump Test

Selected (factory setting): If only one calibration cylinder is assigned, the GX-3R (Pro) automatically starts its warmup sequence after a successful bump test. If multiple calibration cylinders are assigned, these parameters have no effect on operation.

Deselected: The GX-3R (Pro) does not automatically start its warmup sequence after a successful bump test.

Automatic Start After Successful Calibration

Selected (factory setting): If only one calibration cylinder is assigned, the GX-3R (Pro) automatically starts its warmup sequence after a successful calibration. If multiple calibration cylinders are assigned, these parameters have no effect on operation.

Deselected: The GX-3R (Pro) does not automatically start its warmup sequence after a successful calibration.

Alarm Latching

Selected (factory setting): The GX-3R Pro remains in alarm until the alarm condition passes *and* POWER MODE is pressed.

Deselected: The GX-3R Pro automatically resets an alarm when the alarm condition passes.

Auto Fresh Air Adj

Selected: The GX-3R (Pro) will ask if you want to perform a fresh air adjustment at the end of the startup sequence.

Deselected (factory setting): The GX-3R (Pro) does not ask if you want to perform a fresh air adjustment at the end of the startup sequence.

Zero Adjustment on Demand

Selected (factory setting): You can manually perform a fresh air adjust in Measuring Mode by pressing AIR.

Deselected: You cannot manually perform a fresh air adjust in Measuring Mode.

LCD Contrast (GX-3R Pro Only)

Higher number means darker background. Lower number means lighter background. Available settings are 1-50. 20 is the factory setting.

Password Protection

Selected: A password is required to turn off the GX-3R (Pro), reset an alarm, clear the peak readings, perform an auto zero, perform a demand zero, or enter User Mode from the warmup sequence to perform a bump test or calibration. The password is 0405.

Deselected (factory setting): A password is not required for any of the above operations.

Maintenance Password

Selected (factory setting): A password is required to enter Maintenance Mode. The factory-set password is 8102. Enter a password in the field to the right of the Maintenance Password selection box.

Deselected: A password is not required to enter Maintenance Mode.

Battery Change

The **Battery Change** menu item allows you to keep track of when the battery was replaced. Click the drop down menu and use the calendar to select a replacement date.

Sensor Tab

The **Sensor Tab** displays the alarm settings and auto calibration values for all installed sensors. It also shows the date and time of the most recent calibration and bump test for each channel.

The screenshot shows the 'Sensor Tab' interface for a GX-3R (Pro) device. At the top, there are input fields for 'Serial No.' (86P360096), 'Station ID' (DESK), 'Date Time' (4/4/2019 10:18:31 AM), 'Model' (GX-3R Pro), 'User ID' (KIMBERLY), and 'Load Date' (4/4/2019 10:18:30 AM). Below these fields are tabs for 'Parameter', 'Sensor', and 'Station & User'. The 'Sensor' tab is selected, displaying a table of sensor data. The table has columns for Sensor, Warning, Alarm, AlarmH, STEL, TWA, CAL_GROUP, Auto Cal., Last Calibration, Last Bump test, SENSOR_DATE, ZERO_SUPPRESS, and ZERO_FOLLOWER. The data is as follows:

Sensor	Warning	Alarm	AlarmH	STEL	TWA	CAL_GROUP	Auto Cal.	Last Calibration	Last Bump test	SENSOR_DATE	ZERO_SUPPRESS	ZERO_FOLLOWER
CH4(100%LEL)	1.0	5.0	5.0	*****	*****	A	50	3/22/2019 10:14:44 AM	3/22/2019 10:14:44 AM	181012	On	On
O2(40.0%)	7.0	6.5	21.8	*****	*****	A	12.0	3/22/2019 10:14:44 AM	3/22/2019 10:14:44 AM	180130	On	On
H2S(200.0ppm)	1.0	10.0	10.0	5.0	1.0	A	25.0	3/22/2019 10:14:44 AM	3/22/2019 10:14:44 AM	180130	On	On
CO(2000ppm)	25	50	50	200	25	A	50	3/22/2019 10:14:44 AM	3/22/2019 10:14:44 AM	181012	On	On
CO2(100000ppm)	5000	30000	30000	30000	5000	E	25000	10/15/2018 11:19:09 AM	10/15/2018 11:19:09 AM	181012	On	Off

Below the table is a 'Reset alarm point' button. At the bottom of the window, there are 'OK' and 'Cancel' buttons, and a note '(Left space 20)'.

Figure 68: Sensor Tab

Alarm Points (Warning, Alarm, Alarm H, STEL, TWA)

View or change the alarm points for all channels. Factory settings are shown below.

	Detection Range	Warning	Alarm	Alarm H	STEL	TWA
Combustible Gas	0 - 100% LEL	10% LEL	25% LEL	50% LEL	n/a	n/a
Oxygen (O₂)	0 - 40% volume	19.5% volume, decreasing*	18.0% volume, decreasing*	23.5% volume, increasing**	n/a	n/a
Hydrogen Sulfide (H₂S)	0 - 200.0 ppm	5.0	30.0 ppm	100.0 ppm	5.0 ppm	1.0 ppm
Carbon Monoxide (CO)	0 - 2,000 ppm	25 ppm	50 ppm	1200 ppm	200 ppm	25 ppm
Ammonia (NH₃)	0 - 400.0 ppm	25 ppm	35 ppm	300 ppm	35 ppm	25 ppm
Carbon Dioxide (CO₂)	0 - 10.00% volume	0.50% volume	3.00% volume	3.00% volume	3.00% volume	0.50% volume
	0 - 10,000 ppm	20 ppm	5,000 ppm	5,000 ppm	n/a	5,000 ppm
Hydrogen Cyanide (HCN)	0 - 30.0 ppm	5.0 ppm	10.0 ppm	30.0 ppm	10.0 ppm	4.7 ppm
Nitrogen Dioxide (NO₂)	0 - 20.00 ppm	2.00 ppm	4.00 ppm	20.00 ppm	1.00 ppm	0.50 ppm
Phosphine (PH₃)	0 - 20.00 ppm	0.30 ppm	0.60 ppm	0.60 ppm	1.00 ppm	0.30 ppm
Sulfur Dioxide (SO₂)	0 - 100.00 ppm	2.00 ppm	5.00 ppm	100.00 ppm	5.00 ppm	2.00 ppm
* Cannot be set higher than 20.0% volume. ** Cannot be set lower than 21.8% volume.						

Cal Group

Allows you to group channels together for calibration. As shipped from the factory, the standard 4 channels (LEL, O₂, H₂S, CO) in the GX-3R and GX-3R Pro are assigned to Cylinder A which means all 4 channels are calibrated at once. As shipped from the factory, the IR CO₂ or super toxic channel in a GX-3R Pro is assigned to Cylinder E which means that channel is calibrated alone.

There are 5 cylinder assignments available: A, B, C, D, and E. If you want to calibrate each channel separately, you need to assign each channel to a different cylinder (i.e. Cylinder A: LEL, Cylinder B: O₂, Cylinder C: H₂S, Cylinder D: CO, Cylinder E: CO₂).

Auto Cal.

View or change the auto calibration value for each channel. The value should match the concentration listed on the calibration cylinder you are using.

Last Calibration/Last Bump Test

The date of the last successful calibration or bump test.

SENSOR_DATE

The date that each sensor was replaced. Double click the sensor date you want to change and type in a new date. The format is YYMMDD (year, month, day).

Reset Alarm Point

Clicking **Reset Alarm Points** and then **OK** in the window that comes up resets the alarm points to the RKI factory settings or to the values saved if the user performed a **SAVE-AP** for (GX-3R) or **SET DEF ALM-P** (for GX-3R Pro) in the instrument's Gas Select Mode.

Editing Parameters

1. Double click the white box whose value you want to change. Shaded boxes cannot be edited.
2. Type in the new desired value.
3. Repeat steps 1 through 3 for any other values you wish to change.
4. Change any other parameters in the **Parameter** and **Station & User** tabs.
5. Click **OK** and then click **Yes** in the window that comes up to save the changes.

Station & User Tab

The Station & User Tab allows you to update the Station ID and User ID lists in a connected GX-3R (Pro).

To edit the Station ID or User ID list, you will need to import a .csv (comma separated values) file into the program. You can generate .csv files for editing from the program.

Creating ID Files

- 1. Click **Read** for each list type to populate the Station and User fields.
- 2. Click **Export csv file** for either the Station or User ID list.

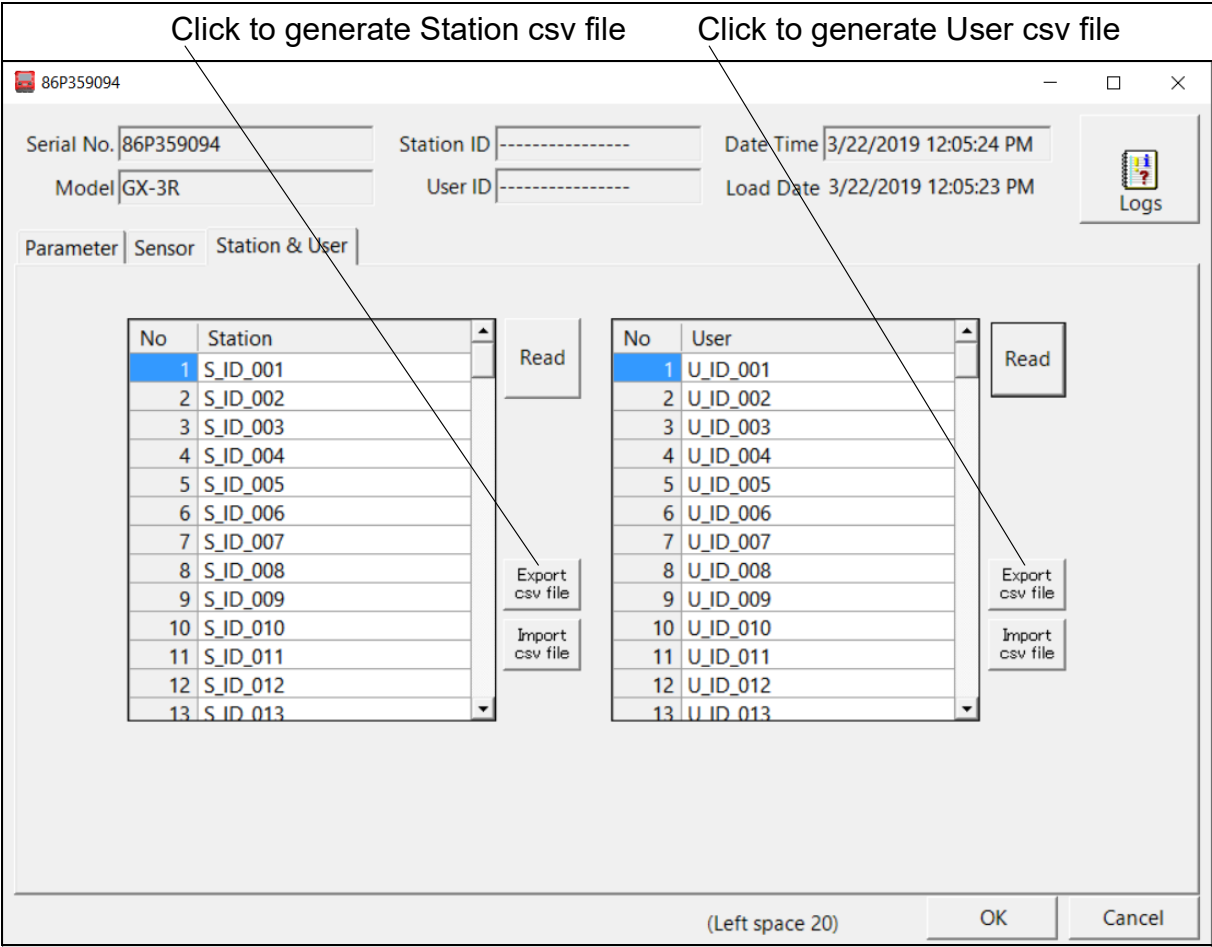


Figure 69: Station and User Tab

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

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

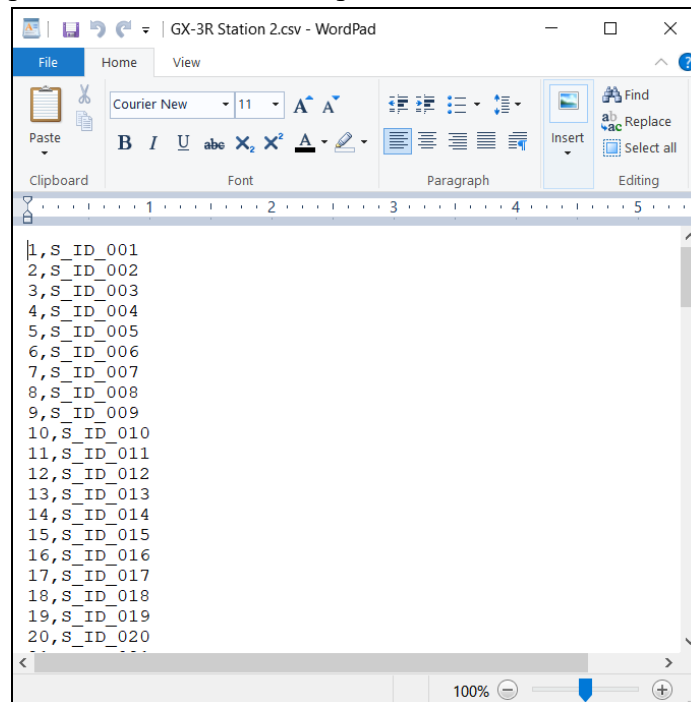


Figure 70: Station ID .csv File Opened in WordPad

5. Any existing Station or User IDs will be displayed as S_ID_XXX or U_ID_XXX with the “XXX” being the ID number. To edit a Station or User ID, delete the existing name and replace it with the desired name. The name can be 16 characters long and may consist of any uppercase letter or number.

