# INDOOR AIR QUALITY MONITORING USING THE WOLFSENSE IAQ PROBE

CONTENTS

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## 1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) outlines the procedures for the measurement of temperature, percent relative humidity (%RH), dew point, carbon monoxide (CO), and carbon dioxide ($CO_2$) using the GrayWolf WolfSense IAQ DirectSense 100 and IQ-410 Probe. This method is applicable for monitoring these parameters in indoor air. Dew point is derived from the temperature and %RH readings.

## 2.0 METHOD SUMMARY

The GrayWolf IQ410 probe contains four fast response high accuracy sensors that provides measurements for five parameters. This fully integrated system measures indoor air quality using a handheld personal computer (HPC) running Wolfsense IAQ HPC software.

- Carbon dioxide is measured using non dispersive infrared spectroscopy. Carbon Dioxide absorbs light at a very specific wavelength where other gases do not absorb.
- Carbon monoxide diffusing into the electrochemical sensor is either oxidized or reduced at the sensing electrode and coupled with a corresponding (but converse) counter reaction at the other electrode, a current is generated through the external circuit. The current generated is proportional to the concentration of gas present outside the sensor.
- Percent RH is measured by absorption or desorption of moisture by a thin polymeric film. As the relative humidity changes so does the dielectric property of the film changes and so does the capacitance of the sensor.
- For temperature, resistance over platinum element is measured. Platinum sensors are highly accurate over a wide temperature range.

## 3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

This section is not applicable to this SOP.

## 4.0 INTERFERENCES AND POTENTIAL PROBLEMS

The combination $CO_2$/CO/temperature/%RH probe is relatively free from interference. Store the probe in a cool, dry, dust-free environment between 32 and 70 degrees Fahrenheit ($^{O}$F). If the probe is being stored for an extended period of time, remove the batteries.

If the probe gets dirty, wipe the outside with a damp wet cloth. Do not attempt to clean the inside of the probe. Return the probe to the manufacturer for cleaning.

Avoid operation in direct sunlight as %RH measurements may be erratic. Do not immerse the probe in water. If condensation forms on the $CO_2$ sensor, the readings may be erratic due to temperature differences between the two detectors. Do not drop or subject the probe to vibrations.

## 5.0 EQUIPMENT/APPARATUS

The following are standard materials and equipment required for monitoring:

- IQ-410 probe for DirectSense 100;

- ACC-A110 GrayWolf alternating current (AC) adapter;
- ACC-ADY2 serial/AC power adapter;
- WolfSense software;
- Handheld personal computer (HPC) with pre-installed GrayWolf DirectSense software, HPC AC adapter, serial and modem cables;
- Microsoft synchronization software and GrayWolf DirectSense software;
- Spare "D" batteries; and
- User Manual

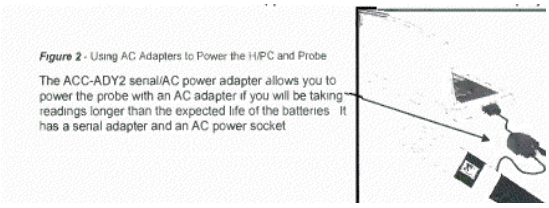
6.0 REAGENTS

This section is not applicable to this SOP.

7.0 PROCEDURES

7.1 Powering Up and Installation of Software

The HPC operates both on battery and on electricity, with the help of the AC adapter supplied with the HPC. The probe can be used with two "D" cell batteries or with an AC adapter. The following figure illustrates the use of AC adapters to power the HPC and the probe.




1. Install the Microsoft synchronization software (Windows ActiveSync)on your desktop PC. The HPC comes pre-installed with the WolfSense IAQ software. When prompted, connect the HPC to the desktop with the serial cable.

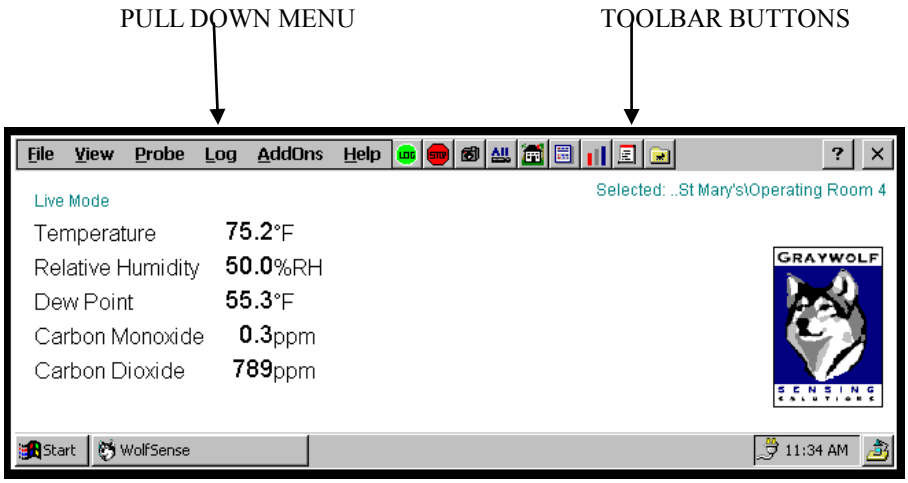
2. Install the WolfSense software from the CD-ROM (provided by GrayWolf). If the CD doesn't run automatically, run Setup.exe from the PC Start menu.

3. Choose the option to load both PC and Remote files only if the GrayWolf Icon (and associated program) on the HPC is missing or was deleted. The setup program will install the WolfSense PC onto the desktop PC.

7.2 Navigating in WolfSense IAQ HPC

1. Double click on the GrayWolf logo on the HPC.

2. The toolbar buttons and pull-down menus are described briefly below. All functions are performed from this main screen.




PULL DOWN MENUS

File: Manages stored files. Open, Notebook, Copy to Clipboard and then to pocket Excel or Word, E-mail Location files from the HPC, Close, Options, Autobackup to Compact Flash Card, Exit.

View: View Readings, Details, or Statistics for live readings. View Location where readings have been logged. View All will display all measurement parameters. Change Units of Measure.

Probe: View information about the probe or to Calibrate the probe. View Active Cal for probe calibration data. Detect PCMA/Port Probes.

Log: Set up how readings will be logged: Snapshot, Standard Timed or Auto Start/Stop. To view Log information. To set or create Location files or Site folders. To Start or Stop a log.

Add-ons: Add-ons listed are explained in other manuals

Help: See Help Topics on WolfSense IAQ HPC or Email for WolfSense Support.

TOOLBAR BUTTONS

LOG: Starts the timed log previously set-up.

STOP: Stops a timed log in progress.

SNAPSHOT: Manually captures live values instantaneously in a location file.

ALL: Displays all measurement parameters, updating readings continuously.

HOME: Returns to the main WolfSense screen.

DETAILS: Displays multiple readings in columnar format.

STATISTICS: Displays statistics about a chosen parameter.

NOTEBOOK: Accesses Text Notes, Drawing Notes, and Report templates.

LOCATIONS: Opens LOCATIONS dialog box.

7.3. Live Mode Operation

1. Connect the probe to the IQ-410 probe via the serial port adaptor. If AC current is available, use the supplied serial/AC adaptor

2. Power up the HPC and double click on the GrayWolf Icon.

3. From the drop down menu, tap on View, Readings. Units can be changed either by double-tapping the current value and available units dialog box will appear or by tapping on View in the drop down menu and selecting Change Units.

7.4 Creation, Selection and Deletion of Site Folders and Location Files

1. From the main WolfSense IAQ HPC screen, tap Log, Location/Sites from the pull down menu or the Locations toolbar button.

2. In the LOCATIONS box tap Sites. In the SITES dialog box the name of the last site folder in which a location file was created or selected will be highlighted.

3. To create a new site, tap in the field under NEW SITE NAME. Type the name of the new site folder and tap Create Site.

4. Location files are created in the Site folder by tapping on the Locations button in the dialog box. Type the name of the new location file. Tap Create Location.

5. To create a location file in an existing Site folder from the main WolfSense IAQ HPC screen, tap Log, Location/Sites from the pull down menu or the Locations toolbar button

6. In the LOCATIONS box tap Sites. Tap through the Site folder and tap on the desired site folder. Tap in the field under NEW SITE NAME. Type the name and Tap Create Site.

7. To delete a location file or the entire site folder tap File, Open, View, View Location.

8. Tap through the site folder directory to the desired site or folder and press the DEL key. Tap Yes to confirm deletion.

7.5 Logging Mode Operation

1. Connect the probe to the IQ-410 Probe via the serial port adaptor. If AC current is available, use the supplied serial/AC adaptor.

2. Power up the HPC and double click on the GrayWolf Icon.

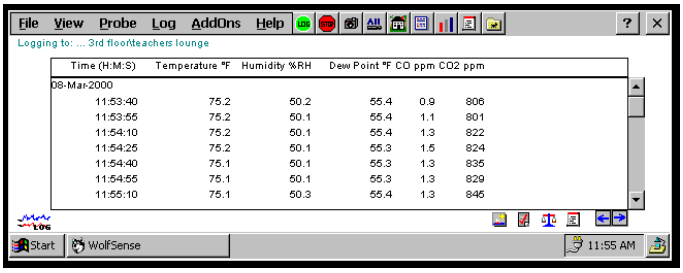
3. The Live Mode screen will be displayed on the HPC. Tap on the View button from the drop down menu and select the parameters to be logged.

