



Computer Interface for Multi-Sensor Instruments

Introduction to ProRAE Suite

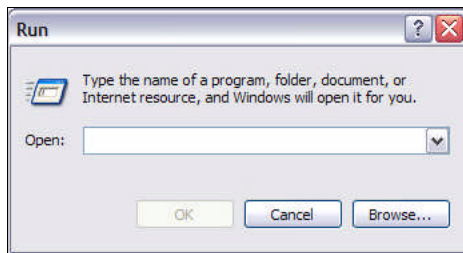
The ProRAE Suite software package and a computer serial cable are included with each Rae Systems multi-sensor instrument that has the datalog option. **Note:** The datalog option is not required to use ProRAE Suite to change instrument configuration data.

ProRAE Suite is compatible with Microsoft® Windows® 95, 98, ME, 2000, NT, XP and later environments. It allows the user to configure the instrument through a user-friendly interface and send the configuration data from the PC to the instrument. Collected data can also be extracted from the instrument to the PC in order to perform data analysis, report generation or record keeping. Installation and operation of ProRAE Suite is described in the following sections.

1. Installing ProRAE Suite Software

ProRAE Suite is available on 3.5" setup disks or a CD; the software can also be downloaded from the website www.raesystems.com. **To install** ProRAE Suite from a disk or CD:

- Insert the first setup disk into the floppy drive.
- Click **Start → Run...**
- Type **A:\Setup.exe** in the **Open:** field, using the corresponding floppy or CD drive:

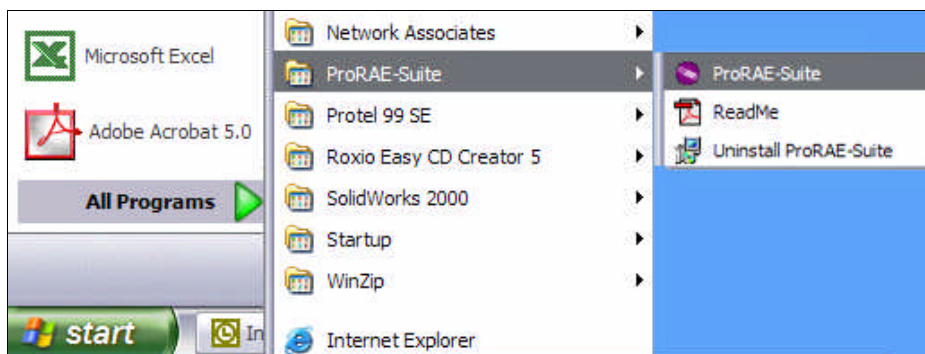


- Press **Enter** or click **OK** on the Run dialog box to start the setup process.
- If the user chooses the default settings in each step of the setup process, then ProRAE Suite will be installed under the default directory: **C:\Program Files\RAE Systems Inc\ProRAE Suite**
- After the software is successfully installed, ProRAE Suite will appear as a new menu item in the Programs menu.

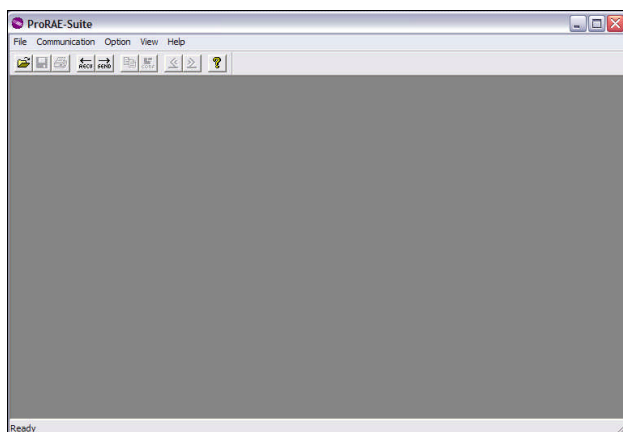
2. Starting ProRAE Suite Software

To start ProRAE Suite:

- Click **Start → Programs → ProRAE Suite**
- There are two submenu items **ProRAE Suite** and **ReadMe**:



Click **ProRAE Suite** to start the program, and the ProRAE Suite main window will appear:



There is a tool bar beneath the menu bar that contains frequently used functions represented by small icons. For example, the **Receive Data...** function in the **Communication** submenu is represented by the **RECV** button. When the cursor passes over each icon, a short description of its function will appear in the text bar at the bottom of the ProRAE Suite main window.

3. Connecting Instrument to PC

During the communication session, the PC will directly control the instrument via serial connection. There is no need to press any keys on the instrument during the communication session. The instrument is supplied with a serial interface cable.

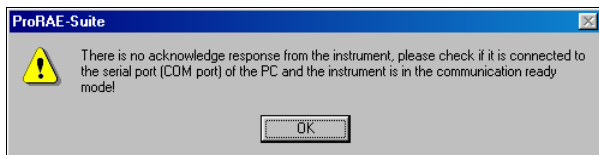
- Insert the **DB-9 connector** end of the cable to the **serial port** of the PC.

Note: Do not connect to the parallel port of the PC by mistake. The parallel port is usually a 25-pin female D connector on the back of the PC; the serial port is usually a 25-pin or 9-pin male D connector. If the serial port on the PC is a 25-pin connector, use a 25-pin to 9-pin adapter.

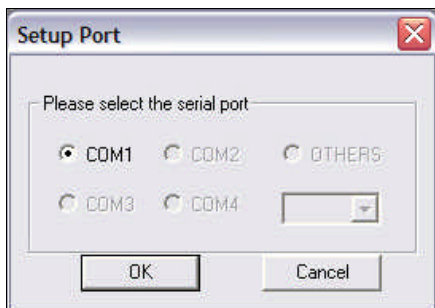
- Insert the other end of the cable to the instrument.
- Turn the instrument on.
- Press **[MODE]** on the instrument several times until **"PC comm?"** appears.
- Press **[Y/+]** and **"Pause instrument, OK?"** will appear.
- Press **[Y/+]** to confirm and **"Comm..."** will appear to indicate the instrument is ready and waiting to communicate with the PC.

4. Setting up Communication Port

Note: In most PC's, there are two serial ports. Make sure the serial port selected in **Setup Port** matches the actual serial port connected to the instrument. If the incorrect serial port is selected, the following error message will appear if a user tries to communicate between the PC and the instrument:



It is necessary to set up the communication port on ProRAE Suite so the instrument can communicate with the PC correctly. ProRAE Suite is capable of supporting up to 255 communication ports. Choose the appropriate port according to the PC's serial port setup. If choosing a port that is greater than 4, select **OTHERS**, then select the corresponding number in the pull-down menu:



Configuration Data (.cfg)

Configuration data are the customized settings for the instrument. The user may edit, save, send and receive configuration data to the instrument via PC connection.

1. Receive Configuration Data

Configuration data may be acquired from two different sources:

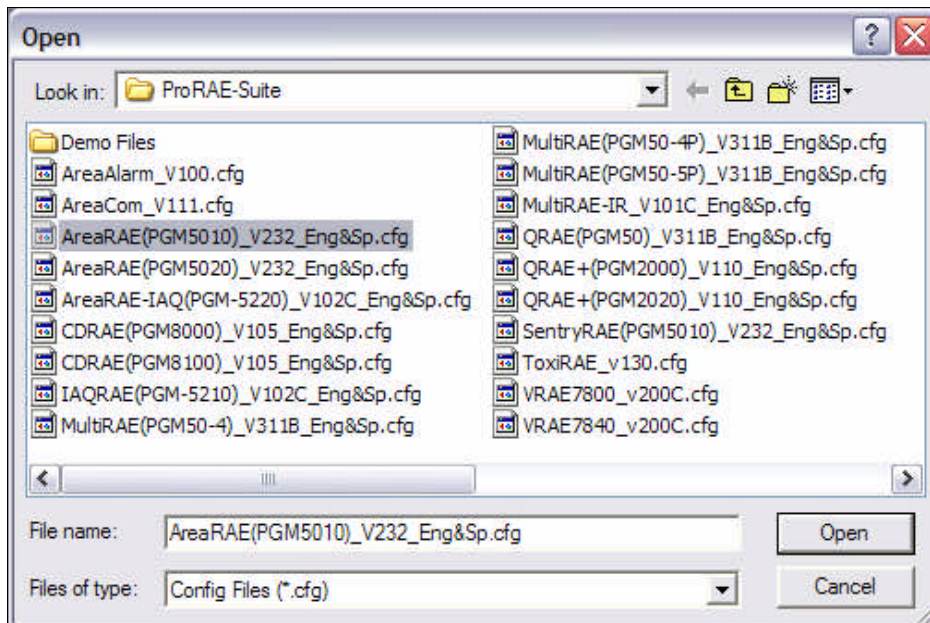
- Downloading data from the instrument to the PC or
- Opening a previously saved data file

To download and review a configuration data from the instrument:

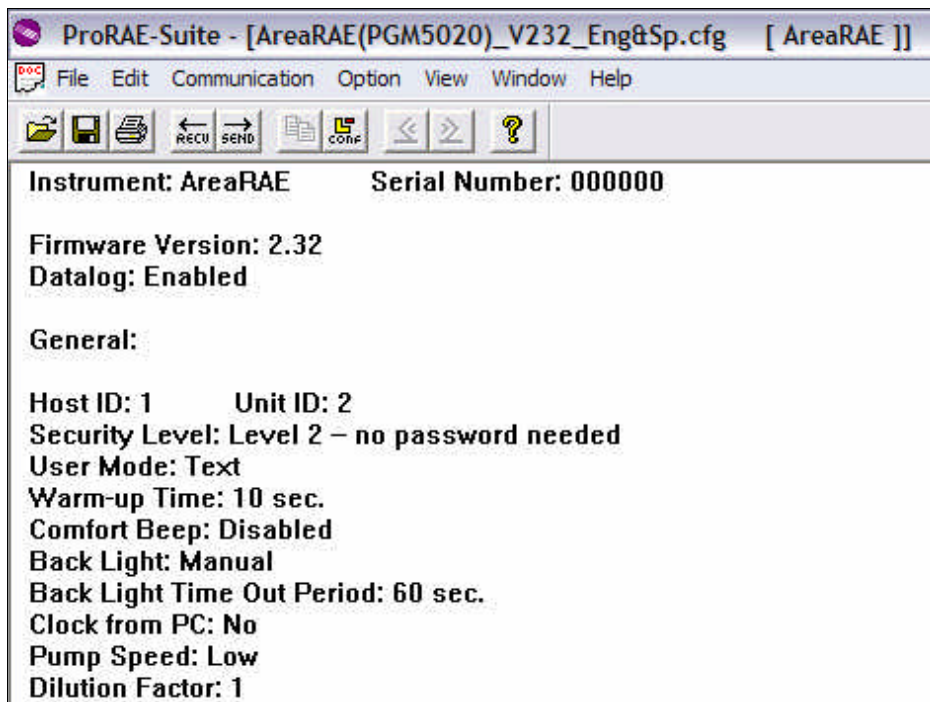
- Select **Communication → Receive Configuration...** from the main menu of ProRAE Suite.
- Click **OK** if the instrument is connected to the communication port and is ready to operate.