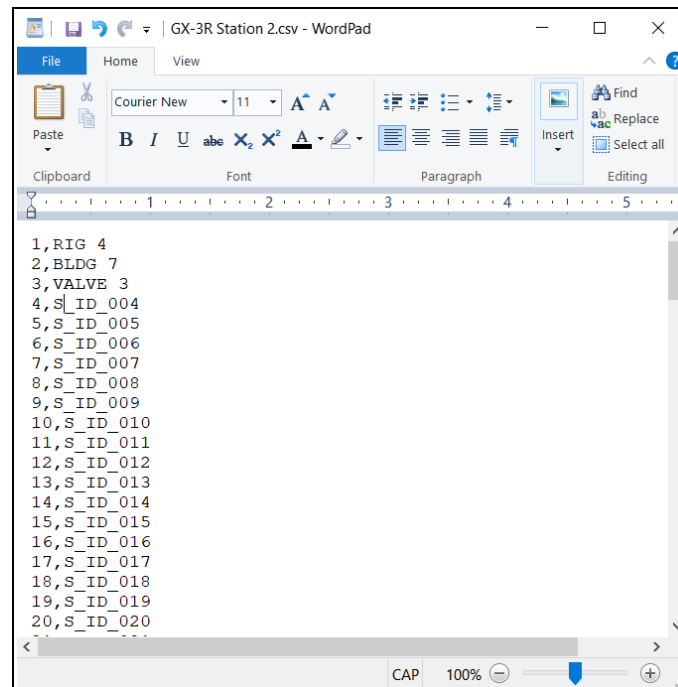


Figure 71: Station ID .csv File Opened in WordPad

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

Loading ID Files

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

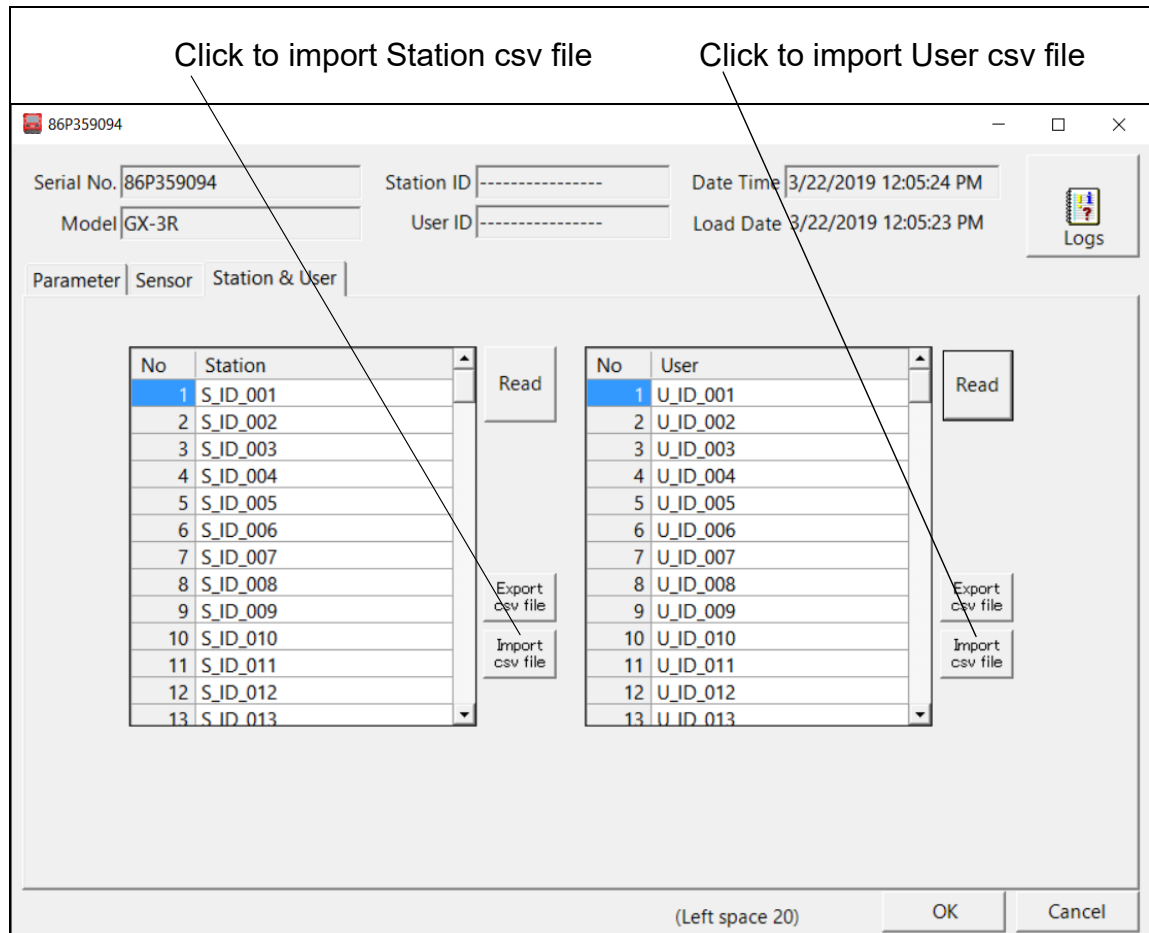


Figure 72: Station and User Tab

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

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

86P360096

Serial No. 86P360096 Station ID MIKE J Date Time 3/7/2019 9:17:19 AM

Model GX-3R Pro User ID U_ID_002 Load Date 3/7/2019 9:17:18 AM

Parameter Sensor Station & User

No	Station
1	DESK
2	S_ID_002
3	S_ID_003
4	S_ID_004
5	S_ID_005
6	S_ID_006
7	S_ID_007
8	S_ID_008
9	S_ID_009
10	S_ID_010
11	S_ID_011
12	S_ID_012
13	S_ID_013
14	S_ID_014
15	S_ID_015
16	S_ID_016

Read

Export csv file

Import csv file

No	User
1	KIMBERLY
2	U_ID_002
3	U_ID_003
4	U_ID_004
5	U_ID_005
6	U_ID_006
7	U_ID_007
8	U_ID_008
9	U_ID_009
10	U_ID_010
11	U_ID_011
12	U_ID_012
13	U_ID_013
14	U_ID_014
15	U_ID_015
16	U_ID_016

Read

Export csv file

Import csv file

(Left space 20) OK Cancel

Figure 73: New Station and User IDs

- Change any other parameters in the **Parameter** and **Station & User** tabs. To select a Station ID Or User ID for the instrument, go back to the **Parameter** tab.
- Click **OK** and then click **Yes** in the window that comes up to save the changes.

Chapter 8: Maintenance

Troubleshooting

NOTE: This troubleshooting guide describes SDM-3R problems only. See the GX-3R (Pro) Operator's Manual for problems you may encounter with the GX-3R (Pro).

Table 8: Troubleshooting the SDM-3R

Symptoms	Probable Causes	Recommended Action
Fresh air adjustment fails	<ul style="list-style-type: none">• The SDM-3R is not in a fresh air environment or the cylinder connected to the AIR fitting is not a zero air cylinder.• If a zero air cylinder is used, the calibration cylinder is out of gas.• The GX-3R (Pro) is not correctly inserted in the instrument cradle.	<ol style="list-style-type: none">1. Confirm that the SDM-3R is in a fresh air environment or that a zero air cylinder is attached to the AIR fitting.2. If a zero air cylinder is used, verify that it contains an adequate supply of test sample.3. Check to make sure the GX-3R (Pro) is correctly inserted in the instrument cradle.4. If a zero air cylinder is used, check all calibration tubing for leaks or for any bad connections.5. If the fail condition continues, replace the sensor(s) in the GX-3R (Pro).6. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.
Calibration fails	<ul style="list-style-type: none">• The auto calibration values do not match the cylinder gas concentrations.• The calibration cylinder is out of gas or is outdated.• The calibration cylinder is not connected to the appropriate gas inlet fitting.• The GX-3R (Pro) is not correctly inserted in the instrument cradle.• The tubing from the regulator to the gas inlet fitting is not connected.	<ol style="list-style-type: none">1. Confirm that the auto calibration values match the concentrations listed on the gas cylinder.2. Verify that the calibration cylinder contains an adequate supply of fresh test sample.3. Verify that the calibration cylinder is connected to the appropriate gas inlet fitting.4. Check to make sure the GX-3R (Pro) is correctly inserted in the instrument cradle. The yellow lever should be up for GX-3Rs and down for GX-3R Pros.5. Check all calibration tubing for leaks or for any bad connections.6. If the fail condition continues, replace the sensor(s) in the GX-3R (Pro).7. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.
Cannot Initiate Bump Test or Calibration of a GX-3R	<ul style="list-style-type: none">• Yellow lever is in the “down” position.	<ol style="list-style-type: none">1. Remove the GX-3R, move the yellow lever into the “up” position, and reinstall the GX-3R.

Symptoms	Probable Causes	Recommended Action
Insufficient Flow	<ul style="list-style-type: none"> • There are kinks in the fresh air, gas cylinder, or exhaust lines. • The gas cylinder is empty. 	<ol style="list-style-type: none"> 1. Check to make sure there are no kinks or blockages in the fresh air, gas cylinder, and exhaust lines. 2. Check to make sure your gas cylinder is not empty. 3. If the difficulties continue, contact RKI Instruments, Inc. for further instructions.
No connection between GX-3R (Pro) and PC Program	<ul style="list-style-type: none"> • SDM-3R is not turned on. • The GX-3R (Pro) is not correctly inserted into the instrument cradle. • The IR window is dirty. • The USB cable is not properly plugged into the SDM-3R or the PC. 	<ol style="list-style-type: none"> 1. Turn on the SDM-3R. If it does not turn on, check that the AC adapter is plugged into an AC socket and to the jack on the left side of the SDM-3R. 2. Check to make sure the GX-3R (Pro) is correctly inserted in the instrument cradle. 3. Clean the IR window on the SDM-3R and GX-3R (Pro). 4. Check to make sure the USB cable is plugged into the left side of the SDM-3R and to a USB port on your PC. 5. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.
The Li-ion battery pack in the GX-3R (Pro) is not charging	<ul style="list-style-type: none"> • The GX-3R (Pro) has an alkaline battery pack installed. • The Li-ion battery pack is faulty. • The GX-3R (Pro) is not correctly inserted in the instrument cradle. • The charger is malfunctioning. 	<ol style="list-style-type: none"> 1. Check to make sure your GX-3R (Pro) doesn't have an alkaline battery pack installed. 2. Replace the Li-ion battery pack and attempt to charge it. 3. Check to make sure the GX-3R (Pro) is correctly inserted in the instrument cradle. 4. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.

Charging a GX-3R (Pro) in an SDM-3R

The SDM-3R can be used to charge the rechargeable batteries in a GX-3R (Pro). To maximize the GX-3R (Pro)'s run time and the battery life, make sure the batteries' charge is as low as possible before recharging them.

1. Perform a bump test, calibration, or alarm check on a GX-3R (Pro) as described in "Performing a Bump Test" on page 60, "Performing a Calibration" on page 67, or "Performing an Alarm Check" on page 76.
2. Turn off the GX-3R (Pro)(s) by selecting the GX-3R (Pro)(s), right clicking on them, and selecting **Power Off**.
 - If the bump test, calibration, or alarm check was successful, the docking station will automatically turn the GX-3R (Pro)(s) off in the time period defined by the **Power Off After Pass** parameter in the **Config** Window.

- The docking station will also turn the GX-3R (Pro)(s) off if there is no activity for the time period defined by **Auto Power OFF Time** in the **Config** Window.
3. Before the GX-3R (Pro) is turned off, the CHARGE LED will be blinking green. Once the GX-3R (Pro) is turned off, the CHARGE LED will blink orange if the GX-3R (Pro) needs to be charged. The CHARGE LED will be solid green if the GX-3R (Pro) is already fully charged.

NOTE: The SDM-3R does not start charging the batteries until the GX-3R (Pro) is off.

4. If the battery pack is drained enough for the docking station to charge it, the CHARGE LED will continue to blink orange while charging is taking place. The SDM-3R will take approximately 3 hours to charge a fully discharged GX-3R (Pro).
 - If you are attempting to charge an instrument with an alkaline battery pack, the CHARGE LED will be solid green and no charging will occur.
 - If the charging process encounters a fail condition, the CHARGE LED will turn steadily red. A fail condition could indicate that there is something wrong with the Li-ion battery pack, or that there is something wrong with the charger.
5. When the charge is complete, the CHARGE LED will turn solid green.

Batteries Too Drained for PC Controlled Operation

If the batteries in the GX-3R (Pro) do not have enough power to keep the GX-3R (Pro) on during operations with the SDM-3R, the GX-3R (Pro) will turn off.

- Alkaline battery pack: The GX-3R (Pro) LCD indicates **REPLACE BATT**. You must change the batteries before you can use the GX-3R (Pro) with the SDM-3R.
- Li-ion battery pack: The GX-3R (Pro) goes into a 5 minute charge cycle and the LCD indicates **CHARGING**. Once the 5 minute charge cycle has ended, the GX-3R (Pro) will automatically turn back on and connect to the SDM-3R.

Chapter 9: Viewing Data in the Logs Window

Logs Button Overview

The Logs Window contains the following types of data:

- Alarm check
- Alarm trend (**Download** operation required)
- Bump test
- Calibration
- Event (**Download** operation required)
- Interval trend (**Download** operation required)
- Memo

Organizing the Data

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

Base View Format

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

Date Base View Format

1. Select **Date** in the Base view box.

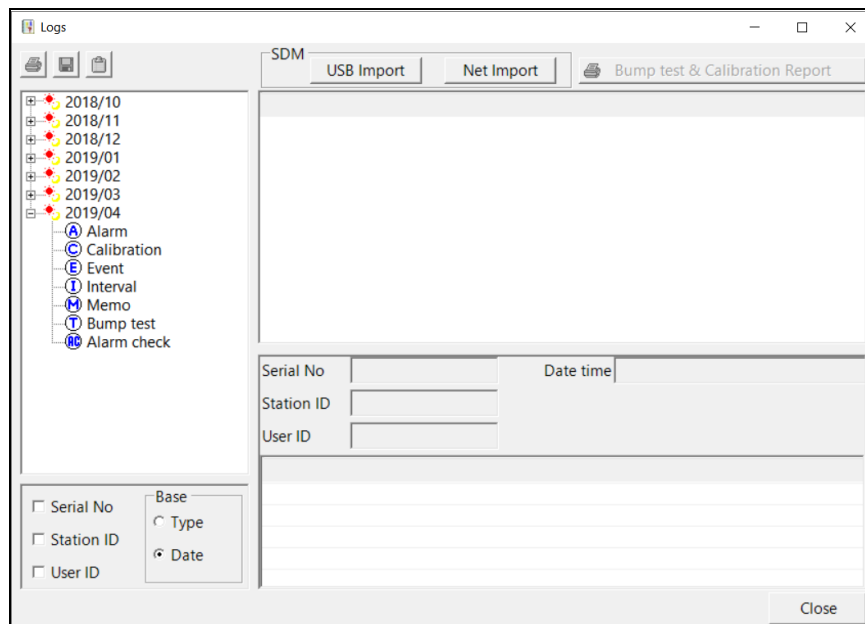


Figure 73: Logs Window in Base View Format, Date

2. Click the (+) next to a date folder in the Data frame of the Logs window or double click the folder to view its contents.
3. Single click on the data type folder (Alarm, Calibration, etc.). All of the files in that data type folder will appear in the upper right frame of the **Logs** window.