4. Tap on Log and select the log program, The standard time log program with a time interval of 15 minutes is used in most cases.

5. Tap on Log and select Location/Sites from the menu. From the locations dialog box display select the location file to be used for logging.

6. Initiate time logging either by tapping the Start Log button in STANDARD TIMED LOG or the AUTO START/STOP LOG dialog boxes, or tap Log, Start Log from the main IAQ HPC screen, or lastly tap the LOG toolbar button.

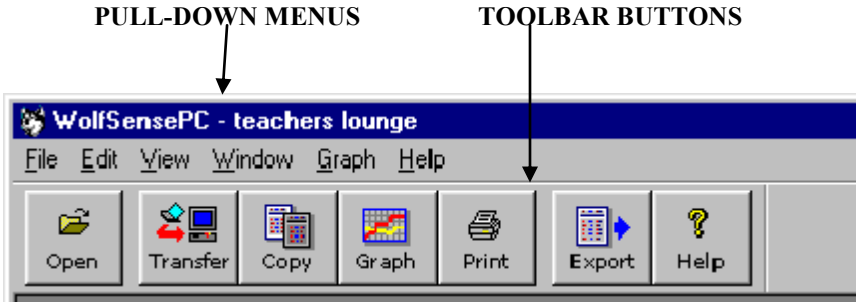
7. The logged data is recorded and appears in a columnar format as shown below.




7.6 Navigating the WolfSense Personal Computer

1. Double click on the GrayWolf logo on the desktop PC.

2. All the functions are performed from this main screen. The toolbar buttons and pull-down menus are described briefly below.




PULL DOWN MENUS

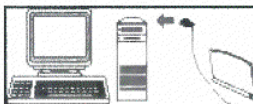
File: Manages files. Open, Notebook, Print, Export, list of recently used files. Transfer, Exit.
Edit: Copy selected columns onto the Windows clipboard so that they may be posted into Word, Excel or other programs. All columns are selected by default.
View: Show or hide the Toolbar, Status Bar and location file Statistics.
Window: Cascade or Tile windows, and Arrange Icons.
Graph: Create graphs.
Help: Shows Help Topics Getting Started, WolfSense IAQ Help, About WolfSense PC.

TOOLBAR BUTTONS

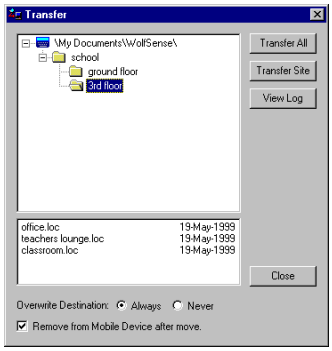
| | |
|---|---|
| OPEN: | OPENS location files in the PC directory chosen at installation of transferred files. |
| TRANSFER: | TRANSFERS files manually between the HPC and desktop PC |
| COPY: | COPY columns onto Windows clipboard for pasting into other applications. |
| GRAPH: | Displays data graphically, with many options for constructing the GRAPH. |
| PRINT: | PRINTS tables or charts as they appear on the screen. |
| EXPORT: | EXPORTS data in comma-separate file to a word processor, spreadsheet or other program.. |
| HELP: | Shows HELP TOPICS on WolfSense PC. |

7.7 Data Transfer from the WolfSense IAQ HPC to WolfSense PC

1. Connect the HPC to the desktop PC using the serial cable. A connection icon will appear on the task bar of both the HPC and the desktop PC. During the installation of the WolfSense PC software on the desktop a partnership may have been set up with the HPC. Microsoft ActiveSync icon will appear on the taskbar of the desktop.



2. Open the WolfSense PC software and click on the Transfer toolbar button. A dialog box will open to remind to connect the HPC to the desktop. Click OK. The desktop PC and the HPC are now connected by ActiveSync The TRANSFER dialog will open the structure of the \My documents\WolfSense site will appear on the Transfer dialog box.




3. Click on Transfer All, to transfer all sites and locations, or click on Transfer Site to transfer the selected site, or View Log to see the results of the last transfer.

4. Click on Close after the data has been transferred.

7.8 WolfSense PC Software

1. After the transfer is complete, click on Start, Programs, GrayWolf, WolfSense PC.

2. Click on Open to see location files that are now stored on the desktop.

3. Search through the directory to find the file to be opened.

4. The file will open in the columnar format similar to View, Details on the HPC.

5. An x-axis and one or multiple y-axis graphs with grids, labels, and titles can be created by clicking on the Graph toolbar button.

6. Export the columnar format data to an Excel file as a .csv file.

7.9 Battery Replacement

Ensure that the HPC battery is fully charged prior to use and the probe has new "D" cell batteries prior to a long monitoring session

8.0 CALCULATIONS

The values displayed on the logger are read directly as $^{O}F$ for temperature and dew point, %RH for humidity, and parts per million (ppm) for CO and $CO_2$. The downloaded data can be exported to Excel as a .csv file; thus, calculations can be done in Excel.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

1. All data must be documented on field data sheets or within site or laboratory notebooks.

2. All instrumentation must be operated in accordance with the manufacturer's instructions. Equipment check-out procedures, calibration, and maintenance activities must be documented in an instrument-specific logbook.

3. Calibration should be performed at least every 12 months on the %RH sensor and at least every 6 months on the CO and $CO_2$ sensors. More frequent calibration is recommended if the sensors will be exposed to high concentrations of contaminants.

4. The temperature sensor should be returned to the factory to be calibrated every 24 months. An annual calibration is highly recommended.

10.0 DATA VALIDATION

This section is not applicable to this SOP. The operator is responsible for ensuring that the unit is operated in accordance with all the requirements set forth in this procedure.

11.0 HEALTH AND SAFETY

General field safety practices should be followed. When working with potentially hazardous materials, follow United States Environmental Protection Agency (U.S. EPA), Occupational Safety and Health Administration (OSHA), and Lockheed Martin health and safety procedures.

## 12.0 REFERENCES

GrayWolf Sensing Solutions. 2000. *WolfSense IAQ HPC DirectSense 100 & VentCal 100 Users Manual* Version 1.5.

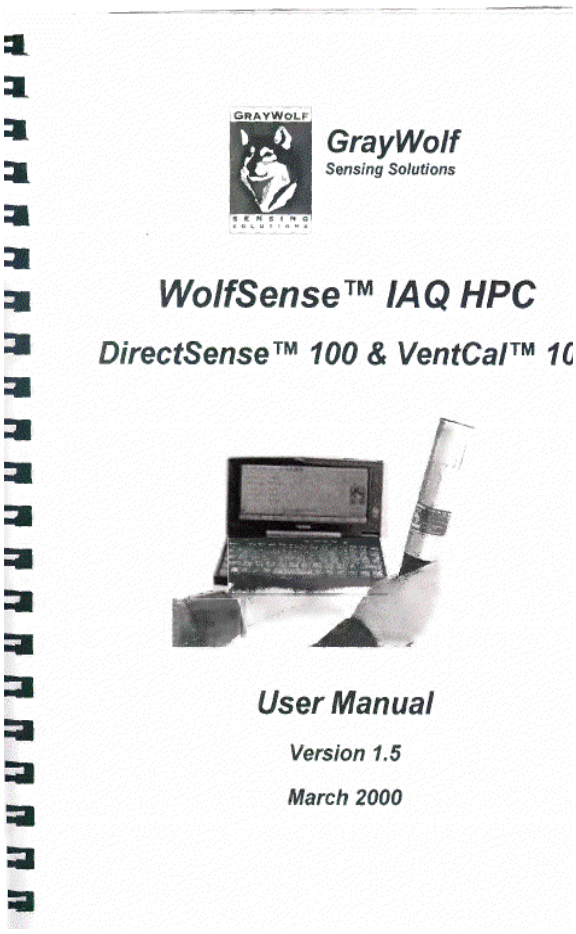
For Windows CE and ActiceSync visit www.microsoft.com/windowsce/hpc