To open a previously saved data file:

- Select **Open from the File...** from the main menu and a dialog box will appear.
- Select **Config Files (*.cfg)** from the **Files of type** pull-down menu:



- There should be one or more data files listed. Each data file has a **.cfg** file extension. There is a generic data file included with ProRAE Suite: **Default_<multi-sensor instrument name>_V####.cfg** i.e. **Default_AreaRAE(PGM5010)_V232_Eng&Sp.cfg** means this file is for an AreaRAE(PGM5010) instrument that has Version 2.00 firmware.
- Choose a data file by highlighting the file name and click **Open** or press **Enter**.
- Once the file is open, the configuration data is displayed:

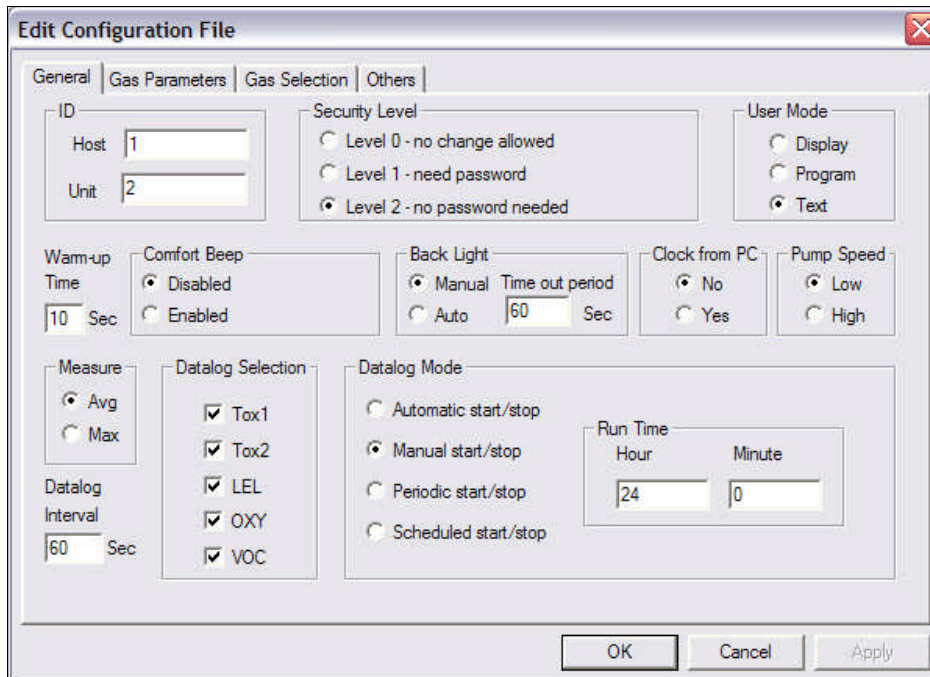


2. Editing Configuration Data

To edit the opened configuration data:

- Click **Edit** → **Configuration** to open the **Edit Configuration File** dialog box. There are three tabs of settings:

General



- ID:** sets the eight-character **Host** and **Unit** identification that is used during the datalog process.
- Security Level:** use any of the three security levels to provide protection against unauthorized changes to the instrument settings for the programming mode.
 - Level 0 – no change allowed:** the user may enter the programming mode without a password, but cannot make changes to alarm limits, the real-time clock, correction factors, user/site id's, etc. (User can still perform calibrations.)
 - Level 1 – need password:** requires a four-digit password to enter the programming mode.
 - Level 2 – no password needed:** the user may enter the programming mode without a password, and the user has full access to change settings; changes to settings are saved.
- User Mode:** All user modes allow the user to view the readings during normal operation and to enter programming mode to calibrate the instrument. **Program Mode** allows the user to enter programming mode to change instrument settings. **Display Mode** does not allow the user to change instrument settings after entering programming mode. **Text Mode** only provides limited screen displays in normal operation and during programming mode.
- Warm-up Time:** set the warm-up time, in seconds, for the instrument.
- Comfort Beep:** enabled comfort beep reminds user at specified time intervals that instrument is on.
- Back Light:** to manually turn the backlight on/off, select **Manual**; user may also enter a **Time out Period** to indicate when the back light should automatically turn off after a certain

period. To automatically let the instrument turn the backlight on/off, select **Auto**; the built-in sensor will detect dim/bright lighting conditions.

- **Clock from PC:** to download the clock from the PC to the instrument, select **Yes**; user avoids manually setting the clock on the instrument.
- **Pump Speed:** choose **Low** or **High** to set the pump flow rate.
- **Measure:** choose to record the **Avg** (average) or **Max** (maximum or peak) reading of all the sensors for each datalog period.
- **Datalog Interval:** the datalog interval is the rate in which data samples are recorded and determines how often a new sample is calculated and stored to the data log.
- **Datalog Selection:** select sensor(s) for data logging purposes. **NOTE:** This does not activate or deactivate a sensor's readings, except for the purpose of datalog recording.
- **Datalog Mode:**

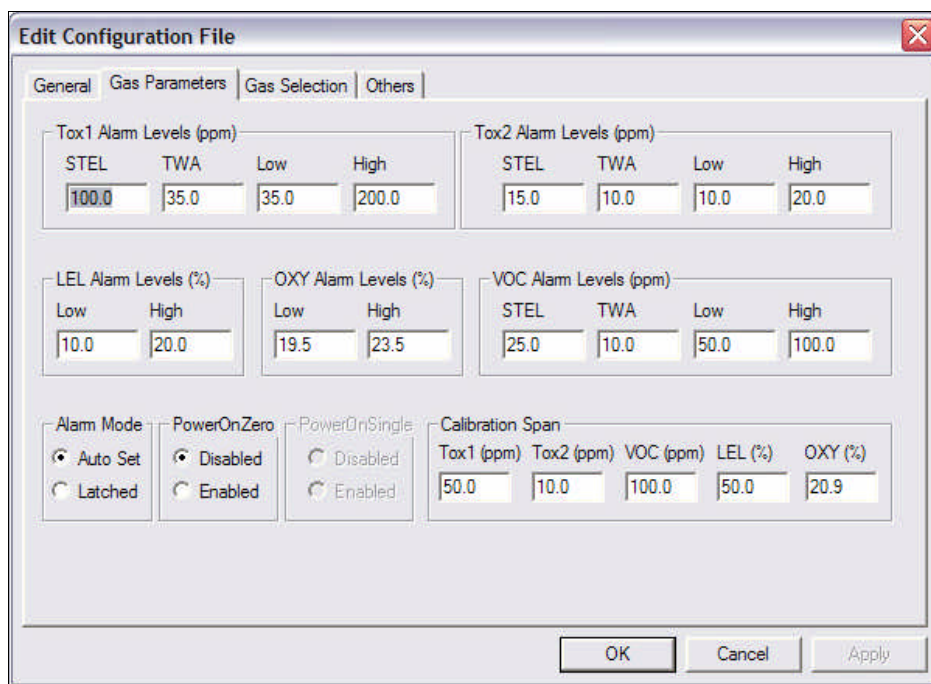
Select **Automatic start/stop** to begin and end data logging when the instrument is turned on and off; data logging will also end when the instrument is in PC Communication mode or Programming mode.

Select **Manual start/stop** to begin data logging with a series of key presses while in normal operation. Specify maximum **Run Time**, which determines an automatic end to the datalog or it can be stopped manually; data logging will automatically turn off after the instrument has been on for the specified run time.

Select **Periodic start/stop** to specify the start/stop hour and minute for each day; the interval between the start and stop time is when the instrument will datalog.

With the instrument turned on, select **Scheduled start/stop** to set an annual datalog start/stop time by specifying the year, month, day, hour, and minute. The instrument will automatically stop data logging once the scheduled time is reached.

Gas Parameters



Edit Configuration File

General | **Gas Parameters** | Gas Selection | Others

Tox1 Alarm Levels (ppm)				Tox2 Alarm Levels (ppm)			
STEL	TWA	Low	High	STEL	TWA	Low	High
100.0	35.0	35.0	200.0	15.0	10.0	10.0	20.0

LEL Alarm Levels (%)		OXY Alarm Levels (%)		VOC Alarm Levels (ppm)			
Low	High	Low	High	STEL	TWA	Low	High
10.0	20.0	19.5	23.5	25.0	10.0	50.0	100.0

Alarm Mode: ☒ Auto Set ☐ Latched

PowerOnZero: ☒ Disabled ☐ Enabled

PowerOnSingle: ☐ Disabled ☐ Enabled

Calibration Span:

Tox1 (ppm)	Tox2 (ppm)	VOC (ppm)	LEL (%)	OXY (%)
50.0	10.0	100.0	50.0	20.9

OK Cancel Apply

- **Alarm Levels:**

Tox1 – toxic sensor 1

Tox2 – toxic sensor 2

LEL – Low Explosive Limit

OXY – Oxygen (O₂)

VOC – Volatile Organic Compound

STEL – Short Term Exposure Level

TWA – Time Weighted Average

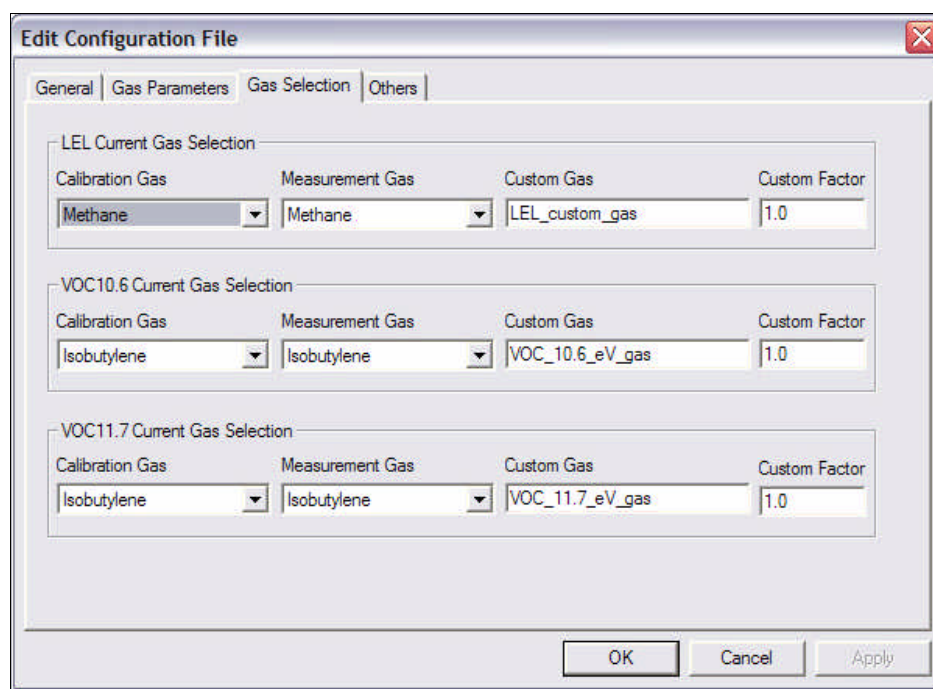
Low – Low Alarm Level

High – High Alarm Level

ppm – parts per million

- **Alarm Mode:** select **Auto Set** to stop the alarm when the alarm condition is removed; select **Latched** to manually turn the alarm off by pressing **[Y/+]** when an alarm condition is present.
- **Power-On Zero:** select **Enabled** and the instrument will automatically perform a fresh air calibration when the instrument is turned on. NOTE: make sure the monitor is in a fresh air environment when this option is enabled.
- **Power-On Single:** select **Enabled** and the instrument will automatically perform a single sensor calibration when the instrument is turned on.
- **Calibration Span:** specify the span value of the calibration gas used by the Tox1, Tox2, VOC, LEL, OXY sensors.

Gas Selection



- **LEL, VOC10.6, and VOC11.7 Current Gas Selection:** The photo-ionization detector (PID) sensor uses either a 10.6 eV or 11.7 eV lamp and measures VOCs. The user may choose a set of gases and a correction factor (for the custom gas) for the PID and LEL sensors.

Calibration Gas: a pull-down menu with a list of 20-40 gas names. The calibration gas is the gas the instrument is calibrated with.

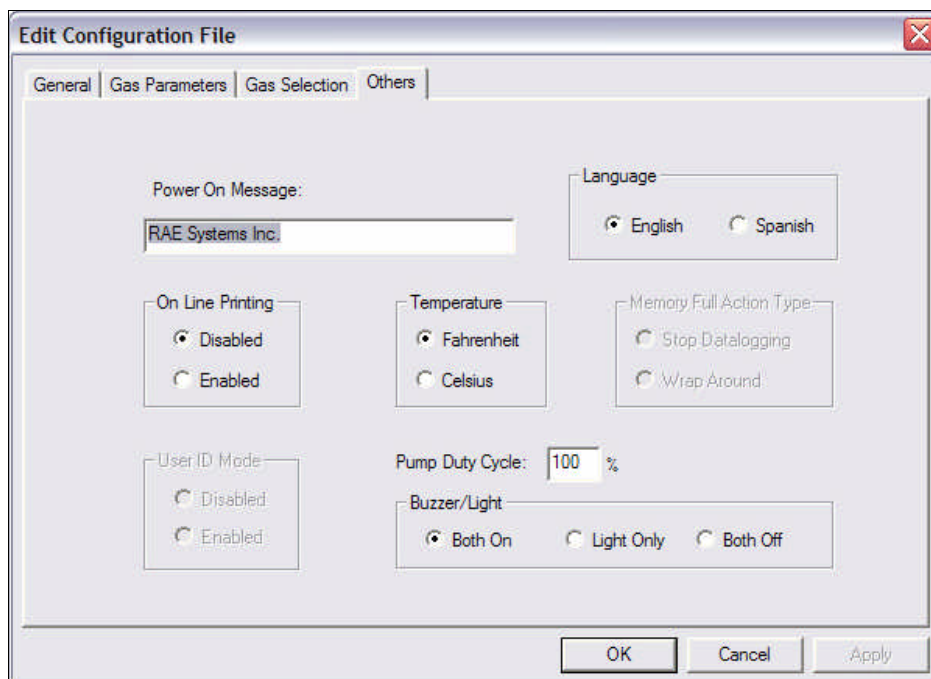
Measurement Gas: a pull-down menu with a list of 20-40 gas names. The measurement gas is the gas the instrument is going to measure.

Custom Gas: the user may enter a custom gas name of their choosing; the field can hold up to 16-characters.

Custom Factor: Enter a correction factor for the Custom Gas. (Refer to Technical Note 106 for more information on correction factors.)

