User Manual R1.0
Santacary Technology Co., Ltd.
MHK-OCZ5 Portable Gases detector

INTRODUCTION

Santacary MHK-OCZ5 is a precise portable gases detector for monitoring oxygen (O_2), carbon dioxide (CO_2), low level ozone (O_3) concentration, temperature and relative humidity in the ambient air. The MHK-OCZ5 will continuously display the ambient concentration of oxygen, carbon dioxide, ozone and activate its audible and visual alarms whenever the preset set points are exceeded.

MHK-OCZ5 is used exclusively for monitoring and cannot be used for measuring oxygen concentrations.

MHK-OCZ5 can be widely used in the car, touring car, garage, food/fruits/goods container, petrochemical, power plant, telecom, medicine, mine, heavy industry, army, food industry, gas industry, and other confined spaces for personal safety.

MHK-OCZ5 can also be widely used in the houses, office, school, meeting room, restaurants, hospitals, mining facilities, metal refineries, commercial and public buildings, agriculture green house, and other places where carbon dioxide monitoring in confined spaces for personal health and personal comfort is important.

Please read this manual carefully before use. This operation manual will provide you with all the necessary information for the correct use of your MHK-OCZ5 monitor. MHK-OCZ5 is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

FEATURES

- Portable O_2, CO_2 and O_3 Gases detector
- O_2 range: 0 ~ 30.0% vol. Resolution: 0.1% vol.
- CO_2 range: 0~9,999 PPM display. Resolution: 1 PPM
- Low level O_3 gas detector range: 0 ~ 5.000 PPM. Resolution: 0.001 PPM or 1.0 PPP

- Using world top brand electrochemical oxygen sensor
- Stable and accurate NDIR sensor for CO_2 detection
- Support ambient fresh air calibration (20.9% vol. O_2 and 400 PPM CO_2)
- Audible and visual alarm
- Two levels of instantaneous alarm
- With temperature and humidity measurement

THEORY OF OPERATION

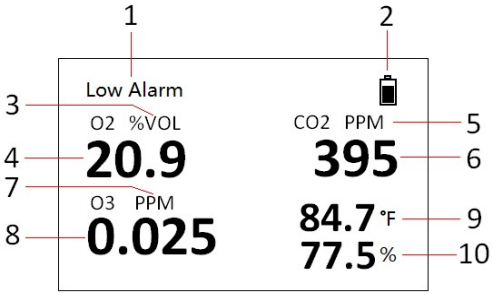
The Santacary MHK-OCZ5 portable O_2, CO_2 and O_3 gases detector uses two-electrode electrochemical and Dual Beam Non-dispersive Infrared (NDIR) technology, operating by the diffusion principle, for determining the concentration of oxygen, low level O_3 and carbon dioxide respectively in air samples. In diffusion mode, the air penetrates the grille on one side and back of the monitor into the interior. Normal air movements are enough to carry the sample to the sensors.

UNIT DESCRIPTION

Device

1. TFT display
2. Power button
3. Select button
4. Enter button
5. Air sampling ports
6. Battery compartment cover

Display



1. Alarm Status (None/Low Alarm/High Alarm)

2. Battery gauge
3. Oxygen concentration unit
4. Oxygen concentration in %VOL (% vol.)
5. Carbon dioxide concentration unit
6. Carbon dioxide concentration
7. Ozone concentration unit
8. Ozone concentration
9. Air Temperature
10. % Relative Humidity

OPERATION

1. Turn On/Turn Off Monitor

1) When the monitor is turned off, press Power button to turn on the unit.

2) When the monitor is turned on, press Power button for 2 seconds to turn off the unit.

When the unit is first turned on, it performs 60 seconds countdown for monitor initial warm up, then enters normal display with current O_2 concentration (% vol.), CO_2, O_3 concentration (ppm), temperature (°C or °F), and humidity (%RH) readings displayed. If the monitor is not used for a long time, the warm up time of O_2 and O_3 sensor needs more than 5 minutes.

The monitor starts taking measurements when power on and updates readings every 2 seconds. In the condition of operating environment change, it takes 15 seconds to respond for O_2, 90 seconds to respond for O_3, 2 minutes to respond for CO_2 and 30 minutes for humidity.

Note:

Always ensures that the grille is not blocked and open to the atmosphere.

Note:
Do not put the monitor close to faces in case that exhalation affects O_2 and CO_2 levels.

