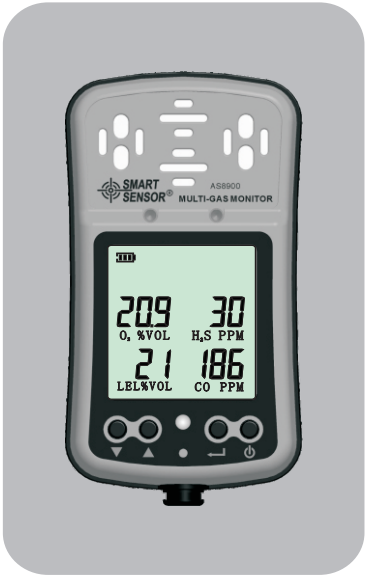
IntelliInstruments™ **Pro**

Model：AS8900

MULTI-GAS MONITOR



Version number:AS8900-0-1

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CONTENTS

一、NOTICE BEFORE USE

1.1 CAUTIONS AND WARNINGS

The user need to read and follow the procedures and conditions as below to prevent ant failure might be occurred during operating this instrument.

- Insufficent oxygen atmospheres may cause combustile gas readings be lower then actual corrected readings.
- Enriched oxygen atmospheres may cause combustile gas readings be higher then the actual corrected readings.
- The intruments need to be re-calibrated after the instrument has been used in an area of silicon vapors were present.
- Please always be kept clean of the sensor opening and the water barriers of the intrument.
- The oxygen readings will be caused temporary fluctuations while the atmospheric preesure is suddenly changed.
- Please do not charge the battery or serving the unit in hazardous or enriched atmospheres condition.
- The intrument only suggested to be used by operated and serviced by qualified personnel whom has fully read and understood the instruction manual completely.
- Caution: high offscale readings indicate the enviroment might be reached to explosive concentration that is also a danger signal to represent the area is hazardous.

- The instrument is recommended to be calibrated the sensitivity with a 25%, 50% of full concentration pentane or methane. Please referring to the zero /calibration section of this instruction manual.
- This insrument is certified to be normal use within the temperature range of -20 deg. C to 40 deg. C only.
- The model of AS8900 must be used only with model AS8930 external sampling pump. (Excluded)

1.2 UNIT PACKING

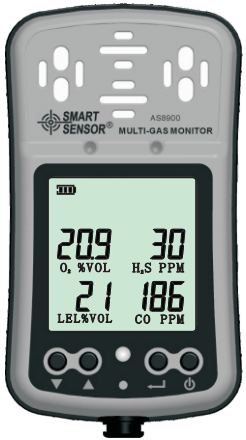
The gift box should be contain the following items

Description	Quantity
AS8900 4 in 1 muilt gases monitor	1PCS
Operation manual	1PCS
Carrying brouch	1PCS
3.7V rechargable lithium battery	1PCS
Charging adaptor	1PCS

1.3 PRODUCT SPECIFICATIONS

Sensor specification:			
Gas	Range	Resolution	T90
Oxygen (O2)	0~30%	0.1%	10sec
Combustile (LEL)	0~100%LEL	0.1%	35sec
Carbon Monoxide (CO)	0~999ppm	1ppm	50sec
Hyrogen Sulfide (H2S)	0~500ppm	1ppm	30sec
Temperature and humidity range:			
Operating Temperature: -10~ 50℃(except LEL is 0 ~40℃)			
Operating Humidity : 15~95 % RH, typical			
Storage Temperature : 0~40℃			
Size: 120.20mm x 64.50mm x 38.30mm			
Weight: 200g			
Battery specification:			
Rechargeable lithium-ion battery, 3.7 Volts			
Battery working runtime: 18 hours. And 12 hours work with AS8930 sampling pump.(work in room temperature and no alarm conditions.)			

1.4 OUTLOOK OF THE INSTRUEMENT



1.5 INTRODUCTIONS

The AS8900 multi-gas monitor is a portable and handheld instrument that is capable to use continuously and simultaneously monitoring 4 gases; Oxygen, Combustile gas, Carbon Monoxide and Hydrogen Sulfide. Every gas readings all shows in one LCD display. The unit also provide user to configure high and low alarm as well as Twa and Stel alarms. The unit will be audio and visual alarm once the alarm condition is exceeded.