- **To save** the new gas selection settings, click **OK** and the **Edit Configuration File** dialog box will close. Screen will return to the main window.
- **To abort** the changes, click **Cancel**.

Others



The screenshot shows the 'Edit Configuration File' dialog box with the 'Others' tab selected. The dialog has four tabs: 'General', 'Gas Parameters', 'Gas Selection', and 'Others'. The 'Others' tab contains the following settings:

- Power On Message:** A text field containing 'RAE Systems Inc.'
- Language:** Radio buttons for 'English' (selected) and 'Spanish'.
- On Line Printing:** Radio buttons for 'Disabled' (selected) and 'Enabled'.
- Temperature:** Radio buttons for 'Fahrenheit' (selected) and 'Celsius'.
- Memory Full Action Type:** Radio buttons for 'Stop Datalogging' and 'Wrap Around'.
- User ID Mode:** Radio buttons for 'Disabled' (selected) and 'Enabled'.
- Pump Duty Cycle:** A numeric field set to '100' with a '%' symbol.
- Buzzer/Light:** Radio buttons for 'Both On' (selected), 'Light Only', and 'Both Off'.

At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Apply'.

- **Power On Message:** The user may enter a customized message which will appear when the instrument powers on.
- **Language:** the user may choose English or Spanish language settings.
- **On Line Printing:** enabled or disabled
- **Temperature:** may be displayed in either Fahrenheit or Celsius units of measurement
- **Memory Full Action Type:** Stop Datalogging or Wrap Around
- **User ID Mode:** Disabled or Enabled
- **Pump Duty Cycle:** The user may change the Pump Duty Cycle.
- **Buzzer/Light:** Both On, Light Only, Both Off
- **To save** the new configuration data settings, click **OK** and the **Edit Configuration File** dialog box will close. Screen will return to the main window.
- **To abort** the configuration changes, click **Cancel**.

3. Sending Configuration Data to the Instrument

To send configuration data to the instrument:

- Click **Communication** → **Send Config**.

- A message box will appear to remind the user to connect the instrument to the PC via serial port.
- Once the instrument is connected to the PC, click **OK** to start the data transfer.
- After the configuration data is successfully sent, a message box will indicate the process is complete.
- Click **OK** to close the message box.
- If the communication is unsuccessful, an error message will indicate there is no response from the instrument. Check the serial cable to make sure the connectors on both ends are properly inserted. Make sure the communication port is set up correctly. Also check to make sure the instrument is ready to communicate. Try sending the configuration file again. If the error message appears after repeated attempts, call an authorized service center.

4. Saving Configuration Data

To save the configuration data to a file for future use:

- Click **File → Save** or **File → Save As**.
- Once the data file is saved, it can be opened at a later time for further modification or be sent to the instrument.

Reconfiguring All Settings

WARNINGS: The option to reconfigure all calibration data (**Config All**) will permanently erase all the calibration data in the instrument. When all the instrument settings are reconfigured, the user needs to recalibrate and reset all configuration settings to their customized needs. This option is recommended for unrecoverable configuration data or a malfunctioning instrument, however, **use sparingly**.

After all settings are reconfigured, the following instrument parameters must be manually adjusted by the user. If the user is unsure of how to do this, call an authorized service center for technical assistance):

1. **Lamp Fail Threshold:** the lamp raw count ready minus 10; access via Diagnostic Mode.
2. **Pump Stall Value (PStall):** access via Diagnostic Mode. **PStall = Pnormal – (Pblock – Pnormal)**, where Pnormal is the pump raw count reading during normal operation, Pblock is the pump raw count reading when the instrument gas inlet is blocked by the users thumb.
3. **Unit ID:** for wireless products only; adjust in programming mode or edit through ProRAE Suite.

A user may update most of the configuration settings in the instrument (except the instrument ID, serial number, datalog option, and net ID). **To configure** the settings in the instrument:

- Click **Option → Config All** and a message box will appear to remind the user to connect the instrument to the PC via serial port.
- Once the instrument is connected to the PC, click **OK** and another message box will warn the user that configuring all settings will erase the current settings in the instrument.
- To proceed, click **OK** and the instrument will start restoring its default operational settings.
- To abort, click **Cancel**.
- After the information is successfully sent, a message box will indicate the process is complete.
- Click **OK** to close the message box.

Logged Data (.dat)

Logged data are the event measurements taken in the field. The user may view logged data in either text or graph mode. Recorded measurements include each data point during the sampling period, the STEL, TWA, AVG values and a summary of the minimum, average, and maximum readings.

1. Receiving Logged Data

To receive logged data from the instrument:

- Click **Communication → Receive Data**, and a message box will remind the user to connect the instrument to the PC via serial port.
- Once the instrument is connected to the PC, click **OK** to start the data transfer.
- After the transfer is complete, another window will open with the newly received logged data.
- To save the logged data to a file for future use, click **File → Save** or **File → Save As**.

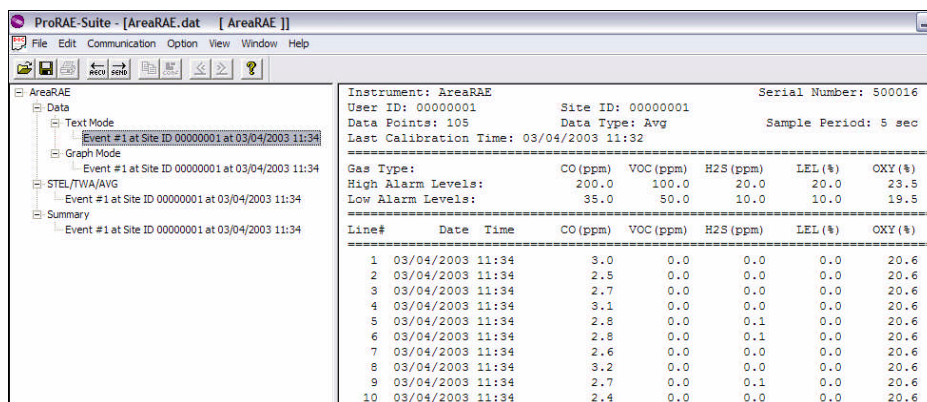
2. Viewing Logged Data

Once the user opens a data file (.dat) or receives the logged data from the instrument, a two-pane data window appears. The left pane is a tree of the types of displays for each event; the right pane displays the details of the event. The user may also adjust the pane sizes by dragging the splitter.

Text Mode

To view the data points of a specific event:

- Click the event number under **Text Mode**, and the data will appear in the right pane.
- To view the next event or the previous event, click the **Next Event** button (double right arrow) or the **Previous Event** button (double left arrow):



ProRAE Suite - [AreaRAE.dat] [AreaRAE]

File Edit Communication Option View Window Help

AreaRAE

- Data
 - Text Mode
 - Event #1 at Site ID 00000001 at 03/04/2003 11:34
 - Graph Mode
 - Event #1 at Site ID 00000001 at 03/04/2003 11:34
 - STEL/TWA/AVG
 - Event #1 at Site ID 00000001 at 03/04/2003 11:34
 - Summary
 - Event #1 at Site ID 00000001 at 03/04/2003 11:34

Instrument: AreaRAE Serial Number: 500016
 User ID: 00000001 Site ID: 00000001
 Data Points: 105 Data Type: Avg Sample Period: 5 sec
 Last Calibration Time: 03/04/2003 11:32

Gas Type: CO (ppm) VOC (ppm) H2S (ppm) LEL (%) OXY (%)

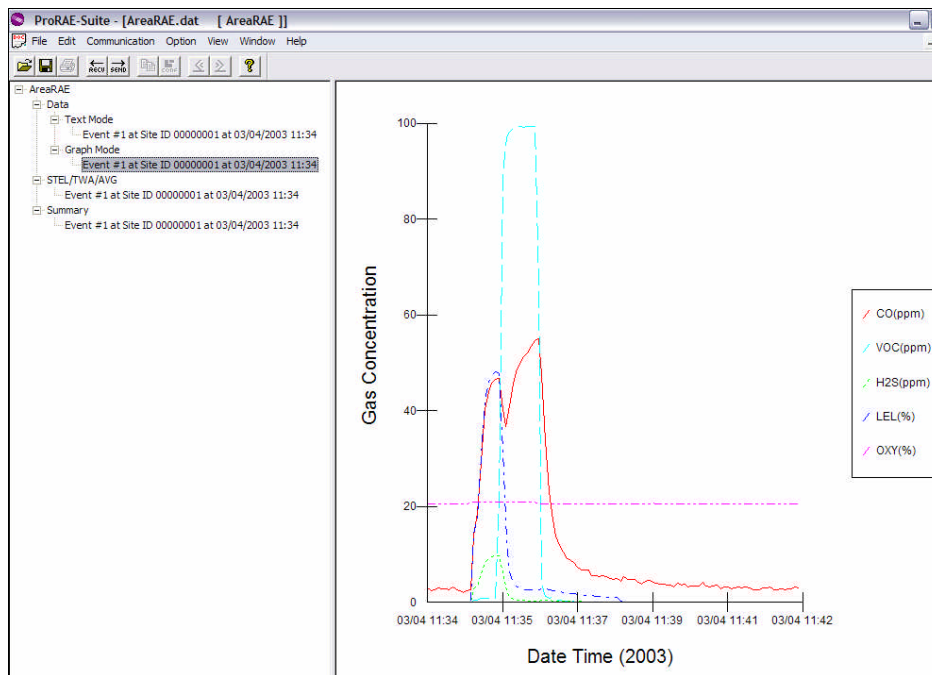
High Alarm Levels: 200.0 100.0 20.0 20.0 23.5
 Low Alarm Levels: 35.0 50.0 10.0 10.0 19.5

Line#	Date	Time	CO (ppm)	VOC (ppm)	H2S (ppm)	LEL (%)	OXY (%)
1	03/04/2003	11:34	3.0	0.0	0.0	0.0	20.6
2	03/04/2003	11:34	2.5	0.0	0.0	0.0	20.6
3	03/04/2003	11:34	2.7	0.0	0.0	0.0	20.6
4	03/04/2003	11:34	3.1	0.0	0.0	0.0	20.6
5	03/04/2003	11:34	2.8	0.0	0.1	0.0	20.6
6	03/04/2003	11:34	2.8	0.0	0.1	0.0	20.6
7	03/04/2003	11:34	2.6	0.0	0.0	0.0	20.6
8	03/04/2003	11:34	3.2	0.0	0.0	0.0	20.6
9	03/04/2003	11:34	2.7	0.0	0.1	0.0	20.6
10	03/04/2003	11:34	2.4	0.0	0.0	0.0	20.6

Graph Mode

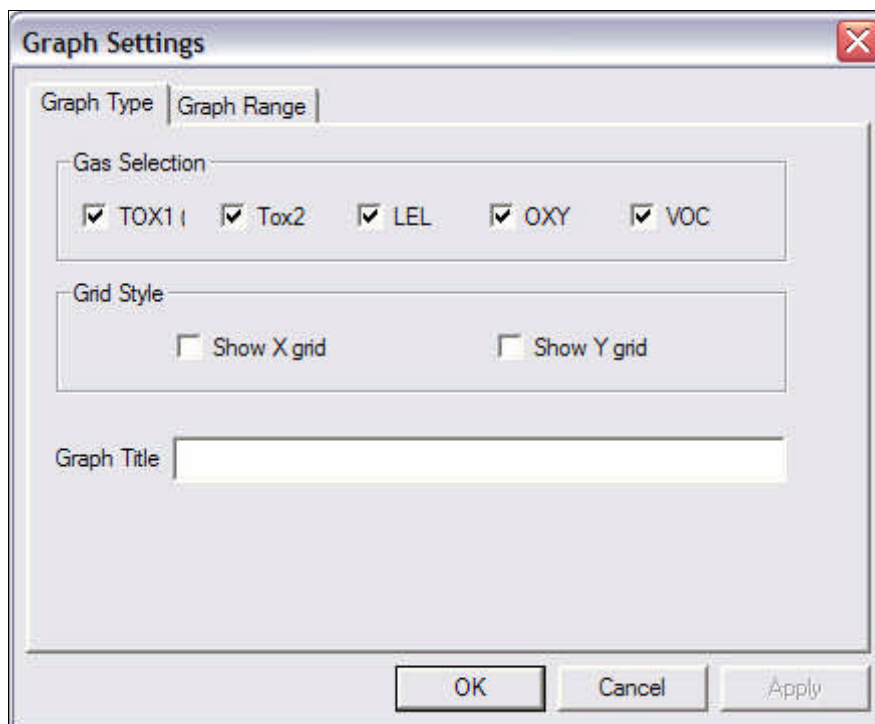
To view the logged data of a specific event:

- Click the event number under **Graph Mode**, and a line graph will appear in the right pane:



To select the **Graph Type**:

- Click anywhere on the right pane to make it active.
- Click **Option** → **Graph Settings** and a dialog box will appear:



The screenshot shows the 'Graph Settings' dialog box. It has two tabs: 'Graph Type' and 'Graph Range'. The 'Graph Type' tab is active. Under 'Gas Selection', there are five checkboxes: TOX1 (checked), Tox2 (checked), LEL (checked), OXY (checked), and VOC (checked). Under 'Grid Style', there are two checkboxes: 'Show X grid' (unchecked) and 'Show Y grid' (unchecked). At the bottom, there is a 'Graph Title' text box and three buttons: 'OK', 'Cancel', and 'Apply'.