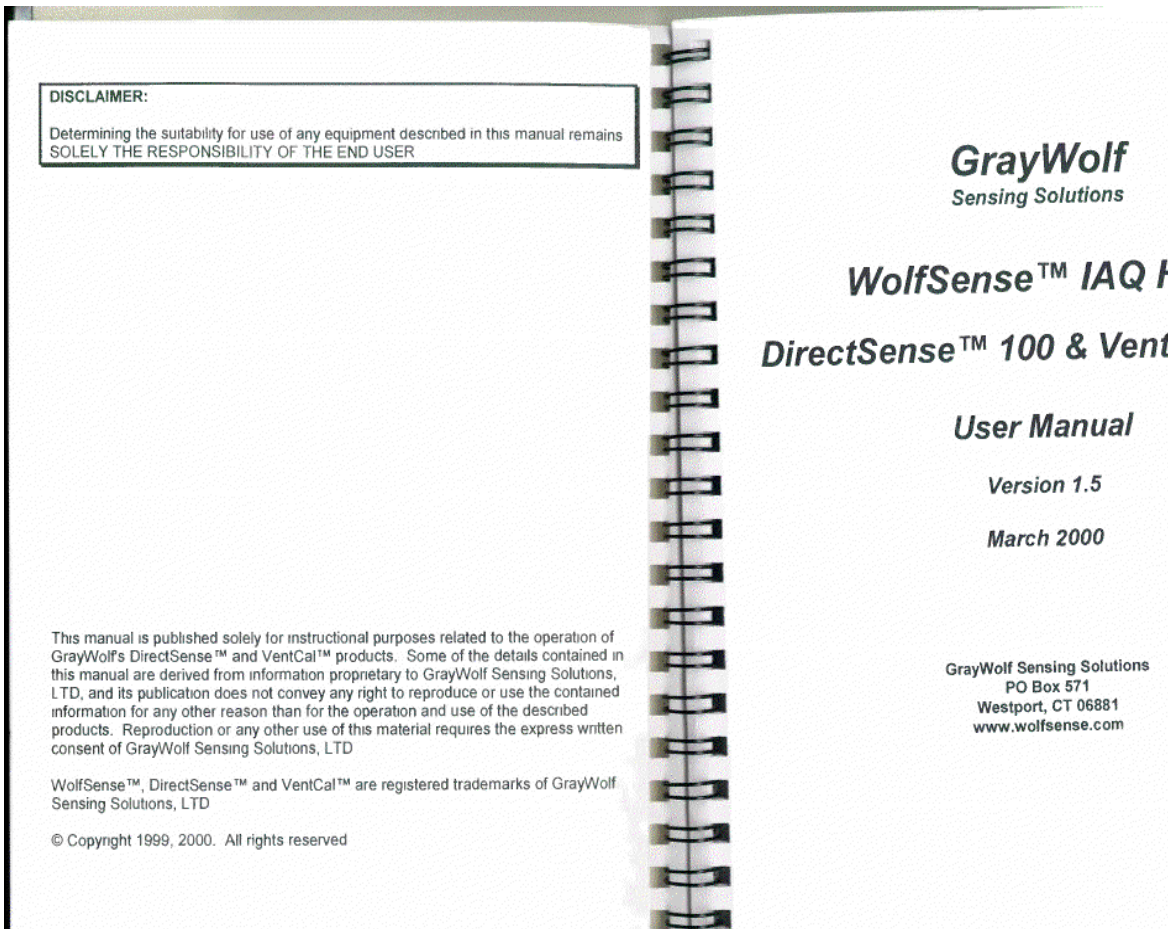
Foe NEC (HPC) support visit www.nec.com/support.

## 13.0 APPENDICES

A - WolfSense™ IAQ HPC DirectSense™ 100 & VentCal™ 100 Users Manual

APPENDIX A
WolfSense IAQ HPC DirectSense 100 & VentCal 100 Users Manual Version 1.5,
SOP #1728
May 2004


GRAYWOLF
SENSING SOLUTIONS
GrayWolf
Sensing Solutions
WolfSense™ IAQ HPC
DirectSense™ 100 & VentCal™ 10
User Manual
Version 1.5
March 2000



DISCLAIMER:

Determining the suitability for use of any equipment described in this manual remains SOLELY THE RESPONSIBILITY OF THE END USER

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GrayWolf
Sensing Solutions

WolfSense™ IAQ P

DirectSense™ 100 & Vent

User Manual

Version 1.5

March 2000

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Westport, CT 06881
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Table of Contents

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## Introduction

GrayWolf Sensing Solutions provides a fully integrated system
air quality and ventilation A Handheld PC (H/PC) running Wo
software takes readings of air quality from a probe connected
You may choose to view live readings as they happen and/or l
future use. Later, when the H/PC is connected to the desktop
any logged readings are transferred to the desktop PC for prin
exporting from WolfSense™ PC software to a word processor
Readings may also be printed directly from the H/PC to an opt

In the DirectSense™ 100 kit, the probe (model IQ-410) has fo
provide five measurements. Temperature (°F/°C), Relative Hu
Point, Carbon Monoxide (CO), and Carbon Dioxide ($CO_2$) Th
from Temperature and Relative Humidity readings

In the VentCal™ 100 kit, the probe (model CD-201) has two s
measurements of Carbon Dioxide, Temperature, and Outdoor
VentCal™ software (SOFT-VENT HPC) upgrades the DirectS
include all VentCal™ capabilities.

This manual will get you started Help files are available in all

## Unpacking your GrayWolf Monitor


*Figure 1* - Your GrayWolf monito
to get started

- *User Manual;*
- Probe IQ-410 for DirectSe
CD-201 for VentCal™ 100
- ACC-A110 GrayWolf AC ad
- ACC-ADY2 serial/AC powe
- PCC-03 softshell carrying c
- WolfSense™ software on C
software on 3½" disks),
- H/PC (if ordered from Gray
supplied accessones H/PC
cables, synchronization soft

*NOTE: The VentCal™ software*
*serial number found on the CD c*

## Powering

The H/PC will run using its own battery pack or with the help of the AC adapter supplied with the H/PC. **Before** first use, charge the battery according to the instructions in your H/PC manual

***NOTE: Charge your H/PC batteries frequently to avoid data loss. The H/PC uses minimal power even when turned off.***

Like the H/PC, the probe runs on batteries or with an AC adapter. The probe uses only alkaline batteries. The GrayWolf kit provides two D cells and a 110VAC adapter (240VAC in Europe) for the probe WolfSense IAQ HPC software will warn you if battery voltage is low If, when you plug in the probe, the batteries are flat, you will see "No Probe Attached" in the upper left-hand corner of the H/PC display

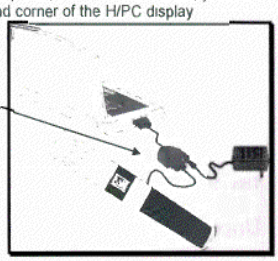


***Figure 2*** - Using AC Adapters to Power the H/PC and Probe

The ACC-ADY2 serial/AC power adapter allows you to power the probe with an AC adapter if you will be taking readings longer than the expected life of the batteries It has a serial adapter and an AC power socket

Changing Batteries on the Probes

Hold the top of the probe with one hand and the handle with the other

Twist the probe handle in a counterclockwise direction

Remove the old batteries

Insert 2 new D-cell alkaline batteries, ensuring that the battery positive is to the top

Carefully screw the handle back onto the probe, ensuring not to cross-thread the handle or overtighten it

***Figure 3*** - Battery Location on the Probe

When taking portable measurements, use the instant-on/instant-off feature of the H/PC to extend battery life When setting up the H/PC to work only from a battery pack for an extended period of time, refer to your H/PC user manual for tips on conserving battery power If you don't have access to AC power for extended data logging, use the Auto Start/Stop Log mode (see "Auto Start/Stop Log" on page 10)

**If the H/PC batteries and the backup batteries are comple files on the H/PC will be erased** You will need to reinstall t software from your desktop PC, or from the optional ACC-CF which maintains a copy of GrayWolf data in case of H/PC dat

## Setting up the Hardware and Software

The serial port on the H/PC (as in ***Figure 2***) is used to connec

- desktop PC during installation of the WolfSense softw
- probe while taking readings;
- desktop PC to transfer files of readings collected from

The H/PC will be referred to as a Mobile Device by the deskto

With the H/PC, you will use the stylus pen to tap options on th would click the left mouse button for your desktop PC

***NOTE: WolfSense IAQ HPC software is pre-loaded onto y shipping. Double-tap the GrayWolf icon on the H/PC to s Before you can analyze your data, however, you must loa software onto your desktop PC. Complete the 5 steps be between the H/PC and the desktop PC for sharing data an PC software for data analysis.***

1. Familiarize yourself with the H/PC user manual and the ***M Windows™ CE*** manual

2. Follow the instructions for setting up the H/PC, including t recommendation for the number of hours to charge the ba first use—even if powering it with the AC adapter provide

3. Install the synchronization software (Windows ActiveSync (Windows CE is hard-programmed onto the H/PC ) Wher the H/PC to the desktop PC with the serial cable.

4. Install the WolfSense software from the CD-ROM supplie
   - If the CD doesn't run automatically, from the PC **Start**
   - When prompted, choose the option to set up only PC Choose the option to load both PC and Remote files GrayWolf icon (and associated program) from the Gra or if you did not purchase your H/PC from GrayWolf
   - The Setup program loads WolfSense PC onto the des

5. Double-tap the GrayWolf icon to start WolfSense IAQ HP

## Navigating in WolfSense IAQ HPC

From the main screen, you will perform all the functions available with WolfSense IAQ HPC. The toolbar buttons and pull-down menus are described briefly below

Toolbar Buttons

LOG - starts a timed log previously set up
STOP- stops a timed log in progress
SNAPSHOT - manually captures live values instantaneously in a location file
ALL - displays all measurement parameters, updating readings continuously
HOME - returns to the main WolfSense screen
DETAILS - displays multiple readings in columnar format
STATISTICS - displays statistics about a chosen parameter
NOTEBOOK - accesses Text Notes, Drawing Notes and Report Templates
LOCATIONS - opens LOCATIONS dialog box

*Figure 4* - WolfSense IAQ HPC Main Screen Toolbar Buttons

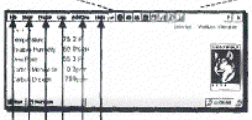


*Figure 5* - WolfSense IAQ HPC Main Screen Pull-down Menus

Pull-Down Menus

**Help** - to see **Help Topics** on WolfSense IAQ HPC or **E-mail** for WolfSense **Support**
**Add-ons** - VentCal Ventilation Calculations, Basic Volume Flow, DuctCal Equal Area Traverse, DuctCal Log-T Traverse, FumeCal Fumehood Face Velocity, ThermCal Thermal Comfort Add-ons listed on this menu are documented in separate manuals
**Log** - to set up how the readings will be logged as **Snapshot**, **Standard Timed** or **Auto Start/Stop** To view **Log Information** To set or create **Location** files or **Site** folders To **Start** or **Stop** a log
**Probe** - to see **Information** about the probe or to **Calibrate** the probe **View Active Cal** for probe calibration data **Detect PCMIA Port Probes**
**View** - to view **Readings**, **Details** or **Statistics** for live readings **View Location** where readings have been or will be logged Check individual measurement parameters to include or exclude them **View All** to display all measurement parameters **Change Units** of measure
**File** - to manage stored files **Open**, **Notebook**, **Copy to Clipboard** and then to Pocket Excel or Word, **E-mail Location** files from the H/PC, **Close**, **Options** (**Autobackup** to Compact Flash Card), **Exit**

## Live Mode

***Readings***

Once the probe is attached, WolfSense IAQ HPC will display
probe in real time.