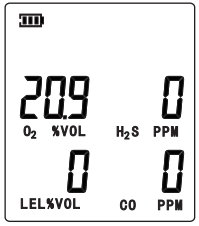
二、OPERATION MANUAL

2.1 INSTRUMENTS OPERATION

1. To turn on the instrument AS8900, please depress and hold the ⏻ button for over 1 second, the unit will be turn on with a beep sound and vibration, then the lcd will light up all icon and segments. Once the software countdown for 18 seconds then the unit will enter into the Gas Monitoring mode.
2. for to turn off the unit, please depress and hold the ⏻ button for over 3 seconds, then the unit will be power off after 3 beep sounds.
3. for to light up or turn off the backlight of the LCD display, please depress the ⏻ button.

2.2 Gas Monitoring mode

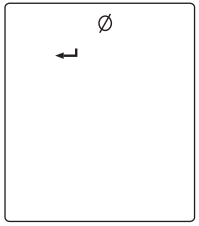
1. once the unit is power on, the display will show all 4 gas symbol with readings.
2. then the unit is already started to continuously monitored and shows the readings on the LCD display. Once the gas level is increase, the corresponding read will be showed the existing gas concentration.



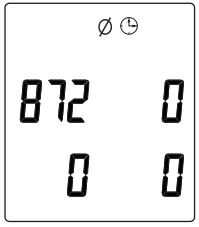
3. Also the battery life indicator is also display in the left upper corner, onr the battery lift is decreased, the shaded showed of the battery icon is alco decreased.
4. Once the gas concentration is exceed the high or low alarm limit (as well as TWA or STEL) the unit will be triggered the audio and visual alarm with vibration.

5. Once the gas concentration is drop below the alarm level, the unit will go back to normal gas monitoring mode.
6. For to access this mode, please depress ▲ button. Then the unit will enter to Zero/Calibration mode.

2.3 Zero/ calibration mode

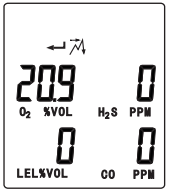


1. Depress the ▲ button once from the gas monitoring mode, the unit will be put in the Zero/ Calibration mode.
2. In this mode the icon Ø and ↵ will be displayed along with the 4 gases readings.
3. Depress the ↵ button once more time,the unit will escape to another Peak Value mode.
4. If depress Ø button the unit will start the Zero/ Calibration process. Once the CO, H2S and LEL sensors have finished the zeroing process, the Oxygen sensor will be start to SPAN.
5. During this process the "CLOCK" icon and full Oxygen span value will be displayed.



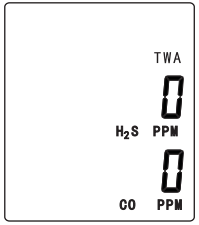
6. Once the process is completed, the display will shows the SPAN and icon
7. To depress the ↵ button, the unit will begin to calibrate the remaining sensors one by one with same process.
8. the calibration gas are the fixed concentration value, to calibrate the instrument by using a blended cylinder containing 25ppm H2S, 100ppm CO, 25% or 50% LEL Methane or pentane, and 19% Oxygen at 0.5 LPM flow speed.

2.4 PEAK VALUE SETTING MODE



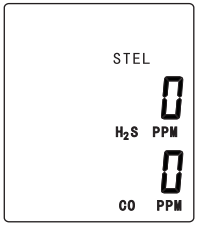
1. To depress the ▲ button from Zero /Calibration mode, the unit will entered to Peak value setting mode.
2. In this mode, the display will shows all 3 gases peak gas readings and the lowest readings of oxygen sensor, with PEAK and ENTER icon are displayed.
3. To depress ↵ button will reset all peak value of the current readings of 4 gases.
4. To depress ↵ button, then the unit will enter to TWA value mode.

2.5 TWA VALUE MODE



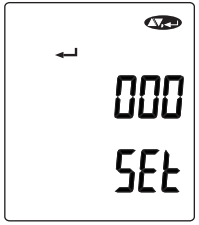
1. In Gas Monitoring mode, depress the ▲ Button for third times, the unit will enter to TWA (Time Weight Average) value mode.
2. In this mode the display will show TWA icon and only will 2 hazardous and combustile gas sensor readings are shown.
3. TWA value are reset while every time the unit is power off, and the time base is set for 8 hours.

