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Omniguard™ 4

Differential Pressure Recorder
(with Dual USB Ports)

Introduction

Congratulations on the purchase of your new *Omniguard 4*. The *Omniguard 4* features:

- 512K of secure log space
- Dual USB ports
- PC communication for transferring job logs to a computer.
- USB port for flash drive, cellular wireless modem, remote auxiliary alarm, telephone autodialer, and WiFi adapter.
- Easy to read blue LCD
- Larger LCD and case window

Unpacking

The *Omniguard 4* is shipped complete and ready to use. When unpacking the unit, please check for the following items:

- Roll of thermal paper (installed)
- USB Cable 6 ft A-B Male-Male
- 10 ft. inlet pressure tubing
- Owner's Manual
- Registration Card

Save the shipping box and packing material, in the event the unit must be shipped to another location or for service. If you are missing any items shown on the packing list, or if you have any questions regarding your *Omniguard 4*, please call your dealer or Engineering Solutions at (206) 241-9395.

The Registration Card must be filled out and returned to activate the 12 month limited warranty.

Owner's Manual Overview

This manual covers the setup and operation of the *Omniguard 4*. It uses several different fonts and other special characters to make various unit functions and types of reporting easy to identify. Below is an example of each:

- Text printed on the display screen is shown as: **ALARM 1**
- Thermal printer text is shown as: **NORMAL OP**
- Keys and connectors on the front panel are shown as: **ALARM SILENCE**

Features

- Real-time differential monitoring of vacuum and/or pressure level.
- Extremely simple to setup and use, with on screen help.

- Log and track by Jobs. Stores multiple jobs, each with unique job name and starting/ending dates.
- Contractor name appears in all Job Logs.
- Programmable high and low alarm settings.
- Windowed case lid allows viewing pressure reading and status with lid closed to prevent damage to unit.
- Large easy-to-read graphic LCD display.
- Multiple display modes.
- 120+ days internal memory stores pressure readings and alarm occurrences with a date/time-stamp, complete record of operation available for printing and transfer to computer.
- Built-in hanging clip gets unit off the ground and away from possible damage, allows easy viewing of monitoring status.
- Totally self-contained unit, all necessary parts store securely inside the lid.
- Temperature compensation circuitry eliminates the need for off-site calibration.
- Pressure readings displayed in Inches WC, Millimeters WC or Pascals.
- USB Type A port supports multiple peripherals and accessories including USB flash drive, cellular wireless modem, remote auxiliary alarm, telephone autodialer and Wifi Adapter.
- USB Type B port supports PC communication for transferring job logs to a computer.
- Audible and visual alarm systems with Alarm Silence function.
- Operating temperature range 30° - 130°F.
- 1 Year Limited Warranty.

Accessories

- WiFi Adapter alerts off-site personnel via email of all job site conditions, including when normal operation is reached and if an alarm occurs. It can also send a complete current job log file.
- Remote auxiliary alarm with high intensity strobe light and 95db alarm & 25 ft. cable (requires USB Port Adapter).
- Cellular wireless modem alerts off-site personnel via e-mail or text message during alarm conditions. It can also sends daily status reports (requires USB Port Adapter).
- Telephone autodialer for off-site alarm notification (requires USB Port Adapter & telephone land line at site).
- Optional 220VAC, 50Hz power supply operation.

Section 1: Basic Care

The *Omniguard 4* is built and engineered to provide you with dependable performance for years to come. Following these basic guidelines will insure that you get maximum use from your unit. Once the unit is set up, field operation is easy. Complete reports are virtually automatic, providing the most accurate records of your job site conditions available.

- This unit is designed to measure differential pressure only from +0.250" to -0.250" WC (optional pressure ranges are available).

Caution: Never apply pressure to the inlet port by mouth or with any other strong pressure device.

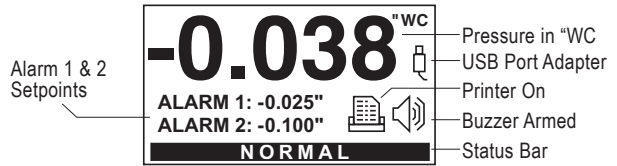
High pressure will permanently damage the sensor.

- Use only *Omniguard* thermal printer paper (other thermal paper will not work).
- Always store the unit away from sources of excessive temperature, dust and moisture.
- Never attempt to repair or modify any of the internal components of the unit.
- Protect the unit from strong shocks or vibrations. Be sure the lid is securely closed whenever transporting or hanging the unit.
- Be sure to plug your *Omniguard 4* into a power supply that complies with the National Electrical Code. Keep all connections dry. As with any electrical device, this unit has the potential to cause an electrical shock hazard.
- If your unit must be shipped at any time to another location or for service, use the original packing material and shipping box for optimum protection during shipping.

Section 2: Navigating The LCD Display

The *Omniguard 4* display features four screen types, shown below. Press the indicated key to move from screen to screen.

Monitor Screen



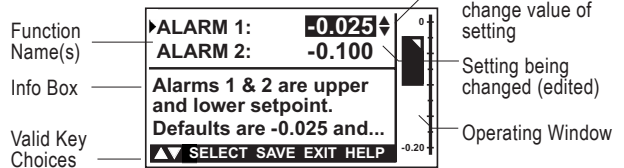
↓ press **MENU**

Main Menu (Help Menu uses same format)



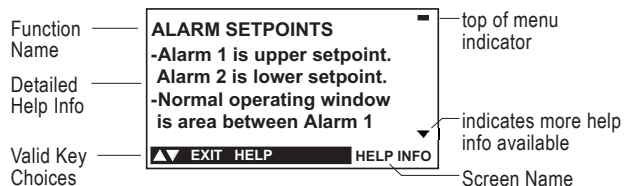
↓ press **SELECT**

View/Edit Settings (Alarm Setpoints shown)



↓ press **HELP**

Help Info Screen (Alarm Setpoints help shown)



↓ press **HELP** again to go to Help Menu Screen

↓ press **EXIT** to return to previous screen or Monitor Screen

Section 3: Quick Setup & Usage

This section is a quick reference for using your *Omniguard 4*.

1. Insert one end of pressure tubing inside the containment area. Connect the other end of tubing to **INLET 1**.
2. Locate a safe place for the *Omniguard 4* outside the containment area. Plug the power cord into a power outlet.
3. Press the **POWER ON/OFF** key to turn the unit on. Set the correct Time & Date if prompted. (This happens if the internal battery has died and the built-in clock lost its settings. Don't worry, the battery is rechargeable and lasts an average of 30 days.)
4. If you want a printed copy of the previous job log, press the **PRINT JOB** key.
5. Press **START JOB** to begin a new job. Enter a name for the new job and then press **SAVE**. The previous job will end and its Job Summary Report will print.
6. Check Alarm 1 & 2 setpoints (displayed in the monitor screen window), adjust if needed.

The status bar will indicate **WAITING FOR PRESSURE** and the **STATUS** LED will flash green until containment pressure reaches the operating window. Once reached, the status bar will display **NORMAL** and the **STATUS** LED will change to steady green indicating that the unit is now in its normal operational mode. Printing and logging of pressure readings begin once the normal operational mode is achieved.

During normal operation, the highest and lowest pressure readings will be printed and logged into memory with a time/date stamp **every 15 minutes** (the default Print/Log rate).

If the monitored pressure then goes **outside** the operating window, the unit will go into alarm mode. The buzzer will sound, the status bar will change to a flashing **>>ALARM<<** and the **STATUS** LED will flash red. The print and log rate of the pressure readings will increase to **every 15 seconds** (the default Print/Log Alarm rate).

To turn the alarm off press the **ALARM SILENCE** key.

Sample Session: Viewing/Changing Settings

1. From the Monitor Screen, press **MENU** to go to the Main Menu.
2. Use the **▲/▼** arrow keys to highlight **ALARM SETPOINTS**.
3. Press **SELECT** to go to the View Setting Screen and allow changes to the **ALARM SETPOINTS**.
4. The **ALARM 1** setting can now be increased or decreased by using **▲/▼**.
5. Once the desired value has been reached, press **◀/▶** to highlight **ALARM 2** setting.

