

# Harnessing the Power of Mobile Computing for Advanced Environmental Measurements

✓ Surveyed

✓ Documented

✓ Reported



Example Screens

Realtime

TVOC	213	ppb
Carbon Dioxide	619	ppm
Carbon Monoxide	0.3	ppm
Ozone	0.45	ppm
Temperature	20.1	°C
Relative Humidity	20.4	%RH
Concentration	0.91	µg/m <sup>3</sup>

Live Graph

Drawing Note

Audio Note

# DIRECTSENSE® IAQ

Indoor Air Quality Monitors



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**GrayWolf is changing the way that environmental measurements are taken. The DirectSense IAQ harnesses leading-edge sensor technology with the power and performance of mobile computing: your choice of Pocket PC, XP/Vista PC or embedded computer platforms.**

- An essential component of any professional IAQ program
- Organizes ALL survey info; data, text, calibration history and more...
- Measures VOCs, CO<sub>2</sub>, CO, %RH, Dewpoint, Temperature and more...
- Options for Toxic Gases, Differential Pressure, Particulates, Airspeed and more...
- Tap the screen for educational info: sensor tips, IAQ documents and guidelines
- Extremely easy to use
- Comes with 18 IAQ Field (Word) forms (mold checklist, etc.) for on-site input
- WolfSense™ PC desktop software is included for data review, graph creation, cut & paste report generation
- Optional Advanced Report Generator software for automated, ultra-efficient, detailed IAQ reports
- Extensive on-board help files, including video help



Standard Pocket PC



Ruggedized Pocket PC



Ultra-mini/Tablet PC  
(with built in camera and swivel touch screen)

### Example Pocket PC Screens

Field (Word) Form      On-board Docs

Realtime

Sensor Tips

Help Files

Field Form(s) Attached

Text Note

Cal Info

Audio Note Attached

Drawing Note Attached

Trend Log

Event Notes

WolfSense

Live Mode  
Selected: ... Building6\Lounge

TVOC	146ppb
Carbon Dioxide	561ppm
Carbon Monoxide	1.6ppm
Ozone	0.17ppm
Temperature	71.0°F
Relative Humidity	18.5%RH
Dew Point	55.7°F

WolfSense Pocket PC version Help

Table of Contents

- Main Reading Display
- Rules
- Creating and Selecting Locations
- Resolving Location Data
- Changing Units
- Helpdesk
- Logging
- Calibration
- Statistics
- Documents
- Auto Backup
- Data Import and Auto Security

Display measurements in realtime. Access "sensor tips", IAQ documents and guidelines on-screen. Store "snapshot" readings. "Trend" log over hours/days/weeks. Document each measurement location with text, graphic, even audio notes. Also attach photos, Word field forms, time-stamped event notes, calibration history and other info to data files.

- Optimize the balance between ventilation energy efficiency and occupant performance (and health)
- Easily establish baseline data & respond immediately to complaints
- Test conditions before and after building modifications
- Screen for additional testing requirements
- Bloodhound pollutant sources

Realtime (IQ-610 w/ Particle Counts)

Realtime (IQ-410 w/ Particulate Concentration)

TVOC	121ppb
Carbon Dioxide	522ppm
Carbon Monoxide	0.6ppm
Ozone	0.01ppm
Temperature	21.2°C
Relative Humidity	17.3%RH
0.5µm cum	1740
0.7µm cum	356
1.0µm cum	95
2.0µm cum	26
5.0µm cum	8
10.0µm cum	2

Trend Log

Time	TVOC	CO2	CO	O3	Temp	Humidity	0.5µm	0.7µm	1.0µm	2.0µm	5.0µm	10.0µm
10:00:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:01:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:02:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:03:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:04:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:05:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:06:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:07:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:08:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:09:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:10:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:11:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:12:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:13:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:14:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:15:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:16:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
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10:20:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:21:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:22:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:23:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:24:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:25:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:26:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:27:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:28:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:29:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2
10:30:00	121	522	0.6	0.01	21.2	17.3	1740	356	95	26	8	2

Realtime (IQ-410 w/ Particulate Concentration)

Temperature	75.1°F
Relative Humidity	51.4%RH
Carbon Monoxide	1.4ppm
Carbon Dioxide	950ppm
Concentration	1.1µm3

DirectSense probes can also plug directly into a Windows XP/Vista PC via a USB cable and GrayWolf's WolfSense LAP software.

