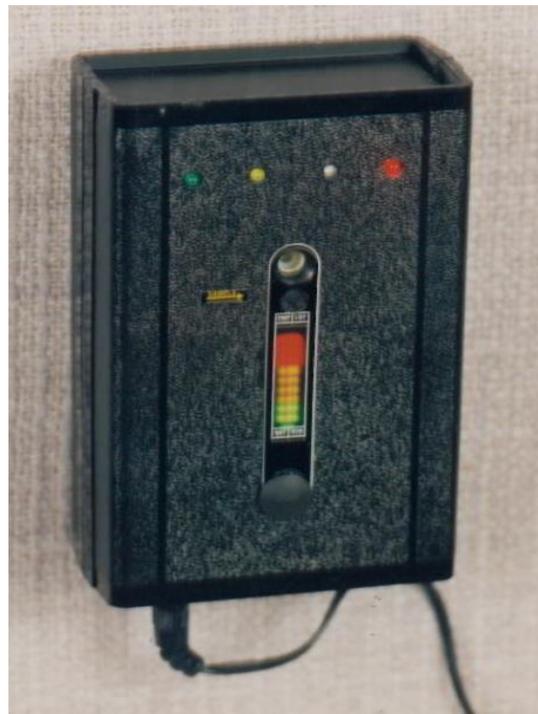




# *PAS Sentry IIa*

*Alcohol Screening System*

with Auto-Start Port



## **CALIBRATION MANUAL**

***PAS Systems International, Inc.***

215 Southport Dr. Suite 400

Morrisville, NC 27560

[www.pasintl.com](http://www.pasintl.com)

Copyright© 2016 by PAS Systems International Inc., All Rights Reserved



# CONTENTS

## *Wet Bath Method*

<b>Equipment Checklist for Wet Bath Sensitivity Check/Calibration</b>	<b>1</b>
<b>Operating the Alcohol Wet Bath Simulator</b>	<b>2</b>
<b>Readying the PAS Sentry</b>	<b>3</b>
<b>PAS Sentry Sensitivity Checking</b>	<b>4</b>
<b>PAS Sentry Calibration</b>	<b>5</b>
<b>Record Keeping</b>	<b>7</b>



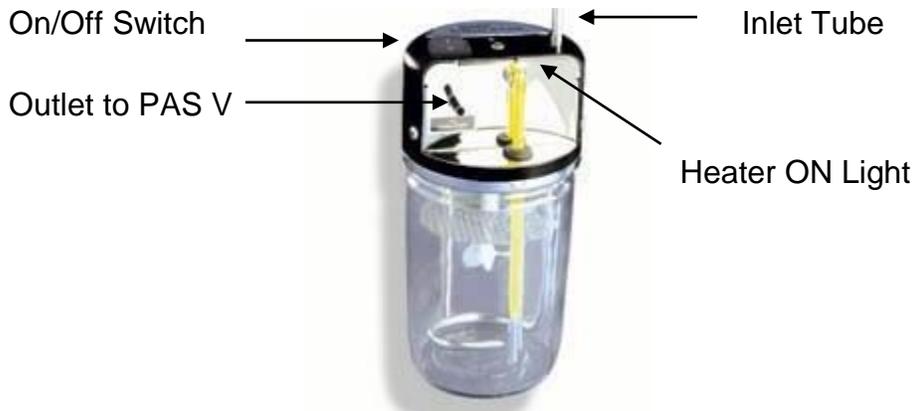
PAS Systems International recommends having the calibration checked once a year, or whenever it seems to be losing sensitivity. Instructions for wet bath sensitivity checking/calibrating are included in this manual. You may also choose to send your PAS Sentry into the manufacturer (PAS Systems) to be calibrated. Additionally, regular visual inspection of the system to confirm the intake port or exit port is not blocked, and each lamp (LED) checked to be sure they display properly when activated is also recommended.

## **Equipment Checklist for *Wet Bath* Sensitivity Check/Calibration**

- The PAS Sentry Alcohol Screening System
- The “Calibration Assembly” (A modified plastic mouthpiece that connects the outlet of the wet bath simulator to the intake port of the PAS Sentry. Available from PAS Systems).
- A NHTSA approved Wet Bath Simulator
- 500 milliliters of .01% ethanol alcohol solution.\*
- Plastic tubing to connect the simulator’s inlet to a mouthpiece into which the operator blows (or can also be used to connect the simulator’s inlet to a wet bath simulator air pump).
- A jeweler’s screwdriver to adjust the fuel-cell sensitivity if calibration should be necessary.
- A PAS Cal-Pump wet bath simulator air pump (recommended)

\* Premixed Certified Stock Solutions are available from PAS Systems International

# Operating the Alcohol Wet Bath Simulator



## The Alcohol Wet Bath Simulator

The lower (jar) portion is filled with a heated solution of water and alcohol, which simulates the blood running through the arteries in the lungs. The upper portion (the head space) is filled with a mixture of air and alcohol that simulates the air in the lungs that is in contact with the blood across the cell membranes. Air flowing out of the outlet pipe simulates the expired air of a person who has been drinking.