6. Use **▲/▼** to adjust the value of the **ALARM 2** setting.
7. Save the updated settings for both Alarm 1 & 2 by pressing **SAVE**. Saved settings are printed and logged into memory.

or press **EXIT** to return to Main Menu **without** saving.

*Note: Press **HELP** at any time to view more detailed help information.*

Hanging the Omniguard 4

The *Omniguard 4* can be hung on a wall for easy viewing and to keep it off of the floor, away from possible damage. Hanging the *Omniguard 4* by the clip allows the cover to close, protecting the unit from water damage while allowing the LCD display and **STATUS** LED to be viewed through the window on the cover. The hose and AC cord should exit the case thru the foam slot, then the cover should be latched closed to protect the unit from damage.

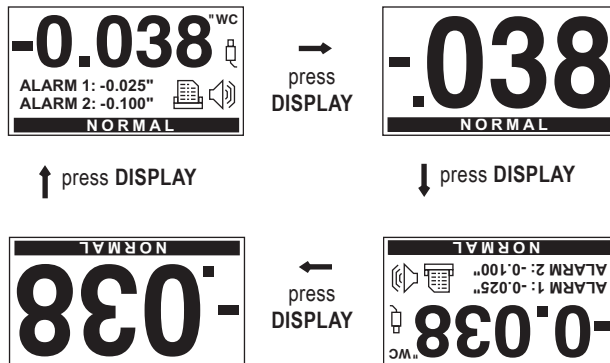
Use the **DISPLAY** key to flip the display orientation when hanging the unit by its handle (see below).

Caution: Only hang the Omniguard 4 on a sturdy surface. A fall could damage the unit and disrupt accurate pressure measurements.

Display Modes

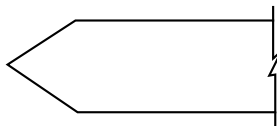
The **DISPLAY** key on the *Omniguard 4* is used to vary the display view and orientation to accommodate hanging the unit by its handle. The pressure reading can be enlarged to enhance viewing from across the room.

Press **DISPLAY** to toggle the views in the sequence shown below.

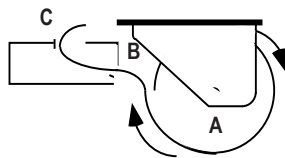


Loading the Thermal Printer Paper

Caution: Only use **Omniguard** thermal printer paper! Thermal paper prints on only one side, the side away from the paper roll. If the roll is installed incorrectly the printer will be able to advance the paper but be unable to print on it.

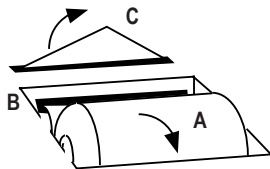


1. Remove the printer housing lid with the thumbscrew. Cut the end of the paper to a tapered point.



2. Place the paper roll, marked **A**, into the tray so the paper unrolls from the bottom.
3. Insert tapered point into slot marked **B**, feed through until tapered point can be pulled from the top at slot marked **C**.

Do not use the **PAPER FEED** key to advance the paper.



4. From **C**, gently pull until the tapered portion is completely exposed.
5. Replace lid onto the paper housing and secure with the thumbscrew.

Section 4: Detailed Operation

The *Omniguard 4* monitors and records the differential pressure between **INLET 1** and **INLET 2 (Reference)**.

In abatement applications the *Omniguard 4* should be located outside the containment area and not in any antechambers (i.e. shower or changing room). This allows a supervisor or hygienist to monitor pressure readings without entering the containment area.

Work Area Setup (see Appendix C for more details)

The *Omniguard 4* should be placed on a solid (non-vibrating) surface, excessive vibrations disrupt accurate pressure measurement.

1. The intake end of the pressure tubing must be located a **minimum of 5 feet away from** any openings or HEPA fan/filter units. Choose a location away from excessive dust or moisture.
2. Cut a 1/2" slit in the polyethylene barrier and feed approximately 1 ft. of pressure tubing through it. Tape the tubing securely to the polyethylene.
3. Connect the free end of the tubing securely over **INLET 1**. Be careful not to turn the nozzle.
4. Route the hose and AC cord through the foam notch area on the upper right corner of the case. Close the lid (being careful to not pinch the hose or AC cord) to protect the unit from damage.
5. The maximum hose length is limited to 70 ft (for 3/16" ID hose). Lengths beyond 70 ft can degrade reading accuracy.
6. Program the Job Name and confirm the Alarm settings are correct. The Alarm 1 and Alarm 2 settings should be in negative units when used to monitor a negative (vacuum) containment area. For positive containment applications, use positive units (Inches WC, Millimeters WC or Pascals) for the Alarm settings.

NOTE: It is important that there be no kinks or sharp bends in any part of the tubing. Any blockage could inhibit accurate recording of the pressure in the containment area.

Power-Up

To begin operating the *Omniguard 4*, plug the power cord into a standard wall outlet supplying 115VAC, 60Hz and press the **POWER ON/OFF** key. The first time a new unit is turned on the settings will be at default values.

Initial Power-Up

Set the Date & Time and Alarm 1 & 2 setpoints because they are set at the factory defaults. The Date & Time will only need to be set once. The Alarm 1 & 2 setpoints will need to be adjusted for each job's requirements.

Normal Power-Up Sequence

If the unit was properly turned off after the previous usage, **POWER OFF** will print. Otherwise **POWER FAIL** will print, indicating that an AC power failure may have occurred. Either message will be followed by the date and time the unit was last powered off.

A diagnostic test will automatically run and the unit will print the date, time and the current alarm setpoints. The unit will then immediately begin to monitor containment pressure.

Until the containment pressure has reached the operating window, the status bar will indicate **WAITING FOR PRESSURE** and the **STATUS** LED will flash green.

*Note: Logging and printing of monitored pressure readings does **not** begin until the containment pressure has reached the operating window!*

You will need to customize the factory Alarm 1 and Alarm 2 setpoints for your jobsite requirements!

Once the containment pressure reaches the operating window (the area between the Alarm 1 and Alarm 2 setpoints) the status bar changes from **WAITING FOR PRESSURE** to **NORMAL** and the **STATUS** LED changes to a steady green. **NORMAL OP** is then printed along with a time-stamp. The **STATUS** LED changes to orange to warn of an impending Alarm condition when the pressure is within 0.005"WC of the Alarm setpoints.

Contractor Name

The Omniguard 4 can store the name of the Contractor that is using the unit. The Contractor name will appear in all Job logs and printed Reports. Only one name can be stored.

To set the Contractor Name --

1. Press **MENU** to view the Main Menu.
2. Highlight **CONTRACTOR NAME** using ▲/▼.
3. Press **SELECT** to view or change the setting.
4. Use the ▲/▼ keys to change the character. Upper and lowercase letters and numbers are all usable characters to enter.
5. Use the ◀ / ▶ keys to move to the next/previous character to set.
6. When the entire name has been entered, press **SAVE** to save the new name and return to the Main Menu.

Pressing the **EXIT** key will return you to the Main Menu **without** saving the updated Contractor Name.

Date & Time

The date and time settings are used as a reference time-stamp for all logged events.

To change the Date & Time --

1. Press **MENU** to view the Main Menu.
2. Highlight **DATE & TIME** using ▲/▼ and press **SELECT** to change the setting.
3. Use ▲/▼ to change the month.
4. Press ◀ / ▶ to advance to the day, using ▲/▼ to change.
5. Repeat the procedure for the year.
6. Press ◀ / ▶ to advance to the time. Use ▲/▼ to set the hours and minutes, use the ◀ / ▶ keys to move from one to the other.

Note: the unit operates on a 24 hour clock.

7. Press **SAVE** to save the updated settings and return to the Main Menu. Press **EXIT** to return without changing the settings.

Alarm Setpoint Selection

The normal operating window is the area between the Alarm 1 and Alarm 2 setpoints. These setpoints can be set anywhere within the operating range of the unit; +/- 0.250" WC in increments of 0.005"WC. The Omniguard 4 can also operate in units of mmWC or Pascals. (See Pressure Units.)

