

(Carbon Monoxide / Oxygen Detector)
Model XOC-2200
 Instruction Manual

- Thank you for purchasing XOC-2200.
- Keep this manual where it is readily accessible for quick and easy reference when necessary.
- Thoroughly read this manual before using the equipment so that it can be used safely and correctly.
- The descriptions in this manual are subject to change without notice.
- This package contains items as listed below. Please check carefully when unpacking. If any of the contains are missing, contact your authorized distributor or representative.
 - CO/O₂ detector 1
 - Calibration test certificate 1
 - Instruction manual 1
 - Alkaline AAA battery 2
(One battery pre-installed)
 - Safety pin adaptor (C-10) 1
(with 4 screws)



Note The pre-installed battery was used to adjust XOC-2200 in our factory. We recommend replacing the battery with a new one (provided) before using the product.

1. Introduction

- This product is a O₂ and CO detector to prevent from occurring oxygen deficiency or gas poisoning by alarm buzzer, lamp and vibration when the gas concentration exceeds the alarm set value.

• Description of Symbols

In order to use the Gas Detector safely, be sure to observe the following items.

	DANGER: Failure to observe the precautions indicated by this symbol will create a imminently dangerous or hazardous condition resulting in serious injury or death.
	WARNING: Failure to observe the precautions indicated by this symbol will create a potentially dangerous situation that may result in serious injury or death.
	CAUTION: Failure to observe the precautions indicated by this symbol will create a potentially dangerous situation resulting in minor injury or property damage.
Note	This symbol indicates advice on how to handle the instrument.

• Explosion-proof Requirements (Japan)

XOC-2200 is explosion-proof (Japan).
 Use the detector as directed below.

- Explosion-proof: Ex ib IIB T3 Gb
 Power Source: 1.5 VDC alkaline AAA battery x 1 pc
 Battery to use: Panasonic alkaline AAA battery (LR03X) x 1 pc, or Toshiba alkaline AAA battery (LR03) x 1 pc
 Ambient temperature: -20°C to +40°C
 Conditions of Use
- This product should not be used in hazardous areas outside of Japan.
 - Do not replace the battery in hazardous areas.
 - Do not use this product for measuring the oxygen concentration in any mixture other than a mixture of air and combustible gas or a mixture of vapor and toxic gas.
 - Only use specified battery.

Warranty

New Cosmos Electric Company Limited (New Cosmos) offers the following as the sole and exclusive limited warranty available to Customer.

This warranty is in lieu of, and customer waives, all other warranties of any kind or nature, expressed or implied, including without limitation, any warranty for merchantability or fitness for a particular purpose. The remedies set forth herein are exclusive.

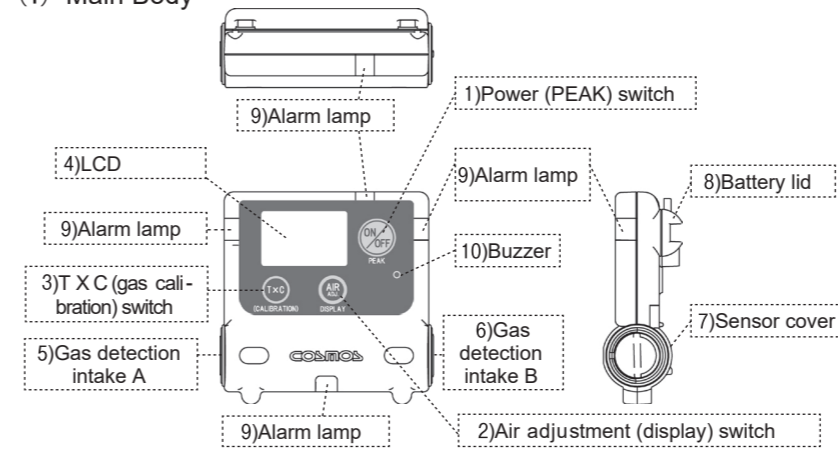
New Cosmos warrants to the original purchaser and no other person or entity (customer) that gas detection product supplied by New Cosmos shall be free from defects in materials and workmanship for a period of one (1) year from the date of purchase. This warranty does not include consumables, such as fuses, filters, etc. Certain other accessories not specifically listed here may have different warranty periods.