Type Base View Format

1. Select **Type** in the Base view box.

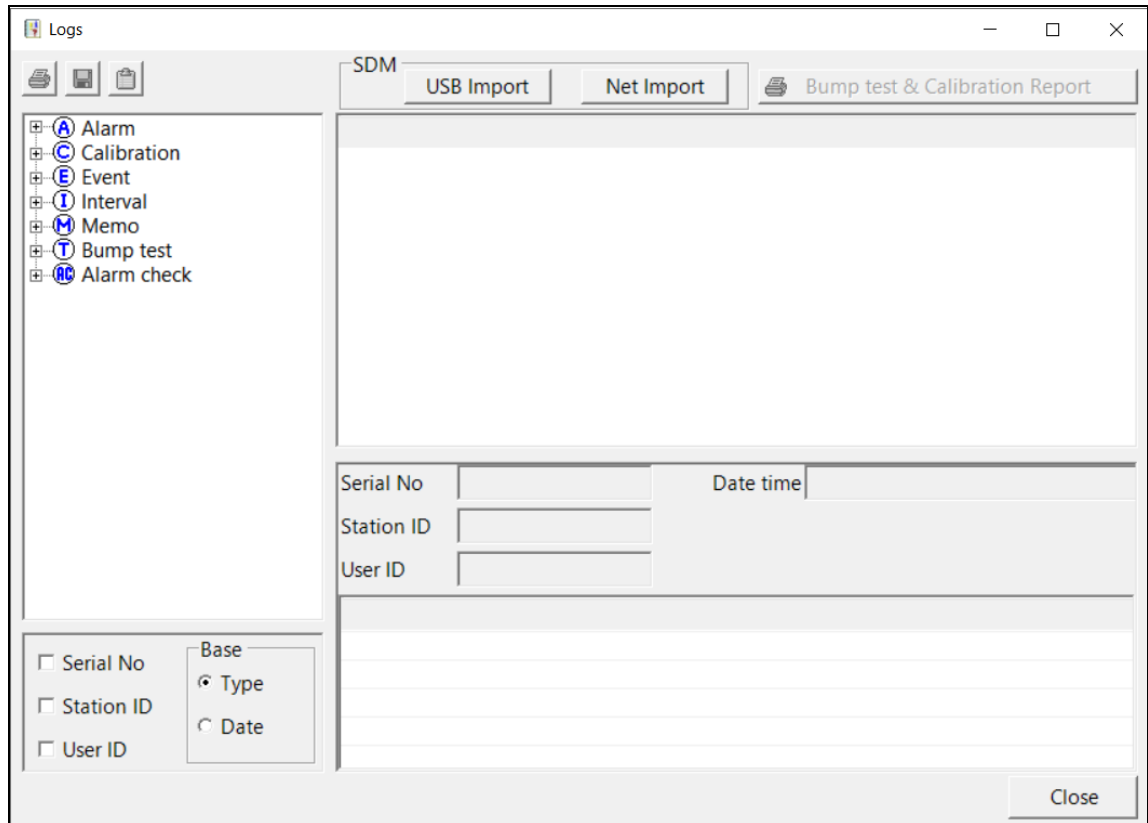


Figure 75: Logs Window in Base View Format, Type

2. Click the expanded view symbol (+) next to a data type folder (Alarm, Calibration, etc.) in the Data frame of the Logs window or double click the folder to view the contents below it.
3. Single click on a date folder. The dates are displayed in year/month format. All of the files in that date folder will appear in the upper right frame of the **Logs** window.

ID View Format

The data may be organized by one or more of the following parameters: serial number, Station ID, User ID.

When viewing data by Serial No., if two GX-3R (Pro)s have the same serial number and have data for the same year/month, they will be distinguished by their different Station ID or User ID.

When viewing data by Station ID or by User ID, if two GX-3R (Pro)s have the same Station ID and/or User ID and have data for the same year/month, they will be distinguished by their different serial numbers.

1. Select one or more of the ID view choices: **Serial No.**, **Station ID**, or **User ID**.

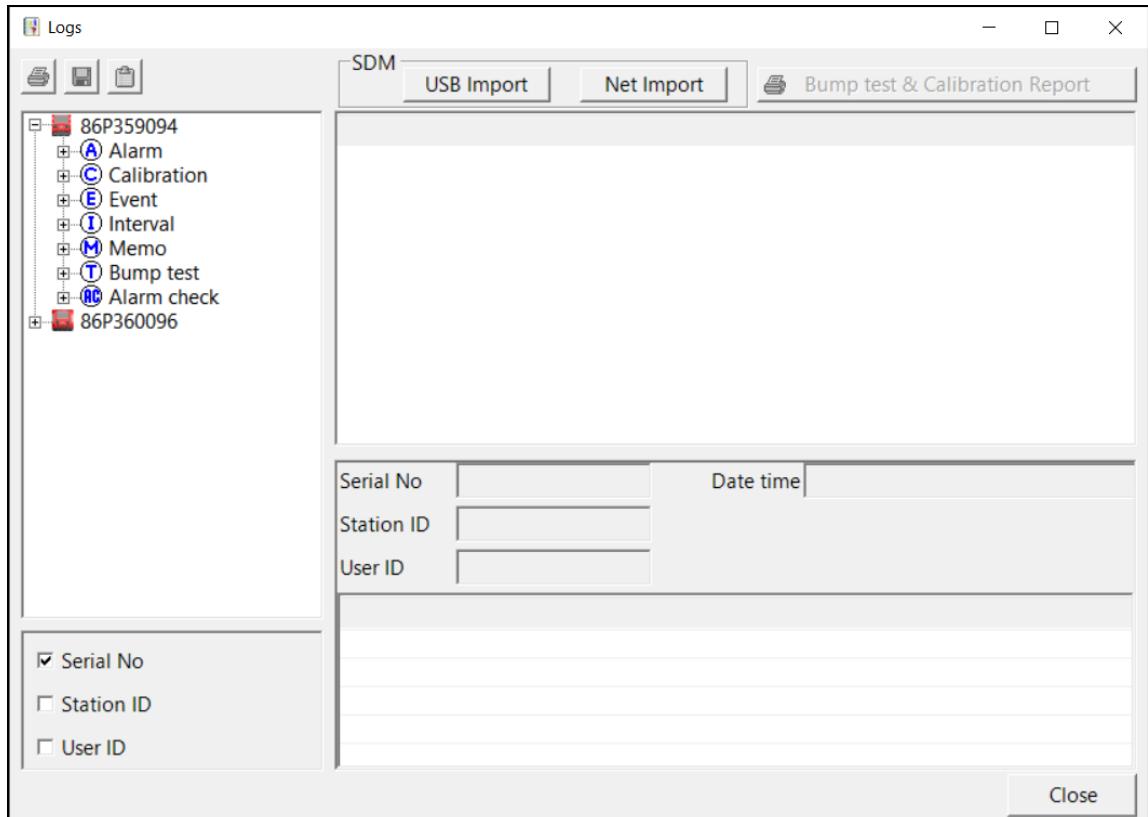


Figure 76: Logs Window in ID View Format

2. Click the (+) next to an ID folder (**Serial No.**, **Station ID**, or **User ID**) in the Data frame of the Logs window or double click the folder.
3. Click the (+) next to the data type folder (Alarm, Calibration, etc.) you wish to view or double click the folder.
4. Single click on a date folder. The dates are displayed in year/month format. All of the files in that date folder will appear in the upper right frame of the **Logs** window.

Alarm Trend Data

If an alarm event (Warning, Alarm, Alarm H, STEL, TWA, man down, or panic) occurs, then an alarm trend file is saved in the GX-3R (Pro). The peak (minimum for oxygen) readings are saved every 5 seconds for 30 minutes before and 30 minutes after the alarm. If the GX-3R (Pro) was not on for 30 minutes before the alarm, the data during this time is left blank. If the GX-3R (Pro) is turned off less than 30 minutes after an alarm event occurs, the data file will only have logged data until the GX-3R (Pro) was turned off.

The GX-3R (Pro) saves up to 8 alarm trend files. When an alarm event triggers an alarm trend file to be saved, subsequent alarm events must occur 15 minutes after the previous triggering event in order to trigger the saving of another alarm trend file. If 8 alarm trend files are already saved in the GX-3R (Pro)'s memory, the oldest alarm trend file is overwritten when a new alarm trend file is saved.

Alarm trend data is downloaded from a GX-3R (Pro) when a complete download is performed or if it is imported from a USB drive.

1. While in the Logs window, find your GX-3R (Pro) by serial number, then click the (+) of or double-click the serial number folder.
2. Click the (+) of or double-click the **Alarm** folder. Alarm trend data folders are arranged by year/month.
3. Click the year/month folder you wish to view. All alarm trend data files for that GX-3R (Pro) in that particular year/month will appear in the upper right frame.

The screenshot shows the 'Logs' window with the 'SDM' tab selected. The left pane shows a tree view with the following structure:

- 86P359094
 - Alarm
 - 2018/11
 - 2018/12
 - 2019/03
 - 2019/04
 - Calibration
 - Event
 - Interval
 - Memo
 - Bump test
 - Alarm check

The main pane displays a table of alarm events:

No.	Serial No	Station ID	User ID	Model	Date Time	Sample
0001	86P359094	-----	-----	GX-3R	4/1/2019 9:18:35 AM	720
0002	86P359094	-----	-----	GX-3R	4/1/2019 9:24:42 AM	720

Below the table, the following fields are displayed:

- Serial No: 86P359094
- Station ID: -----
- User ID: -----
- Occurrence: 4/1/2019 9:24:42 AM
- Sample Count: 720
- Interval Time(Sec): 5

At the bottom, there is a table of sensor readings:

Sensor	Value	Warning	Alarm	AlarmH	STEL	TWA
CH4(100%LEL)	14 %LEL	10 %LEL	25 %LEL	50 %LEL	*****	*****
O2(40.0%)	17.5 %	19.5 %	18.0 %	23.5 %	*****	*****
H2S(200.0ppm)	0.3 ppm	5.0 ppm	30.0 ppm	100.0 ppm	5.0 ppm	1.0 ppm
CO(2000ppm)	2 ppm	25 ppm	50 ppm	1200 ppm	200 ppm	25 ppm
Temperature	23.1 °C	*****	*****	*****	*****	*****

Figure 77: Viewing Alarm Trend Files

- Click a file to see the GX-3R (Pro) information, gas readings at the time of the event, and the alarm setpoints in the lower right frame.

The screenshot shows the 'Logs' window with the following components:

- Sidebar:** A tree view showing logs for device 86P359094. The 'Alarm' category is expanded, showing dates from 2018/11 to 2019/04. Other categories include Calibration, Event, Interval, Memo, Bump test, and Alarm check.
- Main Table:** A table with columns: No., Serial No, Station ID, User ID, Model, Date Time, and Sample. Two entries are visible, with the second entry (No. 0002) selected.
- Details Panel:** A panel at the bottom right showing detailed information for the selected log entry, including fields for Serial No, Station ID, User ID, Occurrence, Sample Count, and Interval Time, as well as a table of sensor readings.

No.	Serial No	Station ID	User ID	Model	Date Time	Sample
0001	86P359094	-----	-----	GX-3R	4/1/2019 9:18:35 AM	720
0002	86P359094	-----	-----	GX-3R	4/1/2019 9:24:42 AM	720

Serial No	86P359094	Occurrence	4/1/2019 9:24:42 AM			
Station ID	-----	Sample Count	720			
User ID	-----	Interval Time(Sec)	5			

Sensor	Value	Warning	Alarm	AlarmH	STEL	TWA
CH4(100%LEL)	14 %LEL	10 %LEL	25 %LEL	50 %LEL	*****	*****
O2(40.0%)	17.5 %	19.5 %	18.0 %	23.5 %	*****	*****
H2S(200.0ppm)	0.3 ppm	5.0 ppm	30.0 ppm	100.0 ppm	5.0 ppm	1.0 ppm
CO(2000ppm)	2 ppm	25 ppm	50 ppm	1200 ppm	200 ppm	25 ppm
Temperature	23.1 °C	*****	*****	*****	*****	*****

Figure 78: Alarm Trend Data

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

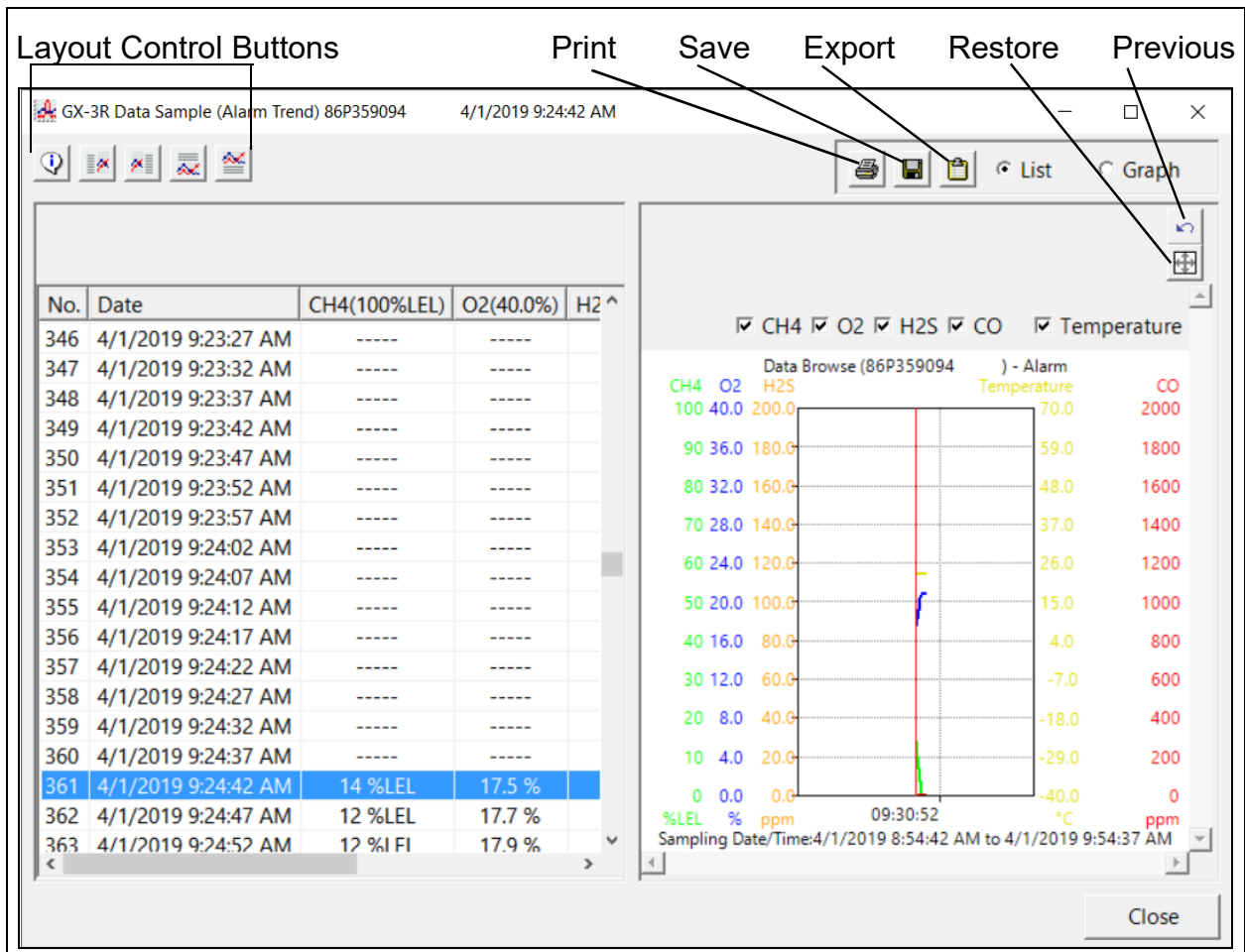


Figure 79: Alarm Trend Data

- To change the layout of the table and chart in relation to each other, click any of the four layout control buttons in the upper left corner of the screen.
 - To change the proportions of the table to the graph, click the divider between the two and move it.
 - To display instrument information along with the data table and graph, click the “i” control button in the upper left corner.
6. The table section of the screen displays the following:
- The gas readings at the time of the alarm event around which the logged data is centered are highlighted in red and are the instantaneous readings at that time. If the gas readings highlighted in red are normal, fresh air readings, then a man down or a panic alarm triggered the alarm trend file.
 - Peak readings (minimum for oxygen) are shown in 5 second intervals.