GrayWolf provides Pocket PCs, Tablet PCs, Ultra-Mini notebooks and embedded computer instruments that are ideal for the application – or use your own.

✓ Display

✓ Notate

✓ Data-Log

CO<sub>2</sub>  
CO  
%RH

Temperature

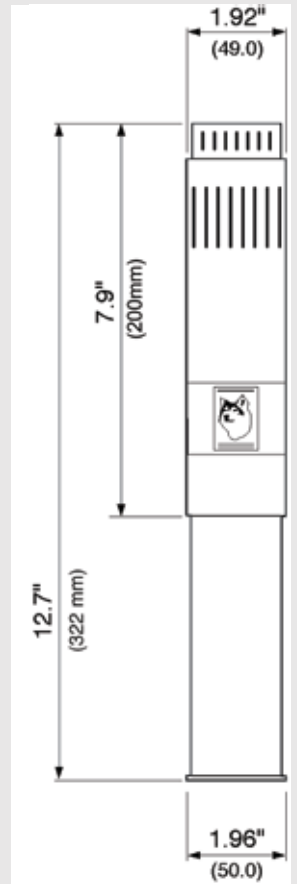
DEWPOINT, WETBULB,  
ABSOLUTE HUMIDITY  
SPECIFIC HUMIDITY,  
HUMIDITY RATIO

**IQ-410,  
IQ-604**



Highly accurate, extremely fast response sensors for Carbon Dioxide, Carbon Monoxide, Relative Humidity and Temperature are perfect for *both* quick walk-through surveys *and* for long-term trending.

The IQ-604 also includes sockets for 1 PID (VOCs) and 1 EC (specific gas) sensors for future upgrade.



GrayWolf offers additional probes to expand your measurement capabilities.

**TG-501**

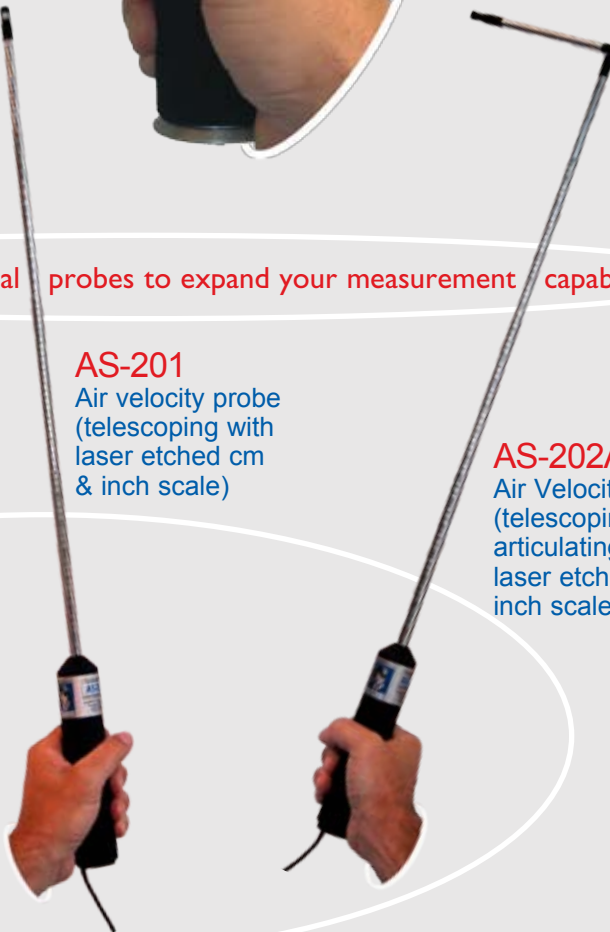
HCN, O<sub>2</sub>, NH<sub>3</sub>, Cl<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>S, NO, SO<sub>2</sub>, EtO, O<sub>3</sub>, and more. Up to five sensors plus °F / °C in one probe

**AS-201**

Air velocity probe (telescoping with laser etched cm & inch scale)

**AS-202A**

Air Velocity probe (telescoping with 90° articulating tip and laser etched cm & inch scale)



A 2nd probe may be connected simultaneously via an optional Y-adaptor or AdvancedSense meter (a 3rd probe via WolfPack area monitor) with option to also add a particulate meter. All parameters display at the same time and log to the same data file.