To see current values from the probe
tap **View**, **Readings**

To change the units of measure, double-tap the current value (Also see CHANGE UNITS below)

When the AVAILABLE UNITS dialog box appears, tap the desired unit of measure for example, Fahrenheit, Celsius or Kelvin (absolute)

To remove a parameter from the display, tap **Disable Display**

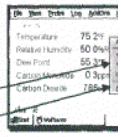
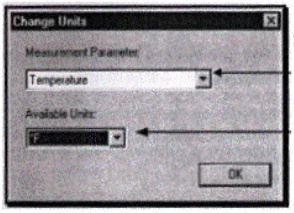


*Figure 6* - Live Mode -

To restore all parameters, tap the **ALL** toolbar button or **View**, **View All**, or type **Ctrl-A**

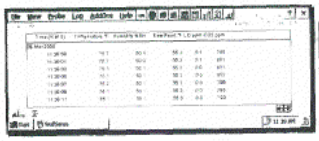



Another way to change
**View**, **Change Units**
In the CHANGE UNITS d
menu arrow for Measur
Tap the measurement
Tap the pull-down men
Tap the unit of measure

*Figure 7* - CHANGE UNITS dialog box

### *Details*

**Details** allows you to display multiple measurement parameters in columnar format This section describes how to view in real time live readings which are updated at two-second intervals (not user-adjustable) See "Stored Readings" on page 12 for information on viewing data that has been logged into location files at user-selected intervals.



To see continuously updated live values from the probe, tap the **Details** toolbar button or **View**, **Details**

The table displays columns based on parameters chosen for display in **View**, **Readings**

*Figure 8* - Live Mode - Details (DirectSense 100)

### *Statistics*

The Statistics window displays the minimum, maximum and average readings for a single parameter in a separate window that may be minimized and kept on the screen.

The **Manual/Auto** button toggles between Automatic and Manual modes.

In **Auto** mode, readings taken from the probe at two-second intervals update the minimum and maximum values, and are automatically added to the readings used to calculate the average. The **Stop/Resume** button lets you stop and resume readings in Auto mode.

In **Manual** mode, tap **Add** to add readings manually to the tally of readings included in the statistics calculations for the chosen parameter.

**Clear** resets the minimum, maximum and average to zero.


Tap the **Statistics** toolbar button or **View**, **Statistics**

To choose a different parameter for display, tap the pull-down menu arrow

## Data Organization: Sites and Locations

Logged readings are stored in individual data files called locati Calibration data, text notes, drawing notes, and template repo organized as attachments to these location files (see "Noteboo Location files are stored in Windows CE folders which WolfSe sites. Each site folder may contain multiple sub-sites and mul further organize the data.

For example, a site folder called "School" may have one sub-s Floor" containing locations for the "Principals Office" and "Libr site called "3rd Floor" containing a location for the "Teachers L in the WolfSense file system is \My Documents\WolfSense\, s files would have these file names:

\My Documents\WolfSense\School\Ground Floor\Principa
\My Documents\WolfSense\School\Ground Floor\Library l
\My Documents\WolfSense\School\3rd Floor\Teachers Lo

### *Creating, Selecting and Deleting Site Folders and Locatio*

First, create or select the site folder you need
Then, create or select a location file in that site folder
The next time a log begins, readings will collect in the location
This location file collects readings until you select a different lo


*Figure 10* - Log menu

To create a new site folder from the main WolfSe tap **Log**, **Locations/Sites** or the **Locations** toolb

In the LOCATIONS dialog box, tap **Sites**

In the SITES dialog box, you will see highlighted the name of the last site folder in which a location file was created or selected

To choose a different site, tap through the site folder tree until you see the desired site folder

Tap the site folder

Tap in the field under NEW SITE NAME

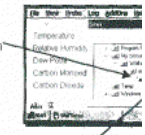
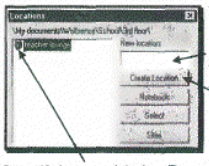


*Figure 11* - Sites dialog



Tap **Locations** Or, if starting from the main WolfSense IAQ HPC screen, tap **Log, Locations/Sites**

Tap in the field under NEW LOCATION

Type the name of the new location file

Tap **Create Location**

The new location file name will appear in the list of locations and is selected for logging

See "Notebook" on page 12 to create a text note, drawing note or template report for new or existing location files

*Figure 12* - LOCATIONS dialog box The wolf's head indicates a location file where data is or will be stored

To select an alternate location for logging, tap **Sites** and tap through the site folder directory to the desired site Tap **Locations**. Tap an existing location to highlight it Tap **Select** The dialog box will close and the location file will be ready for logging

To delete a location file or entire site folder, tap **File, Open** or **View, View Location** Tap through the site folder directory to the desired site or folder Press the **DEL** key Tap **Yes** to confirm that you want to send it to the Recycle Bin

***Printing a Location File from the desktop PC or the H/PC***

From the desktop PC. Transfer location files from the H/PC to the desktop PC (see "WolfSense IAQ HPC to WolfSense PC Data Transfer" on page 21) Open a location file Print directly from WolfSense PC to the printer.

From the H/PC: Set up the optional ACC-PR1 Printer for the H/PC. Tap **File, Open** or **View, View Location** Tap through the site folder directory to the desired site Tap **OK** to open the location file Tap **File, Copy to Clipboard**. From the Windows CE **Start** menu, tap **Programs, Office**, then **Pocket Word** or **Pocket Excel** Tap **Edit, Paste** Tap **File, Print**. Choose options for the printer Tap **OK**

## Types of Logs

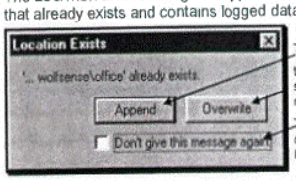

WolfSense IAQ HPC offers three ways to log data into a location file:

- Snapshot Log - manually
- Standard Timed Log - at pre-set intervals initiated at the measurement site and until stopped by user
- Auto Start/Stop Log - at pre-set intervals between pre-programmed start and stop times. This mode powers down after each logging session to extend battery power

*Figure 13* - Log menu

***Append or Overwrite***

The LOCATION EXISTS dialog box appears the first time you try t that already exists and contains logged data




Tap **Append** to ADD rea

tap **Overwrite** to DELET stored in that location fil new set of readings

Tap **Don't give this me** dialog box until the next log modes

*Figure 14* – LOCATION EXISTS dialog box

***Snapshot Log***

The Snapshot Log lets you log values from the probe manuall values if you are running a Standard Timed or Auto Start/Stop

Tap the **Snapshot** toolbar button or **Log, Snapshot Log**

The dialog box confirms the name of the location file to which values are being logged

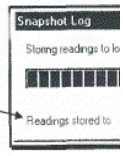



*Figure 15* - Confirmatio

***Standard Timed Log***

The Standard Timed Log program logs readings in a location intervals—until you stop the data logging or exit from WolfSer STANDARD TIMED LOG SETUP dialog box, set the location file to interval between readings