7. The graph section of the screen displays the following:
 - a. You can choose which gas(es) you want to graph by selecting or deselecting the boxes next to each gas name.
 - b. To zoom in on a particular part of the graph, drag a box around that area so that it is highlighted in gray. The graph will zoom in. To return to a previous zoom, click the Previous control button in the upper right corner of the graph section. To return to the original zoom, click the Restore control button in the upper right corner of the graph section.
 - c. A vertical red line appears on the graph at the point that created the alarm trend file. Clicking anywhere on the graph will move that red line and highlight that data point in the table. Clicking a data point in the table will move the red line in the graph to that data point.

Printing Data

1. Select either **List** or **Graph** in the upper right corner of the window.
2. Click the **Print** control button in the upper right corner of the window. The **Print** control button has a printer icon on it.
3. If **Graph** is selected, the data will print as a graph. If **List** is selected, the data will print as a table.

Saving Data







1. Select either **List** or **Graph** in the upper right corner of the window.
2. Click the **Save to File** control button. The **Save to File** control button has a floppy disk icon on it.
3. A dialog box will appear for you to specify the file name, file location, and file type.
4. Specify the file name and file location and click **Save**. If **List** is selected, the file type is “.csv” (comma-separated values). If **Graph** is selected, the file type is “.bmp” (Windows bitmap).

Copying Data

1. Select either **List** or **Graph** in the upper right corner of the window.
2. Click the **Copy to Clipboard** control button. The **Copy to Clipboard** control button has a clipboard icon on it. The table or graph will be saved to the clipboard.
3. Paste the data into a document using the application’s Paste command.

Calibration Data

Calibration data in the Logs window can come from 3 different sources. The icon next to each calibration file indicates the file source.

Calibration Data Source	GX-3R Icon	GX-3R Pro Icon
Downloading GX-3R (Pro) data through the PC Program (right click on connected instrument and click Download)		
Performing calibration using PC Program		
Importing data using the USB Import or Net Import buttons		

1. While in the Logs window, find your GX-3R (Pro) by serial number, then click the (+) or double-click the serial number folder.
2. Click the (+) or double-click the **Calibration** folder to view the contents. Calibration data folders are arranged by year/month.
3. Click the year/month folder you wish to view. All calibration data files for that GX-3R (Pro) in that particular year/month will appear in the upper right frame. You may need to download the data from the instrument again to get more recent information,

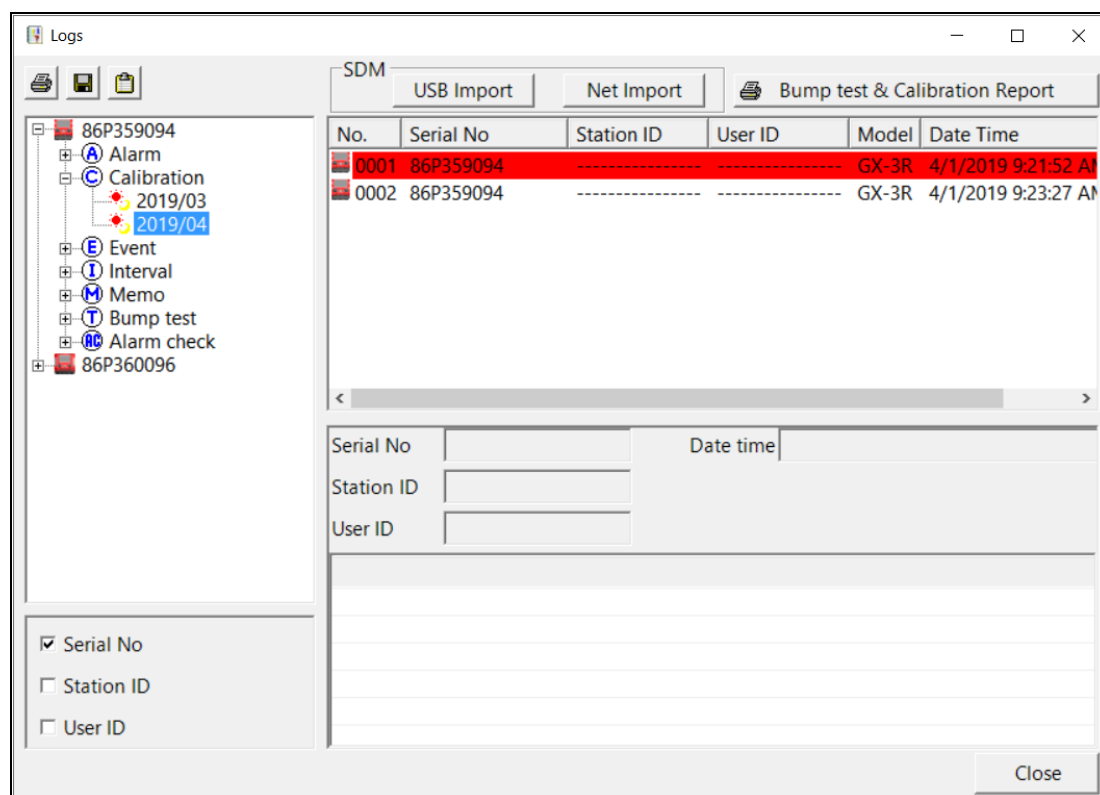


Figure 80: Viewing Calibration Log Files

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

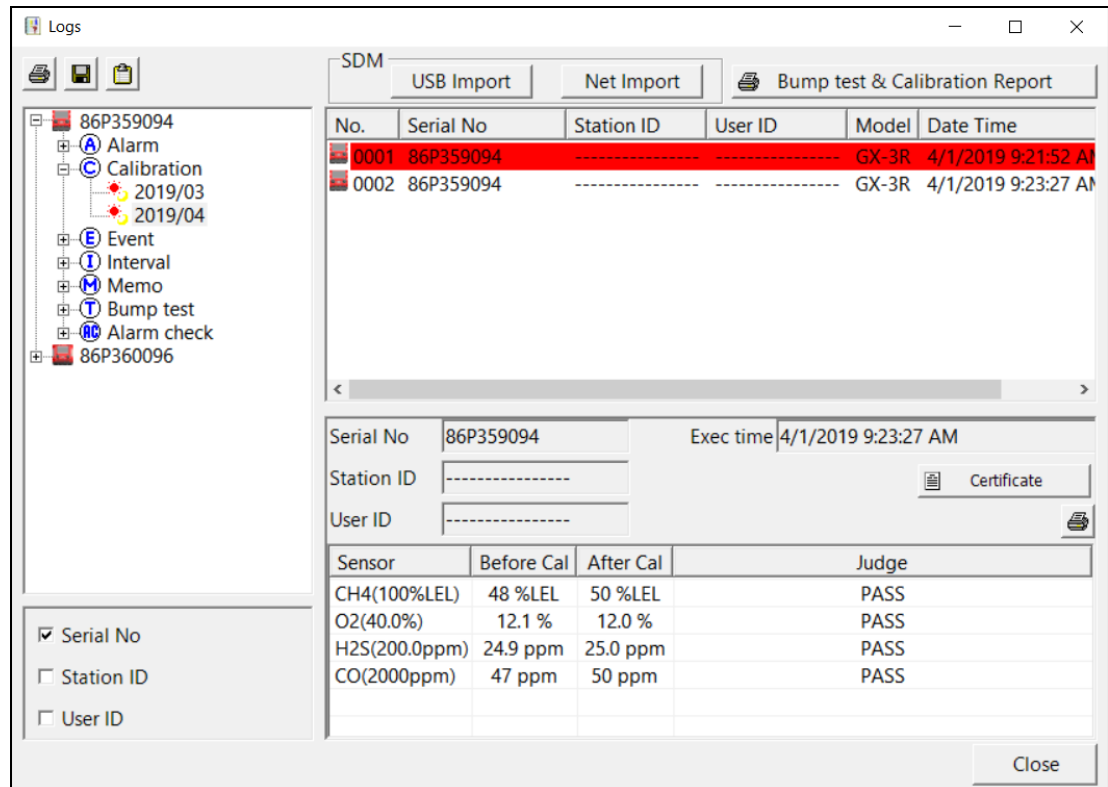
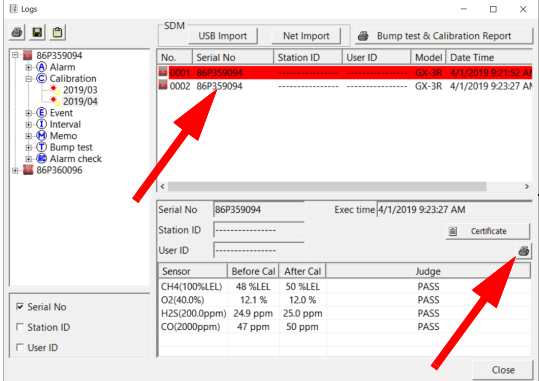


Figure 81: Viewing Calibration Data

- Files that record a failed calibration on all channels are highlighted in red. Files that record a calibration where not all channels passed are highlighted in orange.
- Calibrations that required more than one calibration cylinder will have separate calibration files for each cylinder. For example, a calibration performed on a GX-3R (Pro) that contained the standard 4 sensors plus an IR CO₂ sensor would result in one calibration file for the standard 4 sensors if a 4-gas mix was used and one calibration file for the IR CO₂ sensor.

Printing Data

- To print the calibration data (everything in the lower right frame of the screen) for a selected calibration file, click the **Print** control button located just above the calibration judge column.



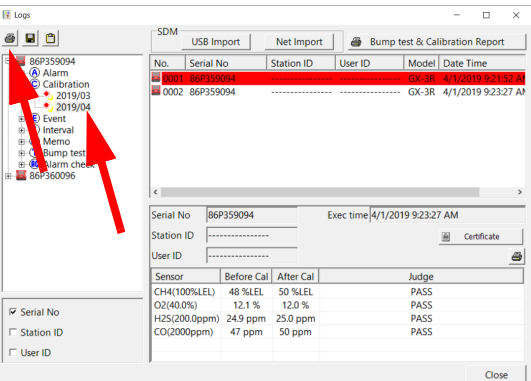
The screenshot shows the 'Logs' window with the 'Calibration' folder selected. The 'Print' button is located above the calibration judge column. The 'Print' button in the upper right corner of the Logs window is also highlighted.

[Calibration Log] 4/2/2019 3:54:40 PM

Item	Value
Exec time	4/1/2019 9:23:27 AM
Serial No	86P359094
Station ID	.....
User ID	.....

Sensor	Before Cal	After Cal	Judge
CH4(100%LEL)	48 %LEL	50 %LEL	PASS
O2(40.0%)	12.1 %	12.0 %	PASS
H2S(200.0ppm)	24.9 ppm	25.0 ppm	PASS
CO(2000ppm)	47 ppm	50 ppm	PASS

- To print the basic calibration results from a date folder (everything in the upper right frame), be sure that the desired date folder is selected and click the **Print** control button in the upper left corner of the Logs window.



The screenshot shows the 'Logs' window with the '2019/04' folder selected. The 'Print' button is located in the upper left corner of the Logs window. The 'Print' button in the upper right corner of the Logs window is also highlighted.

86P359094 Calibration 2019/04 4/3/2019 7:58:21 AM 1 / 1

No.	Serial No	Station ID	User ID	Model	Date Time	Judge
0001	86P359094	.....	.....	GX-3R	4/1/2019 9:21:52 AM	FAIL
0002	86P359094	.....	.....	GX-3R	4/1/2019 9:23:27 AM	PASS

3. To print detailed calibration data for each calibration file in a date folder, be sure that the desired date folder is selected and click the **Bump Test & Calibration Report** control button along the top of the Logs window.

The screenshot shows the 'Logs' window with the 'Bump Test & Calibration Report' button highlighted by a red arrow. The report displays calibration data for serial number 86P359094, including sensor readings (CH4, CO2, H2S, CO) before and after calibration, and a 'Judge' column indicating 'PASS' for all sensors.

Sensor	Before Cal	After Cal	Judge
CH4(100%LEL)	48 %LEL	50 %LEL	PASS
CO2(40.0%)	12.1 %	12.0 %	PASS
H2S(2000ppm)	24.9 ppm	25.0 ppm	PASS
CO(2000ppm)	47 ppm	50 ppm	PASS

4. To print detailed calibration and bump test data (if available) for each calibration and bump test file for a specific serial number, be sure that the desired serial number is selected in the upper left frame and click the **Bump Test & Calibration Report** control button along the top of the Logs window.

The screenshot shows the 'Logs' window with the 'Bump Test & Calibration Report' button highlighted by a red arrow. The report displays bump test data for serial number 86P360096, including sensor readings (CH4, CO2, H2S, CO) before and after calibration, and a 'Judge' column indicating 'PASS' for all sensors.

Sensor	Before Cal	After Cal	Judge
CH4(100%LEL)	48 %LEL	50 %LEL	PASS
CO2(40.0%)	12.1 %	12.0 %	PASS
H2S(2000ppm)	24.9 ppm	25.0 ppm	PASS
CO(2000ppm)	47 ppm	50 ppm	PASS

Saving Data

1. Be sure the desired date folder is highlighted.
2. Click the **Save** control button in the upper left corner of the Logs window.
3. A "Save As" dialog box will appear for you to specify the file name and file location. The file type will be ".csv" (comma separated values).
4. Specify the file name and location and click **Save**.

Copying Data

1. Be sure the desired date folder is selected.
2. Click the **Save to Clipboard** control button. The data will be saved to the clipboard.
3. Paste the data into a document by using the Paste command in an application.

Printing a Calibration Certificate

1. Select a calibration file.
2. Click the **Certificate** button along the right side of the window. The calibration certificate will appear.