In order to work properly, the temperature of the water/alcohol solution must be 34° C (body temperature) and the mixture of alcohol and water must be accurate for the BrAC to be used in the test.

## Preparing Wet Bath Simulator

1. Remove the glass jar from the simulator by unscrewing it from the top assembly.

**Caution:** DO NOT remove Top Assembly and expose the heating element to open air with power turned ON. This will result in damage to the heating element.

2. Place 500 ml of the .01 calibration solution into the simulator.
3. Assemble by tightly turning the jar back into the top assembly.
4. Add tubing to the inlet and outlet of the simulator.
5. Check the seal of the lid on the jar by blowing into the inlet while holding outlet closed. There should be resistance to the airflow.
6. Plug in the simulator and turn the power ON and allow the solution to heat to 34°F (approx 15 min). The heater lamp is lit when the heating element is heating. The heater lamp goes off when the simulator fluid has reached 34°F. However, it will come back on from time to time to keep the fluid at 34°F. When 34°F is reached, the simulator is ready to be used.

# Readying the PAS Sentry

1. Be sure the power is on and the red wait lamp has gone out.
2. Inspect the inlet/outlet ports of the PAS Sentry to make sure that they are not clogged.
3. Conduct an air blank:

**NOTE:** *Be sure the room air is free from alcohol and that the ambient temperature is above 50°F. Do not have jars of stock solution or other alcohol open in the room during testing.*

- a. Take an air sample by pressing the Sensor Control Button; the green indicator light comes on
- b. Observe the light bar for 15-20 seconds. If only the small green sampling indicator light comes on, the air blank check is OK.
4. Clear a fuel cell overload (if one or more of the bar-graph indicator lights comes on during air blank):
  - a. Wait five (5) minutes.
  - b. After 5 minutes, repeat the air blank making sure that the sample/pump light turns on and the pump operates. If none of the bar-graph indicator lights come on (after observing for 15-20 seconds), the air blank check is OK.
  - c. If however, one or more of the indicator lights come on again, this clearance process should be repeated. If after two attempts to clear the unit, the indicator lights are still coming on when the air blank is performed, there are two possibilities:
    1. The unit requires an internal zero adjustment. To have this adjustment made, the unit has to be returned to the manufacturer.
    2. The air in the test room contains a significant amount of alcohol. To determine if this is the case, air blanks should be made away from the test room to see whether the unit gives a zero reading when removed from the test area.

**NOTE:** *Throughout the procedure, the test conductor should check for a flashing battery light to ensure that the battery is not running down during the testing procedure.*

5. Once the air blank has been performed with a satisfactory result, the PAS Sentry unit is ready for sensitivity testing.

# PAS Sentry Sensitivity Checking

**NOTE:** *Always check electrical connections to be sure they are properly connected.*

1. Check that the inlet and outlet ports of the PAS Sentry are free of obstruction.
2. Place the PAS Sentry so the simulator outlet is approximately 6-8 inches from the intake port. The bar-graph display will be facing toward the simulator.
3. Check that the Simulator is running at 34°C and take a deep breath and blow slowly but steadily into the Simulator. (If Cal-Pump is used, follow Cal-Pump instructions). The Simulator outlet should direct the flow of air toward the intake port. After 5 seconds, tap the control button to start a sampling cycle. Continue to blow for another 5 seconds.
4. Look for the green sensor lamp and the yellow sampling lamp and listen for the sound of the air pump which should come on immediately after the Sensor Control Button is activated. Keep blowing until the PAS Sentry pump stops (pump lamp goes out) 5 seconds after sampling began.
5. Observe the bar-graph numeric display. Only the first green bar (0.01) should light. There should be only one green bar lit after 15-20 seconds from the time the pump stops.
6. Record the number of green bars or numeric value that light up. There should be only one when using 0.01% alcohol solution. Repeat the sensitivity test two more times noting each time how many bars light up. If in two out of the three tests, one green bar is illuminated, the sensitivity of the unit is satisfactory. Note that the number of bars lit may vary by one in either direction because of variations in the rate and strength of blowing through the simulator. This is the reason for conducting three tests. If two out of the three tests do not result in the lighting of a green bar (a blinking light counts), then the unit should be recalibrated following the calibration procedure described below

**NOTE:** *A minimum of 5 minutes should pass between each sensitivity test and an air blank should precede each sensitivity test.*