2.6. STEL VALUE MODE



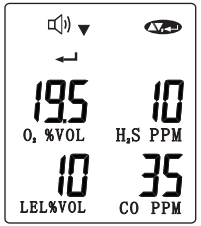
1. In Gas Monitoring mode, depress the ▲ Button for fourth times, the unit will enter to STEL (Short Term Exposure Limit) value mode.
2. In this mode the display will show STEL icon and only will 2 hazardous and combustile gas sensor readings are shown.
3. TWA value are reset while every time the unit is power off, and the time base is set for 15 minutes.

2.7 CONFIGURATION MODE



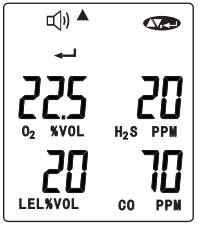
1. To depress the ▲or▼ button simultaneously during the software countdown time for 18 seconds will put this unit into the Configuration Mode.
2. In this mode, the unit is allow the user to change the high, low TWA and STEL alarm level as well as the security code (if desired)
3. once the Configuration Mode is Entered, the security code screen is displayed.
4. the preset code is 123, the first code will flash, then depress ▲ or ▼ button for change the first code, then depress ↵ button for second and third code number setting.
5. Once the security code is set and confirmed, depress the ↵ button to escape the unit to other alarm setting mode.

2.8. LOW ALARM SETTING MODE



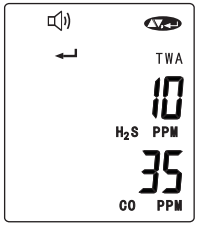
1. Low alarm setting mode is the first configuration screen, the display will show the (speaker) (down) (enter) and (up/down/enter) icons along with the four low alarm set readings of the 4 gases.
2. if the change is desired, press ↵ button, the first gas low alarm value will be flashing.
3. To adjust the value by depress ▲ or ▼ button.
4. Once the setting is confirmed and completed, press ↵ to next gas low alarm setting.
5. Continue this setting procedure until 4 gas low alarm value are set, the display will show (speaker) (down) (enter) and (up/down/enter) icon along with the 4 new low set alarm value.
6. Depress the ↵ button for re-enter this setting mode again for further adjusted setting if required.
7. Pressing the ▲ button to move the setting to high alarm setting mode.
8. Depress the ⏻ button, the unit will back to low alarm setting mode with no changes will be saved.
9. Depress ⏻ button for second time, the unit will be back to the original gas monitoring mode.

2.9. HIGH ALARM SETTING MODE



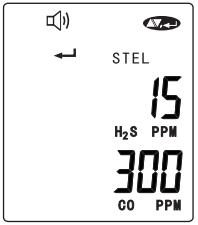
1. the high alarm setting mode is the second configuration screen of the unit.
2. in the mode the display will show (speaker) (down) (enter) and (up/down/enter) icon along with the 4 gases high alarm value.
3. if no change is required, press ▲ button to move to nest setting mode.
4. If the changed is needed, press ↵ button to have the first high alarm value will be flashing.
5. To adjust the value by press ▲ button or ▼ button.
6. Once the setting is confirmed and completed, press ↵ button to next high alarm setting.
7. Continue this setting procedure until 4 gases high alarm value are set. The display will show (speaker) (down) (enter) and (up/down/enter) icon along with the 4 new set alarm value.
8. Depress the ↵ button for re-enter this setting mode again for further adjusted setting if required.
9. Dressing the ▲ button to move the setting to next TWA value setting mode.
10. Depressing ⏻ button , the unit will back to high alarm setting mode with no changes will be saved.
11. Depress ⏻ button for second time, the unit will be back to the original gas monitoring mode.

2.10 TWA ALARM VALUE SETTING MODE



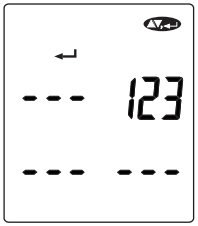
1. If no change is required, press ▲ button to next STEL alarm setting mode.
2. if the change is desired, press ↵ button, the first gas low alarm value will be flashing.
3. To adjust the value by depress ▲ or ▼ button.
4. Once the setting is confirmed and completed, press ↵ to next gas TWA alarm value setting.
5. Continue this setting procedure until 2 gas TWA alarm are set, the display will show(speaker) (twa) (enter) and(up/down/enter) icon along with the 2 new TWA alarm value.
6. Pressing the ↵ button will re-enter the mode for any further adjusted value is required.
7. pressing ▲ button will move to next STEL alarm value setting mode.
8. Pressing ⏻ button will back to original TWA alarm setting mode, with no changed will be saved.
9. Pressing the ⏻ button a second time, the unit will be back to the original gas monitoring mode.