VOCs  
 CO<sub>2</sub>  
 CO  
 %RH  
 Temperature  
 +1 more Toxic Gas  
**IQ-610**

All of the IQ-410 capability *plus* a ppb range PID sensor for VOC measurements:  
 Track VOCs over time, rapidly bloodhound VOC sources or determine optimum locations and times to take air samples for VOC speciation via lab analysis. A very powerful screening tool.



One specific gas sensor slot (additional to CO) is available on the IQ-610  
 Choose from:

- Ozone
- Ammonia
- Chlorine
- Hydrogen Sulfide
- Nitrogen Dioxide
- Nitric Oxide
- Sulfur Dioxide
- Oxygen
- Ethylene Oxide
- HCN, HCl, H<sub>2</sub>, SiH<sub>3</sub>, AsH<sub>3</sub>, PH<sub>3</sub>, ClO<sub>2</sub>, CCl<sub>2</sub>O, HF or F<sub>2</sub>



**PC-GW6**  
 6 Channel Particle Counter

**PM-205**  
 Particulate Concentration

**ZEPHYR**  
 Differential Pressure\*

\*ΔP is also optionally offered built into WolfPack platforms.

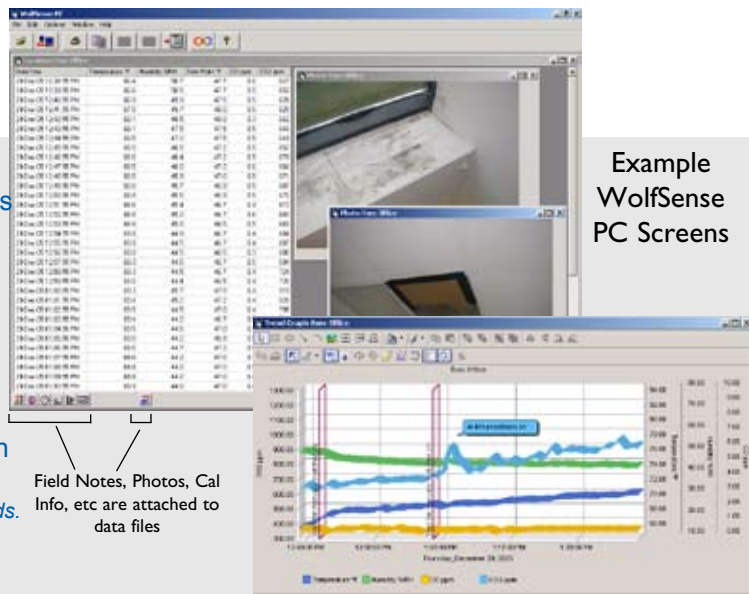


More probes, sensors, display/logging platforms and software features are on the way. Expand your DirectSense system as your measurement needs grow and as legislative requirements change.

# WolfSense® PC

WolfSense PC data transfer software\*, supplied as standard, allows readings logged on the mobile PC to be reviewed on desktop PCs. Simply export to Excel, or utilize WolfSense PC's intuitive menu to produce graphs from trend data, add comments, auto-include event note lines, alarm lines, etc. for a highly professional presentation. Data is displayed with attached notes (text, drawing, calibration, etc.) for easy cut-and-paste into a Word report. Photos, graphs and other files may be attached for exceptional organization and documentation.

\*GrayWolf lets you make as many copies of this software as your organization needs.