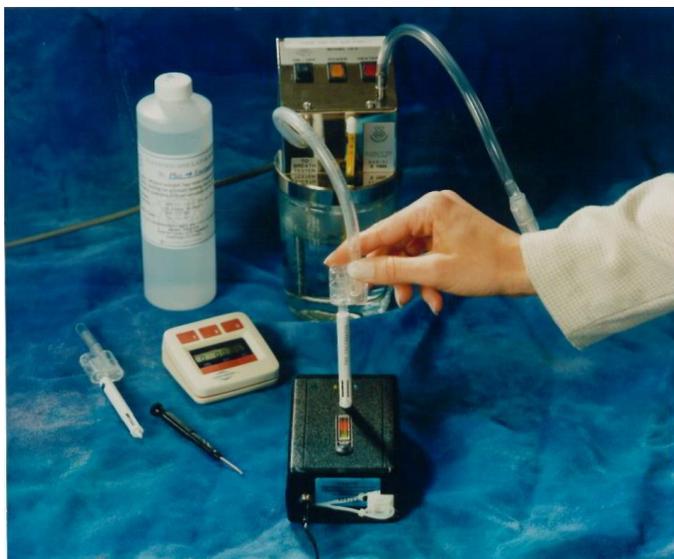
**Periodic functional checks are recommended. These quality control checks can be performed by simply holding the intake port near a known source of alcohol, activating the pump and observing the bar graph display for indications that alcohol vapor is being detected. This will verify the pump assembly is operating properly and the fuel cell sensor is functioning.**

# PAS Sentry Calibration

This procedure follows the same steps as the sensitivity check procedure except that after the sample has been blown into the unit, the signal gain is adjusted to the point where two red bars light up.

**NOTE** Before calibrating the PAS Sentry, run a check on a sample of alcohol-free air. If bars light up, so not continue with the calibration.

1. Remove the push button control assembly. Inside you will see the PAS Sentry control switch stud and calibration signal gain adjustment screw.
2. Check that the inlet and outlet port holes of the PAS Sentry are free of obstruction. Insert calibration assembly.
3. Place the PAS Sentry toward the simulator so the calibration assembly from the simulator can be easily held (or attached) to the opening of the intake port.
4. Check that the green ready lamp is on.



5. Take a deep breath and blow slowly but steadily into the Simulator or use the PAS Cal-Pump auto air pump. After 5 seconds, activate the Control Button Switch Stud and start a sampling cycle.
6. Look for the green sensor bar light and the yellow pump light and listen for the sound of the air pump that should come on immediately after the Switch Stud is pressed. Keep blowing for another 5 seconds until the PAS Sentry pump stops (pump light goes out). The blue analysis lamp will remain on. You have about 30 seconds to complete Steps 7 and 8.

7. Pass a small flat blade jeweler's screwdriver through the switch hole of the instrument. Turn the calibration signal gain adjustment all the way up (counter-clockwise). The adjustment is free to rotate approximately 180°. Take care not to use any force. With the calibration adjustment at maximum, all the bars will light up.
8. When all bars of the display light up (15-20 seconds after sampling), turn the calibration adjustment down (clockwise) until the top red bar just goes out. You may need to make several small, soft and easy adjustments as the fuel cell climbs to its peak reading. If your adjustment is slightly too high, you should see the third red bar flash on and off. Turn counter clockwise just enough so that the flashing stops. Calibration is now complete.
9. Replace the push button switch assembly.
10. Turn off the PAS Sentry. The unit is now ready for operational use.

# RECORD KEEPING

Each organization/company that employs PAS Sentry units should assign a staff member to be responsible for care and maintenance. A log should be established to record the checking, calibration and maintenance activities on each unit. Testers using the units should be required to report any problems with the units to the PAS Sentry staff member who should record the problems in the log. If a unit is dropped or is damaged in some other way this should be entered in the log so that the information can be forwarded to the manufacturer along with the unit for repair. The log will record the life history of the units and should be carefully maintained since it may be subpoenaed if the use of the PAS Sentry is challenged.

To ensure that there is a record that these sensitivity checks have been conducted on a monthly basis, it is necessary to establish a log with a record for each of the PAS Sentry units employed by the Company or Department. An example of such a record is shown below.

## PAS Sentry

Date	Unit # Returned	Problem Reported	Checked By	Action Taken	Date Returned to Manufacturer	Date Returned to Field

## LOGBOOK

The example shown provides a means for recording any reports from Testers of problems with the PAS Sentry units or any unusual occurrences such as dropping the flashlight onto the pavement. The log also provides a brief description of the action taken to overcome the problem or to examine the unit for damage as a result of a tester's report. The log will note instances in which the PAS Sentry has been returned to the manufacturer for service and when it was received and checked upon its return. The log should also contain a notation recording each month's sensitivity check and the outcome of that check and also a calibration adjustment if such an adjustment was necessary.

In addition to monthly sensitivity checks, PAS Sentry units should be checked if they have received an unusual stress such as being dropped on the pavement. If a PAS Sentry unit has been sent to the manufacturer and returned following repair, a check should be made to ensure that the calibration was not affected by the handling during shipping. Also, perform periodic functional checks with known sources of alcohol to be certain all functions (e.g., pump) are performing.

***PAS Systems International, Inc.***

215 Southport Dr. Suite 400

Morrisville, NC 27560

<http://www.pasintl.com>

Tel: (540) 372-3431

800-660-SNIF

Printed 01/16

\$5.00