2.11 STEL ALARM SETTING MODE



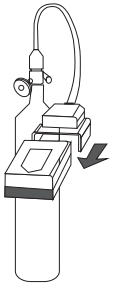
1. In this mode the display will show (speaker)(stel) (enter) and (up/down/enter) icon with 2 stel alarm value.
2. If the no changed is required, press ▲ button to move the unit to next setting screen.
3. If change is needed, press ↵ button , the first stel alarm value will be flashing.
4. To adjust the value by ▲ or ▼ button.
5. Once the setting is finished, press ↵ button to next gas stel alarm value setting.
6. Continue this setting until 2 gas stel alarm value are set, the display will show (speaker) (stel) (enter) and (up/down/enter) icons along with 2 new stel alarm value.
7. Pressing the ↵ button will re-enter this mode for further adjusted value is required.
8. Pressing ▲ button will move the next setting mode.
9. Pressing ⏻ button will be back to the original stel alarm setting mode, with no change will be saved.
10. Pressing the ⏻ button a second time, the unit will be back to the original gas monitoring mode.

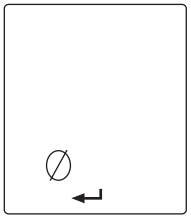
2.12 SECURITY CODE SETTING CODE

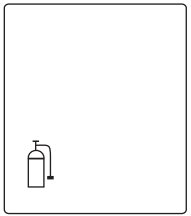


1. The next setting is the security code setting, The display will show (enter) (up/down/enter) and the manufacturing preset security 123.
2. If no change is required, press ▲ button to move into other LEL setting mode.
3. If security code need to be changed, press ↵ button, then the preset code will be flashing.
4. To adjust the first digit, press ▲ or ▼ button, once the value is confirmed, press ↵ button to set the second digit.
5. Continue this procedure until three digits are set the display will show (enter) (up/down/enter) icons along with the new security code.
6. If further change of security code is required, press ↵ Re-enter this setting mode again.
7. If no change is needed, press ▲ button move to next LEL setting mode.
8. Pressing the ⏻ button will bring you back to the security mode again, with no changes on security code is saved.
9. Pressing ⏻ button second time , the display will be back to normal gas monitoring mode.

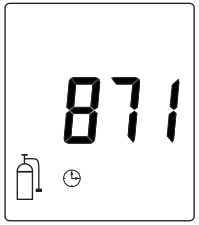
2.10 INSTRUMENT CALIBRATION MODE





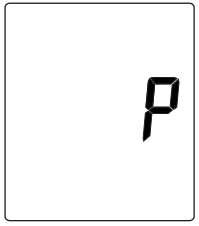


1. This is the final setting mode for zero/calibration mode.
2. The user wants to enter this mode with correct security code.
3. The unit could be easy to calibrate by using a cylinder of a standard gas.
4. To enter in this mode, to press both button of ▲ and ▼ in normal gas monitoring mode, and key in the correct security code to enter in this calibration mode.
5. To press ▲ button 4 times, then will enter to this instrument calibration mode. In this mode the display shows ∅ and ↵ icons, press button again for start the calibration with the icon cylinder is flashing.
6. Please make sure the unit is connected with the gas cylinder firmly before the cylinder icon flashing for 6 seconds.
7. Then to press the ↵ button, the display will shows cylinder and clock with the calibrating value.
8. If the calibration is succeeded, the dispay will shows P icon represent pass.



9. If it shows F , it means the calibration is failed, need to recalibrate again.

10. If no standard gas is used, please do not enter to this instrument calibration mode, for the pre-set value will be easy to be deleted.



2.13 LEL SETTING

* LEL is the final configuration setting mode, after press ↵ button, the LEL and the value readings will be flashed.
* Pressing the ▲ or ▼ button to set new % between 25% and 50%.
* Once the setting is finished, the new setting value will show on the display, then press ↵ button to confirm.
* Pressing the ⏻ button the unit will back to the normal gas monitoring mode.
* If press the ▲ button, it will back to first setting mode again.

Remarks: LEL is the low explosion level of the combustible gas in normal air.

2.14 ACCESSORY AS8930 SAMPLING PUMP

* The AS8930 external sampling pump is available to work with all AS8900 series gas monitor but no exclude in any unit pack.
* This pump mount into the AS8900 unit by 2 fasten screws. Please review to the assembly drawing attached.