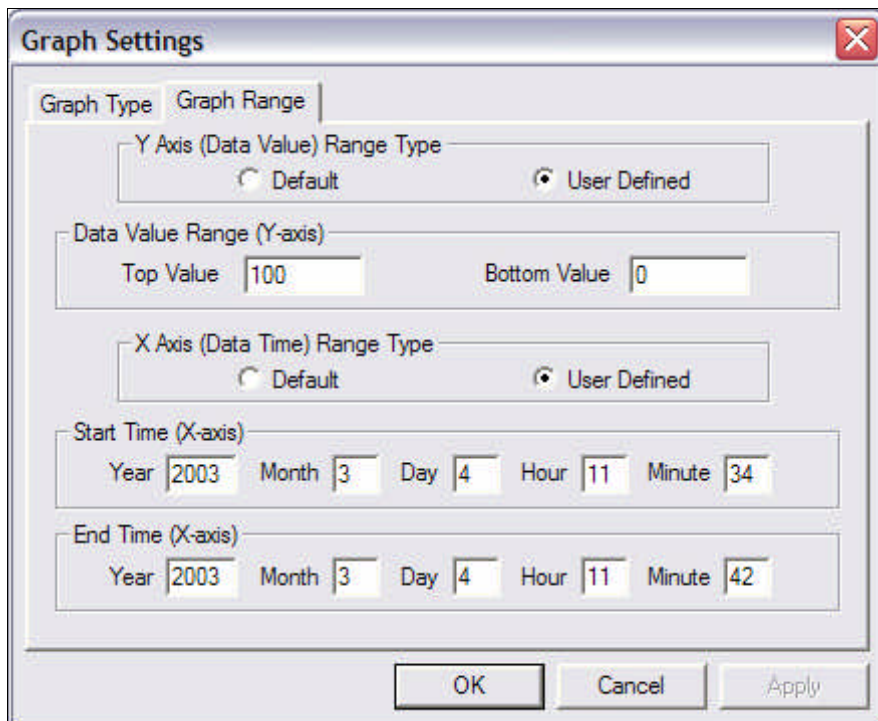
Data Selection: select **Min** to display the minimum values; **Avg** to display the average values; and or **Max** to display the maximum values

Grid Style: select Show X grid to display the X axis, Show Y grid to display the Y axis of the grid

Graph Title: customized title

The user may choose the value range on the X-axis and Y-axis. To select a **Graph Range**:

- Click anywhere on the right pane to make it active.
- Click **Option → Graph Settings** and a dialog box will appear.
- Click on the **Graph Range** tab:



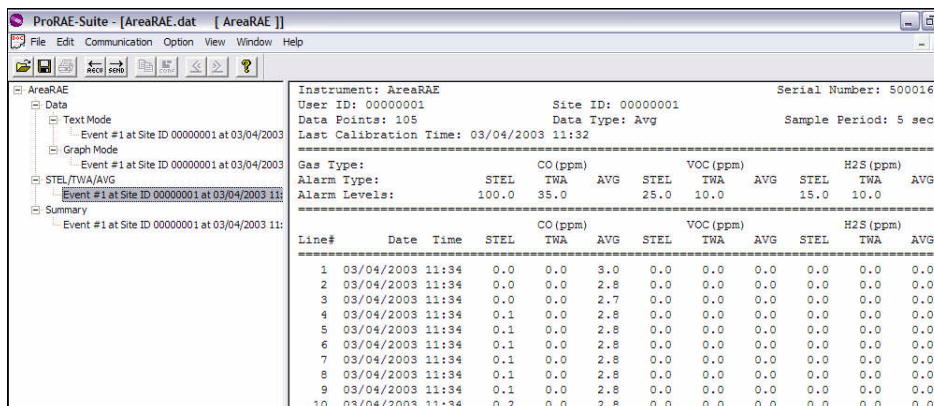
The image shows a screenshot of the 'Graph Settings' dialog box with the 'Graph Range' tab selected. The dialog has two main sections: 'Y Axis (Data Value) Range Type' and 'X Axis (Data Time) Range Type'. Both sections have radio buttons for 'Default' and 'User Defined'. In the 'Y Axis' section, 'User Defined' is selected, and the 'Data Value Range (Y-axis)' is set with 'Top Value' at 100 and 'Bottom Value' at 0. In the 'X Axis' section, 'User Defined' is also selected. The 'Start Time (X-axis)' is set to Year 2003, Month 3, Day 4, Hour 11, and Minute 34. The 'End Time (X-axis)' is set to Year 2003, Month 3, Day 4, Hour 11, and Minute 42. At the bottom are 'OK', 'Cancel', and 'Apply' buttons.

- To choose the range for the **Y-Axis (Data Value) Range Type**:
 - Select **Default** to let ProRAE Suite scale the range of the Y-axis to cover the maximum data value on the Y-axis.
 - Select **User Defined** to customize the **Top Value** and the **Bottom Value** in **Data Value Range (Y-axis)**.
- To choose the range for the **X-Axis (Data Time) Range Type**:
 - Select **Default** to let ProRAE Suite scale the range of the X-axis to cover the maximum data value on the X-axis.
 - Select **User Defined** to customize the **Start Time** and the **End Time**.

STEL, TWA & AVG Values

To view the STEL, TWA or AVG value of any event:

- Click the event number under **STEL/TWA/AVG**, and the data will appear in the right pane:



ProRAE Suite - [AreaRAE.dat] [AreaRAE]

File Edit Communication Option View Window Help

Instrument: AreaRAE Site ID: 00000001 Serial Number: 500016
 User ID: 00000001 Data Points: 105 Data Type: Avg Sample Period: 5 sec
 Last Calibration Time: 03/04/2003 11:32

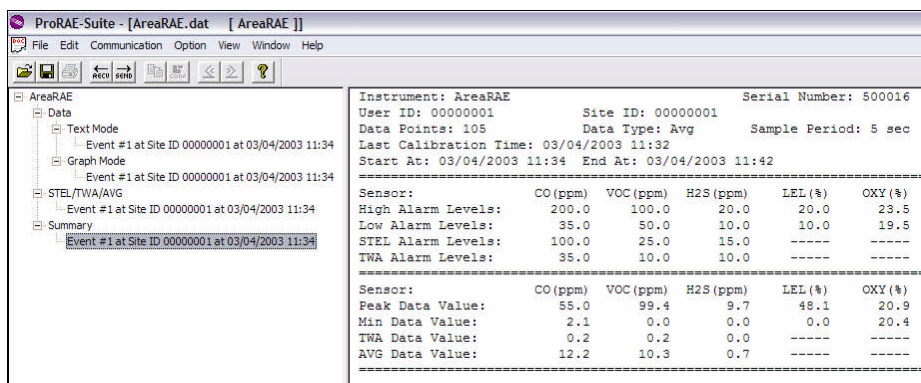
Gas Type: CO (ppm) VOC (ppm) H2S (ppm)
 Alarm Type: STEL TWA AVG STEL TWA AVG STEL TWA AVG
 Alarm Levels: 100.0 35.0 25.0 10.0 15.0 10.0

Line#	Date	Time	STEL	CO (ppm)	VOC (ppm)	H2S (ppm)	AVG	STEL	TWA	AVG
1	03/04/2003	11:34	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0
2	03/04/2003	11:34	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0
3	03/04/2003	11:34	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0
4	03/04/2003	11:34	0.1	0.0	2.8	0.0	0.0	0.0	0.0	0.0
5	03/04/2003	11:34	0.1	0.0	2.8	0.0	0.0	0.0	0.0	0.0
6	03/04/2003	11:34	0.1	0.0	2.8	0.0	0.0	0.0	0.0	0.0
7	03/04/2003	11:34	0.1	0.0	2.8	0.0	0.0	0.0	0.0	0.0
8	03/04/2003	11:34	0.1	0.0	2.8	0.0	0.0	0.0	0.0	0.0
9	03/04/2003	11:34	0.1	0.0	2.8	0.0	0.0	0.0	0.0	0.0
10	03/04/2003	11:34	0.2	0.0	2.8	0.0	0.0	0.0	0.0	0.0

Summary Information

To view the summary information of any event:

- Click the event number under **Summary**, and the summary data will appear in the right pane:



ProRAE Suite - [AreaRAE.dat] [AreaRAE]

File Edit Communication Option View Window Help

Instrument: AreaRAE Site ID: 00000001 Serial Number: 500016
 User ID: 00000001 Data Points: 105 Data Type: Avg Sample Period: 5 sec
 Last Calibration Time: 03/04/2003 11:32
 Start At: 03/04/2003 11:34 End At: 03/04/2003 11:42

Sensor:	CO (ppm)	VOC (ppm)	H2S (ppm)	LEL (%)	OXY (%)
High Alarm Levels:	200.0	100.0	20.0	20.0	23.5
Low Alarm Levels:	35.0	50.0	10.0	10.0	19.5
STEL Alarm Levels:	100.0	25.0	15.0	-----	-----
TWA Alarm Levels:	35.0	10.0	10.0	-----	-----

Sensor:	CO (ppm)	VOC (ppm)	H2S (ppm)	LEL (%)	OXY (%)
Peak Data Value:	55.0	99.4	9.7	48.1	20.9
Min Data Value:	2.1	0.0	0.0	0.0	20.4
TWA Data Value:	0.2	0.2	0.0	-----	-----
AVG Data Value:	12.2	10.3	0.7	-----	-----

3. Exporting Logged Data

Configuration Data to a Tab-Delimited File

The user may export configuration data to a tab-delimited file, which can be opened by a spreadsheet program such as Microsoft Excel®. To export the text displayed in the right pane:

- Click anywhere on the right pane to activate it.
- Click **Option → Export Text**.
- When the **Save As** dialog box appears, enter a **File Name**.
- Click **Save**.

Graphics to a Bitmap or Windows® Metafile

To export the displayed graph in the right pane:

- Click anywhere in the right pane to activate it.
- Click **Option → Export Graph** and the **Save As** dialog box will appear.
- Select the type of file (.bmp or .wmf) in **Save As**.

- Specify the **File Name**.
- Click **Save**. The newly created file only contains the graph displayed in the right pane.

4. Printing Logged Data

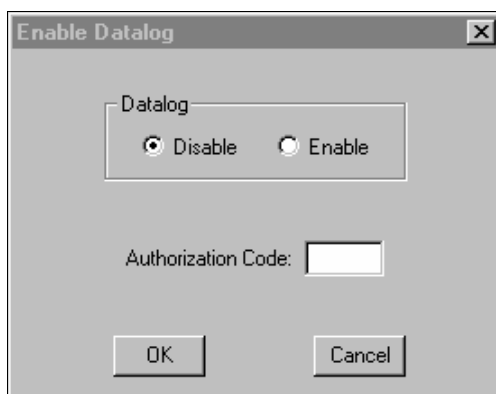
- After viewing the data results, the user may print a report of the text or graph.
- Click anywhere in the right pane to activate it.
- Select **File → Print** to print the text or graph.
- A **Printer Setup** dialog box will appear before printing so the user may customize the print settings.

Installing Datalog Capability

To install datalog capability:

- Open ProRAE Suite to its main window. (Do not open any configuration or data files.)
- Click **Option → Enable Datalog**, and a message box will remind the user to connect the instrument to the PC via serial port.
- Once the instrument is connected to the PC, click **OK** to start.