2. Fahrenheit and Celsius switching
Press elect button SELECT shortly to switch two temperature units: °F and °C.

3. Ambient Air Calibration for O_2 and CO_2
This detector can implement calibration when needed. Below is the guideline.

- Calibrate the detector at least once every 180 days depending on the use and sensor exposure to poisons and contaminants.
- Calibrate the detector if the ambient gas display varies at startup.

By pressing the Enter button ENTER shortly, the detector enters into **Calibration Menu**. In this menu, there are two items by pressing the Enter button ENTER shortly to loop switching: “Fresh Air Calibration” and “Exit” as described in below table.

Calibration Menu

Menu Items	Functional Description
Fresh Air Calibration 20.9% O2 400PPM CO2	The MHK-OCZ5 will perform an automatic fresh air adjustment for the sensors: 20.9% of O_2 and 400PPM of CO_2. If the fresh air adjustment is successful, the unit will proceed to normal display
Exit	Exit the Menu and proceed to normal display

Procedures of Calibration

Place the detector in clean atmosphere. Pressing the Enter button ENTER shortly, the detector enters into Calibration Menu. By pressing Select button SELECT shortly in the “Fresh Air Calibration 20.9% O2 400PPM CO2” item to calibrate the sensors. Or pressing Select button SELECT shortly in the “Exit” item to cancel calibration and return to normal display.

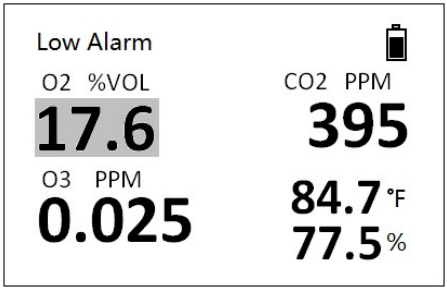
ALARM

Low Alarm and High Alarm

MHK-OCZ5 has two alarm set points: Warning (either O_2: 23.5% or 5000ppm CO_2 or 0.5ppm O_3) and Danger (either O_2: 19.5% or 9999ppm CO_2 or 1.0ppm O_3). These set points are factory set and cannot be changed. MHK-OCZ5 is equipped with audio and visual alarms to alert user when the ambient gas concentration exceeds one of the two alarm set points. When one gas value reaches the defined danger alarm set point, the audio alarm will sound at 3 beeps/sec. When one gas value exceeds the defined warning alarm set point, the audio alarm will sound at 2 beeps/sec.

Factory Alarm Set points

Gas	Low	High
O_2	19.5% vol.	23.5% vol.
CO_2	5000ppm	9999ppm
O_3	1.0ppm	0.5ppm



ATTENTION!

If a Danger alarm of O_2 is triggered while using the meter as a monitor, leave the area immediately. Remaining on site under such circumstances can cause serious damage to health or can even lead to death.

BATTERIES REPLACEMENT

1. When the batteries power is low, the low voltage symbol appears on the display. It indicates that the batteries need to be replaced. If they are not replaced in time, the accuracy of measurement will be affected.
2. Open the battery compartment cover and take out the batteries.
3. Install 3 new AA batteries correctly according to the diagram of positive and negative poles in the battery compartment.
4. If the detector is not used for a long time, please take out the batteries to prevent the batteries from leaking and damaging the detector.

MATERIALS SUPPLIED

- MHK-OCZ5 portable gases detector
- Carry case
- English User Manual

SPECIFICATIONS

Oxygen Sensor Specification:

Sensor	Electrochemical sensor
O_2 Measurement Range	0 ~ 30.0% vol. O_2
O_2 Resolution	0.1% vol.
Sample Method	Diffusion
Temperature Range	-20 to 50°C (-4°F ~ 122°F)
Humidity Range	5 to 95%RH
O_2 baseline Drift (-10-50°C)	<1% change in output @ 3 months
O_2 response time	<15 seconds from 20.9% to 0% O_2
O_2 Measurement Interval	2 seconds

CO_2 Specification:

Sensor	Dual Beam Non-dispersive Infrared (NDIR) sensor
CO_2 Measurement Range	0~9,999ppm display
CO_2 Resolution	1ppm / 0.01%
CO_2 Accuracy	±40ppm or ±3% of reading
Repeatability	±20ppm @ 400ppm
Sample Method	Diffusion