Alarm 1: (default is -0.025"WC)

- upper setpoint of operating window

Alarm 2: (default is -0.100"WC)

- lower setpoint of operating window

The Omniguard 4 can be used in both positive and negative pressure monitoring applications. The procedure for setting of Alarm setpoints is the same for both applications.

Negative Pressure Application -- Asbestos or lead abatement

example settings: **Alarm 1 @ -0.020" WC**

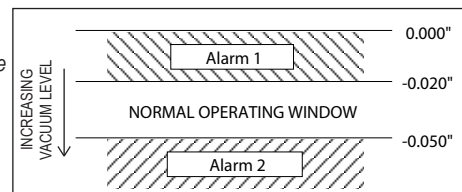
Alarm 2 @ -0.050" WC

Positive Pressure Application -- Clean room or HVAC system

example settings: **Alarm 1 @ +0.050" WC**

Alarm 2 @ +0.025" WC

Negative Pressure
(containment)
Application



Example of Setting Alarm Levels

This is an example of setting the alarm levels for negative containment area with an operating window of $-0.020''$ to $-0.050''$ WC.

To change the Alarm Setpoints --

1. Press **MENU** to view the Main Menu.
2. Highlight **ALARM SETPOINTS** using **▲/▼**.
3. Press **SELECT** to view or change the setpoint values.
4. Use **▲/▼** to set Alarm 1 to $-0.020''$ WC. The value will change in $0.005''$ increments. The bar graph at the right of the screen indicates the relative operating window size within the operating pressure range of the unit.
5. Press **◀ / ▶** to highlight Alarm 2. Use **▲/▼** to set the value to $-0.050''$ WC.
6. Press **SAVE** to save the updated settings and return to the Main Menu.

Pressing the **EXIT** key will return you to the Main Menu **without** saving the updated settings.

Once the containment pressure reaches a value between $-0.020''$ and $-0.050''$ WC the unit will be in **normal operational mode**.

Then, if the containment pressure ...

- ... rises to $-0.019''$ WC, **Alarm 1** will activate.
- ... falls to $-0.051''$ WC, **Alarm 2** will activate.

Starting/Ending A Job

The **START JOB** key is used to end the current job, which will complete the job log and cause a Job Summary report to print, as well as start and name the new job.

START JOB will not erase any previous job logs, nor will it alter any other settings (such as the Alarm Setpoints). A report for the previous job can be printed at any time.

*Note: It is a good idea to print a report of the previous job (using **PRINT JOB**) before pressing the **START JOB** key. A report for the previous job may also be printed at a later time by selecting **PRINT/VIEW JOB LOGS** from the main menu.*

To end the previous job and start a new Job --

1. Press the **START JOB** key.
2. Use the **◀** key to move to the cursor to the beginning of the line. Then use **▲/▼** keys to change the character. Upper and lowercase letters and numbers are all usable characters.
3. Use the **▶** key move to the next character to set.
4. When the entire name has been entered, press **SAVE** to save the

new Job name. The previous job will end and a summary of it will print, followed by a **NEW JOB** message.

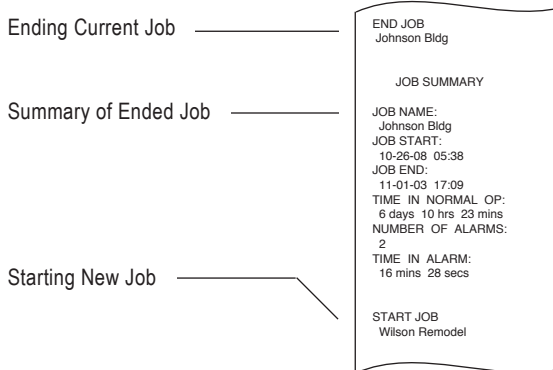
Pressing the **EXIT** key will return you to the Monitor Screen **without** starting a new job.

When completed, the screen will display **Ending Last Job**. After a few moments the unit will automatically return to the Monitor Screen.

The memory has a capacity to store approximately 120+ days of normal operation and 400 alarm messages. When the memory is full, the new data will begin to overwrite the oldest data.

Note: Overwritten data cannot be retrieved.

Example of Printout after **START JOB** is pressed--



Alarm Condition

Once the containment pressure reaches the operating window, the unit will be in normal operation and the alarms will be armed. If the containment pressure rises or falls **outside** the operating window, the following will occur:

1. Internal buzzer and the Remote Auxiliary Alarm (if present) will sound and will remain active until **ALARM SILENCE** is pressed.
2. Any accessory devices (Telephone Autodialer, Cellular Wireless Modem, or WiFi Adapter) will activate and will remain active until the correct pressure is restored and the unit returns to normal operation
3. The status bar will change to **>>ALARM<<** and begin flashing. The **STATUS** LED will flash red.
4. Printer will indicate which alarm setpoint was exceeded. The print/log rate will increase to the preset alarm rate. Printouts will show the time followed by the pressure reading.

When the containment pressure returns to within the normal operating window, the unit will log and print **NORMAL OP** with a time-stamp. The buzzer and accessories (if present) will turn off, also a Normal Operation status message will be sent to off-site personnel if the WiFi Adapter or Cellular Wireless Modem is present. The **STATUS LED** will return to a steady green.

Alarm Silence, Disable and Rearming

The buzzer symbol on the Monitor Screen indicates whether the internal audible alarm (and optional Remote Auxiliary Alarm if present) is armed or disabled. The alarm is always armed when the unit is first turned on. The alarm silence function is controlled by the **ALARM SILENCE** key.

To disable or silence the buzzer (and Remote Auxiliary Alarm) --

Press **ALARM SILENCE** once and the alarm will be disabled. This will be indicated on the screen with an **X** marking through the buzzer symbol.

To rearm a silenced buzzer (and Remote Auxiliary Alarm) --

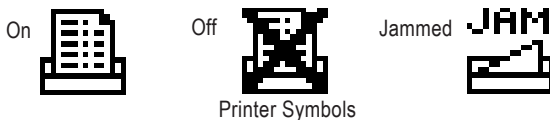
Press **ALARM SILENCE** and the buzzer symbol will be displayed without an **X** through it.



Turning Printer On/Off

The **PRINTER ON/OFF** key controls the printer power. All pressure readings are logged to memory regardless of printer setting.

*Note: If a printer error is detected, the printer will automatically turn off and a **JAM** message will appear above the printer symbol. Clear the jam and use the **PRINTER ON/OFF** key to turn the printer back on. Paper jams are logged with a time-stamp.*



Viewing/Printing Jobs & the Print Job Key

The *Omniguard 4* provides a printout of all recorded data, alarm messages and changes in operational settings. The current Job or any previous Job (or portions of those jobs) and the *Omniguard's* Configuration Report can be printed at anytime.

Cancel printing by pressing any key.

Print Job Key --

Pressing **PRINT JOB** will print the selected report time frame for the current Job. This makes it easy to print a particular portion of the current Job on a regular basis.

To setup a report time frame --

1. Press **MENU** to view the Main Menu.
2. Highlight **PRINT JOB KEY SETUP** using **▲/▼** and press **SELECT**.
3. Using **▲/▼** highlight the time frame desired and press **SAVE**.

To view or print a Job Log --

1. Press **MENU** to view the Main Menu.
2. Highlight **VIEW/PRINT JOB LOGS** using **▲/▼** and press **SELECT**.
3. Using **▲/▼** highlight either **CURRENT JOB** or **ALL JOB LOGS**
4. The selected Job Log will appear on the screen for viewing. Press the **PRINT JOB** key at any time while viewing the report and the Job Report will begin printing.