The screenshot shows a window titled "Calibration Certificate" with a close button (X) in the top right corner. The window contains a form with the following sections:

- Language:** Radio buttons for English (selected), Português (Brasil), and 日本語.
- Align:** Radio buttons for Left (selected) and Center.
- Buttons:** A copy icon button and a "Close" button.
- Fields:**
 - 1. Calibrated Date: 15 August 2019
 - 2. Certificate Number: 2019-1
 - 3. Customer Name: (empty)
 - 4. Address: (empty)
 - 5. Gas Detector Data:

Serial Number	86P359094
Manufacturer	RIKEN KEIKI
Model	GX-3R
Station ID	DESK
User ID	KIMBERLY
 - 6. Overall Results: Pass
 - 7. ZERO:

GAS	CH4	O2	H2S	CO
Applied gas concentration	0 %LEL	20.9 %	0.0 ppm	0 ppm
Reading before calibration	0 %LEL	20.9 %	0.0 ppm	0 ppm
Reading after calibration	0 %LEL	20.9 %	0.0 ppm	0 ppm
Result	Pass	Pass	Pass	Pass
 - 8. Calibration Result:


GAS	CH4	O2	H2S	CO
Range	0-100 %LEL	0-40.0 %	0-200.0 ppm	0-2000 ppm
Applied gas concentration	50 %LEL	12.0 %	25.0 ppm	50 ppm
Reading before calibration	50 %LEL	12.0 %	25.5 ppm	50 ppm
Reading after calibration	50 %LEL	12.0 %	25.0 ppm	50 ppm
Result	Pass	Pass	Pass	Pass
 - 9. Alarm: Pass
 - 10. Buzzer: Fail
 - 11. Environmental Condition: (empty)
 - 12. Observation: (empty)
 - 13. Replacement part: (empty)
 - 14. Next Calibration Date: (empty)
- Footer:**
 - ☐ This calibration certificate results that the inspection and calibration was carried out in accordance with the operation manual or the maintenance manual officially published by the manufacturer Riken Keiki Co., Ltd.
 - Issued Date: 15 August 2019

Figure 82: Calibration Certificate

3. Use the **English**, **Portuguese**, or **Japanese** selection dots in the Language section at the top of the screen to choose the displayed language.
4. Use the **Left** and **Center** selection dots in the Align section at the top of the certificate to change the alignment of the information that's manually typed in.


- Information in fields with a white background can be edited. Information in fields with a grey background cannot be edited. Add or edit information, as desired.
- The prefix for the certificate number, “2019” in the example above, is defined in the UserData tab of the Configuration Window.
- To print a certificate, click the **Print** button in the top right corner of the screen. The calibration certificate will print to the computer’s default printer OR to the printer defined in the UserData tab of the Configuration Window. If you defined a logo location in the UserData tab of the Configuration Window, the logo will print in the lower left corner of the certificate.

Calibration Certificate



1. Calibrated Date	15 August 2019				
2. Certificate Number	2019-1				
3. Customer Name					
4. Address					
5. Gas Detector Data	Serial Number	86P359094			
	Manufacturer	RIKEN KEIKI			
	Model	GX-3R			
	Station ID	DESK			
	User ID	KIMBERLY			
6. Overall Results	Pass				
7. ZERO	GAS	CH4	O2	H2S	CO
	Applied gas concentration	0 %LEL	20.9 %	0.0 ppm	0 ppm
	Reading before calibration	0 %LEL	20.9 %	0.0 ppm	0 ppm
	Reading after calibration	0 %LEL	20.9 %	0.0 ppm	0 ppm
	Result	Pass	Pass	Pass	Pass
8. Calibration Result	GAS	CH4	O2	H2S	CO
	Range	0-100 %LEL	0-40.0 %	0-200.0 ppm	0-2000 ppm
	Applied gas concentration	50 %LEL	12.0 %	25.0 ppm	50 ppm
	Reading before calibration	50 %LEL	12.0 %	25.5 ppm	50 ppm
	Reading after calibration	50 %LEL	12.0 %	25.0 ppm	50 ppm
	Result	Pass	Pass	Pass	Pass
9. Alarm	Pass				
10. Buzzer	Fail				
11. Environmental Condition					
12. Observation					
13. Replacement part					
14. Next Calibration Date					

☐ This calibration certificate results that the inspection and calibration was carried out in accordance with the operation manual or the maintenance manual officially published by the manufacturer Riken Keiki Co., Ltd.



Issued Date : 15 August 2019

Company Name :

Diploma No. :

Signature :

Figure 83: Printed Calibration Certificate

Event Data

The GX-3R (Pro) saves the 100 most recent alarm events and the 100 most recent trouble events. When a GX-3R (Pro) is connected to the PC Program and a complete download is performed, the alarm and trouble event files are retrieved and saved in the program. They can also be imported using the **USB Import** button.

Alarm event files save the time, instrument channel, gas, and alarm type of every gas alarm event that occurs on a particular GX-3R (Pro). Warning, Alarm, Alarm H, STEL, TWA, overscale, man down, and panic events are saved.

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

Even though two types of files are saved, the PC Program does not distinguish between the two and shows them together and with the same lightning bolt symbol.

1. While in the Logs window, find your GX-3R (Pro) by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the **Event** folder to view the contents. Event data folders are arranged by year/month.
3. Click the year/month folder you wish to view. All event data files for that GX-3R (Pro) in that particular year/month will appear in the upper right frame.

No.	Serial No	Station ID	User ID	Model	Date Time	Ch	Sensor	Event
0001	86P359094	-----	-----	GX-3R	4/1/2019 9:18:35 AM	4	CO(2000ppm)	WARNING
0002	86P359094	-----	-----	GX-3R	4/1/2019 9:18:45 AM	1	CH4(100%LEL)	WARNING
0003	86P359094	-----	-----	GX-3R	4/1/2019 9:18:45 AM	1	CH4(100%LEL)	ALARM
0004	86P359094	-----	-----	GX-3R	4/1/2019 9:18:51 AM	2	O2(40.0%)	WARNING
0005	86P359094	-----	-----	GX-3R	4/1/2019 9:18:52 AM	2	O2(40.0%)	ALARM
0006	86P359094	-----	-----	GX-3R	4/1/2019 9:19:13 AM	2	O2(40.0%)	WARNING
0007	86P359094	-----	-----	GX-3R	4/1/2019 9:19:14 AM	2	O2(40.0%)	ALARM
0008	86P359094	-----	-----	GX-3R	4/1/2019 9:19:20 AM	1	CH4(100%LEL)	WARNING
0009	86P359094	-----	-----	GX-3R	4/1/2019 9:19:25 AM	1	CH4(100%LEL)	ALARM
0010	86P359094	-----	-----	GX-3R	4/1/2019 9:19:33 AM	4	CO(2000ppm)	WARNING
0011	86P359094	-----	-----	GX-3R	4/1/2019 9:21:28 AM	2	O2(40.0%)	Fail(BUMP)
0012	86P359094	-----	-----	GX-3R	4/1/2019 9:21:28 AM	3	H2S(200.0ppm)	Fail(BUMP)
0013	86P359094	-----	-----	GX-3R	4/1/2019 9:21:28 AM	4	CO(2000ppm)	Fail(BUMP)
0014	86P359094	-----	-----	GX-3R	4/1/2019 9:21:28 AM	1	CH4(100%LEL)	Fail(BUMP)
0015	86P359094	-----	-----	GX-3R	4/1/2019 9:21:52 AM	1	CH4(100%LEL)	Fail(Span)
0016	86P359094	-----	-----	GX-3R	4/1/2019 9:21:52 AM	2	O2(40.0%)	Fail(Span)
0017	86P359094	-----	-----	GX-3R	4/1/2019 9:21:52 AM	3	H2S(200.0ppm)	Fail(Span)
0018	86P359094	-----	-----	GX-3R	4/1/2019 9:21:52 AM	4	CO(2000ppm)	Fail(Span)
0019	86P359094	-----	-----	GX-3R	4/1/2019 9:24:42 AM	2	O2(40.0%)	WARNING
0020	86P359094	-----	-----	GX-3R	4/1/2019 9:24:42 AM	2	O2(40.0%)	ALARM

Figure 84: Viewing Event Data

Printing Data

1. Be sure the desired date folder is selected.
2. Click the **Print** control button in the upper left corner of the **Logs** window.

Saving Data

1. Be sure the desired date folder is selected.
2. Click the **Save** control button in the upper left corner of the **Logs** window.
3. A “Save As” dialog box will appear for you to specify the file name and file location.
4. Specify the file name and location and click **Save**. The file type will be “.csv” (comma separated values).

Copying Data

1. Be sure the desired date folder is selected.
2. Click the **Save to Clipboard** control button. The data will be saved to the clipboard.
3. Paste the data into a document using the application’s Paste command.

Interval Trend Data

Average gas concentrations over the user defined interval trend time are logged in the interval trend data files. The interval trend time is set using either the **Interval Time** menu item in the Edit Function Screen. See “Chapter 7: Changing GX-3R (Pro) Parameters” on page 94 for instructions to set the interval trend time. Events such as gas alarms or sensor failures are saved in the interval trend data file when they occur.

An interval trend data file is created and saved in the GX-3R (Pro) when the instrument is turned *off* or when a user ID, or station ID is changed during operation. The serial number, user ID, and station ID that are entered in the instrument when it is turned *on* or that are updated during operation are saved for the corresponding interval trend file. If the instrument’s user ID or station ID are changed during operation, any interval trend files that result from subsequent operating sessions will have the new user ID or station ID saved in them.

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

Interval trend data will not appear unless a complete download is performed or if an import is done using the **USB Import** button.

1. While in the **Logs** window, find your GX-3R (Pro) by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the Interval folder to view the contents. Interval data folders are arranged by year/month.

- Click the year/month folder you wish to view. All interval trend data files for that GX-3R (Pro) in that particular year/month will appear in the upper right frame.