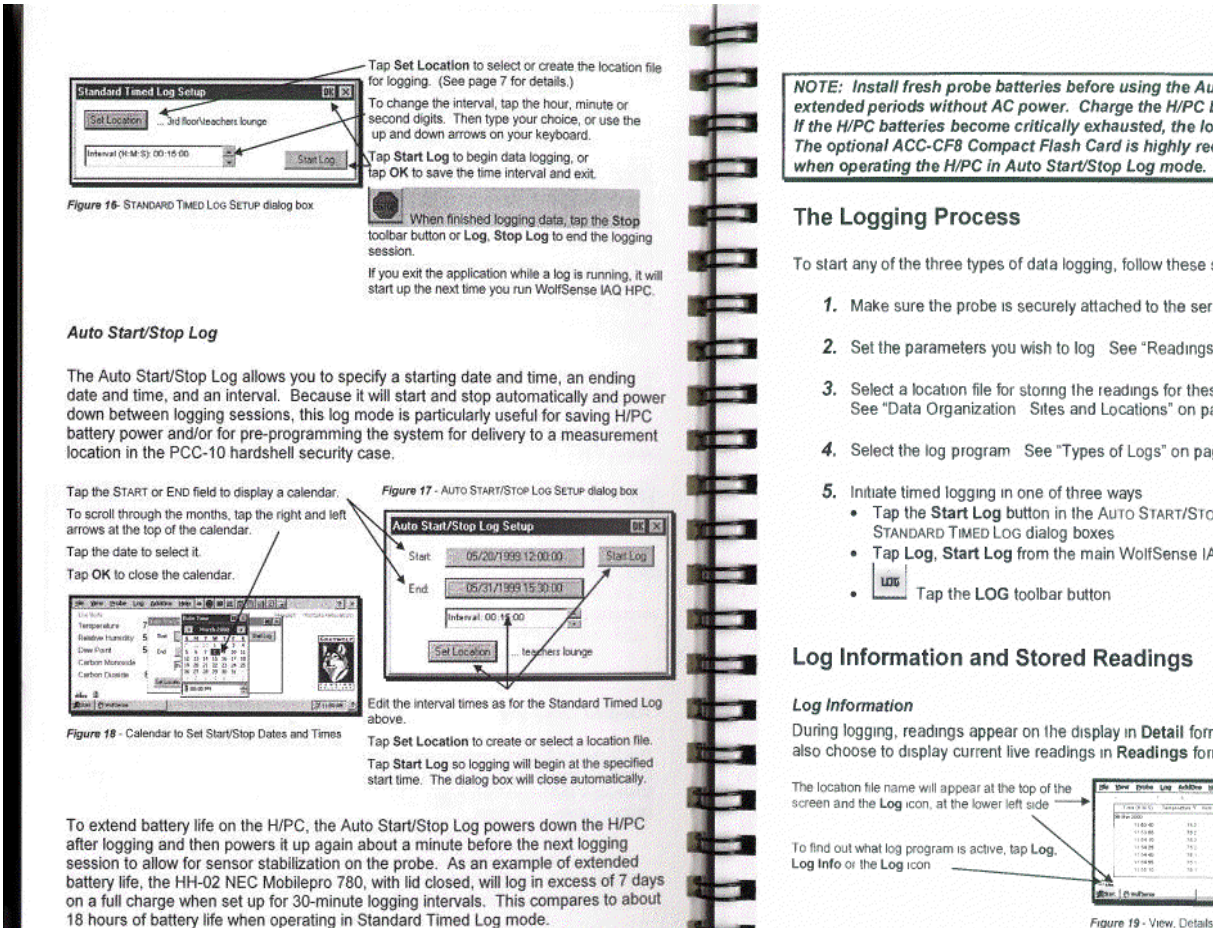
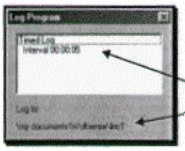



*Figure 16*- STANDARD TIMED LOG SETUP dialog box

*Figure 17* - AUTO START/STOP LOG SETUP dialog box

*Figure 18* - Calendar to Set Start/Stop Dates and Times

*Figure 19* - View, Details



The LOG PROGRAM dialog box shows the kind of log, the specified interval, and the location file to which readings are being logged

*Figure 20* - LOG PROGRAM dialog box

***Stored Readings***

You may also view stored readings after logging them in a file From the main WolfSense IAQ HPC screen, tap **File**, **Open** or **View**, **View Location**. Tap through the site folders to locate the location file you want to open Tap to highlight it. Tap **Select**.

## Notebook

Notebook contains Text Notes, Drawing Notes and Report Templates that you create for your location files Each location file may have one text note and one drawing note, both of which may be updated as often as needed The multiple report templates provided may be copied and saved as many times as needed for each location file. You may add or delete your own customized template files in the "Report" selection by modifying \ProgramFiles\GrayWolf\WolfSense\Templates

Text notes, drawing notes and template reports may be printed from the desktop PC after transferring location files from the H/PC to the desktop PC

*Figure 22* - Notes and Reports from desktop PC

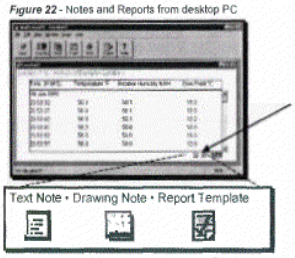



*Figure 21* – Notebook icons for Notes and Reports

Once a text note, drawing note or template report has been created for a location, an icon will appear in the lower right-hand corner of the screen These icons will also appear on the WolfSense PC software on your desktop PC

Tap the desired icon to view or edit the associated text note, drawing note or template report

To print from the desktop PC, click on **Edit**, **Copy** to copy the note or report to the clipboard Click on **Edit**, **Paste** to paste the note or report into Word, Excel or other document Click on **File**, **Print**

You may print a text note or template report directly from the viewer Click on **File**, **Print** (This will not work for a drawing note )

Just as you do when you set up a log, you must first select the you wish to create notes or reports.

From the main WolfSense IAQ HPC screen, tap **Log**, **Locations/Sites**
Tap **Sites** to find the desired site folder
Tap **Locations** for a list of location files
Tap the desired location file name Tap **Select**
You are ready to create notes and/or reports for that location

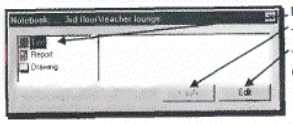
Shortcut Tap the **Notebook** toolbar button or **File**, **Notebook** to go directly to the last location file selected


*Figure 23* - LOCATIONS d

***Notes***

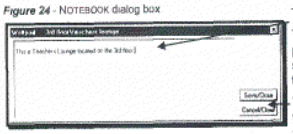
To create or edit a note immediately after selecting a location tap **Notebook** o

**Text Notes**



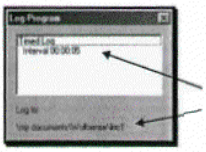

For a text note, tap **Text**
Tap **Create**
The **Edit** button will be a exists for the location

*Figure 24* - NOTEBOOK dialog box




Tap inside the edit wind
Type or revise a text no provided On your keyb start new lines of text, u the cursor through the t
Tap **Save/Close** to exit tap **Cancel/Close** to clo saving any changes

*Figure 25* - Text Note window



The LOG PROGRAM dialog box shows the kind of log, the specified interval, and the location file to which readings are being logged

*Figure 20* - LOG PROGRAM dialog box

### *Stored Readings*

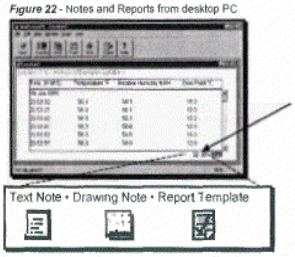
You may also view stored readings after logging them in a file From the main WolfSense IAQ HPC screen, tap **File**, **Open** or **View**, **View Location**. Tap through the site folders to locate the location file you want to open Tap to highlight it. Tap **Select**.

## Notebook

Notebook contains Text Notes, Drawing Notes and Report Templates that you create for your location files Each location file may have one text note and one drawing note, both of which may be updated as often as needed The multiple report templates provided may be copied and saved as many times as needed for each location file. You may add or delete your own customized template files in the "Report" selection by modifying \ProgramFiles\GrayWolf\WolfSense\Templates

Text notes, drawing notes and template reports may be printed from the desktop PC after transferring location files from the H/PC to the desktop PC

*Figure 22* - Notes and Reports from desktop PC




Once a text note, drawing note or template report has been created for a location, an icon will appear in the lower right-hand corner of the screen These icons will also appear on the WolfSense PC software on your desktop PC

Tap the desired icon to view or edit the associated text note, drawing note or template report

To print from the desktop PC, click on **Edit**, **Copy** to copy the note or report to the clipboard Click on **Edit**, **Paste** to paste the note or report into Word, Excel or other document Click on **File**, **Print**

You may print a text note or template report directly from the viewer Click on **File**, **Print** (This will not work for a drawing note )

*Figure 21* – Notebook icons for Notes and Reports

Just as you do when you set up a log, you must first select the you wish to create notes or reports.

From the main WolfSense IAQ HPC screen, tap **Log**, **Locations/Sites**
Tap **Sites** to find the desired site folder
Tap **Locations** for a list of location files
Tap the desired location file name Tap **Select**
You are ready to create notes and/or reports for that location

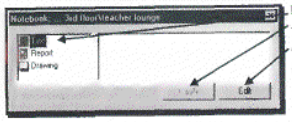
Shortcut Tap the **Notebook** toolbar button or **File**, **Notebook** to go directly to the last location file selected


*Figure 23* - LOCATIONS d

### *Notes*

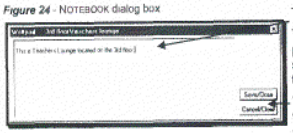
To create or edit a note immediately after selecting a location tap **Notebook** o

### Text Notes




For a text note, tap **Text**
Tap **Create**
The **Edit** button will be a exists for the location

*Figure 24* - NOTEBOOK dialog box

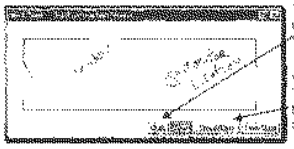


Tap inside the edit wind
Type or revise a text no provided On your keyb start new lines of text, u the cursor through the t
Tap **Save/Close** to exit tap **Cancel/Close** to clo saving any changes

*Figure 25* - Text Note window

### Drawing Notes

Tap **Drawing** in the NOTEBOOK dialog box (*Figure 24*). Tap **Create**.
The **Edit** button will be available only if a drawing already exists for the location file selected.
Create a drawing with the ink-capture editor provided.
To draw points: tap on the screen.
To draw freehand: hold the stylus on the screen while moving it.