Example of Typical Job Printout

Typical startup sequence

Setting changes print for verification

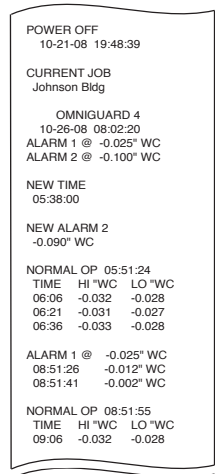
Containment pressure reached operating window... Normal OP

Alarm Condition (Alarm 1 tripped)

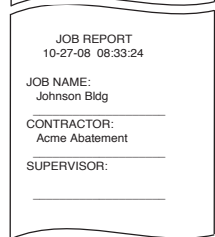
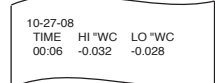
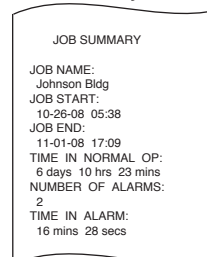
Back into Normal Operation

New Date prints at midnight

Sign off header



Example of Job Summary Printout



Configuration Report

The *Omniguard 4* provides a report of all the unit's current settings (Alarm Setpoints, Log Rates, etc.) and the current system information (memory status, unit serial number, etc.). This report can be viewed and printed at any time.

To view or print the Configuration Report --

1. Press **MENU** to view the Main Menu.
2. Highlight **CONFIGURATION REPORT** using ▲/▼ and press **SELECT**.
3. The Configuration Report will appear in its entirety on the screen for viewing. Press the **PRINT JOB** key and the Configuration Report will begin printing.

Cancel report printing by pressing any key.

Print/Log Rates

The printing and logging of pressure readings begins once the unit reaches normal operation (status bar indicates **NORMAL**). There are two user-definable rates at which printing/logging occurs.

Normal Rate: (default is 15 min.)

- setting choices are 5, 15, 30 minutes or OFF.
- rate at which the highest & lowest pressure readings are printed and logged to memory during normal operation
- when set to OFF, unit will only log & print alarm readings

Alarm Rate: (default is 15 sec.)

- setting choices are 15, 30, 60 or 120 seconds.
- rate at which pressure readings are printed and logged to memory during an alarm condition

To change the Print/Log Rate --

1. Press **MENU** to view the Main Menu.
2. Highlight **PRINT/LOG RATES** using ▲/▼ and press **SELECT** to change settings.
3. Use ▲/▼ to change the **NORMAL RATE**.
4. Press ◀ / ▶ to move from **NORMAL RATE** to **ALARM RATE** and repeat step 3 to change the **ALARM RATE** setting.
5. Press **SAVE** to save the updated settings and return to the Main Menu.

Pressing the EXIT key will return you to the Main Menu without saving the updated settings.

To conserve paper and log space, the Alarm Print/Log rate will automatically change to 15 minutes if the unit stays in an alarm condition for more than 10 minutes. The pressure monitoring rate is not affected. The Alarm Print/Log rate will return to its original setting when the next alarm occurs.

Inlet Pressure Response Rate

This setting determines how quickly the unit will react to pressure changes. Reduce this setting if you are using the unit in conditions where air pressure fluctuates rapidly and can cause false alarms, such as in high wind.

Response Rate: (default rate is Medium)

- rate choices are Slow, Medium and Fast
- in windy conditions, set to Slow
- if quick response to small pressure changes is needed, set to Fast

To change the Response Rate --

1. Press **MENU** to view the Main Menu.
2. Highlight **RESPONSE RATE** using ▲/▼ and press **SELECT** to view or change the setting.
3. Use ▲/▼ to change the setting.
4. Press **SAVE** to save the updated setting and return to the Main Menu.

Pressing the EXIT key will return you to the Main Menu without saving the updated settings.

Display Contrast & Backlight

The contrast level and backlight setting on the LCD screen allows the user to adjust the display for optimal viewing in varied lighting conditions. The backlight automatically dims after 4 minutes to extend battery and backlight life. It can be reactivated by pressing any key.

Contrast: (default is 50%)

- range is 0% (min) to 100% (max)

Backlight: (default is ON)

- choices are ON or OFF

To change the Contrast or Backlight --

1. Press **MENU** to view the Main Menu.
2. Highlight **DISPLAY** from the Main Menu using ▲/▼ and press **SELECT** to change the settings.
3. Press ◀ / ▶ to choose **CONTRAST** or **BACKLIGHT** and use ▲/▼ to change the settings for each.
4. Press **SAVE** to save the updated settings and return to the Main Menu.

Pressing the EXIT key will return you to the Main Menu without saving the updated settings.

Description of Controls

Menu Keys

MENU - displays Main Menu or selects the highlighted item for review or editing.

SELECT - press to view or change settings of the highlighted item from the Main Menu.

▲ / ▼ - scroll through menu selections or change settings. Step through settings by pressing ◀ / ▶ .

SAVE - saves updated unit settings to memory after editing, then exits to the Main Menu.

EXIT - exits to previous screen; if editing, exits **without** saving any updated settings.

Ports

INLET 1 - connector for pressure tubing from containment.

INLET 2 - connector for sensing ambient pressure from outside containment.

USB - connector for USB flash drive, also supports accessories Remote Aux Alarm, WiFi Adapter, Cellular Wireless Modem and Telephone Autodialer.

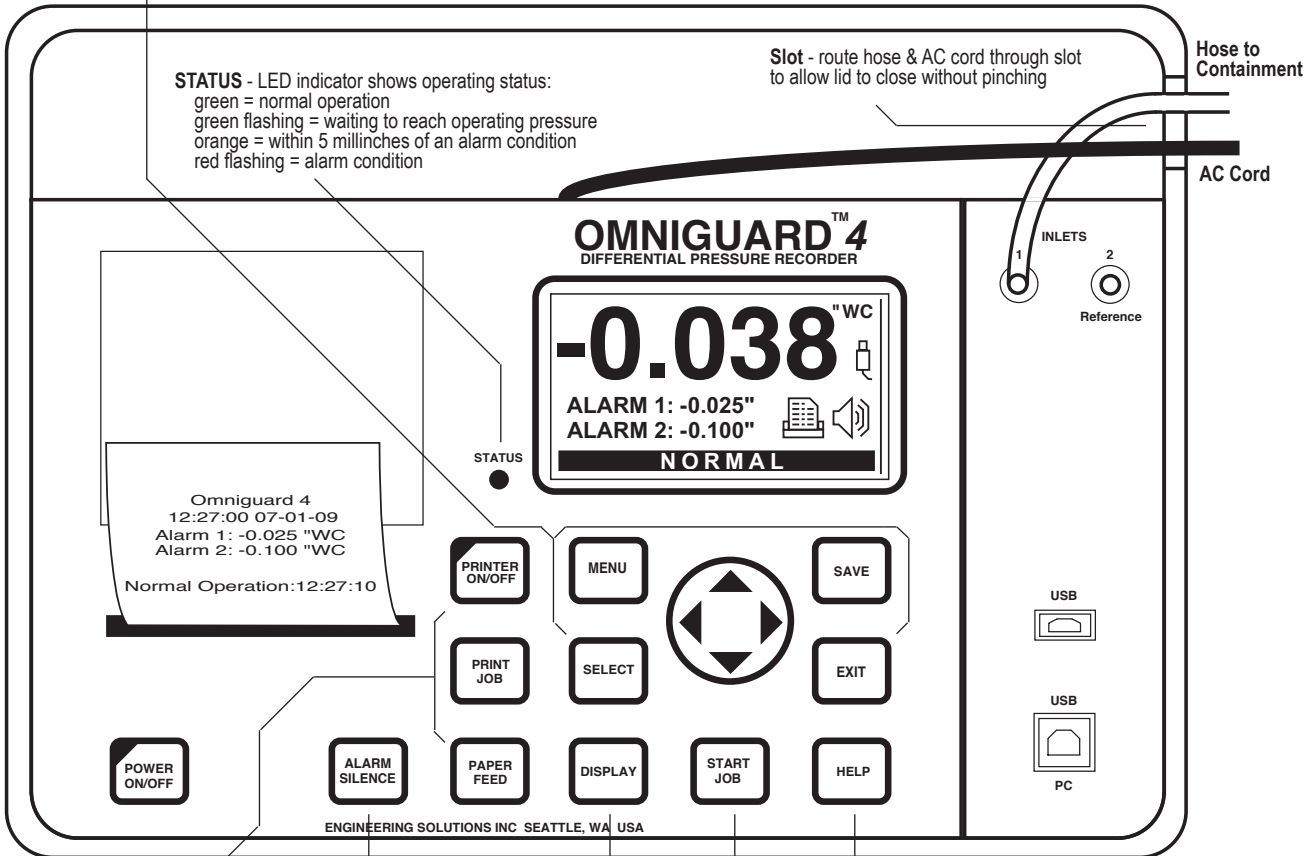
USB PC - connector for sending data to and from a PC.