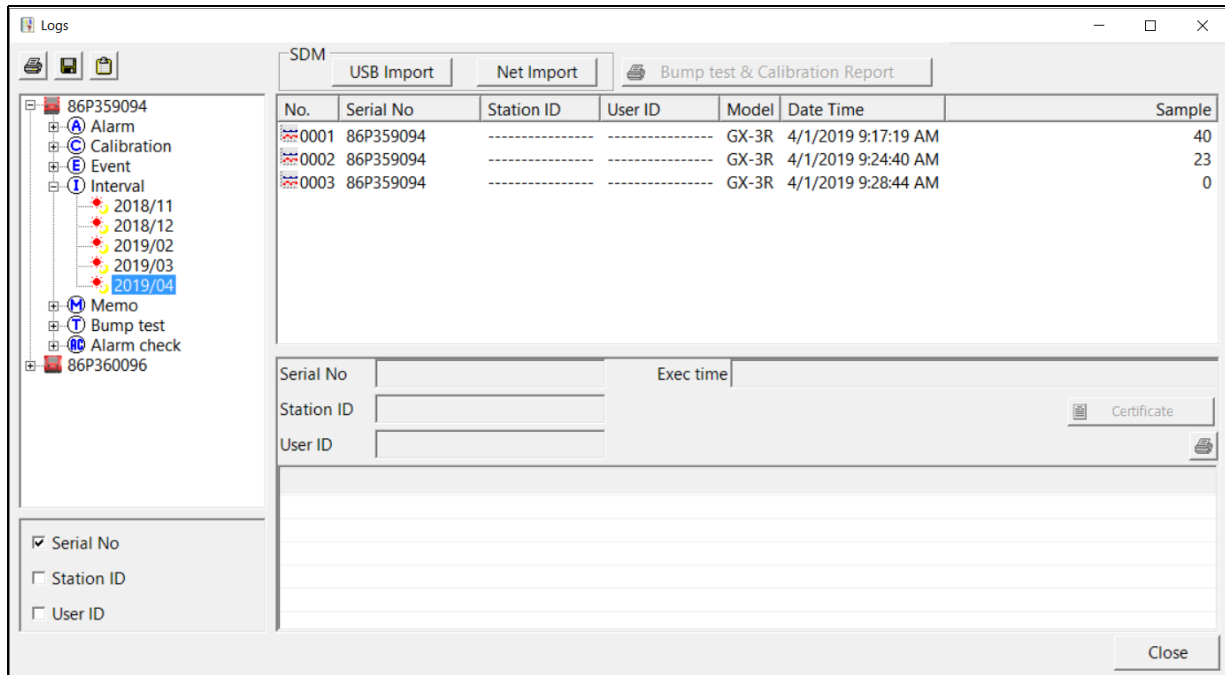


Figure 85: Viewing Interval Trend Files

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

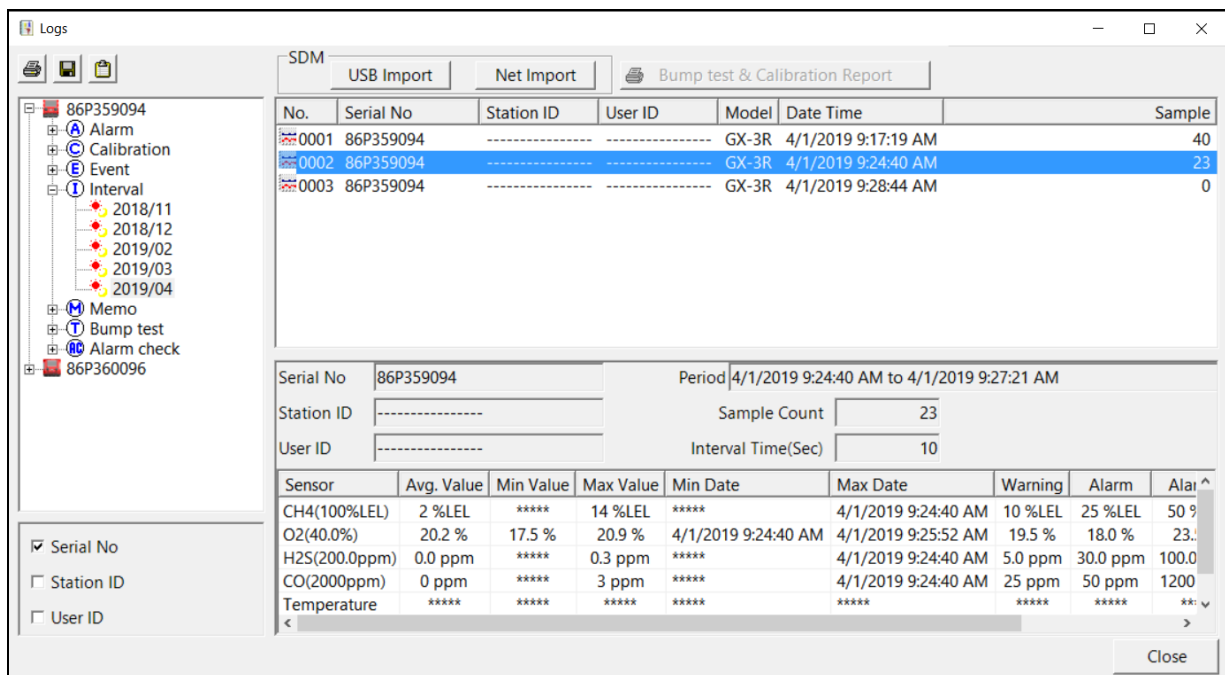


Figure 86: Interval Trend Data

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

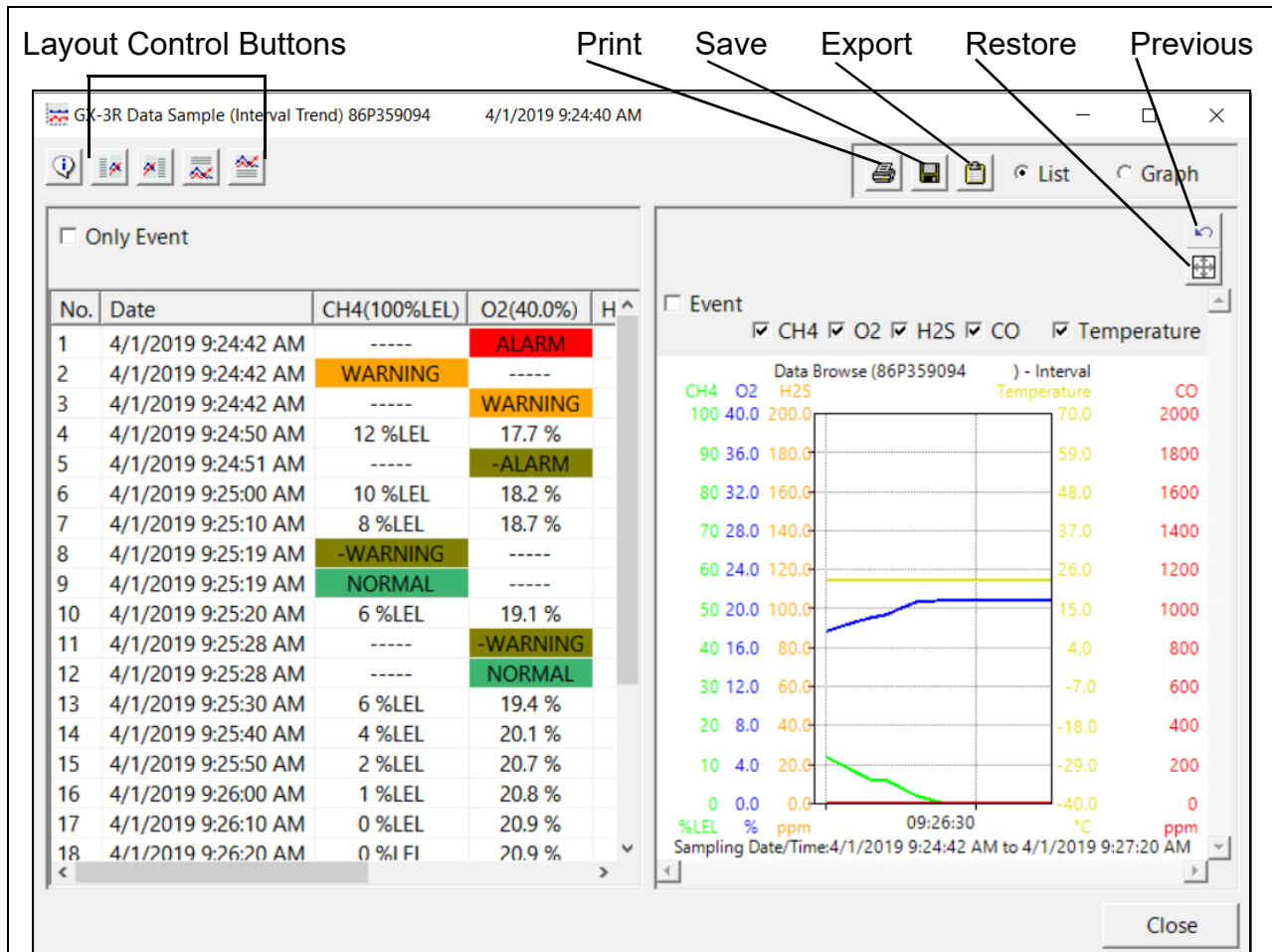


Figure 87: Interval Trend Data

- a. To change the layout of the table and chart, click any of the four layout control buttons in the upper left corner of the screen.
 - b. To change the proportions of the table to the graph, click the divider between the two and move it.
 - c. To display instrument information along with the data and graph, click the “i” control button in the upper left corner.
6. In the table part of the screen:
 - a. The interval trend data is shown as the average gas readings over the user defined interval trend time. So if the data logging session started at 4:13:38 PM and the interval time is set to 1 minute, then the readings logged at 4:14:38 PM are the average reading for each channel over that one minute period. If a channel went into Warning or Alarm, it will be indicated.
 - b. Events are displayed whether they occurred at scheduled log times or in between them. Events include gas alarms such as a warning condition, trouble conditions such as a sensor failure, and an indication that the GX-3R (Pro) is returning to “normal” condition after an alarm has been reset using the POWER MODE button.
 - c. To view only events in the interval trend data file, click the **Only Event** selection box.

7. In the graph part of the screen:
 - a. You can choose which gas(es) you want to graph by selecting or deselecting the boxes next to each gas name.
 - b. To zoom in on a particular part of the graph, drag a box around that area so that it is highlighted in gray. The graph will zoom in. To return to a previous zoom, click the **Previous** control button in the upper right corner of the graph section. To return to the original zoom, click the **Restore** control button in the upper right corner of the graph section.
 - c. Clicking anywhere on the graph will cause a vertical red line to appear and the corresponding data point will be highlighted in the table. Clicking a data point in the table will move the red line in the graph to that data point.

Printing Data

1. Select either **List** or **Graph** in the upper right corner of the window.
2. Click the **Print** control button in the upper right corner of the window. The **Print** control button has a printer icon on it.
3. If **Graph** is selected, the data will print as a graph. If **List** is selected, the data will print as a table.

Saving Data

1. Select either **List** or **Graph** in the upper right corner of the window.
2. Click the **Save to File** control button. The **Save to File** control button has a floppy disk icon on it.
3. A dialog box will appear for you to specify the file name, file location, and file type.
4. Specify the file name and file location and click **Save**. If **List** is selected, the file type is “.csv” (comma-separated values). If **Graph** is selected, the file type is “.bmp” (Windows bitmap).

Copying Data

1. Select either **List** or **Graph** in the upper right corner of the window.
2. Click the **Copy to Clipboard** control button. The **Copy to Clipboard** control button has a clipboard icon on it. The table or graph will be saved to the clipboard.
3. Paste the data into a document using the application’s Paste command.

Memo Data

Any information entered into the Memo field in the Edit window is saved in a file in the Logs window. If there is text in the Memo field, a new file is created every time a GX-3R (Pro) is connected to the PC Program. If a change is made to the Memo, the change is saved in the Memo file for that operating session. See “Parameter Tab” on page 94 for instructions to use the Memo field.

1. While in the **Logs** window, find your GX-3R (Pro) by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the **Memo** folder to view the contents. Memo data folders are arranged by year/month.
3. Click the year/month folder you wish to view. All memo files for that GX-3R (Pro) in that particular year/month will appear in the upper right frame.

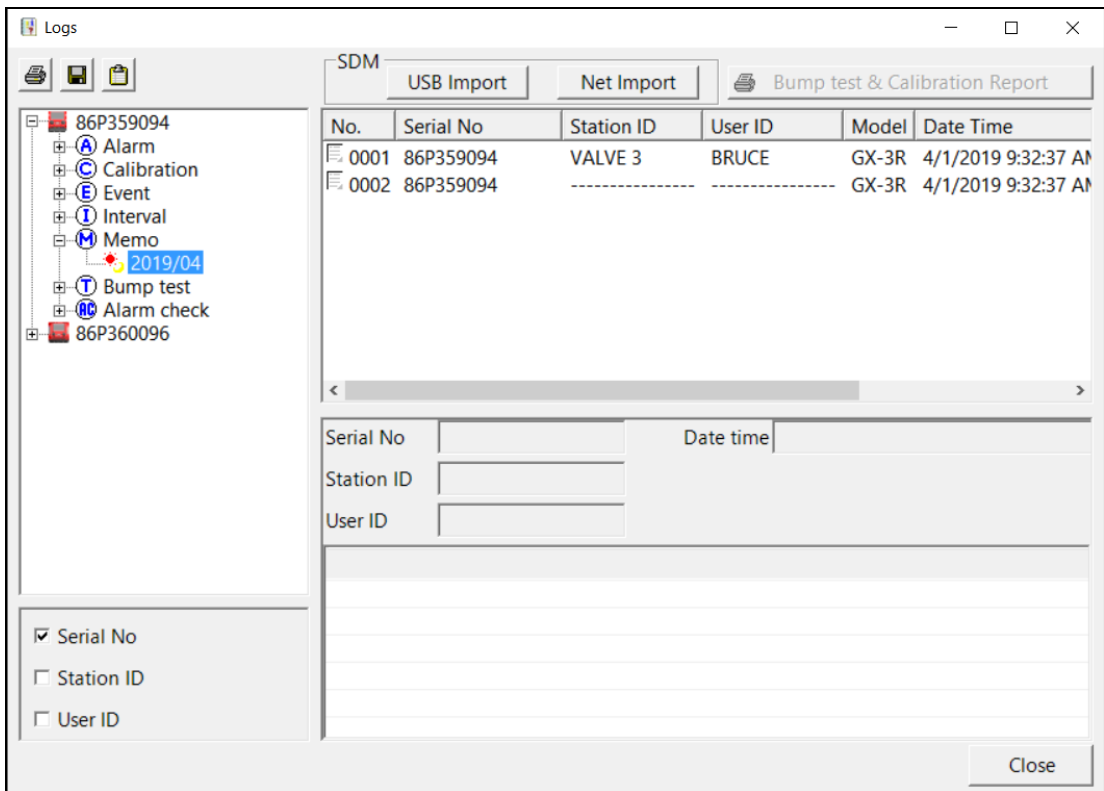


Figure 88: Viewing Memo Files

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

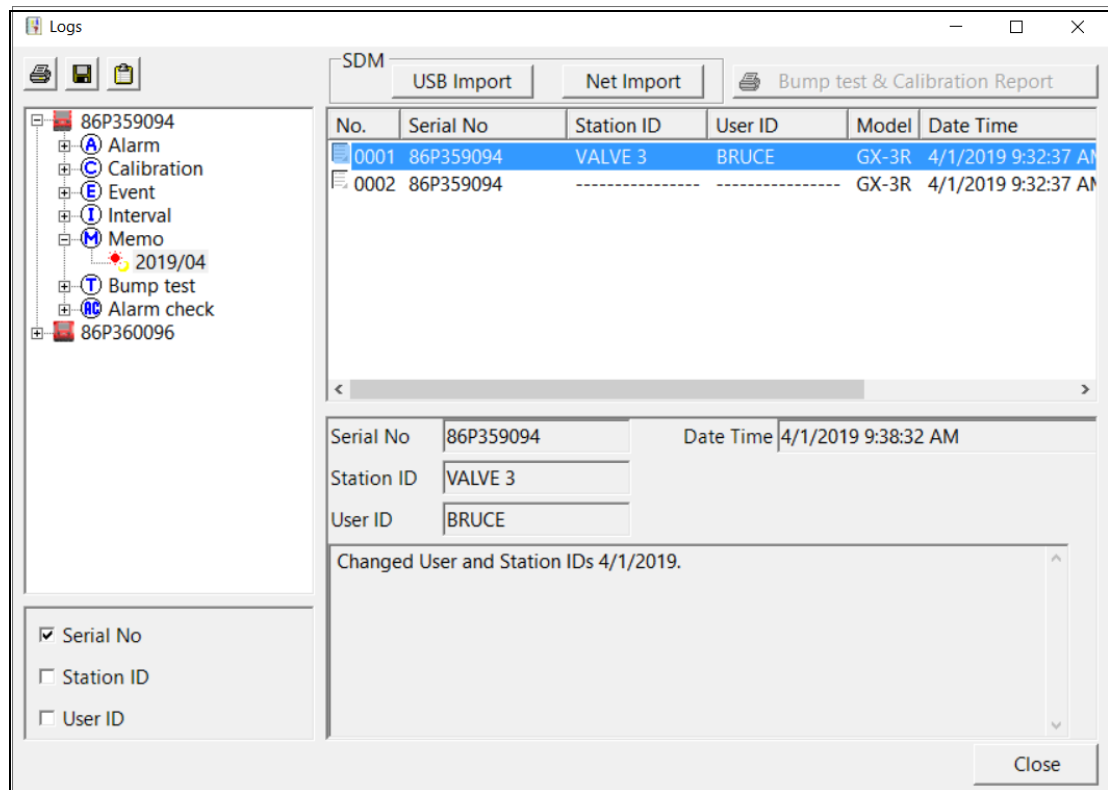


Figure 89: Viewing Memo File Data

Printing Data

- Click the **Print** control button in the upper left corner of the Logs window.

Saving Data







- Click the **Save** control button in the upper left corner of the Logs window.
- A "Save As" dialog box will appear for you to specify the file name and file location.
- Specify the file name and location and click **Save**.

Copying Data

- Click the **Save to Clipboard** control button. The data will be saved to the clipboard.
- Paste the data into a document using the application's Paste command.

Bump Test Data

Bump test data in the Logs window can come from 3 different sources. The icon next to each bump test file indicates the file source.