To remove all points drawn since the last time the stylus touched the screen, tap **Undo**.
To remove all points, tap **Clear**.
To erase individual points, hold down the **Alt** key while tapping or dragging the stylus.
Tap **Save/Close** to save the file with changes, or tap **Cancel/Close** to close the editor without saving any changes.

*Figure 24 - Drawing note window*

### *Reports*

Use the multiple report templates provided in WolfSense IAQ HPC to create reports for any location file. Create as many copies of each as needed. Add your own report templates to the \Program Files\GrayWolf\WolfSense\Templates directory. Create templates using a word processor and save them as Rich Text Format (.rtf) files.

To access Reports from the main WolfSense IAQ HPC screen, tap **Log, Locations/Sites, Notebook**, or, if you have already selected the location file, tap **File, Notebook** or the **Notebook** toolbar button:

Tap **Report**.
Tap a report template on the right.
Tap **Create**. **Edit** will be available only if a report already exists for the location.
The report will be displayed in MS Pocket Word. See Help for Pocket Word about editor features.
A report transferred to the desktop PC will be converted to the RTF (Rich Text Format) file type.

*Figure 25 - Report Template*

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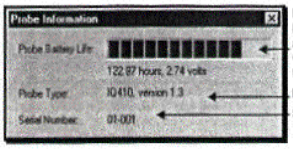
## Probe Information

To display the status of the probe, tap **Probe**, **Information**.




**Probe Battery** - how m
Battery life calculations
alkaline batteries used
will vary depending on
the ambient temperatur
**Probe Type** - model nu
**Serial Number** - uniqu

*Figure 28* - PROBE INFORMATION display

## Probe Calibr

Calibration data includes date, time, last factory calibration, la
settings for each parameter It is stored in the probe and a cc
the measurement data) in every location file Any time calibra
new data is appended to the calibration data already in the loc
complete record of calibrations for all measurement data in ea
location file transferred from the H/PC to the desktop PC will
data with the measurement data.

You may view calibration data from location files stored on the
desktop PC after location files have been transferred to it.

From the WolfSense main screen on the H/PC or desktop PC, open a location file

Tap the **Calibration Data** icon in the lower right-hand corner of the screen
On the H/PC you may tap **Probe**, **View Active Cal** instead

*Figure 29* – Probe Calit

You may also view calibration data for a probe attached to the
that case, the Calibration Data icon will be in the lower left-ha

### Probe Calibration

The probe may be calibrated in one of three ways.

- at the factory, according to GrayWolf standards;
- at the factory (or an outside calibration laboratory) using NIST-certified traceable standards,
- by the user (described in this section)

You cannot change factory and NIST calibrations Temperature is factory-calibrated. Dew Point*, which is derived from Temperature and Relative Humidity*, has no calibration.

The three parameters you may change are Relative Humidity (%RH)*, Carbon Monoxide(CO)* and Carbon Dioxide ($CO_2$) The range for each parameter has two pre-set calibration points Normally, you only change these points to match reference gas or salt values for calibration

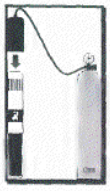


*Figure 30* - Calibration Environment for CO or $CO_2$ Flowhood over Probe

Calibration should be performed at least every 12 months on the %RH sensor and at least every 6 months on the CO and $CO_2$ sensors More frequent calibration is recommended if the sensors are exposed to contaminants such as heavy cigarette smoke Note that most IAQ monitoring protocols advise calibrating CO and $CO_2$ sensors more frequently.

The probe should be returned to the factory for temperature calibration every 24 months WolfSense provides kits for %RH, CO and $CO_2$ calibration. See "Probes & Accessories" on page 30 for the contents of each kit

To set up the correct calibration environment for Carbon Monoxide(CO)* and Carbon Dioxide ($CO_2$), place the flowhood over the probe (***Figure 30***) For Relative Humidity (%RH)*, place the probe upside down in the gas cylinder with salts and water (***Figure 31***).

*Figure 31* - Calibration Environment for %RH Probe in Gas Cylinder with Salts and Water

***Note: If WolfSense detects that a sensor may have drifted out of specification, the $*_{CAL}$ icon will appear, along with a * next to the parameter that may need to be checked. However, do NOT rely on this indicator to ensure proper calibration because WolfSense can only detect sensor drift in some instances.***

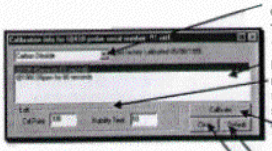
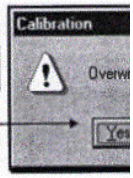


*Figure 32* - PROBE CALIBRATION dialog box

To calibrate the probe, tap Pr
Tap the ▼ arrow to see the di
calibrated parameters
Tap the parameter you want t
Tap the high or low point valu
Edit the CAL POINT to match y
necessary CAL POINT must n
reference you use Recomm
seconds, but you may edit it if
Tap **Calibrate** to begin the ca
Optional Tap **Default** to forc
the factory defaults for calibra
times initially supplied by Gra
Optional: Tap **Clear** to remov
a user calibration is cleared, t
calibration (if available) or the
**Clear** affects only the selecte

If you changed the calibration point value, you will be prompted to confirm this action

***WARNING!*** *Confirming this action will overwrite the existing calibration settings*



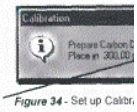

Tap Yes

*Figure 33* - CALIBRATION

Place the probe in the appropriate calibration environment

Start the flow of gas for CO or $CO_2$, or place the probe in the %RH chamber

Wait for the readings to settle within a range of roughly 2-3% This typically takes under 2 minutes for CO and $CO_2$, but 15-30 minutes for %RH




Tap **OK**

*Figure 34* - Set up Calibr

A countdown screen shows the additional stabilization time allowed and remaining for this measurement


Once the stabilization time has elapsed, the software will automatically record the current value of the measurement You may then continue with the other calibration point or other measurement parameters

All calibration information is stored in the

*Figure 35* - Calibration C

probe so that each probe "remembers" its correct calibration values. You will be prompted to send the updated calibration information to the probe.

***NOTE:*** *No changes to the calibration information are confirmed to the probe until you tap* ***OK*** *to exit the calibration dialog box.*


Tap **OK** in the upper right-hand corner of the CALIBRATION IN-0 dialog box (***Figure 32***)

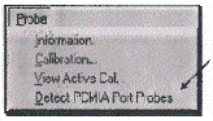
Tap **Yes** to send the new calibration information to the probe

**No** to abandon your changes, or

**Cancel** to return to the calibration dialog box

***Figure 36*** - Last Chance to Stop Changes to Calibration Settings or Probe

### *Calibrating Additional External Probes*




If you want to calibrate an additional probe, such as an MIE particulate sensor (see separate manual), plug it into the PCMIA slot and select **Detect PCMIA Port Probes** on the Probe menu. Because selecting this option slows down response time, uncheck it when you are not plugging a probe into the PCMIA slot

***Figure 37*** – Probe menu



## Navigating in WolfSense PC

From the main screen, you will perform all the functions available with WolfSense PC. The pull-down menus and toolbar buttons are described briefly below.

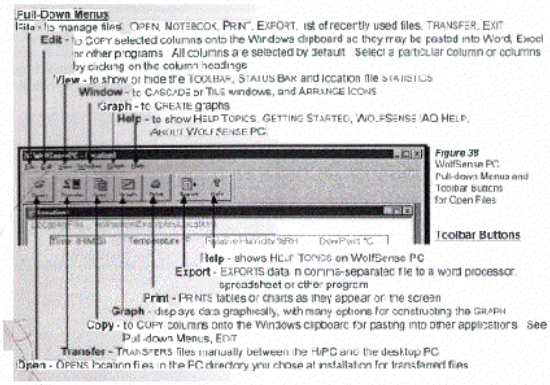



***Figure 38*** WolfSense PC Pull-down Menus and Toolbar Buttons for Open Files

## WolfSense IAQ HPC to WolfSense PC Data Transfer

After gathering air quality data on the HPC using WolfSense IAQ HPC, you will use the file transfer utility in WolfSense PC to move location files from the HPC to your desktop PC's hard drive. WolfSense PC software on the desktop PC will print, graph and/or export to spreadsheets the transferred location file data.

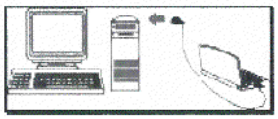


***Figure 39*** - HPC connected to desktop PC for file transfer

***NOTE:*** *Since the H/PC does not have a hard drive and all data files on the H/PC are stored in RAM memory only, it is strongly recommended that you frequently move location files from the H/PC to your desktop PC's hard drive for permanent storage Make sure the location files on the H/PC are in the \My Documents\WolfSense folder that was created during installation*

When you are ready to transfer files from the H/PC to the desktop PC, use the serial cable to connect the H/PC to your desktop PC. When the desktop PC and H/PC are communicating, the connection icon will appear on the task bar of both the H/PC and PC. If the desktop and H/PC do not connect automatically, you may have to initiate communications manually.