STATUS - LED indicator shows operating status:
 green = normal operation
 green flashing = waiting to reach operating pressure
 orange = within 5 millinches of an alarm condition
 red flashing = alarm condition

Slot - route hose & AC cord through slot to allow lid to close without pinching

Hose to Containment

AC Cord



Printer Keys

PRINTER ON/OFF - turns the printer on and off. Printer status is indicated by the printer symbol at the Monitor Screen.

PRINT JOB - press to print a current Job Report. Actual report type is assigned to key in the Print Job Key Setup menu item. **Cancel** printing by pressing any key.

PAPER FEED - advances the printer paper.

POWER ON/OFF - turns unit on and off.

Special Purpose Keys

ALARM SILENCE - silences the internal buzzer (and Remote Aux Alarm if present) when an Alarm Condition occurs. Audible Alarm status is indicated by the buzzer symbol at the Monitor Screen.

DISPLAY - toggles display thru 4 different screens: monitoring, pressure only, inverted monitoring & inverted pressure only.

START JOB - press to begin a new Job. Assign a name to the new Job. Ends previous Job and prints its Summary report.

HELP - provides information about the highlighted item or displays Help Menu to select a topic for which more information is available.

Pressure Units

The pressure units used by the *Omniguard 4* to display and record pressure readings are selectable.

Pressure Units: (default is Inches WC)

- choices are Inches WC ("WC), Millimeters WC (mmWC) or Pascals (Pa)

To select the desired pressure units --

1. Press **MENU** to view the Main Menu.
2. Highlight **PRESSURE UNITS** by using ▲/▼ and press **SELECT** to change the setting.
3. Use ▲/▼ to change the pressure units to the desired measurement.
4. Press **SAVE** to save the updated settings and return to the Main Menu.

Pressing the **EXIT** key will return you to the Main Menu **without** saving the updated settings.

Passcode Protect

The passcode protect feature allows the site manager to assign a passcode that prevents unauthorized changes to the unit's settings. Once enabled, the four digit code must be entered to change any setting. Settings may be viewed without the passcode.

Passcode Protect: (default is OFF)

Passcode: (default passcode is 0 0 0 0)

- passcode can be set to ON or OFF
- master passcode is 7 7 7 7

To set and enable the Passcode --

1. Press **MENU** to view the Main Menu.
2. Highlight **PASSCODE PROTECTION** from the Main Menu using ▲/▼ and press **SELECT** to view or change the setting.
3. Press ▲/▼ to select the passcode On or Off.
5. Press ◀ / ▶ to move to the Passcode digits.
4. Set each digit of the passcode using ▲/▼.
5. Press ◀ / ▶ to move from one digit to the next.
6. Press **SAVE** to save the updated settings and return to the Main Menu.

Pressing the **EXIT** key will return you to the Main Menu **without** saving the updated settings.

Note: In the event that the passcode is lost or forgotten it can be reset and settings can be changed using the master passcode.

Zero Calibration

The *Omniguard 4* does not require calibration between jobs. Internal temperature compensation and other circuitry provides unsurpassed accuracy over a 30°- 130° Fahrenheit range.

*Note: The clicking noise you hear the unit making is it constantly compensating for zero offset drift. We **do** recommend annual calibration verification.*

To manually reset the zero point --

1. Disconnect the pressure tubing from **INLET 1** and **INLET 2**.
2. Press **MENU** to view the Main Menu.
3. Highlight **ZERO CALIBRATE** using ▲/▼ and press **SELECT** to choose zero calibration.
4. Press **SAVE** to calibrate and return to the Main Menu.

*Pressing any other key will return you to the Monitor Screen **without** resetting zero.*

When completed, the screen will display **DONE**. After a few moments the unit will automatically return to the Monitor Screen.

*Note: Allow the unit to warm up for 15 minutes prior to zero calibrating. This permits the pressure sensor to stabilize its readings. Zero calibration can only be done when the pressure tubing is **not attached to the unit**.*

Using Help

To access Help information on a highlighted topic --

Press **HELP**. Detailed information about the unit's current status or the highlighted function will be displayed.

To access the Help Menu --

1. Press **HELP** twice.
2. Highlight the desired topic using ▲/▼.
3. Press **SELECT** to view the information available for that topic.

USB Ports

The *Omniguard 4* now has two USB ports. The top port, labeled **USB** supports the following devices:










- USB Flash Drive
- Remote Auxiliary Alarm (requires a USB Port Adapter)
- WiFi Adapter (requires a USB Port Adapter)
- Telephone Autodialer (requires a USB Port Adapter)
- Cellular Wireless Modem (requires a USB Port Adapter)
- Telephone Serial Modem (requires a USB Port Adapter)

The bottom port, **USB PC** is used to communicate between your PC and the *Omniguard 4*. Using the Windows® compatible Omniguard Communication software, job logs may be transferred to the PC and the setup of multiple *Omniguard 4*'s can be easily handled. The software is available as a free download @ www.engsolinc.com.

*Note: This version of Omniguard 4 no longer has the **AUX ALARM** port. To use a Remote Auxiliary Alarm or Telephone Autodialer, you will need to purchase the optional USB Port Adapter.*

USB Port Status Symbols

The *Omniguard 4* displays a variety of symbols to identify the status of the USB connectors and the devices connected.

	Analyzing device	USB flash drive connected	
	Connected to PC	USB flash drive error (full, write protected)	
	USB Port Adapter connected	WiFi Adapter or Telephone modem connected	
	Cellular wireless modem connected	Telephone modem error (bad init string, unknown)	
	Cellular wireless modem error (not authorized, carrier not detected)		

Communication

The *Omniguard 4* has built-in USB ports to connect to a PC or to a user supplied external serial modem. Before a PC can communicate with an *Omniguard 4*, you must first download and install the Windows® compatible Omniguard Communication software from our web site @ www.engsolinc.com. Detailed instructions for installation and operation of the software are included with the download.

The *Omniguard 4* can communicate with a PC two different ways...

1. Connect a USB cable directly to the PC.
2. Connect via dialup to a PC. Requires the accessory USB Port Adapter and a user supplied external serial modem with a phone line connected to it. (See Remote Monitoring & Telephone Modem Setup)

Once connected, you can --

- transfer the current Job Log or all Job Logs to the PC
- "remotely monitor" the *Omniguard 4*, observing pressure, status and log updates as they occur on the job site.
- configure and set up multiple *Omniguards*, using the software to upload configuration settings

Transferring a Job Log to the PC

The Job Logs stored in the *Omniguard 4*'s memory can be transferred to a PC for permanent storage, statistical analysis and summary report generation. Job Logs transferred to a PC can be reviewed and reprinted any number of times.

To transfer a job log --

1. Install the Communication program on your computer.
2. Plug the USB cable (included with your *Omniguard 4*) into the USB PC connector on the *Omniguard 4*.
3. Plug the other end of the cable into the appropriate USB connector on your PC.
4. Run the Communication program and select *Omniguard 4* from the menu, then Job Logs, then Receive..... The logs selected will be transferred to the PC and displayed in a window.
5. Job Logs can also be exported in a tab separated format so they can be imported into Microsoft Excel for charting and analysis.

USB Flash Drive – Data Collection

The **USB** connector on the *Omniguard 4* makes it possible to gather Job Logs at the job site using a USB Flash Drive. The logs can be viewed later on a PC using the Omniguard Communication software available free @ www.engsolinc.com.