Bump Test Data Source	GX-3R Icon	GX-3R Pro Icon
Downloading GX-3R (Pro) data through the PC Program (right click on connected instrument and click Download)		
Performing bump test using PC Program		
Importing data using the USB Import or Net Import buttons		

1. While in the **Logs** window, find your GX-3R (Pro) by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the **Bump Test** folder to view the contents. Bump test data folders are arranged by year/month.
3. Click the year/month folder you wish to view. All bump test data files for that GX-3R (Pro) in that particular year/month will appear in the upper right frame. You may need to download the data from the instrument again to get more recent information,

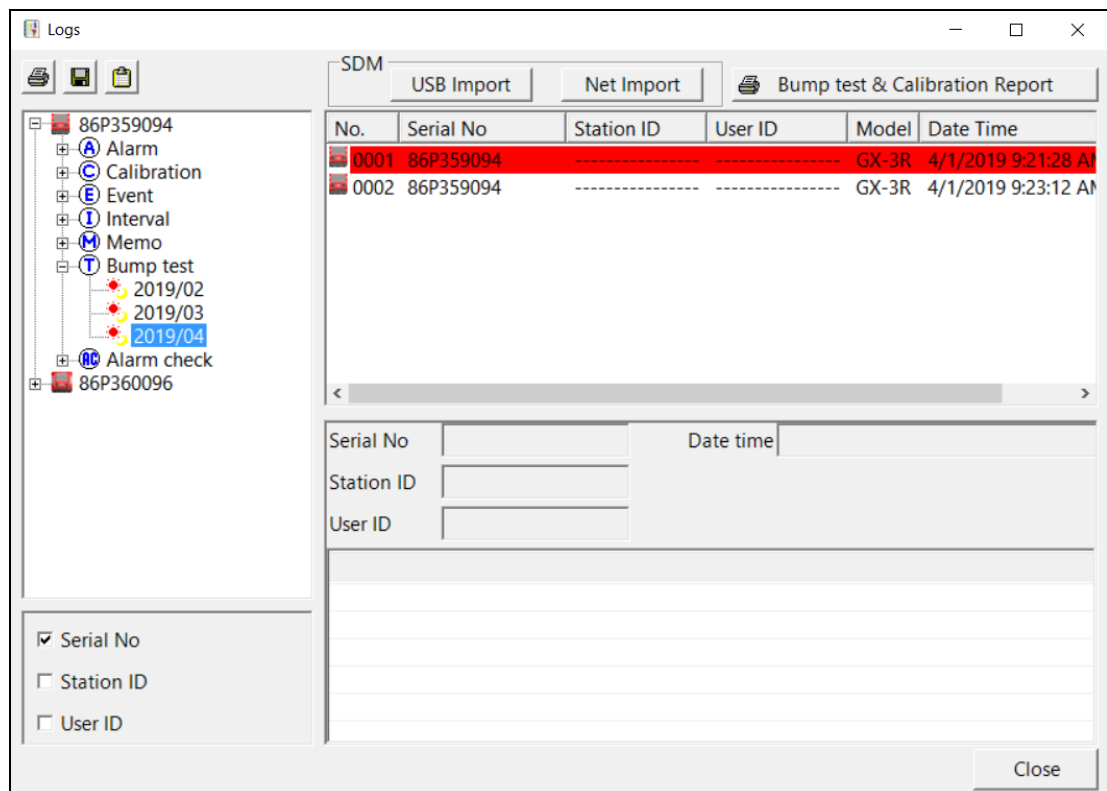


Figure 90: Viewing Bump Test Log Files

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

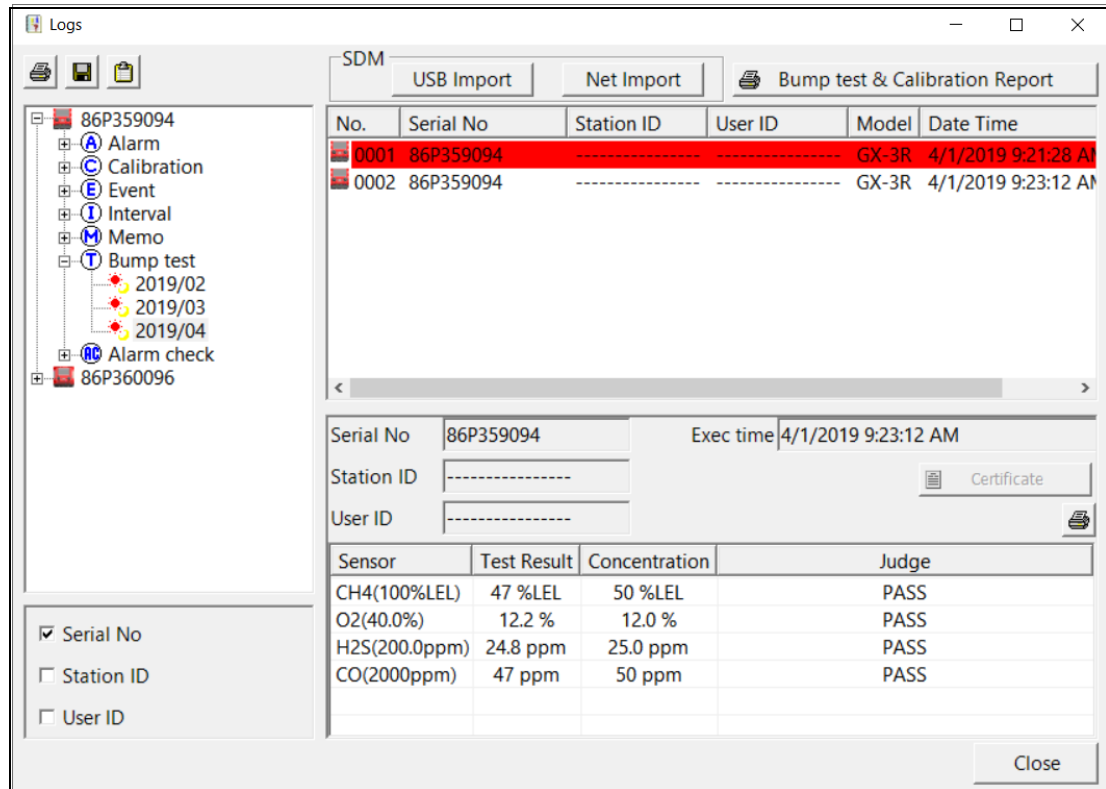


Figure 91: Viewing Bump Test Data

- Files that record a failed bump test on all channels are highlighted in red. Files that record a bump test where not all channels passed are highlighted in orange.
- Bump tests that required more than one calibration cylinder will have separate bump test files for each cylinder. For example, a bump test performed on a GX-3R (Pro) that contained the standard 4 sensors plus an IR CO₂ sensor would result in one bump test file for the standard 4 sensors if a 4-gas mix was used and one bump test file for the IR CO₂ sensor.

Printing Data

1. To print the bump test data (everything in the lower right frame of the screen) for a selected bump test file, click the **Print** control button located just above the bump test judge column.

The screenshot shows the 'Logs' window with the 'Bump test & Calibration Report' tab selected. A red arrow points to the 'Print' button (represented by a printer icon) located above the 'Judge' column in the bump test results table. Another red arrow points to the 'Print' button in the upper left corner of the Logs window. The printout on the right, titled '[Bump Test Log]', shows the following data:

Item	Value
Exec time	4/1/2019 9:23:12 AM
Serial No	86P359094
Station ID	.....
User ID	.....

Sensor	Test Result	Concentration	Judge
CH4(100%LEL)	47 %LEL	50 %LEL	PASS
O2(40.0%)	12.2 %	12.0 %	PASS
H2S(200.0ppm)	24.8 ppm	25.0 ppm	PASS
CO(2000ppm)	47 ppm	50 ppm	PASS

2. To print the basic bump test results from a date folder (everything in the upper right frame), be sure that the desired date folder is selected and click the **Print** control button in the upper left corner of the Logs window.

The screenshot shows the 'Logs' window with the 'Bump test & Calibration Report' tab selected. A red arrow points to the 'Print' button (represented by a printer icon) located in the upper left corner of the Logs window. Another red arrow points to the '2019/04' date folder in the left sidebar. The printout on the right, titled '86P359094 Bump test 2019/04', shows the following data:

No.	Serial No	Station ID	User ID	Model	Date Time	Judge
0001	86P359094	.....	.....	GX-3R	4/1/2019 9:21:28 AM	FAIL
0002	86P359094	.....	.....	GX-3R	4/1/2019 9:23:12 AM	PASS

3. To print detailed bump test data for each bump test file in a date folder, be sure that the desired date folder is selected and click the **Bump Test & Calibration Report** control button along the top of the Logs window.

The screenshot shows the 'Logs' window with the '2019/04' folder selected. The 'Bump test & Calibration Report' button is highlighted. A red arrow points from this button to a preview of the report for serial number 86P359094.

86P359094 Bump test 2019/04 4/3/2019 9:13:52 AM

Station ID	Serial No	Station ID	Model	Date	Auth	Sensor	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6
86P359094	0001	86P359094	GX-3R	4/1/2019 9:23:27 AM	PASS	Sensor	CH4(100%LEL)	CO(40.0%)	H2S(200.0ppm)	CO2(40.0%)	CO2(40.0%)	CO2(40.0%)
						Test Result	0.0 %	12.1 %	24.9 ppm	25.0 ppm	25.0 ppm	25.0 ppm
						Test Result	0.0 %	12.1 %	24.9 ppm	25.0 ppm	25.0 ppm	25.0 ppm

4. To print detailed calibration (if available) and bump test data for each calibration and bump test file for a specific serial number, be sure that the desired serial number is selected in the upper left frame and click the **Bump Test & Calibration Report** control button along the top of the Logs window.

The screenshot shows the 'Logs' window with the '86P360096' folder selected. The 'Bump test & Calibration Report' button is highlighted. A red arrow points from this button to a preview of the report for serial number 86P360096.

86P360096 Bump test & Calibration Report 4/19/2019 8:59:08 AM

Station ID	Serial No	Station ID	Model	Date	Auth	Sensor	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6
86P360096	0001	86P360096	GX-3R	4/19/2019 8:59:08 AM	PASS	Sensor	CH4(100%LEL)	CO(40.0%)	H2S(200.0ppm)	CO2(40.0%)	CO2(40.0%)	CO2(40.0%)
						Test Result	0.0 %	12.1 %	24.9 ppm	25.0 ppm	25.0 ppm	25.0 ppm
						Test Result	0.0 %	12.1 %	24.9 ppm	25.0 ppm	25.0 ppm	25.0 ppm

Saving Data

1. Be sure the desired date folder is highlighted
2. Click the **Save** control button in the upper left corner of the Logs window.
3. A "Save As" dialog box will appear for you to specify the file name and file location.
4. Specify the file name and location and click **Save**.





Copying Data

1. Be sure the desired date folder is selected.
2. Click the **Save to Clipboard** control button. The data will be saved to the clipboard.

3. Paste the data into a document using an application's Paste command.

Alarm Check Data

Alarm check data in the Logs window can come from 2 different sources. The icon next to each alarm check file indicates the file source.

Calibration Data Source	GX-3R Icon	GX-3R Pro Icon
Performing calibration using PC Program		
Importing data using the USB Import or Net Import buttons		

1. While in the **Logs** window, find your GX-3R (Pro) by serial number, then click the expanded view symbol (+) of or double-click the serial number folder to view the contents.
2. Click the expanded view symbol (+) of or double-click the **Alarm Check** folder to view the contents. Alarm check data folders are arranged by year/month.
3. Click the year/month folder you wish to view. All alarm check data files for that GX-3R (Pro) in that particular year/month will appear in the upper right frame.

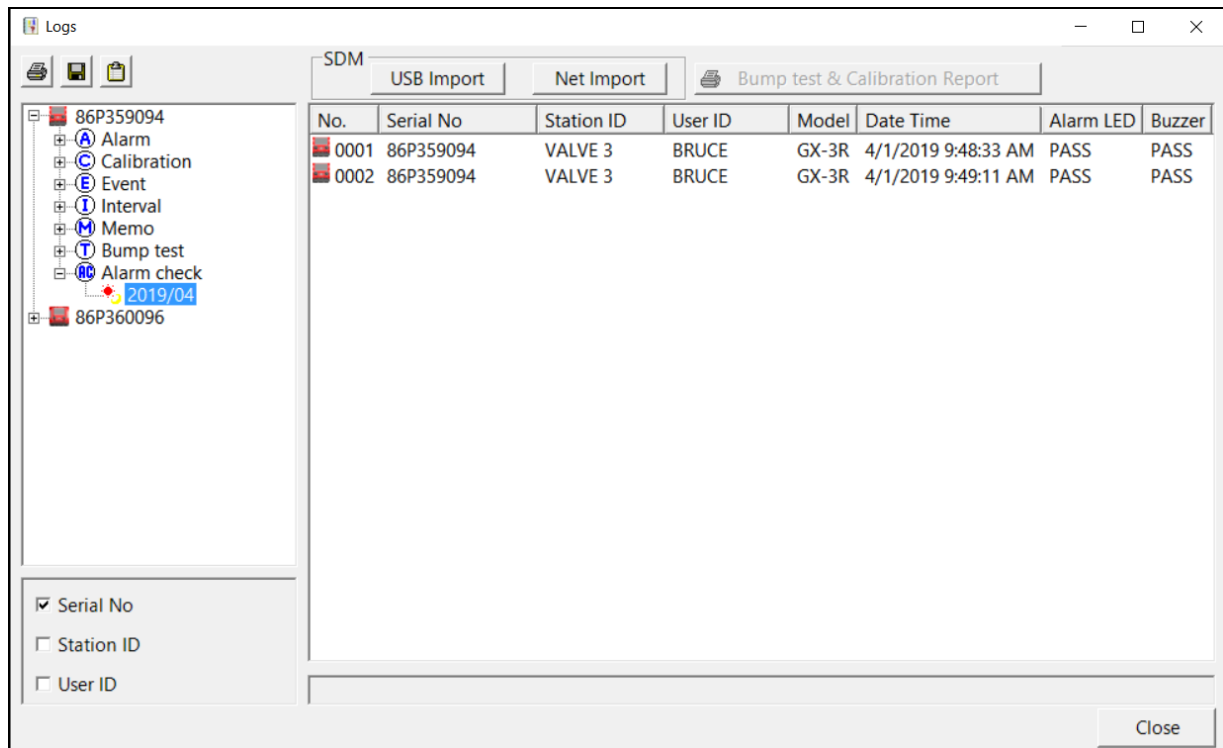


Figure 92: Viewing Alarm Check Log Files

4. Files that record a failed alarm check on all tests are highlighted in red. Files that record an alarm check where not all tests passed are highlighted in orange.

Printing Data

1. Be sure the desired date folder is selected
2. Click the **Print** control button in the upper left corner of the Logs window.

Saving Data

1. Be sure the desired date folder is highlighted.
2. Click the **Save** control button in the upper left corner of the Logs window.
3. A “Save As” dialog box will appear for you to specify the file name and file location.
4. Specify the file name and location and click **Save**. The file type will be “.csv” (comma separated values).

Copying Data

1. Be sure the desired date folder is selected.
2. Click the **Save to Clipboard** control button. The data will be saved to the clipboard.
3. Paste the data into a document using the application’s Paste command.