After examination of allegedly defective product return to New Cosmos, with freight prepaid, should the product fail to conform to this warranty, customer's only remedy and New Cosmos's only obligation shall be, at New Cosmos's sole option, replacement or repair of such non-conforming product or refund of the original purchase price of the non-conforming product. In no event will New Cosmos be liable for any other special, incidental or consequential damages or losses of any kind whatsoever, including but not limited to, loss of anticipated profits and any other loss caused by reason of non-operation of the product.

This warranty is valid only if the product is maintained and used in accordance with New Cosmos's instructions and/or recommendations. New Cosmos shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own or authorized service personnel or if the warranty claim results from physical abuse or misuse of the product.

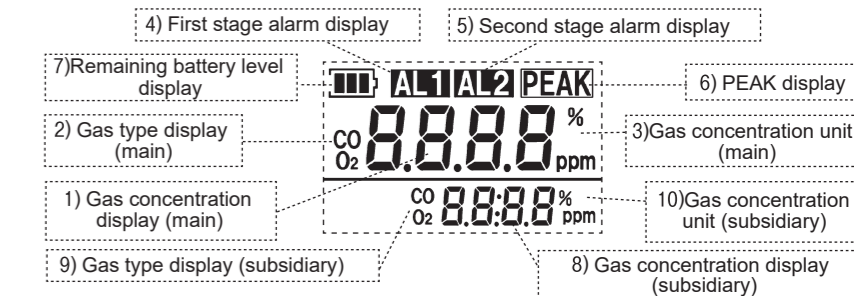
2. Part Names and Functions

(1) Main Body



1) Power (PEAK) switch	Turns the power ON/OFF. Or used for the PEAK holding function.
2) Air adjustment (display) switch	Performs zero / 21% adjustment. Switches between main and sub display.
3) T X C (gas calibration) switch	Displays T X C (TWA concentration) or cancels the TWA alarm (for CO only). Also used for gas calibration. *For details about gas calibration, see the instruction manual for the gas calibration kit (available separately).
4) LCD	Displays the different types of indications including gas concentrations (refer to page 4).
5) Gas detection intake A	Port to detect carbon monoxide.
6) Gas detection intake B	Port to detect oxygen.
7) Sensor cover	For storing the gas sensor.
8) Battery lid	For storing the battery.
9) Alarm lamp	Blinks when an alarm is activated.
10) Buzzer	Sounds when an alarm is activated.