Transferring the Job Logs to a USB Flash Drive

The Job Logs stored in the *Omniguard 4*'s memory are copied as a single Log file to a USB Flash Drive. The Omniguard Communication software can read the Log file and separate it back into individual Job Logs for storage on your PC. Each time a USB Flash Drive is inserted into the *Omniguard*, all Job Logs are copied to the drive.

To transfer job logs --

1. The *Omniguard 4* must be turned on and displaying the current pressure.
2. Plug the USB Flash Drive into the **USB** connector on the *Omniguard 4*. The display will change to indicate the log is being copied to the USB Flash Drive. This could take several minutes before completing.

- When the transfer is complete the display will show the name of the new Job Log file created on the flash drive. The file name will consist of the last 6 digits of the *Omniguard 4* serial number followed by a letter(s). Each file also has the time & date it was copied onto the flash drive.

Example: If the Omniguard 4 serial number is G406932, the first log file will be 406932.OGL. The second file will be 406932A.OGL, the third file will be 406932B.OGL, etcetera. The log files are stored in the folder OMNIGUAR in the sub folder LOGS.

To view the logs, insert the USB Flash Drive into an open USB connector on the PC. Using the Omniguard Communication software, select "Open Log..." from the "File" menu. Navigate to the USB Flash Drive, select the "OMNIGUAR\LOGS" folder and open the appropriate log file.

Remote Auxiliary Alarm Setup & Usage

The Remote Auxiliary Alarm is a combination high-intensity strobe light and 95db audible alarm on a 25 foot cable that connects to the *Omniguard 4* **USB** connector using the optional USB Port Adapter. The Remote Auxiliary Alarm plugs into the **AUX ALARM** port on the USB Port Adapter which in turn is connected to the **USB** port using the USB cable (included with the *Omniguard 4*).

In an alarm condition, the Remote Auxiliary Alarm will activate. It may be disabled by pressing the **ALARM SILENCE** key on the *Omniguard 4*. The Remote Auxiliary Alarm will only re-arm once the unit has returned to normal operation.

WiFi Adapter & Off-Site Monitoring

The *Omniguard 4* WiFi Adapter is an exciting new accessory that enable off-site personnel to receive e-mail updates of your *Omniguard 4*'s job site status. The WiFi Adapter connects an *Omniguard 4* to an existing WiFi network and can send one or more of the following alerts:

- WiFi Connection Established
- Connected (with date and time stamp)
- Lost Connection (with date and time stamp)
- Waiting for Pressure (with date and time stamp)
- Entered Normal Operation (with date and time stamp)
- Normal Operation Hi/Lo Pressure Readings per set rate time (with date and time stamp)
- Alarm Alert & Pressure Reading (with date and time stamp)
- Low Battery Warning (with date and time stamp)
- Job Log (sent on a regularly scheduled time basis)

The WiFi Adapter also has the ability to e-mail you a full Job Log. Eliminating the need to manually download logs at the job site. These

job logs are received via e-mail as an attachment.

The WiFi Adapter is configured by using the Omniguard Communication software (available free at engsolinc.com). You can determine what alerts/reports you wish to receive and how often you receive them. The software gives you the flexibility to meet each customers different needs.

The combination of the WiFi Adapter and software gives you the freedom to monitor your Omniguard 4 without being there.

Telephone Autodialer Setup & Usage

The Telephone Autodialer is supplied with a 25 foot cable that connects to the *Omniguard 4* **USB** connector using the optional USB Port Adapter. The Telephone Autodialer plugs into the **AUTODIALER** port on the USB Port Adapter which in turn is connected to the **USB** port using the USB cable (included with the *Omniguard 4*). The Autodialer also requires a working land line telephone connection box with an RJ11 jack.

In an alarm condition, the Autodialer will call the pre-programmed phone numbers (up to 4) and play a pre-recorded message alerting the off-site personnel of an alarm condition at the job site.

The Autodialer only activates once in a given time period (5, 10 or 15 minutes – the **MESSAGE RATE** setting). This prevents the autodialer from calling more than once if there are multiple alarms occurring within a short period of time. After the 5, 10 or 15 minute period has elapsed, the autodialer will dial out again if the unit is still in an alarm condition or when the next alarm condition occurs.

Message Rate

The Message Rate setting is the minimum amount of time the Telephone Autodialer or Cellular Wireless Modem must wait between multiple alarms before dialing or sending a new alert message in response to a new alarm condition.

- Message Rate:** (default is 10 min)
- choices are 5 min, 10 min or 15 min

To change the Message Rate --

1. Press **MENU** to view the Main Menu.
2. Highlight **MESSAGE RATE** from the Main Menu using **▲/▼** and press **SELECT** to view or change the setting.
3. Press **▲/▼** to change the setting to either 5, 10 or 15 minutes.
4. Press **SAVE** to save the updated settings and return to the Main Menu.

*Pressing the **EXIT** key will return you to the Main Menu **without** saving the updated settings.*

Wireless Communication Using a Cellular Wireless Modem

The *Omniguard 4* can automatically send alarm and job reports to cell phones and e-mail accounts using the optional Cellular Wireless Modem and USB Port Adapter. In addition it can respond to information requests from wireless cell phones and via e-mail.

Wireless communication requires a specially configured MultiTech MultiModem cellular wireless modem. This modem is similar to a cell phone. It has a phone number and requires an active cell phone account, using either a traditional plan with monthly payments or a prepaid plan. Contact Engineering Solutions for more information on acquiring a cellular wireless modem.

Master Cell Phone Numbers –

Two cell phone numbers can be programmed directly into the *Omniguard 4*. A text message will be sent to each phone number when the *Omniguard* enters normal operation and when an alarm condition occurs. The **MESSAGE RATE** setting determines the minimum time between alarm text messages, this is to prevent frequent messages if the unit is going in and out of the alarm state.

Phone numbers programmed directly into the *Omniguard 4* will also receive a Daily Summary report indicating how long the unit was in normal operation, the number of alarms and the total time the unit was in the alarm state. The Daily Summary is sent at 5:30pm each day unless a Notify List has been selected (see below).

Notify Lists –

In addition to the two Master Cell Phone Numbers, the *Omniguard 4* can also send alerts to personnel contained in a Notify List. The *Omniguard 4* can store up to four Notify Lists, only one can be active at a time. A Notify List contains a list of wireless phone numbers **and** e-mail addresses for a specific group of off-site personnel. Each Notify List allows different phone numbers and/or e-mail addresses for Alarm and Normal Operation notification and for Reports. The Lists also allow the report notification time to be changed.

*Notify Lists can **only** be created and programmed into the *Omniguard 4* using the *Omniguard Communications PC* software. See the *Help* that comes with the software for more information on setting up Notify Lists.*

Request Job Site Status via Cell Phone or E-mail –

It is possible to request information from an *Omniguard 4* connected to a cellular wireless modem. A text message or e-mail is sent to the *Omniguard 4* which replies with a report type requested. The available reports include a Daily Summary, overall Job Summary, Current Status and Settings. To get a complete list of reports the *Omniguard* can provide send a text message or e-mail with a “0” (zero) in the body of the message.

Text messages must be in the “short message” format and are sent to

the phone number of the wireless modem. E-mail message must be in plain text format and should be sent to the e-mail address provided by the wireless service provider.

Example: Where “nnnnnnnnnn” is the phone number of the wireless modem, the e-mail address is:

For T-Mobile it is “nnnnnnnnnn@tmomail.net. and for AT&T it is “nnnnnnnnnn@mmode.com”.

To configure and test the Cellular Wireless Modem setup –

1. Plug the modem cable into the **SERIAL** port on the USB Port Adapter and the modem.
2. Connect the USB Port Adapter to the *Omniguard 4* **USB** port using the USB cable (included with your *Omniguard 4*).
3. Plug in the modem power adapter to turn the modem on. After the modem is turned on you should see the wireless connection icon displayed on the screen of the *Omniguard 4* within two minutes.
4. Press **MENU** to view the Main Menu.
5. Highlight **WIRELESS MODEM** from the Main Menu using ▲/▼ and press **SELECT** to view or change the setting.
6. If desired, press ▲/▼ to change **CELL # 1** Once the first digit of the number has been changed, use ◀ / ▶ to move to the other digits.