Example WolfSense PC Screens

# WolfSense ARG

Optional WolfSense ARG Advanced Report Generator; IAQ edition, takes report production to an entirely different level. A software wizard walks you through report template set-up. Whether you want 5 page reports or 250 pagers, once templates are structured just transfer data to efficiently produce highly professional reports. Make use of a range of included text blocks (Survey Strategies, Results & Conclusions, etc.), edit them and/or add your own.

Template elements that may be selected include:

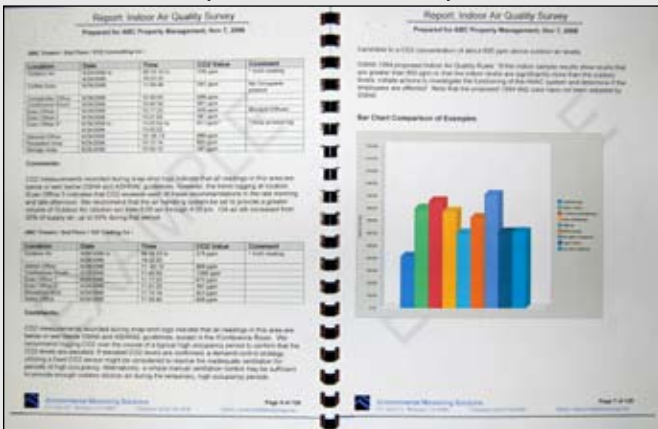
- Recurring Text (for every report)
  - Prompting Text (author selects from a list of text blocks)
  - Parameter by Parameter Data Tables, Bar Graphs
  - Parameter Info (Health Effects, Typical Background Levels, Government & Industry Guidelines, etc.)
  - Location by Location Data and Notes (collected on-site)
  - Auto-Generated Trend/Comparative Graphs
  - Equipment List
  - Calibration Data...and much more
- Output to Word (or RTF) format for easy editing and printing.



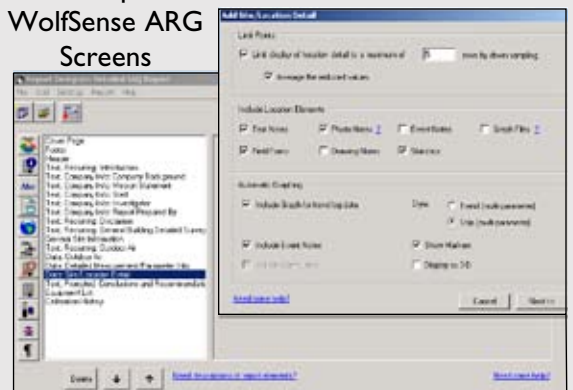
Software is supplied on CD and USB Key. Upgrades may be downloaded online (1 year of free software upgrades supplied as standard)



Example Printed ARG Report



Example WolfSense ARG Screens



Example VentCal Screens



# VentCal™

Optional VentCal™ software walks users through CO<sub>2</sub> tracer calculations of outdoor air ventilation rates utilizing choice of 3 tracer gas techniques:

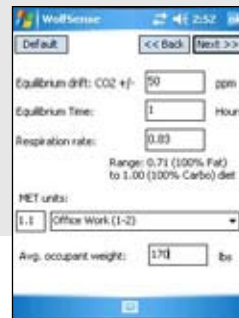
- Air - Ratio
- Equilibrium Tracer
- Tracer Decay

Display results as:

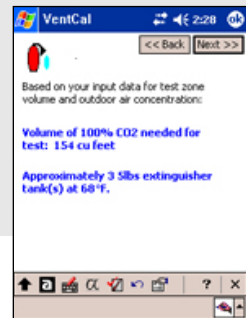
- Air changes/Hour
  - Volume Airflow/Occupant
  - Volume Airflow/Floor Area
- Produces an HTML report