三、OTHERS

3.1 MAINTENANCE

The following guideline should be followed to achieve good maintenance for AS8900 unit.

CLEANING:

* If necessary, wipe the outside surface of the unit, please use the soft, clean cloth.
* Never use any solvent or cleaning solutions.
* Make sure the rubber buttons are free od dirts.
* to clean the sensor opening, please use the clean, soft cloth or soft brush.

CHARGING THE BATTERY:

* The lithium-ion battery suggested to be fully charged before using the AS8900.
* To charge the battery, plug the connecting lead wire of the battery charger into the charging port located at the bottom of the unit. This port is protect by a rubber flap, so need to release the flap before charging.
* The battery should to fully charged in 6 hours.
* Once fully charged, the unit will be good enough to work for 18 hours operation, and work about 12 hours with AS8930 external sampling pump.
* The shaded area of battery indicator shows full once the battery is fully charged.
* If all shaded area only have one bar is left, the battery need to be charged at once.
* When the battery is low, the unit might emit a periodic alarm sound to alert you to charge the unit.

3. 2 WARRANTY

* AS8900 Multi-gas Monitor is warranted to be free from defects in material and workmanships for a period of one year after purchase.
* This warranty not includes the sensor and battery pack after 6 month purchase period.

3.3 MANUFACTURING STATEMENTS

* Thank you for buying and using Smart Sensor AS8900 Multi-Gas monitor.
* The unit has been designed, manufacturing, tested and proven under professional quality team.
* The unit should be reliable to use and operate under the reasonable care and maintenance described in this instruction manual.

3.4. ENCLOSURE

* The used or nonfunctional battery, please follow the international environment regulation to settle.
* Smart Sensor has the right to modify or change the design of the unit, operation manual or product specification prior without any further notice.

The effect of oxygen-deficient and oxygen-enriched atmospheres	
The concentration of oxygen(%)	Symptoms (atmospheric pressure)
100%	Deadly, 6 minutes(Absolutely airtight environment, such as hyperbaric oxygen chamber
50%	Deadly, can be cured after 45 minutes treatment. (Absolutely airtight environment, such as hyperbaric oxygen chamber)
>23.5%	Rich oxygen
20.9%	Normal
19.5%	Minimum
15～19%	Reduce efficiency, and lead to problems of head, lung and circulation system
10～12%	Shortness of breath, loss of judgment, purple lips
8～10%	governance loss, syncope, unconscious, pale, nausea and vomiting
6～8%	8 minutes, blood pressure, weak heartbeat, mouth breathing, quickly stopped breathing
4～6%	40 seconds, convulsions, respiratory arrest, death

Harm of carbon monoxide	
Content of carbon monoxide in Air	Suction time and showed symptoms of poisoning
50ppm	Maximum
200ppm	2~3 hours , a slight headache, dizziness, nausea
400ppm	2hours, forehead pain, life risk after 3hours
800ppm	Headache, nausea within 45minutes,death within 2~3hours
1600ppm	Headache, nausea within 20 minutes ,death within 1 hour

* The above parameters are for reference only

The concentration of Hydrogen and symptoms of poisoning		
Range		Symptoms of poisoning
Unit: ppm	Unit: mg/m3	
0.025～0.1	0.035～0.14	Olfactory sensation
50～100	70～140	Slight symptoms of poisoning within 1~2 hours
100～150	140～210	Olfactory nerve paralysis,obvious poisoning symptoms
200～250	210～350	Can afford 0.5~1 hour, but sequela
200～350	350～490	Poisoning in 6~8 minutes,death within 4~8 hours
850～500	490～700	Seriously poisoned within 0.5~1hour,death within 1~4 hours
500～600	700～835	Seriously poisoned within 1minute,death within 0.5~4 hours
600～700	835～980	Death within 2~15 minutes
700～1000	980～1400	mmediately die

Commonly used flammable gas explosion limit Table			
Name	Chemical formula	The explosion limit in air (V%)	
		Upper limit LEL	Lower limit LEL
Methane	CH_4	5	15
Ethane	C_2H_6	3	15.5
Propane	C_3H_8	2.1	9.5
Butane	C_4H_{10}	1.9	8.5
Gasoline(Liquid)	C_4-C_{12}	1.1	5.9
Kerosene(Liquid)	C_{10}-C_{16}	0.6	5
City gas		4	
liquefied petroleum gas		1	12
Turpentine(Liquid)	C_{10}-H_{16}	0.8	

* The above parameters are for reference only