To delete the phone number, set the first digit to a blank.

7. Press ◀ / ▶ to move to **CELL # 2**. Again use ▲/▼ to change the first digit of the phone number. Once the first digit of the number has been changed, use ◀ / ▶ to move to the other digits.
8. Press ◀ / ▶ to move to **NOTIFY**. Select the desired List of off-site personnel to notify using ▲/▼.
9. Press ◀ / ▶ to move to **TEST MODEM**. When **Test** is selected, pressing the **SELECT** key will cause a message to be sent to the Cell # 1 and Cell # 2 phone numbers as well as any cell phone numbers or e-mail addresses in the chosen Notify List.
10. Press **SAVE** to save the updated settings and return to the Main Menu.

*Pressing the **EXIT** key will return you to the Main Menu **without** saving the updated settings.*

Remote Monitoring & Telephone Modem Setup

Office personnel using their modem equipped PC can call the phone number of the site and connect to the *Omniguard 4* through the USB Port Adapter and an External Serial Modem. The modem plugs into the **SERIAL** port of the USB Port Adapter and requires a

standard RJ11 phone plug and a working telephone line. Remote off-site monitoring of *Omniguard 4* is supported along with remote job log transfers.

Caution: *Transferring Job Logs to the PC via modem may take up to 10 minutes (depending on modem speed and the size of the Job Logs being transferred). The Omniguard 4 is not actively monitoring pressure during the log transfer. Once the transfer is complete, the unit resumes monitoring the pressure.*

Note: The External Serial Modem is no longer sold by Engineering Solutions. Almost any serial modem should work with the Omniguard 4 (a USB modem will not work). Modems with a speed of 14.4kbps or faster are recommended. We have had problems with the Motorola modems and can not recommend them for this application. The Practical Peripherals modems seem to work quite well and can be had for as little as \$2 on eBay.

The external modem setup should be tested and its proper operation confirmed before leaving the job site. Before performing the modem test, use the **Telephone Modem** menu item to configure the *Omniguard 4* to work with the external modem you are using.

To configure and test the Telephone Modem setup --

1. Plug the modem cable into the **SERIAL** port on the USB Port Adapter and modem.
2. Connect the USB Port Adapter to the *Omniguard 4* **USB** port using the USB cable (included with your *Omniguard 4*).
3. Plug the phone cable into the modem and a working telephone line RJ11 phone jack. Turn the modem on.
4. Press **MENU** to view the Main Menu.
5. Highlight **TELEPHONE MODEM** using ▲/▼ and press **SELECT** to view or change the settings.
6. Press ▲/▼ to change the **Init Command** setting if necessary.
7. Press ◀/ ▶ to move to **TEST MODEM**. Press **SELECT** to test the modem settings. The *Omniguard 4* will check the response of the modem to the Init Command (set in step 6) and its status will be displayed on the screen. If an error message appears, a suggested solution will also be made.
8. Press **SAVE** to save the updated settings and return to the Main Menu.

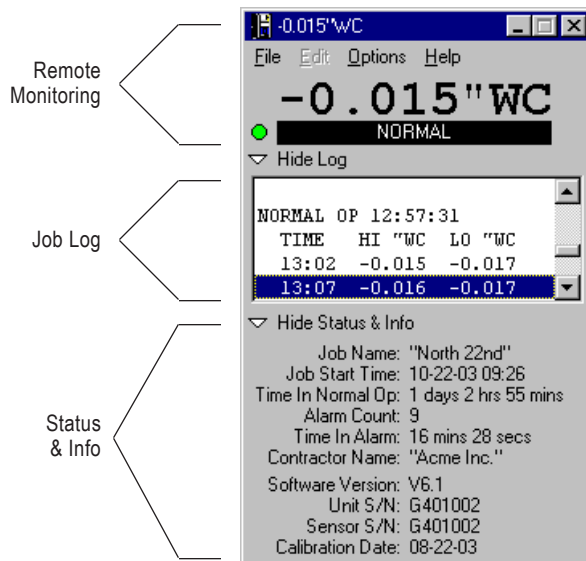
Pressing the **EXIT** key will return you to the Main Menu **without** saving the updated settings.

To confirm that the modem is working, use a PC equipped with a modem and the *Omniguard Communication* software to connect to the *Omniguard 4*. See the Help available in the *Omniguard Communication* software for more information.

Omniguard 4 Communication

Remote Monitoring Screen

Each section of the window can be opened or closed independently. Remote monitoring occurs in real-time and does not affect the normal operation of the *Omniguard 4*.



Appendix A: Troubleshooting

If you experience problems with your *Omniguard 4*, use this section to try to resolve the problem. For additional information consult with your dealer or call Engineering Solutions at (206) 241-9395 (8:00 a.m.-12:00 noon, 12:30-4:30 p.m. Pacific Time) and ask for Technical Support, or e-mail techsupport@engsolinc.com.

Problem: The unit does not display the proper pressure.

Remedy: Check to see that the tubing is connected properly to the **INLET 1** port. The **INLET 2** port should not be connected.

Remedy: Make sure that the tubing does not have a kink or a sharp bend.

Remedy: Make sure that you are using the correct 3/16" ID tubing size, and the end of the tubing on the inlet nozzle is not worn. If it is worn or loose, cut off 1" of the tube using a sharp knife and reinsert on the inlet nozzle.

Remedy: Make sure that the tubing connection into the containment area is properly placed and secured as described in Section 4: Work Area Setup.

Problem: Excessive momentary alarms.

Remedy: Adjust alarm setpoints to allow for normal air pressure fluctuations caused by entries into work area or other equipment. Make sure that you are within the minimum negative air pressure requirements.

Remedy: If you suspect that wind may be causing rapid pressure fluctuations, reduce the setting for Response Rate (see Section 4: Detailed Operation).

Problem: Printer indicates an alarm but audible alarm was not activated.

Remedy: Confirm that the Audible Alarm is on. The buzzer icon should be shown, in the right corner of the display, without an **X** through it (see Section 4: Alarm Silence , Disable and Rearming).

Problem: Printer is not working properly or a paper jam occurs.

Remedy: The printer may be turned off. Turn it on using the **PRINTER ON/OFF** key.

Remedy: Thermal paper prints on **one** side only, the side away from the paper roll. If installed incorrectly, the printer will be able to advance the paper but unable to print on it. Make sure that the paper is fed properly as described in Section 3: Loading the Thermal Printer Paper.

Remedy: Paper jams can occur if the paper is allowed to fall back into the printer head after tearing off a report. If a paper jam occurs, the unit will automatically shut the printer off to prevent damage.

The printer symbol will be displayed with a **JAM** message (see Section 4: Turning Printer On/Off). After the paper jam is cleared, use the **PRINTER ON/OFF** key to turn the printer back on.

Note: Do not apply oil or grease of any kind to the printer as this will attract dirt and debris and could cause permanent damage to the printer mechanism.

Problem: OMNIGUARD 4 unit does not enter normal operation when turned on, and does not print.

Remedy: For normal operation, the monitored pressure must be between the Alarm 1 and Alarm 2 setpoints. When the unit is first turned on, the containment pressure will not likely be within the alarm setpoints, and the unit will not print or log the pressure readings. The unit will begin printing and logging the pressure readings only after it senses containment pressure has reached the normal operating window.

Problem: The unit displays Date & Time Not Set followed by Factory Default after the power has been off.

Remedy: The internal clock battery is discharged. Leave the unit plugged in for 24 hours to recharge the battery. It will be necessary to update the Date and Time settings. The internal battery lasts for an average of 30 days without recharging. It recharges automatically any time the unit is plugged in. No other settings need to be re-entered (they are saved in non-volatile memory and do not require the internal clock battery).