- From your PC desktop, double-click on the **Mobile Devices** icon From the **File** menu, make sure that Serial Communications are enabled and check the Communications parameters
- From the H/PC, tap **Start**, **Programs**, **Communications**, **PC Link**
- You may need to reattach the serial cable or close WolfSense IAQ HPC

***NOTE:*** *Make sure that data logging is not running while transferring files Location files that are currently being used for logging cannot be transferred*

***Using WolfSense PC's Transfer Utility***

WolfSense PC uses Microsoft ActiveSync™ software to establish the link between your H/PC and desktop PC (If ActiveSync is not installed on your system, GrayWolf's WolfLink runs automatically instead WolfLink transfers only WolfSense files If using WolfLink, WolfSense IAQ HPC must be running on the H/PC ) The Transfer Utility then moves location files from the H/PC to your desktop PC

From the PC desktop, click on **Start**, **Programs** **GrayWolf**, **WolfSense PC**

Activate the Transfer Utility by clicking on **File**, **Transfer** or the **Transfer** toolbar button

When prompted, connect the H/PC to the desktop PC with the serial cable (or use the IR port)

ActiveSync (or WolfLink) will link the H/PC and desktop PC

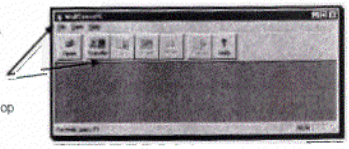
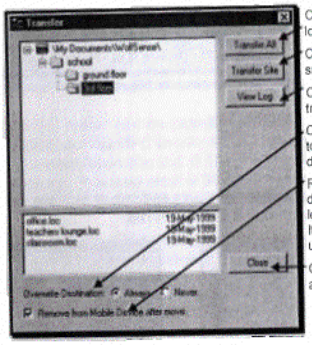


***Figure 40*** - WolfSense PC Main Screen

Then you will see the TRANSFER dialog box below. It works like Explorer:

- Expand or collapse a site tree item by clicking the + a
- Select a site folder by clicking on the name.
- A selected item appears in reverse video.
- When you select a site folder, all location files in it are

Once connected, you will see the structure of the \My Docume folder on the H/PC This same site folder structure will be cre in the data files folder you selected during installation to recei




Click on **Transfer All** to locations

Click on **Transfer Site** site with all its sub-sites

Click on **View Log** to s transfer, such as errors

OVERWRITE DESTINATIO to overwrite any locatio desktop PC ALWAYS

REMOVE FROM MOBILE default is to delete from location files that were If you do not wish to de uncheck the checkbox

Click on **Close** when y all the location files yo

***NOTE:*** *Althoug are displayed, Report files and moved with the*

***Figure 41*** - WOLFSENSE TRANSFER dialog box

## WolfSense PC Software

After file transfer is complete, click on **Start**, **Programs**, **GrayWolf**, **WolfSense PC**

Click on **Open** to see location files that are now stored on your desktop PC

Click through the directory to find the file you want to open

Click on **Open**

The file will open in a columnar format similar to **View, Details** on the H/PC

The icons in the lower left-hand corner indicate if a text note, drawing note or template report exists for this file

Tap this icon to see Calibration Data

See "Navigating in WolfSense PC" on page 21 for ways to manipulate your data (graphing shown below)

*Figure 42* – Location File Open in WolfSense PC

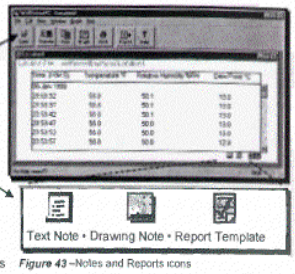





*Figure 43* –Notes and Reports icons

### *Graphing Data Files in WolfSense PC*

WolfSense PC offers options for creating graphs: an x-axis and one or multiple y-axes, grids and labels, and titles that may or may not be displayed

*Figure 44* - Graph Axes

*Figure 45* - Graph Options

*Figure 46* - Graph Title

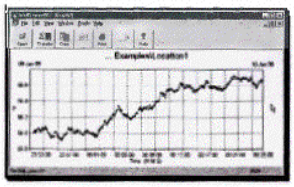


*Figure 47* - Graph Generated from WolfSense PC

## Maintenance, Cleaning, Service

***H/PC***

Please refer to your user manual for specific instructions on t

***Probe***

The probe requires very little maintenance· battery changes sensor replacement (typically every 24-36 months), dusting

See "Powering" on page 2 for details on battery changes.

The %RH, CO and $CO_2$ sensors may be calibrated in the fiel instructions in "Probe Calibration" on page 18 The tempera at the factory. It is recommended that you return your probe annual factory recalibration and check-up

The CO sensor has an expected operating life of approximat WolfSense IAQ HPC checks the output of the sensor during CO sensor nears the end of its operating life, warns you that replaced. You may order a SEN-CO1 replacement sensor fr the probe to GrayWolf to have the sensor changed

To change the CO sensor yourself:

1. Unscrew the probe handle from the probe body (See ***Figure 3*** o
2. Carefully remove the black cap from the top of the probe This is normally be removed by hand
3. Cut the tie that is holding the $CO_2$ and CO sensors
4. Unplug the $CO_2$ cell
5. Unplug the CO cell
6. Plug in the new CO cell
7. Plug in the $CO_2$ cell
8. Fix cells in place with a new tie
9. To reassemble the probe, use the reverse procedure

Before using the probe with the new sensor, calibrate the C( procedure described in "Probe Calibration" on page 18

When not using the probe for a period of time, store it in a c environment. The recommended storage temperature is 32 If the storage period will be more than four weeks, remove t probe before storing

If the outside of the probe becomes dirty, you may clean it u cloth. It is not recommended that you clean inside the probe

## Summary of Cautions

Avoid operation in direct sunlight as X-Rd measurements may become erratic.

Do not immerse the probe in water.

This is a precision instrument. Do not drop the probe or subject it to undue vibration or shock.

When not using the probe for a period of time, store it in a cool, dry, dust-free environment. The recommended storage temperature is 32°F to 70°F (0°C to 21°C). If the storage period will be more than four weeks, remove the batteries from the probe before storing.

Do not place the probe in an environment where condensation will form on it. The $CO_2$ sensor is an optical sensor which uses an active detector and a reference detector for stable long-term readings. If condensation has formed on one of the detectors or if there are temperature differences between the two detectors, $CO_2$ readings may be erratic until the sensor has stabilized to its new environment.

## Troubleshooting

*Symptom – The H/PC has locked up*

First try a Simple Reset to close all programs and applications t
restart Windows CE. Whether the power is on or off, use the st
**Reset** button (usually found on the bottom of the unit). Any unsa

If the unit does not respond to the Simple Reset, you will need t
Reset, which returns the H/PC to its original state as shipped fr
**Reset erases from your H/PC all data, files, and programs st**
**(like WolfSense).** It does not erase hard-programmed software
Pocket Word or Excel. Nor will it erase anything stored on the A
Flash Card, which maintains a backup copy of WolfSense and F

1. Back up the H/PC to the desktop computer through sync
   performing the Full Reset. This may not be possible or
   usually means the unit has not responded to less drastic

***Note: Steps 2. through 4. apply to H/PCs provided by Gray***
***was not provided by GrayWolf, check your H/PC User Manu***
***directions.)***

2. Shut off the H/PC.
3. Remove the main battery.
4. With the stylus pen, press the Backup Off Switch or Ful
   is recessed in the main battery compartment, for 45-60
   This removes power from the backup memory circuit an
5. Power on the H/PC.
6. Run the Setup Wizard, starting with Stylus Calibration.
   If you bypass stylus calibration, the touch screen will not
7. Reinstall WolfSense from the optional ACC-CF8 Compa
   desktop PC (see "Setting up the Hardware and Software

Minimize future data loss and simplify recovery through frequent
scheduled synchronizations with the desktop PC. Consider using
Compact Flash Card for the H/PC with the Autobackup option on
H/PC **File**, **Options** menu. Autobackup stores all WolfSense da
separate backup directory on the Compact Flash Card. Because
automatically backs up data every four minutes, you should lose
minutes' worth of readings.

**Symptom – GrayWolf icon no longer appears on the desktop**
The GrayWolf application, WolfSense IAQ HPC, is not hard-programmed onto the H/PC like Windows CE. If the icon no longer appears on the desktop, you will need to reinstall the program from your desktop PC (see "Setting up the Hardware and Software" on page 3) or from the optional ACC-CF8 Compact Flash Card as described in the ACC-CF8 manual

**Symptom – No communication with the probe**
Check to ensure that
- The probe is plugged in properly.
- The probe has good batteries
- The battery contacts are clean and not corroded
- The $CO_2$ sensor is flashing (visible through the slots) to indicate power is on.
- Another application on the H/PC has not locked the use of the serial port. Shut down any other applications. If this fails, you may have to reset the H/PC

**Symptom – Bad or erratic $CO_2$ or %RH readings**
Check to ensure that
- The probe is shielded from direct sunlight Readings from these sensors can be affected by strong direct light.

**Symptom – Bad or erratic $CO_2$ readings**
Check to ensure that
- The sensor is plugged into the circuit board
- You have not moved the probe from a cold environment to a relatively warm, humid environment
- The probe is not in a variable temperature air stream.

The $CO_2$ sensor is an optical sensor which uses an active detector and a reference detector for stable long-term readings If condensation has formed on one of the detectors or if there are temperature differences between the two detectors, $CO_2$ readings may be erratic until the sensor has stabilized to its new environment.

**Symptom – $CO_2$ sensor continues to flash after H/PC is turned off**
It is normal for the sensor to flash for a minute or two after power-down.