Deleting Data in the Logs Window

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

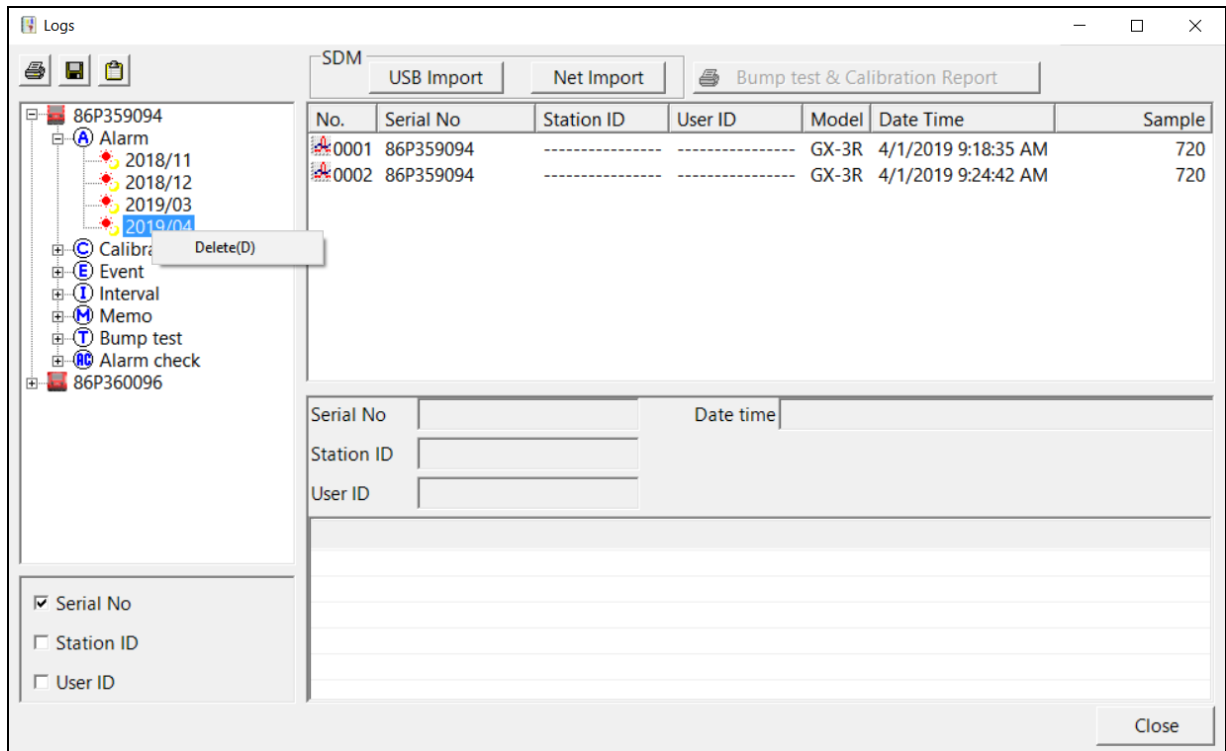


Figure 93: Deleting Data in the Logs Window

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

Chapter 10: Instrument Function Menu

Overview

When you are in the main program window, if you right click on a GX-3R (Pro) or a docking station, the Instrument Function Menu appears.

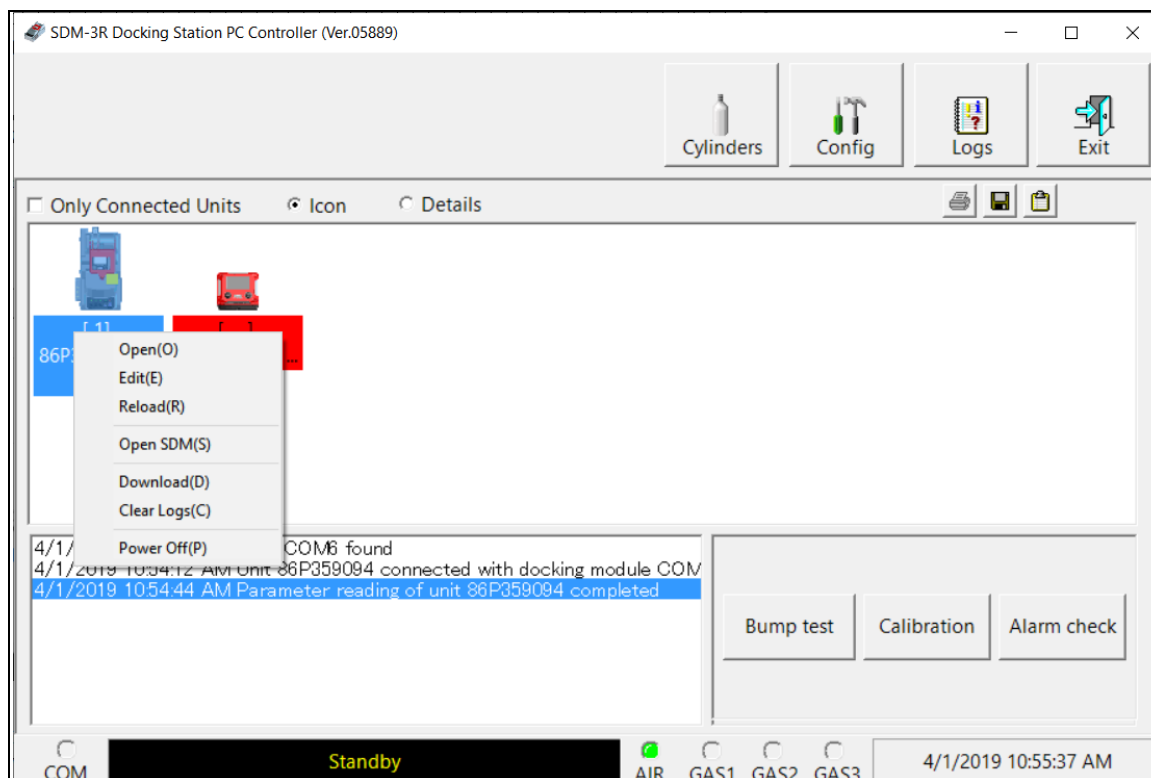


Figure 94: Instrument Function Menu

The items in the Instrument Function Menu are: **Open**, **Edit**, **Reload**, **Open SDM(S)**, **Download**, **Clear Logs**, and **Power Off**.

If you right click on a GX-3R (Pro) that is currently connected to a docking station, all items in the Instrument Function Menu are selectable as shown above in Figure 94:.

If you right click on a GX-3R (Pro) that is not currently connected to the PC Program but that has previously been connected, only the **Open** item is selectable. The other items will be grayed out.

If you right click on an SDM-3R that is connected to the PC Program but does not have a GX-3R (Pro) in it, only the **Open SDM(S)** item is selectable. The other items will be grayed out.

Open Function

The **Open** function brings up the Instrument Information window for viewing only. No changes can be made with the **Open** function. The Instrument Information Window consists of the Parameter Tab, the Sensor Tab, and the Station & User Tab. For further explanation of each tab, see “Chapter 7: Changing GX-3R (Pro) Parameters” on page 94.

86P360096

Serial No. 86P360096 Station ID DESK Date Time 4/4/2019 10:39:37 AM
Model GX-3R Pro User ID KIMBERLY Load Date 4/4/2019 10:39:36 AM

Parameter Sensor Station & User

Serial No. 86P360096
Station ID DESK
User ID KIMBERLY

Cal Interval(Day) 90
Interval Time(Sec) 300

Memo

Disp Mode User Mode 1 User Mode 2 Maintenance Mode

HC Gas List CH4(100%LEL) ☐ HC Long Energy

☐ Invert Select ☐ LCD Background

Buzzer Volume
☐ Low ☒ High

☒ Data Log Overwrite

(Left space 20) OK Cancel

Figure 95: Instrument Information Window, Parameter Tab

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

Edit Function

See “Chapter 7: Changing GX-3R (Pro) Parameters” on page 94 for instructions.

Reload Function

The **Reload** function reloads the GX-3R (Pro) parameters. This can be used to confirm that instrument changes made using the PC Program actually got saved to the instrument.

1. Right click a GX-3R (Pro) and select **Reload(R)** when the pull down menu appears.
2. A confirmation box appears. Click **OK** to proceed with the reload operation.

Download Logs Function

The Download function downloads all logged data from the GX-3R (Pro) to the PC Program.

1. Right click a GX-3R (Pro) and select **Download(D)** when the pull down menu appears.
2. A confirmation box appears. Click the **OK** button to proceed with the data download. A data download will take approximately 2 minutes to complete.

NOTE: Downloaded data is saved to the PC Program's database and is not saved to the SDM-3R.

Clear Logs Function

The Clear Logs function clears all logged data from a GX-3R (Pro).

1. Right click a GX-3R (Pro) and select **Clear Logs(C)** when the pull down menu appears.
2. A confirmation box appears. Click the **OK** button to proceed with clearing all the data from the GX-3R (Pro).
3. The message window will indicate that the data is being cleared. When the data has been cleared, the message window will indicate this.

Power Off Function

The Power Off function turns off the selected GX-3R (Pro).

1. Right click a GX-3R (Pro) and select **Power Off(P)** when the pull down menu appears.
2. A confirmation box appears. Click **OK** to turn off the selected GX-3R (Pro).

Chapter 11: Spare Parts List

Table 9: Spare Parts List

Part Number	Description
06-1248RK	Polyurethane tubing, 5/16-inch OD x 3/16-inch ID, for connecting to inlet fittings
06-1248RK-03	3 foot length of 5/16-inch OD x 3/16-inch ID, for connecting calibration cylinder to inlet fittings
06-1254RK	Polyurethane tubing, 7/16-inch OD x 5/16-inch ID, for exhaust tube, 15 feet maximum
06-1254RK-10	10 foot length of 7/16-inch OD x 5/16-inch ID, for exhaust tube
10-1119	Screw, M3 x 12 mm, for securing charging jack to the SDM-3R
10-1233-06	Screw, M4 x 8 mm, for connection brackets, wall mounting brackets, and/or panel on right side of SDM-3R
14-0401	Wall mounting brackets, set of 3, with screws
14-0401-02	Wall mounting brackets, set of 2, with screws
14-0402	Connection brackets, set of 2, with screws, for connecting SDM-3Rs together
16-0611RK	T-fitting for exhaust manifold
17-4710	Sample fitting plugs
21-1959	Panel cover for right side of SDM-3R
32-0504RK	Check valve for exhaust fitting (when manifolded)
33-0167RK	Particle air filter replacement, CF-8369
33-6015RK	CO ₂ scrubber, for zeroing CO ₂ sensor
47-5073RK	USB cable, Type A to Type B, for connecting to a computer
47-5088	Ethernet cable, black, 5 ft.
49-0133	Single-station AC adapter
71-0487	Operator's Manual, SDM-3R Docking Station Standalone Configuration
71-0488	Operator's Manual, SDM-3R Docking Station PC Controlled Configuration (this document)
81-0000RK-51	Calibration cylinder, 200 ppm H ₂ in air, 34 liter steel
81-0012RK-01	Calibration cylinder, 50% LEL CH ₄ in air, 34 liter steel
81-0012RK-03	Calibration cylinder, 50% LEL CH ₄ in air, 103 liter
81-0018RK-01	Calibration cylinder, 50% LEL isobutane in air, 34 liter steel

Table 9: Spare Parts List

Part Number	Description
81-0018RK-03	Calibration cylinder, 50% LEL isobutane in air, 103 liter
81-0071RK-01	Calibration cylinder, 5,000 ppm CO ₂ in nitrogen, 34 liter steel
81-0071RK-03	Calibration cylinder, 5,000 ppm CO ₂ in nitrogen, 103 liter
81-0072RK-01	Calibration cylinder, 2.5 %vol CO ₂ in nitrogen, 34 liter steel
81-0072RK-03	Calibration cylinder, 2.5 %vol CO ₂ in nitrogen, 103 liter
81-0076RK	Calibration cylinder, 17 liter
81-0076RK-01	Calibration cylinder, zero air, 34 liter steel
81-0076RK-03	Calibration cylinder, zero air, 103 liter
81-0078RK-01	Calibration cylinder, 100% N ₂ , 34 liter steel
81-0078RK-03	Calibration cylinder, 100% N ₂ , 103 liter
81-0090RK-01	Calibration cylinder, 3-gas (50% LEL CH ₄ /12% O ₂ /50 ppm CO), 34 liter steel
81-0090RK-03	Calibration cylinder, 3-gas (50% LEL CH ₄ /12% O ₂ /50 ppm CO), 103 liter
81-0142RK-02	Calibration cylinder, 5-gas (50% LEL CH ₄ /12% O ₂ /25 ppm H ₂ S/50 ppm CO/5 ppm SO ₂) in nitrogen, 58 liter
81-0142RK-04	Calibration cylinder, 5-gas (50% LEL CH ₄ /12% O ₂ /25 ppm H ₂ S/50 ppm CO/5 ppm SO ₂) in nitrogen, 34 liter aluminum
81-0154RK-02	Calibration cylinder, 4-gas (50% LEL CH ₄ /12% O ₂ /50 ppm CO/25 ppm H ₂ S), 58 liter
81-0154RK-04	Calibration cylinder, 4-gas (50% LEL CH ₄ /12% O ₂ /50 ppm CO/25 ppm H ₂ S), 34 liter aluminum
81-0158RK-02	Calibration cylinder, 4-gas (50% LEL Isobutane/12% O ₂ /50 ppm CO/25 ppm H ₂ S), 58 liter
81-0158RK-04	Calibration cylinder, 4-gas (50% LEL Isobutane/12% O ₂ /50 ppm CO/25 ppm H ₂ S), 34 liter aluminum
81-0170RK-02	Calibration cylinder, 5 ppm SO ₂ in nitrogen, 58 liter
81-0170RK-04	Calibration cylinder, 5 ppm SO ₂ in nitrogen, 34 liter aluminum
81-0176RK-02	Calibration cylinder, 25 ppm NH ₃ in nitrogen, 58 liter
81-0176RK-04	Calibration cylinder, 25 ppm NH ₃ in nitrogen, 34 liter aluminum
81-0180RK-02	Calibration cylinder, 10 ppm NO ₂ in nitrogen, 58 liter
81-0180RK-04	Calibration cylinder, 10 ppm NO ₂ in nitrogen, 34 liter aluminum

Table 9: Spare Parts List

Part Number	Description
81-0186RK-02	Calibration cylinder, 5 ppm PH ₃ in nitrogen, 58 liter
81-0196RK-02	Calibration cylinder, 10 ppm HCN in nitrogen, 58 liter
81-0196RK-04	Calibration cylinder, 10 ppm HCN in nitrogen, 34 liter aluminum
81-1054RK	Regulator, demand-flow type, for Cl ₂ , HCN, and NH ₃ in 34-liter aluminum, 58-liter, and 103-liter calibration cylinders (cylinders with internal threads)
81-1054RK-H2S	Regulator, demand-flow type, for CO, CO ₂ , H ₂ S, N ₂ , NO ₂ , PH ₃ , SO ₂ , zero air, and LEL combustible gases in 34-liter aluminum, 58-liter, and 103-liter calibration cylinders (cylinders with internal threads)
81-1055RK	Regulator, demand-flow type, for all gases in 17- and 34-liter steel cylinders (cylinders with external threads)
81-1500RK	Cylinder holder for 58 liter calibration cylinder
81-1501RK	Cylinder holder for 103 liter calibration cylinder
81-1502RK	Cylinder holder for 34 liter calibration cylinder
81-SDM3R100	Docking station for GX-3R (Pro), 1 solenoid, includes docking station, single-station AC adapter, air filter, exhaust tube
81-SDM3R101	Docking station for GX-3R (Pro), 1 solenoid, includes docking station, single-station AC adapter, air filter, exhaust tubing, USB cable, Ethernet cable, and USB drive
81-SDM3R201	Docking station for GX-3R (Pro), 2 solenoids, includes docking station, single-station AC adapter, air filter, exhaust tubing, USB cable, Ethernet cable, and USB drive
81-SDM3R301	Docking station for GX-3R (Pro), 3 solenoids, includes docking station, single-station AC adapter, air filter, exhaust tubing, USB cable, Ethernet cable, and USB drive
81-6105RK	USB drive
82-6050RK	4-port USB hub
82-6051RK	7-port USB hub