Shipping & Repair

Please call the Engineering Solutions customer service department for a return authorization. A Return Material Authorization number (RMA #) will be assigned to aid in tracking your unit.

You may also e-mail to, techsupport@engsolinc.com.

Send the entire unit, enclosing a brief explanation of the problem along with your company name, address, phone number and name of the individual responsible for the unit. **The RMA# must be clearly marked on the outside of the box.** No COD's will be accepted. If the original packing materials are not available, package the unit securely in a sturdy container with enough padding to surround the unit on all sides. The unit should not be able to be shift after packing. Engineering Solutions will not be responsible for any damage which may occur.

Ship To : Engineering Solutions, Inc.
6300 Southcenter Blvd, Suite 209
Tukwila, WA 98188
(206) 241-9395

Appendix B: Specifications

Differential Pressure Range: +/-0.250" WC (+/-6.35mmWC, +/-62.5 Pascals)

Accuracy: +/- .003" WC or +/-1% of reading whichever is greater

Resolution: 0.001" WC, (+/-0.05mm WC, +/-0.5 Pascals)

Burst Pressure: 3 psi (20 kPa) on either inlet port

Pressure Units Displayed: "WC (Inches Water Column), mmWC (millimeters Water Column), or Pa (Pascals)

Data Storage: 512,000 characters, approximately 120+ days of readings (over 8,000 logged events) in non-volatile memory (no battery req'd)

Display: Graphic Liquid Crystal Display (LCD) with adjustable backlight and over 3.5 sq. inch viewing area

Internal Clock: the internal clock is powered by a self-charging lithium-ion battery that provides 30+ days of clock operation when AC or DC power is not present

Printer: 20 character wide thermal printer (uses 2.2" wide thermal printer paper)

Printing/Logging Rates:

Normal Operation -- highest and lowest pressure readings printed/logged at intervals of 5, 15, 30 minutes or OFF

Alarm Condition -- current pressure reading printed/logged at intervals of 15, 30, 60 or 120 seconds for first 10 minutes of alarm condition, increasing to 15 minute intervals thereafter

Alarms: Two programmable alarm setpoints, 95db audible alarm with flashing LED and on-screen warning indicate alarm condition

Pressure Inlets: Two 3/16" OD barbed hose connectors, 10 ft of hose provided

USB Port: USB V1.1 Type-A

USB Port: USB V1.1 Type-B

Power: 115 VAC 60Hz with 6 ft power cord (220 VAC 50Hz optional)

Case: Dimensions 9.25" x 7.5" x 4.5", Shipping Weight 8 lbs., Material is copolymer polypropylene with polycarbonate window in the lid, handle and stainless steel hanging hook

Warranty: One Year Limited Warranty

Appendix C: Establishing a Containment Site

The Omniguard 4 monitors and records the differential pressure between the **INLET 1** port and the **INLET 2 (Reference)** port.

In abatement applications the *Omniguard 4* should be located outside the containment area and not in any antechambers (i.e. shower or changing room). This allows a supervisor or hygienist to monitor pressure readings without entering the containment area.

This section of general guidelines to establishing a containment site is provided by Engineering Solutions Inc for informational purposes only. Engineering Solutions Inc is not responsible for its accuracy nor conformance with specific regulations for your area. Engineering Solutions Inc specifically advises all users to obtain the advice of qualified professionals for each use and application of the *Omniguard 4*. Engineering Solutions Inc makes no claims as to the proper usage or interpretation of the data provided by the *Omniguard 4*.

General Guidelines to Establishing a Containment Site

1. The contractor and hygienist are to be certified prior to qualifying to bid on an abatement job.
2. All workers are to have undergone specific training in abatement procedures.
3. Typical abatement requirements:
 - a. containment area to be sealed within a double layer of 8 mil plastic or equivalent.
 - b. before beginning work within the containment area and at the beginning of each shift, the containment area must be inspected for breaches and smoke-tested for leaks, and any leaks sealed.
 - c. air volume within containment must be changed 4 times per hour, i.e. the entire air volume must be evacuated every 15 minutes.
 - d. minimum pressure in containment is -0.020"WC, i.e. the differential pressure between containment pressure and ambient/outside pressure must be at least -0.020"WC as measured by a manometer.
 - e. the containment area must be kept under negative pressure throughout the period of its use.
 - f. air movement must be directed away from employees within containment and toward a HEPA filtration unit.
 - g. fiber levels within the containment area must be sampled at a specific interval and be less than a proscribed level, i.e. sampled 1 time a day or more and fiber levels below "5 fibers/100 fields".

4. Calculating site airflow requirements:

A typical heavy duty HEPA fan/filter unit has a 1000 CFM (cubic feet per minute) capacity with a new filter. Units are typically derated by 25%, so a 1000 CFM unit is derated to 750 CFM by the hygienists when calculating actual site airflow requirements.

Example #1: A room measuring 20 x 20 ft with a 10 ft ceiling encloses 4000 CF of air. To meet the 4X per hour change rate the fan/filter unit must be capable of pulling 267 CFM of air ($4000 \times 4/60$) from the containment area and maintain a minimum negative pressure of -0.020 "WC.

Example #2: Room size is 20 x 50 with 12 ft ceiling. Requires $(20 \times 50 \times 12) \text{ CF} \times 4 / 60 = 800$ CFM or 2 units (of a 1000 CFM fan/filter unit... remember the fan/filter unit is derated to 750 CFM).

Example #3: Room size is 100 x 100 with 16 ft ceiling. Requires $(100 \times 100 \times 16) \text{ CF} \times 4 / 60 = 10667$ CFM or 15 fan/filter units (of a 1000 CFM unit).

5. The containment area pressure should be monitored at various points to confirm adherence to abatement requirements. Remember that air is a medium, and air pressure is not identical throughout the containment area. The pressures at specific locations within the containment area vary due to distance, room temperature, proximity to openings, room geometry, etc. Typically one manometer is used for every two "rooms" that have a doorway and attached hallway, up to 1000 square ft.
5. Using a manometer that provides highly accurate pressure readings, time stamped logging of all readings, and audible alarm and printouts of all logged readings protects workers and the public from accidental exposure to airborne hazards and provides proof of containment to protect employers from environmental contamination lawsuits.

NOTE: It is important that there be no kinks or sharp bends in any part of the tubing. Any blockage could inhibit accurate recording of the pressure in the containment area.

Appendix D: Limited Warranty

Engineering Solutions warrants that all products, component parts and accessories will, for a period of twelve (12) months from date of purchase, be free from defects in material and workmanship under normal use and service.

PURCHASER'S SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS F.O.B., ENGINEERING SOLUTIONS, INC., 6300 SOUTHCENTER BLVD, SUITE 209, TUKWILA, WA 98188.

To keep this warranty valid, the purchaser must (a) return signed Registration card to Engineering Solutions within fifteen (15) days of purchase, (b) have promptly informed Engineering Solutions' customer service department of any defects in writing, (c) properly used, maintained and repaired the Product, and (d) have proof of purchase.

This warranty does not cover normal wear and tear or defects due to (a) improper or negligent handling or unauthorized modifications, (b) defective or improper premises, chemical, electrochemical or electrical influences, (c) weather or other influences of nature.

LIMITATIONS OF WARRANTY - THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND OBLIGATIONS OF ENGINEERING SOLUTIONS OR ITS SUPPLIERS, EXPRESS OR IMPLIED. ENGINEERING SOLUTIONS EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF REMEDY- Under no circumstances shall Engineering Solutions or any of its suppliers be liable for any loss or damage, including, but not limited to, loss or damage arising out of failure of the Product to operate for any period of time, inconvenience, use of rental or replacement equipment, loss of profit or other economic loss, or general, direct, special, indirect, incidental or consequential damages or property damages.

PRODUCT SUITABILITY - Many states and localities have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Engineering Solutions attempts to assure that its Products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the Products are installed or used. Engineering Solutions recommends that, before purchasing and using a Product, purchasers review the Product application, and federal, state and local regulations, to be sure that the Product, installation, and use will comply with them.