Temperature Dependence	Typ. ±0.3% of reading per °C or ±4ppm per °C, whichever is greater, referenced to 25 °C
Pressure Dependence	0.13% of reading per mmHg
CO_2 Response Time	About 2 min for 90% of step change
CO_2 Warm-up Time	<5 seconds at 22°C
CO_2 Measurement Interval	2 seconds

O_3 Sensor Specification:

Sensor	Electrochemical sensor
Measurement Range	0~5.000 PPM
Resolution	0.001 PPM / 1.0 PPP
Repeatability	<±5% of signal
Sample Method	Diffusion
Accuracy	±5%FS
Warm-up time	<3 mins
Response time	< 90 seconds (diffusion)
Recovery time	< 90 seconds (diffusion)
Service life	2 years (in air)
O_3 Measurement Interval	2 seconds

Temperature Specification

Temperature Range	-10.0~60.0°C (14~140°F) display
Display Resolution	0.1°C (0.1°F)
Display Options	°C/°F switchable
Accuracy	±0.5°C (±0.9°F)
Response Time	5~30 seconds (device must

	equilibrate with environment)

RH Specification

Measurement Range	0.0~99.9%RH
Display Resolution	1%RH
Accuracy	±4.5%RH
Response Time	<8 seconds for 63% of step change

General Specification

Display	2.2" TFT LCD
Operating	-10°C to 50°C (14°F to 122°F), 15~90% RH non-condensing
Storage	-10°C to 60°C (14°F to 140°F), <99% RH non-condensing
Power Supply	Three AA Alkaline Batteries
Dimensions	74x148x26.5mm (2.91x5.83x1.04")
Weight	145 grams (5.11 oz.) without batteries

Out of range of operating conditions will impact the accurate of O_2 measurement.

MAINTENANCE

To maintain the detector in good operating condition, perform the following basic maintenance as required.

1. Inspect the detector at regular intervals.
2. Clean the exterior with a soft damp cloth. Do not use solvents, soaps, or polishes.
3. Do not immerse the detector in liquids.

4. Keep away MHK-OCZ5 from dust and particles and never touch exhaust or concentrated vapors, harsh chemicals or extremely high concentration levels, such as corrosive gases, organic gases. They may poison the sensor.
5. Long-term placement in high-concentration organic gas will cause the sensor zero point to drift and slow recovery.
6. It is forbidden to store and use MHK-OCZ5 in high-concentration alkaline gas for a long time.

Troubleshooting

If a problem occurs, refer to the solutions provided in below table. If the problem persists, contact Santacary Technology Co., Ltd..

Problem	Possible cause	Solution
The monitor can't power on	Power adapter isn't well plugged.	Please check whether the power adapter is well plugged.
	Damaged or defective monitor	Contact Santacary Technology Co., Ltd.
The monitor enters alarm immediately when activated	Sensors need to stabilize	If the monitor is not used for long time, the warm up time of sensors need more than 5 minutes.
	Sensors require calibration	Calibrate the sensors
	Hazardous environment	Leave the area immediately. Deactivate and reactivate the monitor in a safe area that is

		free of hazardous gas.
Monitor does not accurately measure O_2 or CO_2 or O_3 concentration.	Sensors require calibration	Calibrate the sensors.
	Monitor is colder/hotter than gas temperature	Allow the monitor to attain ambient temperature before use
	Air grilles are blocked	Make sure that the air grilles are ventilated

WARRANTY

The MHK-OCZ5 is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover misuse, abuse, alteration, neglect, improper maintenance.
Proof of purchase is required for warranty. Warranty is void if the monitor has been opened.

CO_2 LEVELS AND GUIDELINES

NIOSH recommendations
250-350ppm: normal outdoor ambient concentrations
600 ppm: minimal air quality complaints
600-1000 ppm: less clearly interpreted
1000 ppm: indicates inadequate ventilation; complaints such as headaches, fatigue, and eye/throat irritation will be more widespread. 1000 ppm should be used as an upper limit for indoor levels.

ASHRAE Standard 62-1989: 1000ppm
CO_2 concentration in occupied building should not exceed 1000ppm.

Building bulletin 101 (BB101): 1500ppm

UK standards for schools say that CO_2 at averaged over the whole day (i.e. 9am to 3.30pm) should not exceed 1500ppm.

OSHA: 5000ppm

Time weighted average over five 8-hour work days should not exceed 5000ppm.

Germany, Japan, Australia, UK: 5000ppm

8 hours weighted average in occupational exposure limit is 5000ppm.

CONTACT US

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