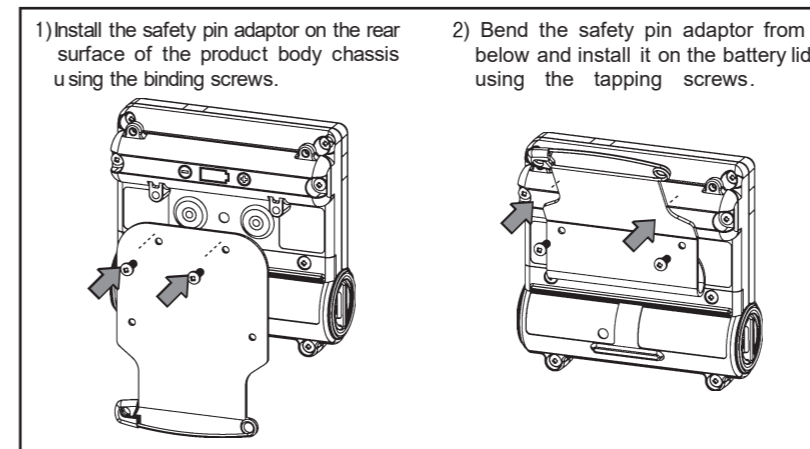
(2) LCD



1) Gas concentration display (main)	Displays digital indication of gas concentration value.
2) Gas type display (main)	Displays gas type. (CO or O ₂)
3) Gas concentration unit (main)	Displays gas concentration unit.
4) First stage alarm display	Blinks when the concentration exceeds the first stage alarm level.
5) Second stage alarm display	Blinks when the concentration exceeds the second stage alarm level.
6) PEAK display	Displayed when the gas concentration indicates the PEAK value.
7) Remaining battery level display	Displays remaining battery level.
8) Gas concentration display (subsidiary)	Displays digital indication of gas concentration value.
9) Gas type display (subsidiary)	Displays gas type.
10) Gas concentration unit (subsidiary)	Displays gas concentration unit.

(3) Safety pin adaptor (C-10) installation procedure

Installing the safety pin adaptor onto the battery lid allows wearing of the device with the safety pin. Follow the installation procedure described below:



(4) Optional Items (sold separately)

Item name	Part No.	Description
Leather case	C-11	Covers the whole device to protect it from dirt and water. (IPX1)
Heat-resistant leather case	C-12	Covers whole device to protect it from dirt and water. (IPX1). It uses heat-resistant material to reduce temperature increases from high temperature radiation heat. (No change in operating temperature range of the product.)
Strap with clip	ST-3	Prevents the gas detector from dropping.
Simplified inspection jig	EG-105	For simplified inspections of alarm performance and indication accuracy. (Gas used for inspection is available separately.)
Inspection gas	—	For simplified inspection, supplied in a nozzle-type cartridge.
Gas calibration kit	EG-106	For indication accuracy inspection and gas calibration. (Calibration gas is available separately.)

(5) Replacement Parts (sold separately)

Item name	Part No.	Description
Filter element (10 pcs)	FE-116	Filter to protect the gas detection intake from dust and water exposure.

3. Operational Procedure

① Turning the power on

Press and hold the [Power (PEAK)] switch for approx. 3 seconds. "on" will be displayed, a countdown will begin with "3," "2," and "1", the gas alarm settings will be displayed, and then air adjustment will be automatically performed. Upon the completion of air adjustment, the measured gas concentration will be displayed.

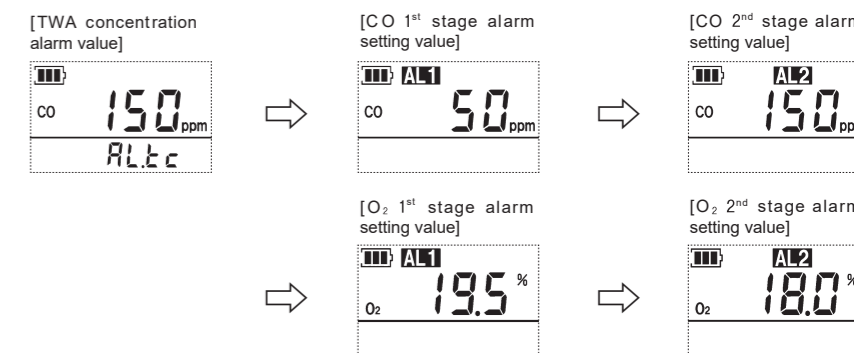
WARNING Make sure to turn on the power in clean air. Since air adjustment will be conducted automatically, the incorrect gas concentrations will be displayed when turned on in gas atmosphere.

Note

- After switch operation, the LCD display light (backlight) turns on for approx. 5 seconds and then turns off automatically.
- To return TWA (see "Glossary" on page 14) concentration to 0 ppm, turn off the power.