## Specifications

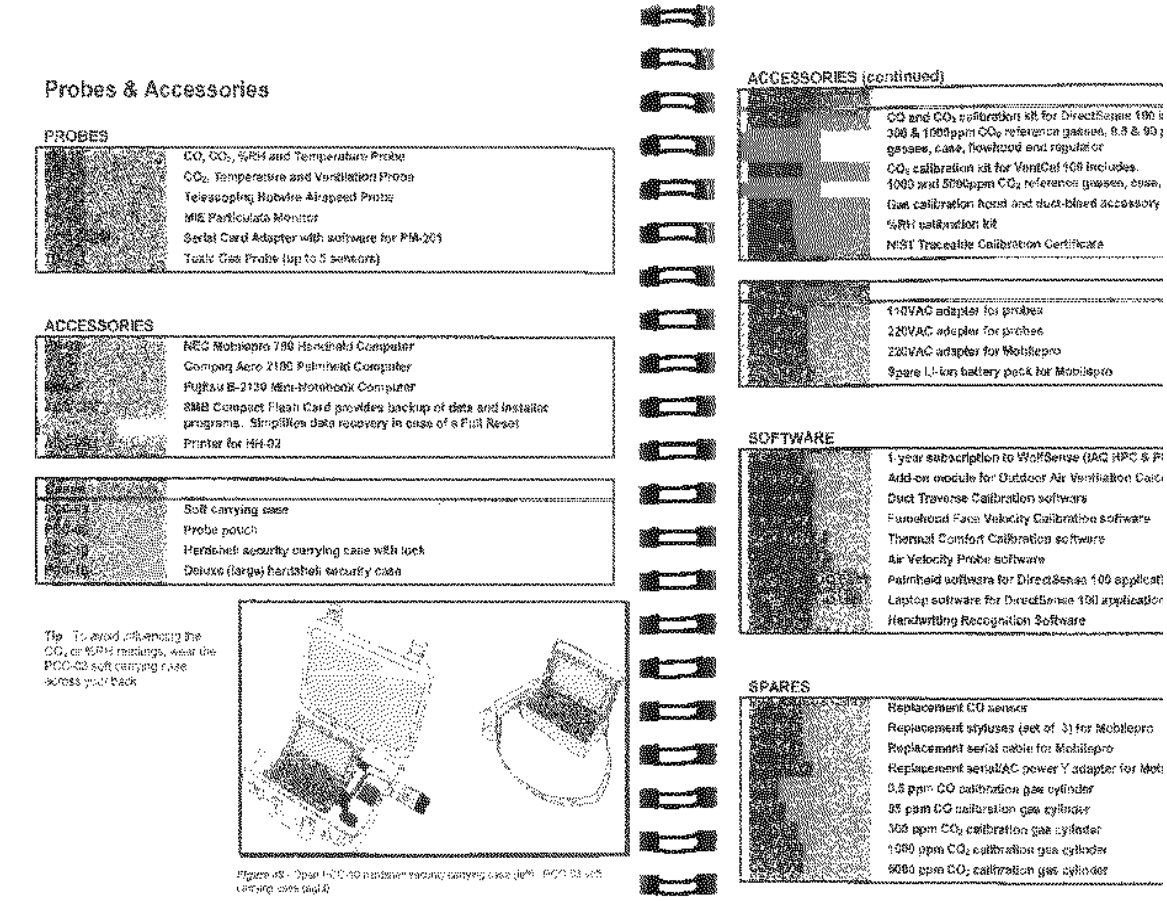
**H/PC**
16MB RAM minimum
Windows™ CE 2 0
Recommended models:
NEC Mobilepro 780

**DESKTOP PC (minimum requirements)**
Windows™ 95/98/NT
10MB minimum available hard disk space

**PROBES**

| Parameter | Range | Accurac |
|---|---|---|
| Carbon Dio› de | 0 to 10,000ppm | ±3%rdg |
| Carbon Mon ›xide | 0 to 500ppm | ±2ppm < |
| Relative Hur idity | 0 to 100% | ±2%rh < |
| Temperatur | 15° to 160°F (-10° t‹ 70°C) | 1%rdg ± |
| Dew Point | -27° to 158°F (-33° t › 70°C) | ±4°F for |

**Response Time:** All sensors exhibit 90% response < 1 min
**Probe Dimensions:** 2 in. (5cm) diameter X 12 5in. (30cm)
**Weight (probe) with batteries:** 1 lb. 10 oz (0 7kg)
**Power (probe):** Typical battery life with 2 alkaline D cells of (21°C); or 5VDC with AC adapter



Probes & Accessories

PROBES

- CO, $CO_2$, %RH and Temperature Probe
- $CO_2$, Temperature and Ventilation Probe
- Telescoping Pitot-tube Airspeed Probe
- IAQ Particulate Monitor
- Serial Card Adapter with software for PM-201
- Toxic Gas Probe (up to 5 sensors)

ACCESSORIES

- NEC Mobilepro 780 Handheld Computer
- Compaq Aero 2180 Palmheld Computer
- Fujitsu B-2130 Mini-Notebook Computer
- 8MB Compact Flash Card provides backup of data and installed programs. Simplifies data recovery in case of a Full Reset
- Printer for HH-82

- Soft carrying case
- Probe pouch
- Hardshell security carrying case with lock
- Deluxe (large) hardshell security case

Tip: To avoid influencing the $CO_2$ or %RH readings, wear the PCC-03 soft carrying case across your back.

Figure 48 - Type I-C-10 hardshell security carrying case (left), PCC-03 soft carrying case (right)

ACCESSORIES (continued)

- CO and $CO_2$ calibration kit for DirectSense 100 (300 & 1000ppm $CO_2$ reference gasses, 9.5 & 90 gasses, case, flowhood and regulator
- $CO_2$ calibration kit for VentCal 106 Includes: 1000 and 5000ppm $CO_2$ reference gasses, case, Gas calibration hood and duct-blast accessory
- %RH calibration kit
- NIST Traceable Calibration Certificate

- 110VAC adapter for probes
- 220VAC adapter for probes
- 220VAC adapter for Mobilepro
- Spare Li-Ion battery pack for Mobilepro

SOFTWARE

- 1 year subscription to WolfSense IAQ HPC & P
- Add-on module for Outdoor Air Ventilation Calc
- Duct Traverse Calibration software
- Fumehood Face Velocity Calibration software
- Thermal Comfort Calibration software
- Air Velocity Probe software
- Palmheld software for DirectSense 100 applicat
- Laptop software for DirectSense 100 applicatio
- Handwriting Recognition Software

SPARES

- Replacement CO sensor
- Replacement styluses (set of 3) for Mobilepro
- Replacement serial cable for Mobilepro
- Replacement serial/AC power Y adapter for Mob
- 9.5 ppm CO calibration gas cylinder
- 90 ppm CO calibration gas cylinder
- 300 ppm $CO_2$ calibration gas cylinder
- 1000 ppm $CO_2$ calibration gas cylinder
- 5000 ppm $CO_2$ calibration gas cylinder

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Mr. Don Grayway Sewing
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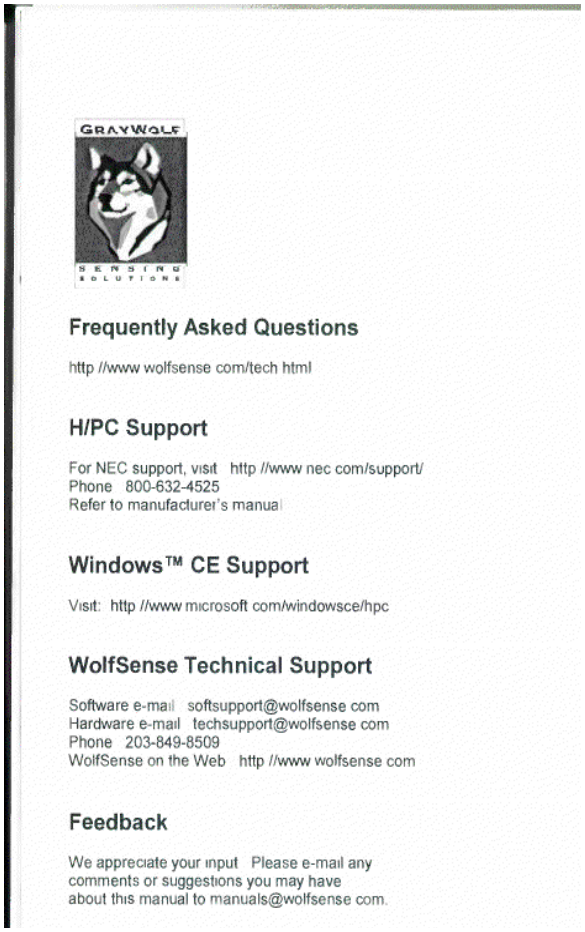
Jonesboro ME
04648

Warranty

Limitation of Warranty and Liability for GrayWolf Products



GRAYWOLF SENSING SOLUTIONS

## Frequently Asked Questions

http //www wolfsense com/tech html

## H/PC Support

For NEC support, visit http //www nec com/support/
Phone 800-632-4525
Refer to manufacturer's manual

## Windows™ CE Support

Visit: http //www microsoft com/windowsce/hpc

## WolfSense Technical Support

Software e-mail softsupport@wolfsense com
Hardware e-mail techsupport@wolfsense com
Phone 203-849-8509
WolfSense on the Web http //www wolfsense com

## Feedback

We appreciate your input Please e-mail any comments or suggestions you may have about this manual to manuals@wolfsense com.