Upon a successful connection, the **Enable Datalog** dialog box will appear:



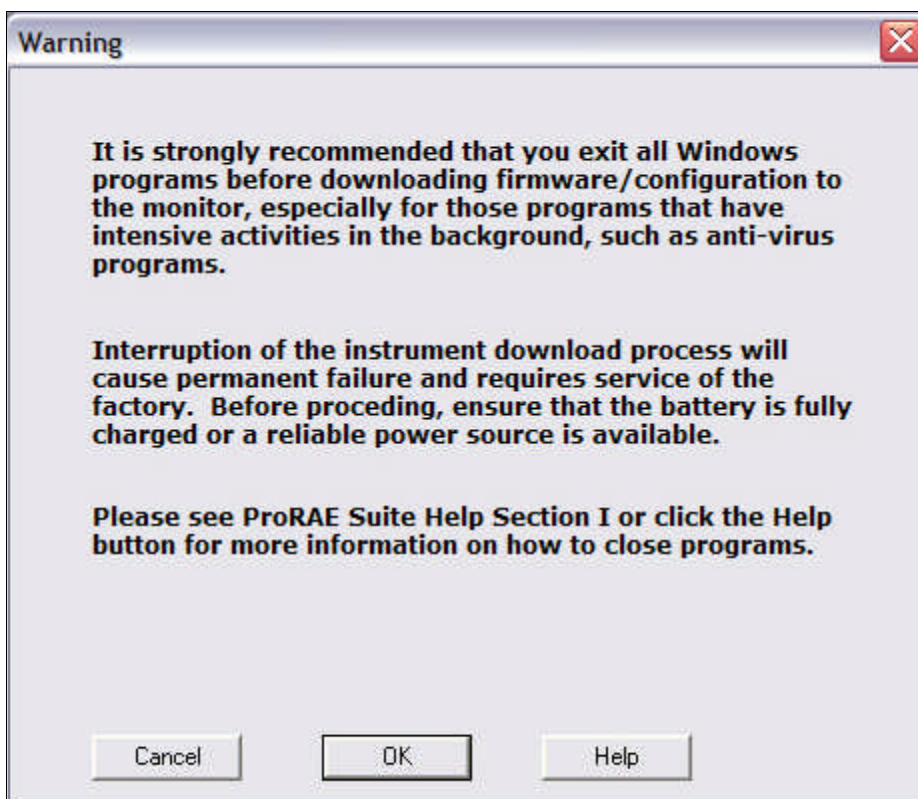
- To enable datalog capability click **Enable**.
- Type the three digit authorization code in the **Authorization Code** field. (The authorization code is provided by RAE Systems at the time the datalog option is purchased.)
- Click **OK** to close the dialog box.
- If the datalog option was enabled, a message box will let the user know that the datalog option has been successfully installed.

Upgrading Firmware (.a07)

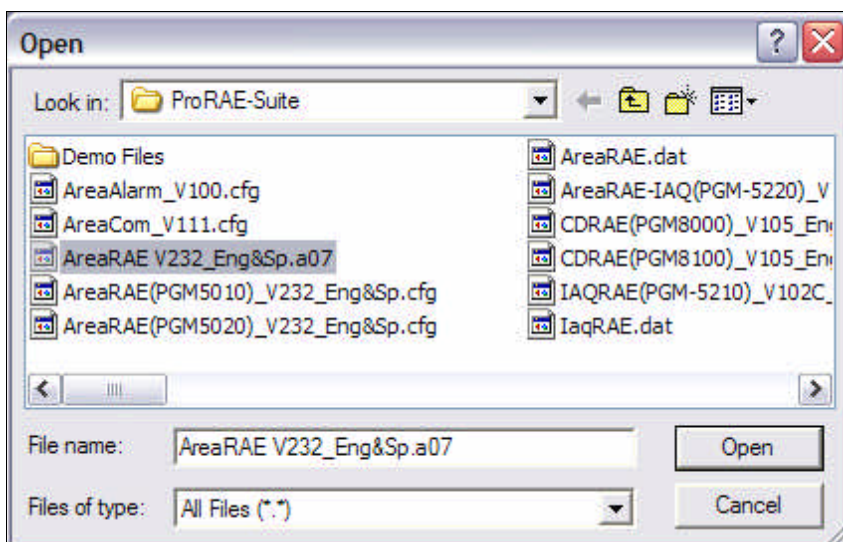
To upgrade the firmware for the instrument:

- Open ProRAE Suite to its main window. (Do not open any configuration or data files.)

- Click **Option** → **Load Firmware**, and the following warning message will appear:



- Once the instrument is connected to the PC, click **OK**, and the Open dialog box will appear:



- Select the appropriate firmware file (**.a07**) to load into the instrument.
- Click **Open** to start the uploading.
- A message box will let the user know if the firmware has been successfully uploaded into the instrument.



Computer Interface for Single Sensor Instruments

Introduction to ProRAE Suite

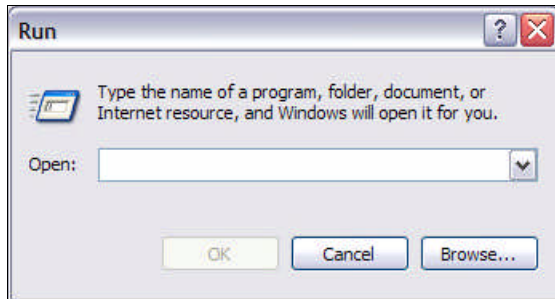
The ProRAE Suite software package and a computer serial cable are included with each Rae Systems single-sensor instrument that has the datalog option. **Note:** The datalog option is not required to use ProRAE Suite to change instrument configuration data.

ProRAE Suite is compatible with Microsoft® Windows® 95, 98, ME, 2000, NT, XP and later environments. It allows the user to configure the instrument through a user-friendly interface and send the configuration data from the PC to the instrument. Collected data can also be extracted from the instrument to the PC in order to perform data analysis, report generation or record keeping. Installation and operation of ProRAE Suite is described in the following sections.

1. Installing ProRAE Suite Software

ProRAE Suite is available on 3.5" setup disks or a CD; the software can also be downloaded from the website www.raesystems.com. **To install** ProRAE Suite from a disk or CD:

- Insert the first setup disk into the floppy drive.
- Click **Start → Run...**
- Type **A:\Setup.exe** in the **Open:** field, using the corresponding floppy or CD drive:

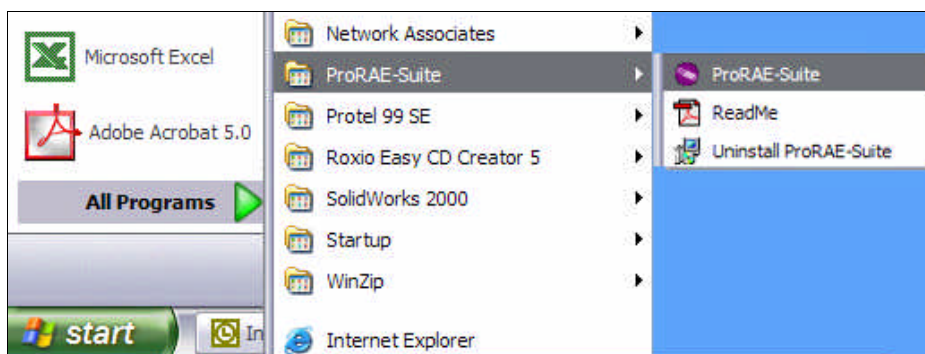


- Press **Enter** or click **OK** on the Run dialog box to start the setup process.
- If the user chooses the default settings in each step of the setup process, then ProRAE Suite will be installed under the default directory: **C:\Program Files\RAE Systems Inc\ProRAE Suite**
- After the software is successfully installed, ProRAE Suite will appear as a new menu item in the Programs menu.

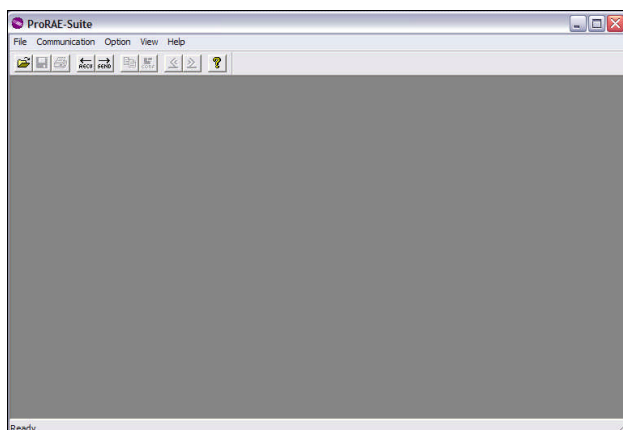
2. Starting ProRAE Suite Software

To start ProRAE Suite:

- Click **Start → Programs → ProRAE Suite**
- There are two submenu items **ProRAE Suite** and **Read-Me**:



- Click **ProRAE Suite** to start the program, and the ProRAE Suite main window will appear:



There is a tool bar beneath the menu bar that contains frequently used functions represented by small icons. For example, the **Receive Data...** function in the **Communication** submenu is represented by the **RECV** button. When the cursor passes over each icon, a short description of its function will appear in the text bar at the bottom of the ProRAE Suite main window.

3. Connecting Instrument to PC

During the communication session, the PC will directly control the instrument via serial connection. There is no need to press any keys on the instrument during the communication session. The instrument is supplied with a serial interface cable.

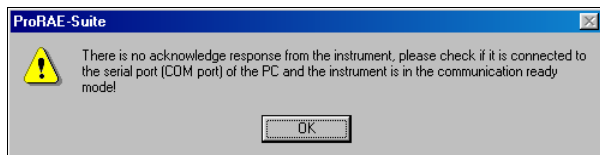
- Insert the **DB-9 connector** end of the cable to the **serial port** of the PC.

Note: Do not connect to the parallel port of the PC by mistake. The parallel port is usually a 25-pin female D connector on the back of the PC; the serial port is usually a 25-pin or 9-pin male D connector. If the serial port on the PC is a 25-pin connector, use a 25-pin to 9-pin adapter.

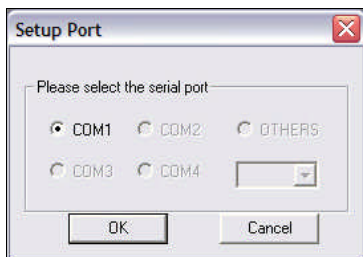
- Insert the other end of the cable to the instrument.
- Turn the instrument on.
- Press **[MODE]** on the instrument several times until **"PC comm?"** appears.
- Press **[Y/+]** and **"Pause instrument, OK?"** will appear.
- Press **[Y/+]** to confirm and **"Comm..."** will appear to indicate the instrument is ready and waiting to communicate with the PC.

4. Setting up Communication Port

Note: In most PC's, there are two serial ports. Make sure the serial port selected in **Setup Port** matches the actual serial port connected to the instrument. If the incorrect serial port is selected, the following error message will appear if a user tries to communicate between the PC and the instrument:



It is necessary to set up the communication port on ProRAE Suite so the instrument can communicate with the PC correctly. ProRAE Suite is capable of supporting up to 255 communication ports. Choose the appropriate port according to the PC's serial port setup. If choosing a port that is greater than 4, select **OTHERS**, then select the corresponding number in the pull-down menu:



Configuration Data (.cfg or .ccg)

Configuration data are the customized settings for the instrument. The user may edit, save, send and receive configuration data to the instrument via PC connection.

1. Receive Configuration Data

Configuration data may be acquired from two different sources:

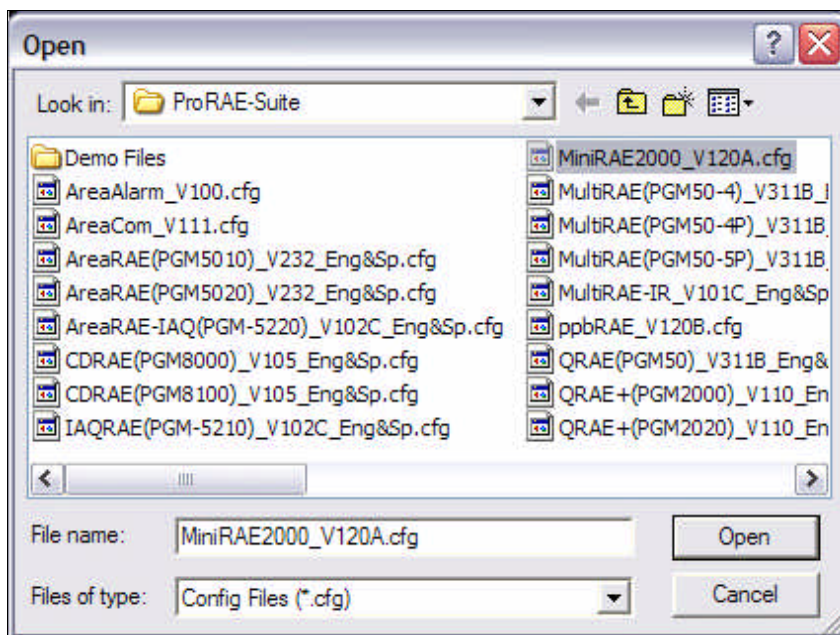
- Downloading data from the instrument to the PC or
- Opening a previously saved data file from the PC to the instrument.