Air Ratio



Equilibrium Tracer



Tracer Decay



# DIRECT SENSE™ IAQ

## Indoor Air Quality Monitor

SPECIFICATIONS: IQ-410, IQ-604, IQ-610

**Carbon Dioxide: (NDIR)** Range: 0 to 10,000 ppm  
Accuracy: ± 3% rdg ± 50 ppm

**Carbon Monoxide: (electrochemical)** Range: 0 to 500 ppm  
Accuracy: ±2ppm <50ppm, ±3%rdg >50ppm

**VOCs: (PID) IQ-610 only** Range: 5 to 20,000 ppb  
(user selectable units: ppb, ppm, µg/m3, mg/m3)  
Resolution 1 ppb, L.O.D. <5 ppb

10.6 eV PIDs do not respond to VOCs with ionization potentials >10.6, such as ethane, methane or formaldehyde. However, they do respond to the vast majority of VOCs. Standard calibration is to Isobutylene. Users may calibrate to alternative VOCs.

**Relative Humidity: (capacitive)** Range: 0 to 100 %RH  
Accuracy: ±2%RH <80%RH (±3%RH>80%RH)

**Temperature: (Pt100)** Range: 5° to 160°F (-15° to +70°C)  
Accuracy: ±0.3°C

**Response Time:** All sensors exhibit 90% response <1 minute

**Probe Dimensions:** 2in. (5cm) dia. x 12.5in. (30cm) lgth.

**Weight (probe):** w/batteries 1lb. 10oz. (0.7kg)

**Power (IQ-410, IQ-604):** 2 x D cells; probe battery life 120+ hrs.  
(IQ-610): typical probe battery life 60+ hrs.  
(computer battery life varies by make and model)

**Operating Range**

PID (VOC) sensors: 0 to 90%RH, -15 to 60°C  
Probe & other sensors: 0 to 98%RH, -15 to 70°C

**PC Software Req's:** WIN 2000/XP (w/.NET 2.0+ installed), Vista, WIN7 or higher  
30MB hard disc (min.) space

GRAYWOLF SOFTWARE IS 21 CFR PART 11 COMPLIANT.

ALL SPECIFICATIONS ARE TO SUBJECT TO CHANGE WITHOUT FURTHER NOTICE.

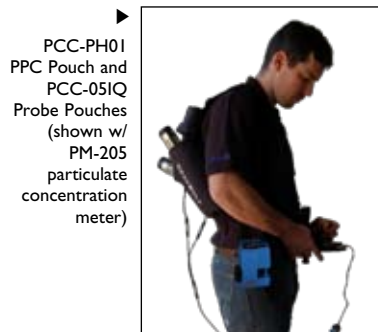
- The DirectSense IAQ Standard, DS IAQ Plus and DS IAQ Master are complete kits that include your choice of Pocket PC or Notebook computer and come with the IQ-410 or IQ-610 IAQ probe, WolfSense IAQ application software, WolfSense PC desktop data transfer software, hardshell security case, probe and mobile PC pouches and much more. Contact your representative or GrayWolf for details.
- Portable printers, air pumps, extension cables, dual probe adapters, dual probe security cases, dual probe tripod mounts, serial adapters (for simultaneous connection of particulate meters to mobile PCs), audio note-to-text translation software and other accessories are available from GrayWolf.

MEASURE SMART

REPORT EFFICIENTLY

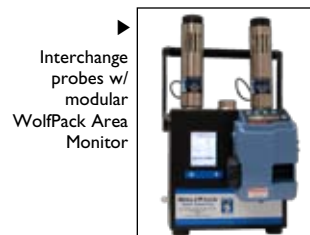


▲ PCC-10 Security Case



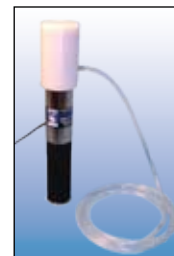
▶ PCC-PH01 PPC Pouch and PCC-05IQ Probe Pouches (shown w/ PM-205 particulate concentration meter)

ACC-TPDI Tripod with ACC-MNT1 PPC Mount (add ACC-TF2 fitting for dual probes) ▼



▶ Interchange probes w/ modular WolfPack Area Monitor

CA-HD2 Gas Calibration Hood ▼



▶ CA-RH1 %RH Cal Kit



▼ CA-GS25 VOC Cal Kit



◀ CA-GS12 CO<sub>2</sub> and CO Gas Cal Kit



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