To download and review a configuration data from the instrument:

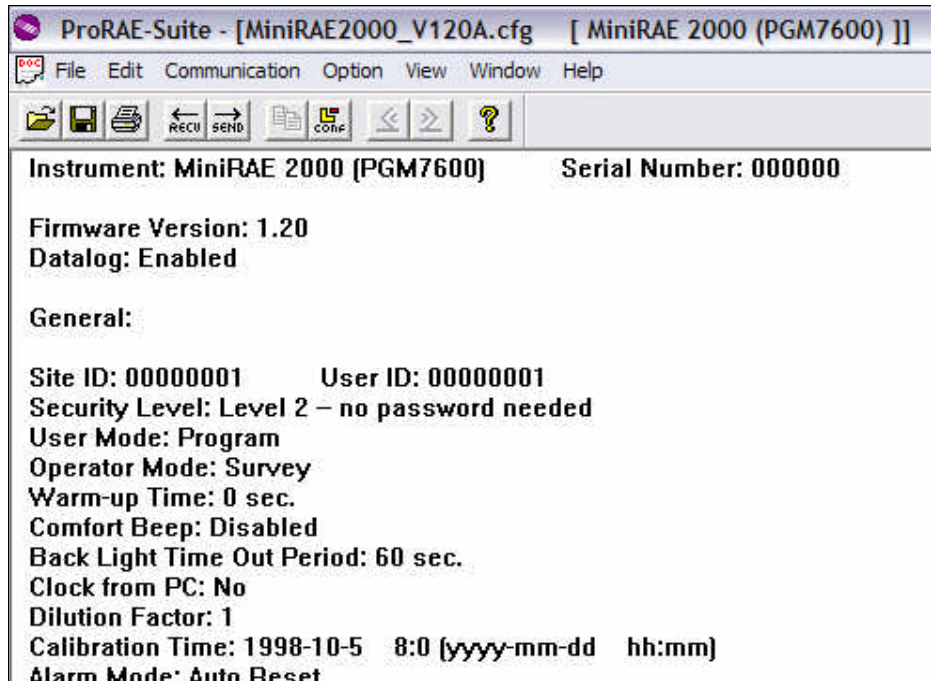
- Select **Communication → Receive Configuration...** from the main menu of ProRAE Suite.
- Click **OK** if the instrument is connected to the communication port and is ready to operate.

To open a previously saved data file:

- Select **Open from the File...** from the main menu and a dialog box will appear.
- Select **Config Files (*.cfg or *.ccg)** from the **Files of type** pull-down menu:



- There should be one or more data files listed. Each data file has a **.cfg** or **.ccg** file extension. There is a generic data file included with ProRAE Suite: **Default_<single-senor instrument name>_V###.cfg** i.e. **Default_MiniRAE2000_V200.cfg** means this file is for a MiniRAE 2000 instrument that has Version 2.00 firmware.
- Choose a data file by highlighting the file name and click **Open** or press **Enter**.
- Once the file is open, the configuration data is displayed:

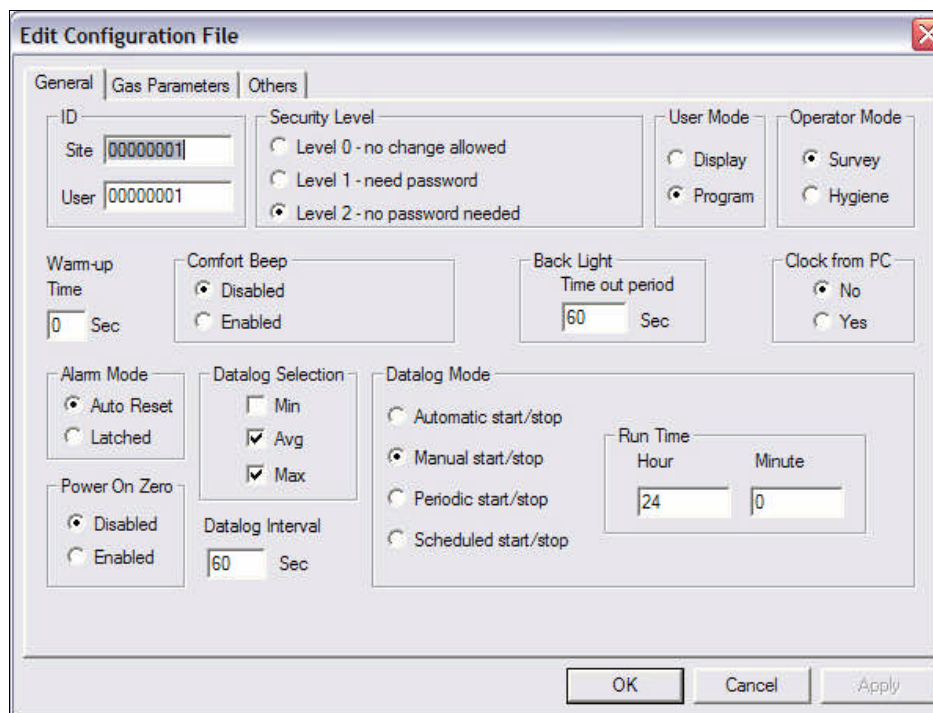


2. Editing Configuration Data

To **edit** the opened configuration data:

- Click **Edit** → **Configuration** to open the **Edit Configuration File** dialog box. There are three tabs of settings:

General



- ID:** sets the eight-character **Site** and **User** identification that is used during the datalog process.
- Security Level:** use any of the three security levels to provide protection against unauthorized changes to the instrument settings for the programming mode.

Level 0 – no change allowed: the user may enter the programming mode without a password, but cannot make changes to alarm limits, the real-time clock, correction factors, user/site id's, etc. (User can still perform calibrations.)

Level 1 – need password: requires a four-digit password to enter the programming mode.

Level 2 – no password needed: the user may enter the programming mode without a password, and the user has full access to change settings; changes to settings are saved.

- User Mode:** **Display Mode** allows the user to view readings during normal operation, but the user cannot enter the Programming Mode. **Program Mode** allows the user to enter the Programming Mode to calibrate the instrument or change instrument settings.
- Operator Mode:** **Hygiene Mode** takes continuous measurements. **Survey Mode** allows the user to manually start/stop measurements.
- Warm-up Time:** set the warm-up time, in seconds, for the instrument.
- Comfort Beep:** enabled comfort beep reminds user at specified time intervals that instrument is on.

- **Back Light:** enter a **Time out Period** to indicate when the back light should automatically turn off.
- **Clock from PC:** to download the clock from the PC to the instrument, select **Yes**; user avoids manually setting the clock on the instrument.
- **Alarm Mode:** select **Auto Reset** to let the instrument automatically turn off the alarms when the alarms situations no longer exist. Select **Latched** to let the alarms remain on until a key is pressed.
- **Power-On Zero:** select **Enabled** to automatically perform a fresh air calibration when the instrument is turned on. Make sure instrument is in a fresh air environment and has warmed up after turning on.
- **Datalog Selection:** choose to datalog the minimum, average, and/or maximum values for data logging purposes.
- **Datalog Interval:** the datalog interval is the rate in which data samples are recorded and determines how often a new sample is calculated and stored to the data log.
- **Datalog Mode:**

Select **Automatic start/stop** to begin and end data logging when the instrument is turned on and off; data logging will also end when the instrument is in PC Communication mode or Programming mode.

Select **Manual start/stop** to begin data logging with a series of key presses while in normal operation. Specify maximum **Run Time**, which determines an automatic end to the datalog or it can be stopped manually; data logging will automatically turn off after the instrument has been on for the specified run time.

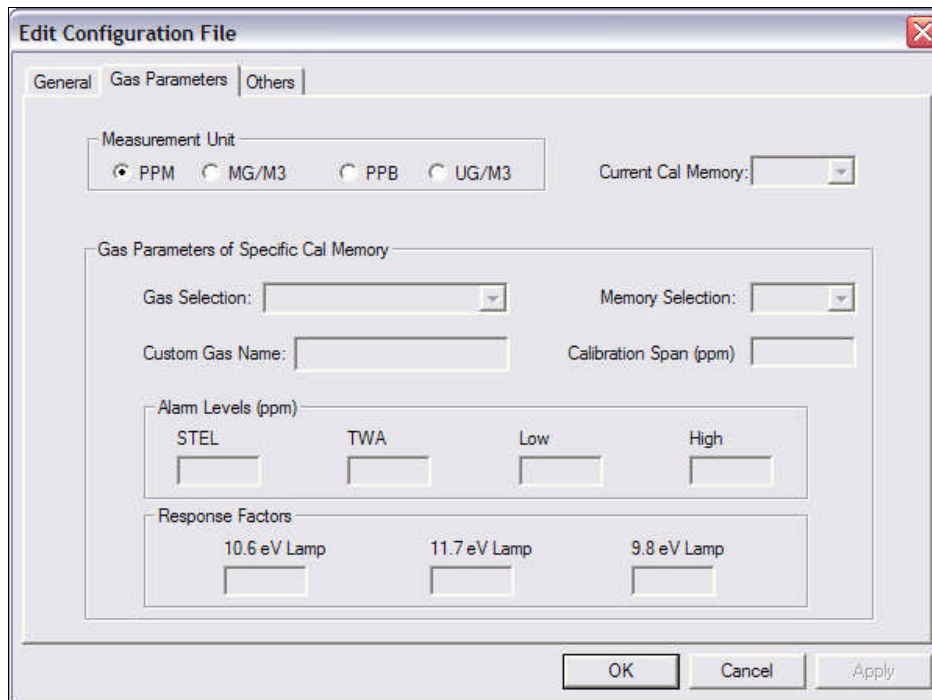
Select **Periodic start/stop** to specify the start/stop hour and minute for each day; the interval between the start and stop time is when the instrument will datalog.

With the instrument turned on, select **Scheduled start/stop** to set an annual datalog start/stop time by specifying the year, month, day, hour, and minute. The instrument will automatically start/stop data logging once the scheduled time is reached.

Gas Parameters

To save gas parameters, save the configuration file as a **.ccg** file; files saved as a **.cfg** will not include gas parameters. It may take more than 2-3 minutes to send/receive configuration files that include gas parameters to/from the instrument. After the user clicks **OK** to finish editing the gas parameters, a message to remind the user to recalibrate for a specific calibration memory may appear if the last calibration date is earlier than 7 days.

Note: Not every firmware version supports the function to edit gas parameters. Please verify with the read-me file for each firmware release to make sure that version supports the function to edit gas parameters. If the user is saving gas parameters as a .ccg file with an earlier firmware version, the default gas parameters will be saved. However, the saved gas parameters may not match the ones in the instrument.



- Measurement Units:**

PPM – parts per million

MG/M3 – milligrams per cubic meter

$$1 \text{ ppm} = 1 \text{ mg/m}^3 = 1000 \text{ ppb} = 1000 \text{ }\mu\text{g/m}^3$$

PPB – parts per billion

UG/M3 – micrograms per cubic meter

$$1 \text{ ppb} = 1 \text{ }\mu\text{g/m}^3$$

- Current Cal Memory:** the calibration memory the instrument is presently using. Set a different calibration memory by selecting a number between 0 - 7 from the pull-down menu. Once a different memory is selected, the **Gas Parameters of Specific Cal Memory** display will update the related gas parameters.

- Gas Parameters of Specific Cal Memory**

Gas Selection and **Custom Gas Name:** use the pull-down menu to select any gas from a built-in library of gases. If a customized gas is needed, select **Custom Gas** from the pull-down menu, then a **Custom Gas Name** text box will appear. Input the custom gas name (up to 16 characters).

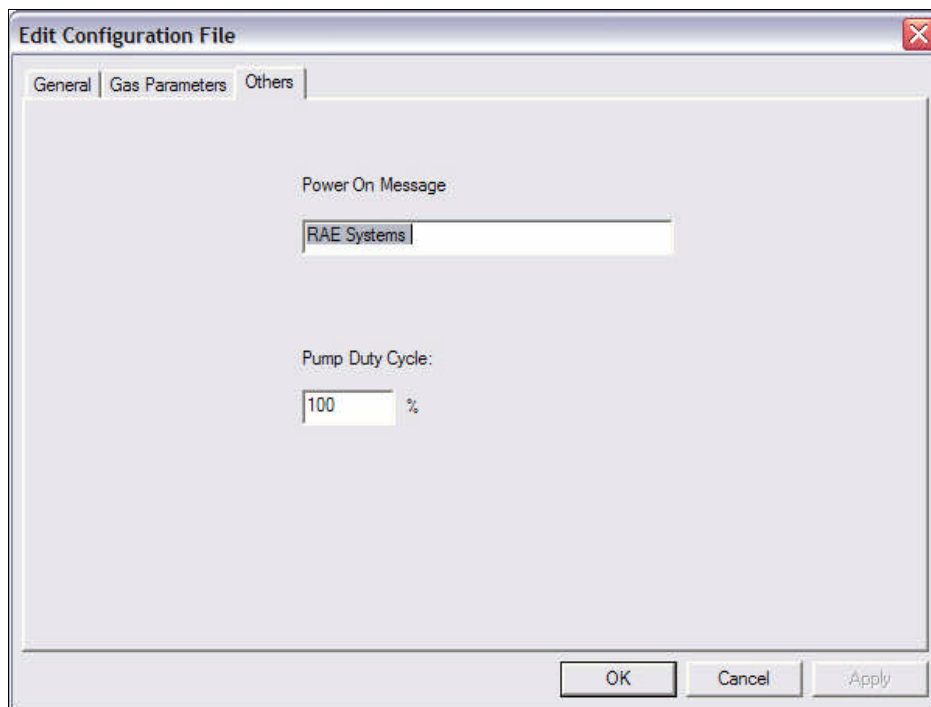
Memory Selection: select a memory number between 0 – 7.

Calibration Span: the span value for the selected calibration gas. The unit of measurement in parentheses is automatically updated when a different unit of measurement is selected.

Alarm Levels: the alarm settings for the selected calibration gas: **STEL** (Short Term Exposure Level), **TWA** (Time Weighted Average), **Low** (Low Limit), **High** (High Limit). The unit of measurement in parentheses is automatically updated when a different unit of measurement is selected.

- **Response Factors:** the correction factor of the selected calibration gas. Response factor may be different with each type of lamp: **10.6 eV Lamp, 11.7 eV Lamp, 9.8 eV Lamp.**

Others



- **Power On Message:** The user may enter a customized message which will appear when the instrument powers on.
- **Pump Duty Cycle:** The user may change the Pump Duty Cycle.
- **To save** the new configuration data settings, click **OK** and the **Edit Configuration File** dialog box will close. Screen will return to the main window.
- **To abort** the configuration changes, click **Cancel**.

3. Sending Configuration Data to the Instrument

To send configuration data to the instrument:

- Click **Communication → Send Config**.
- A message box will appear to remind the user to connect the instrument to the PC via serial port.
- Once the instrument is connected to the PC, click **OK** to start the data transfer.
- After the configuration data is successfully sent, a message box will indicate the process is complete.
- Click **OK** to close the message box.
- If the communication is unsuccessful, an error message will indicate there is no response from the instrument. Check the serial cable to make sure the connectors on both ends are properly inserted. Make sure the communication port is set up correctly. Also check to make sure the instrument is ready to communicate. Try sending the configuration file again. If the error message appears after repeated attempts, call an authorized service center.

4. Saving Configuration Data

To save the configuration data to a file for future use:

- Click **File → Save** or **File → Save As**. If the configuration data is saved as a **.cfg** file, the gas parameters will not be saved. To save gas parameters, save the configuration data as a **.ccg** file.
- Once the data file is saved, it can be opened at a later time for further modification or be sent to the instrument.

Reconfiguring All Settings

WARNING: The option to reconfigure all calibration data (**Config All**) will permanently erase all the calibration data in the instrument. When all the instrument settings are reconfigured, the user needs to recalibrate and reset all configuration settings to their customized needs. This option is recommended for unrecoverable configuration data or a malfunctioning instrument, however, **use sparingly**.

A user may update most of the configuration settings in the instrument (except the instrument ID, serial number and the datalog option). **To configure** the settings in the instrument:

- Click **Option → Config All** and a message box will appear to remind the user to connect the instrument to the PC via serial port.
- Once the instrument is connected to the PC, click **OK** and another message box will warn the user that configuring all settings will erase the current settings in the instrument.
- To proceed, click **OK** and the instrument will start restoring its default operational settings.
- To abort, click **Cancel**.
- After the information is successfully sent, a message box will indicate the process is complete.
- Click **OK** to close the message box.

Logged Data (.dat)

Logged data are the event measurements taken in the field. The user may view logged data in either text or graph mode. Recorded measurements include each data point during the sampling period, the STEL, TWA, AVG values and a summary of the minimum, average, and maximum readings.

1. Receiving Logged Data

To receive logged data from the instrument:

- Click **Communication → Receive Data**, and a message box will remind the user to connect the instrument to the PC via serial port.
- Once the instrument is connected to the PC, click **OK** to start the data transfer.
- After the transfer is complete, another window will open with the newly received logged data.
- To save the logged data to a file for future use, click **File → Save** or **File → Save As**.

2. Viewing Logged Data

Once the user opens a data file (**.dat**) or receives the logged data from the instrument, a two-pane data window appears. The left pane is a tree of the types of displays for each event; the right pane displays the details of the event. The user may also adjust the pane sizes by dragging the splitter.

Text Mode

To view the data points of a specific event:

- Click the event number under **Text Mode**, and the data will appear in the right pane.

- To view the next event or the previous event, click the **Next Event** button (double right arrow) or the **Previous Event** button (double left arrow):

ProRAE-Suite - [ppbRAE.dat [ppbRAE (PGM7240)]]

File Edit Communication Option View Window Help

ppbRAE (PGM7240)

Instrument: ppbRAE (PGM7240) Serial Number: 100042
 User ID: 00000001 Site ID: 00000004
 Data Points: 42 Gas Name: Isobutylene Sample Period: 5 sec
 Last Calibration Time: 03/05/2003 13:43

Text Mode
 Event #1 at 03/05/2003 13:45
 Graph Mode
 Event #1 at 03/05/2003 13:45
 STEL/TWA/AVG
 Event #1 at 03/05/2003 13:45
 Summary
 Event #1 at 03/05/2003 13:45

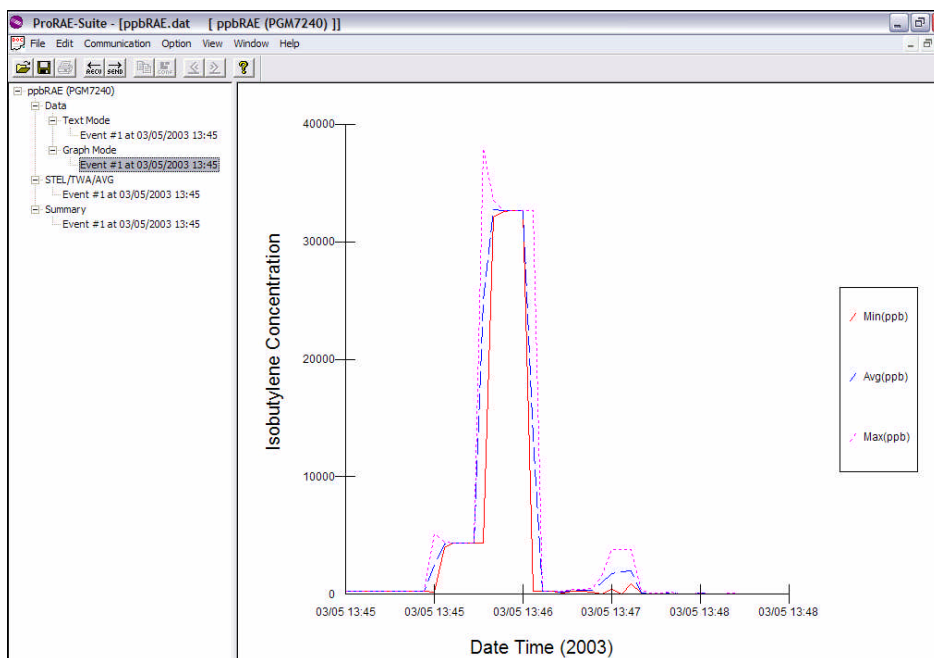
Measurement Type:	Min (ppb)	Avg (ppb)	Max (ppb)
High Alarm Levels:	25000	25000	25000
Low Alarm Levels:	10000	10000	10000

Line#	Date Time	Min (ppb)	Avg (ppb)	Max (ppb)
1	03/05/2003 13:45	240	242	243
2	03/05/2003 13:45	244	244	246
3	03/05/2003 13:45	240	267	309
4	03/05/2003 13:45	229	252	298
5	03/05/2003 13:45	242	247	251
6	03/05/2003 13:45	227	237	248
7	03/05/2003 13:45	244	246	248
8	03/05/2003 13:45	246	251	258
9	03/05/2003 13:45	239	249	262
10	03/05/2003 13:45	193	2475	5130

Graph Mode

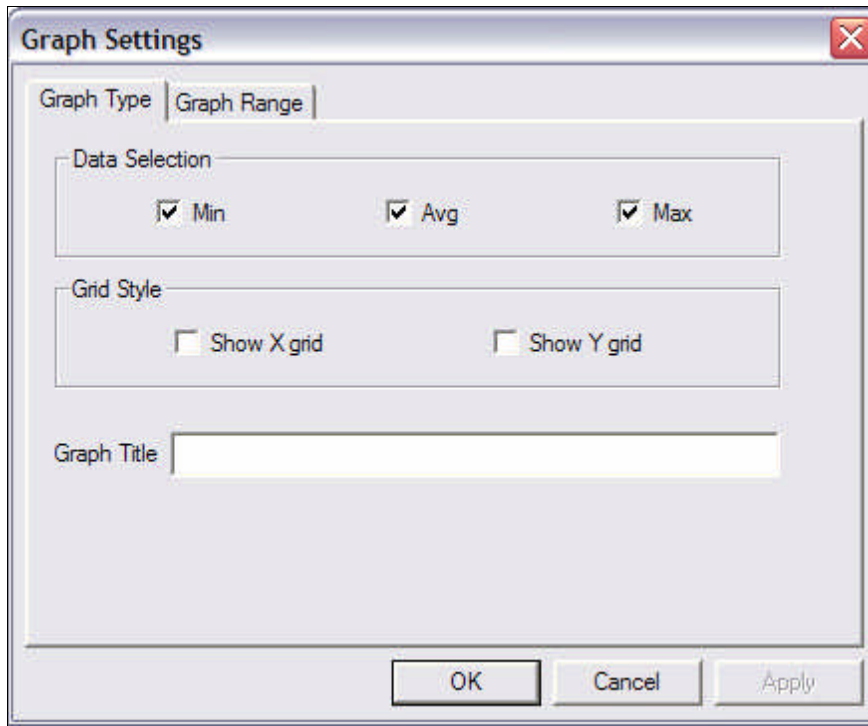
To view the logged data of a specific event:

- Click the event number under **Graph Mode**, and a line graph will appear in the right pane:



To select the **Graph Type**:

- Click anywhere on the right pane to make it active.
- Click **Option** → **Graph Settings** and a dialog box will appear:



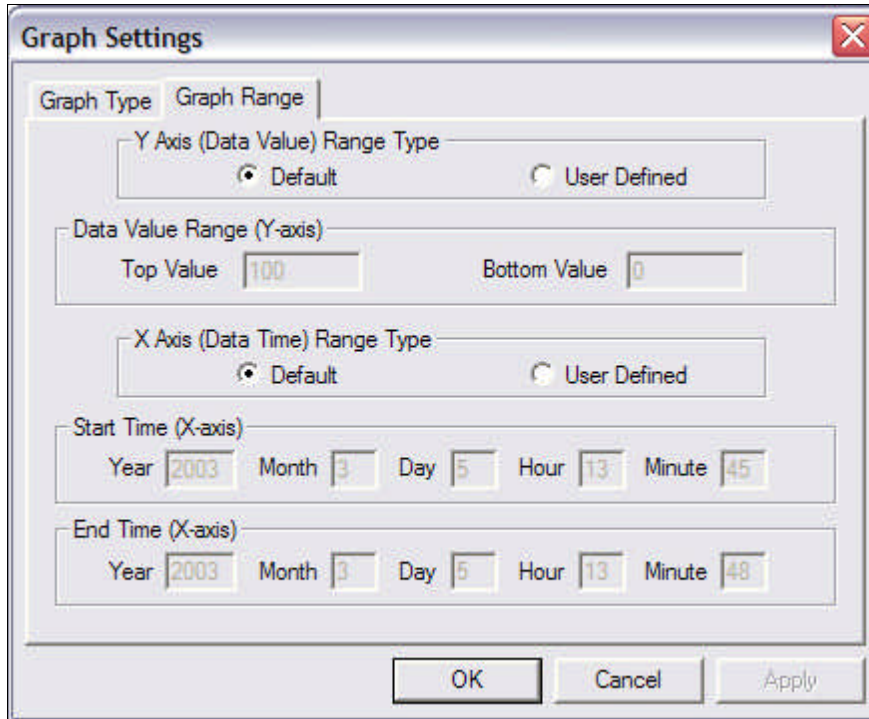
Data Selection: select **Min** to display the minimum values; **Avg** to display the average values; and or **Max** to display the maximum values

Grid Style: select Show X grid to display the X axis, Show Y grid to display the Y axis of the grid

Graph Title: customized title

The user may choose the value range on the X-axis and Y-axis. To select a **Graph Range**:

- Click anywhere on the right pane to make it active.
- Click **Option** → **Graph Settings** and a dialog box will appear.
- Click on the **Graph Range** tab:



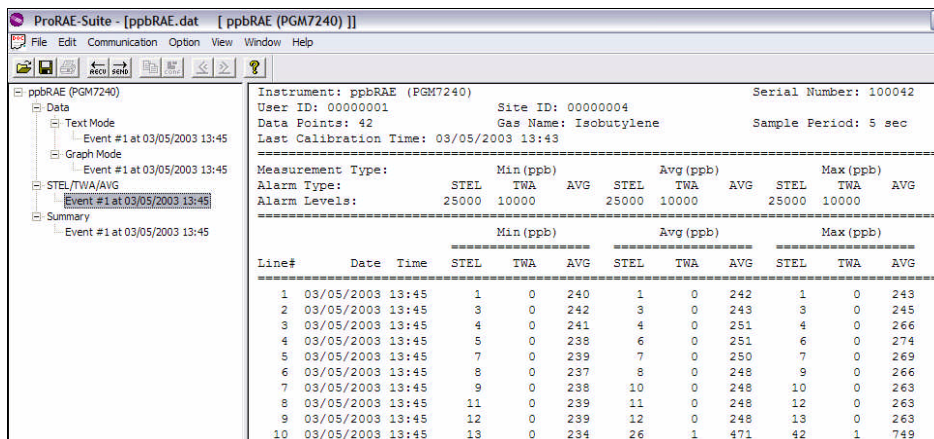
The image shows a 'Graph Settings' dialog box with two tabs: 'Graph Type' and 'Graph Range'. The 'Graph Range' tab is active. It contains two main sections: 'Y Axis (Data Value) Range Type' and 'X Axis (Data Time) Range Type'. Each section has a radio button for 'Default' and 'User Defined'. The 'Y Axis' section has input fields for 'Top Value' (100) and 'Bottom Value' (0). The 'X Axis' section has input fields for 'Start Time' and 'End Time', each with sub-fields for Year, Month, Day, Hour, and Minute. The 'Start Time' fields are set to Year: 2003, Month: 3, Day: 5, Hour: 13, Minute: 45. The 'End Time' fields are set to Year: 2003, Month: 3, Day: 5, Hour: 13, Minute: 48. At the bottom are 'OK', 'Cancel', and 'Apply' buttons.

- To choose the range for the **Y-Axis (Data Value) Range Type**:
 - Select **Default** to let ProRAE Suite scale the range of the Y-axis to cover the maximum data value on the Y-axis.
 - Select **User Defined** to customize the **Top Value** and the **Bottom Value** in **Data Value Range (Y-axis)**.
- To choose the range for the **X-Axis (Data Time) Range Type**:
 - Select **Default** to let ProRAE Suite scale the range of the X-axis to cover the maximum data value on the X-axis.
 - Select **User Defined** to customize the **Start Time** and the **End Time**.

STEL, TWA & AVG Values

To view the STEL, TWA or AVG value of any event:

- Click the event number under **STEL/TWA/AVG**, and the data will appear in the right pane:



ProRAE Suite - [ppbRAE.dat [ppbRAE (PGM7240)]]

Instrument: ppbRAE (PGM7240) Site ID: 00000004 Serial Number: 100042
 User ID: 00000001 Gas Name: Isobutylene Sample Period: 5 sec
 Data Points: 42 Last Calibration Time: 03/05/2003 13:43

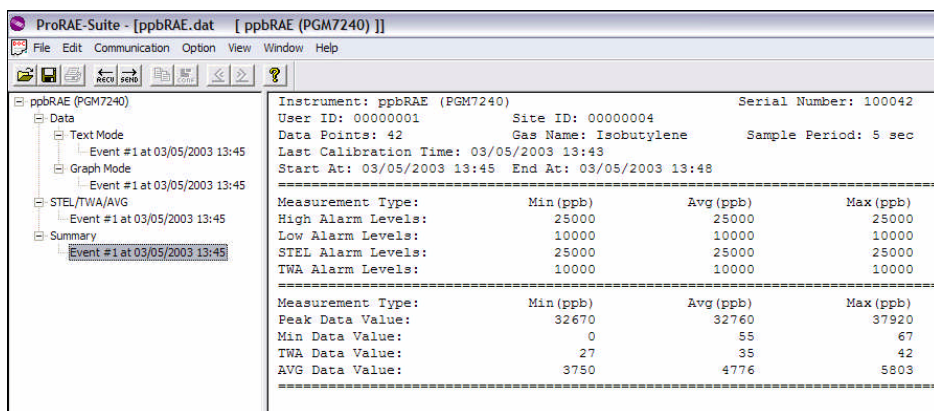
Measurement Type: Min (ppb) Avg (ppb) Max (ppb)
 Alarm Type: STEL TWA AVG STEL TWA AVG STEL TWA AVG
 Alarm Levels: 25000 10000 25000 10000 25000 10000

Line#	Date	Time	STEL	TWA	AVG	STEL	TWA	AVG	STEL	TWA	AVG
1	03/05/2003	13:45	1	0	240	1	0	242	1	0	243
2	03/05/2003	13:45	3	0	242	3	0	243	3	0	245
3	03/05/2003	13:45	4	0	241	4	0	251	4	0	266
4	03/05/2003	13:45	5	0	238	6	0	251	6	0	274
5	03/05/2003	13:45	7	0	239	7	0	250	7	0	269
6	03/05/2003	13:45	8	0	237	8	0	248	9	0	266
7	03/05/2003	13:45	9	0	238	10	0	248	10	0	263
8	03/05/2003	13:45	11	0	239	11	0	248	12	0	263
9	03/05/2003	13:45	12	0	239	12	0	248	13	0	263
10	03/05/2003	13:45	13	0	234	26	1	471	42	1	749

Summary Information

To view the summary information of any event:

- Click the event number under **Summary**, and the summary data will appear in the right pane:



ProRAE Suite - [ppbRAE.dat [ppbRAE (PGM7240)]]

Instrument: ppbRAE (PGM7240) Site ID: 00000004 Serial Number: 100042
 User ID: 00000001 Gas Name: Isobutylene Sample Period: 5 sec
 Data Points: 42 Last Calibration Time: 03/05/2003 13:43
 Start At: 03/05/2003 13:45 End At: 03/05/2003 13:48

Measurement Type: Min (ppb) Avg (ppb) Max (ppb)
 High Alarm Levels: 25000 25000 25000
 Low Alarm Levels: 10000 10000 10000
 STEL Alarm Levels: 25000 25000 25000
 TWA Alarm Levels: 10000 10000 10000

Measurement Type: Min (ppb) Avg (ppb) Max (ppb)
 Peak Data Value: 32670 32760 37920
 Min Data Value: 0 55 67
 TWA Data Value: 27 35 42
 AVG Data Value: 3750 4776 5803

3. Exporting Logged Data

Configuration Data to a Tab-Delimited File

The user may export configuration data to a tab-delimited file, which can be opened by a spreadsheet program such as Microsoft Excel®. To export the text displayed in the right pane:

- Click anywhere on the right pane to activate it.
- Click **Option** → **Export Text**.
- When the **Save As** dialog box appears, enter a **File Name**.
- Click **Save**.

Graphics to a Bitmap or Windows® Metafile

To export the displayed graph in the right pane:

- Click anywhere in the right pane to activate it.
- Click **Option** → **Export Graph** and the **Save As** dialog box will appear.

- Select the type of file (.bmp or .wmf) in **Save As**.
- Specify the **File Name**.
- Click **Save**. The newly created file only contains the graph displayed in the right pane.

4. Printing Logged Data

After viewing the data results, the user may print a report of the text or graph.

Click anywhere in the right pane to activate it.

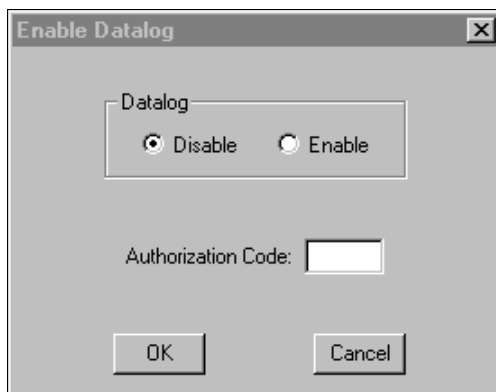
Select **File → Print** to print the text or graph.

A **Printer Setup** dialog box will appear before printing so the user may customize the print settings.

Installing Datalog Capability

To **install** datalog capability:

- Open ProRAE Suite to its main window. (Do not open any configuration or data files.)
- Click **Option → Enable Datalog**, and a message box will remind the user to connect the instrument to the PC via serial port.
- Once the instrument is connected to the PC, click **OK** to start.
- Upon a successful connection, the **Enable Datalog** dialog box will appear:



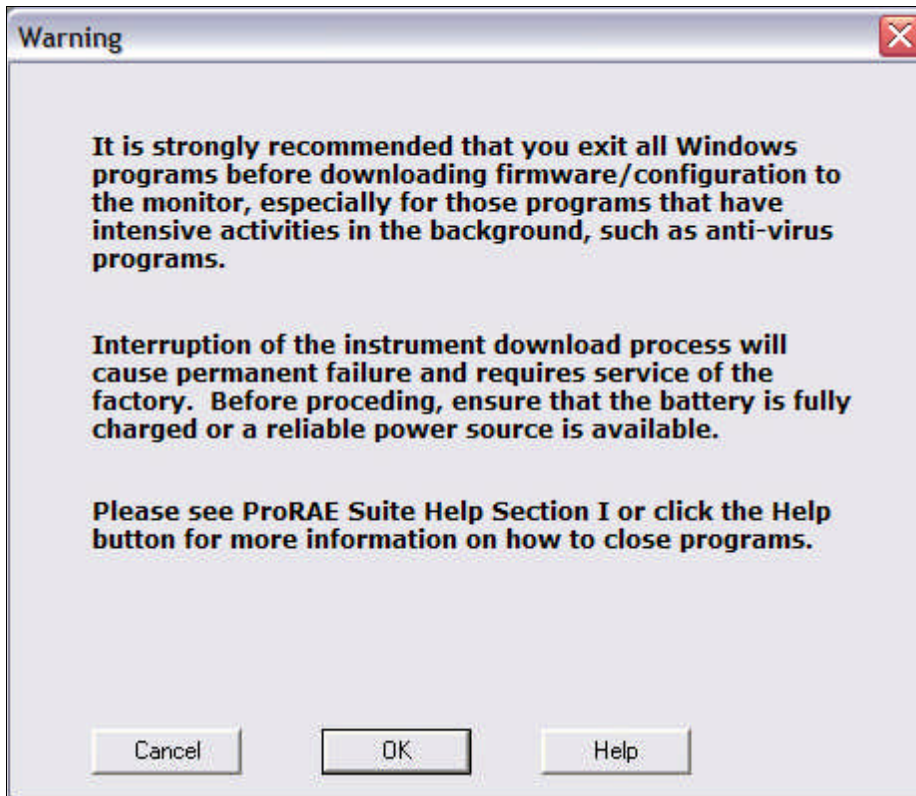
- To **enable** datalog capability click **Enable**.
- Type the three digit authorization code in the **Authorization Code** field. (The authorization code is provided by RAE Systems at the time the datalog option is purchased.)
- Click **OK** to close the dialog box.
- If the datalog option was enabled, a message box will let the user know that the datalog option has been successfully installed.

Upgrading Firmware (.a07)

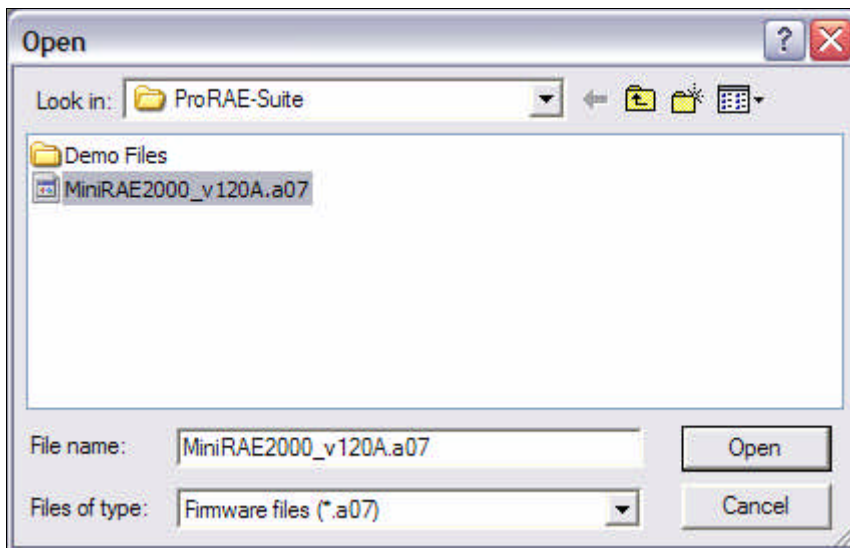
To **upgrade** the firmware for the instrument:

- Open ProRAE Suite to its main window. (Do not open any configuration or data files.)

- Click **Option** → **Load Firmware**, and the following warning message will appear:



- Once the instrument is connected to the PC, click **OK**, and the Open dialog box will appear:



- Select the appropriate firmware file (**.a07**) to load into the instrument.
- Click **Open** to start the uploading.
- A message box will let the user know if the firmware has been successfully uploaded into the instrument.