• Gas alarm concentration setting

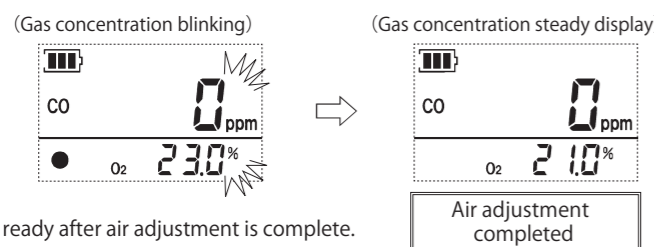
Displayed in the following order:
 [TWA concentration alarm value] → [CO 1st stage alarm setting value] → [CO 2nd stage alarm setting value] → [O₂ 1st stage alarm setting value] → [O₂ 2nd stage alarm setting value]



• Gas alarm concentration setting value (Standard setting value)

Target gas	Carbon Monoxide (CO)	Oxygen (O ₂)
TWA concentration alarm	150ppm · h	—
1 st stage alarm	AL1 50ppm	19.5%
2 nd stage alarm	AL2 150ppm	18.0%

- Air adjustment
Air adjustment (zero / 21% adjustment) is completed when the gas concentration display changes from a blinking display to a steady display of "0" or "21.0".



Gas detection is ready after air adjustment is complete.

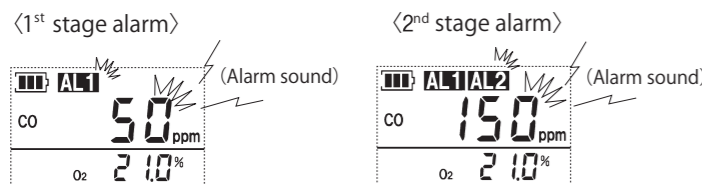
Note When the target gas is O₂, check that the blinking "23.0%" is displayed during air adjustment. When the sensor approaches the end of its lifetime, a value less than 23.0% is displayed. Replace the oxygen sensor with a new one before the value reaches "21.0%".

② Gas detection (Alarm status)

Note For simultaneous alarms, priority for alarm activation is ① Second stage alarm, ② TWA concentration alarm, and ③ First stage alarm.
When the gas concentration display exceeds the service range, the service range upper limit and "OL" are displayed alternately.

● First and Second stage alarm

If the gas concentration exceeds the first or second stage alarm concentration setting level, alarm activation is accompanied by sound and vibration and the gas concentration display, alarm display, and alarm lamp blink.



Note The ON/OFF cycle of the alarm sound and the blinking cycle of the alarm light become faster for the second stage than for the first.
During an alarm, the backlight of the LCD display remains on.

- Time Weighted Average (TWA) concentration alarm (for CO only)
If the TWA concentration (see "Glossary" on page 14) exceeds the alarm setting level, "the gas concentration" and "AL. tc" are displayed alternately while the alarm lamp blinks. Press the [T x C] switch to cancel the TWA concentration alarm. Note that "gas concentration display" and "AL. tc" will continue to be displayed alternately until the power is turned off.

(If only the TWA concentration alarm is activated)



(If the second stage alarm and TWA concentration alarm are activated simultaneously)



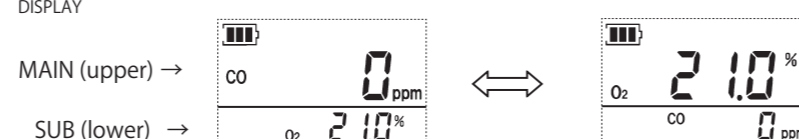
③ Air adjustment (zero adjustment)

AIR ADJ. Press and hold the [Air Adjustment] switch for approximately 3 seconds to perform air adjustment manually.

WARNING Be sure to execute the air adjustment in clean air. Accurate gas detection results cannot be obtained if the adjustment is made in an atmosphere mixed with gases. Execute the air adjustment at least once a day. In addition, make the air adjustment when the work environment (temperature or humidity) changes because the zero point may shift.

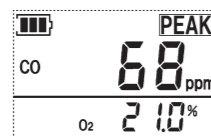
④ Switching displays

AIR ADJ. DISPLAY Press the [Air Adjustment(Display)] switch to change between the main (upper row) and the subsidiary (lower row) displays.



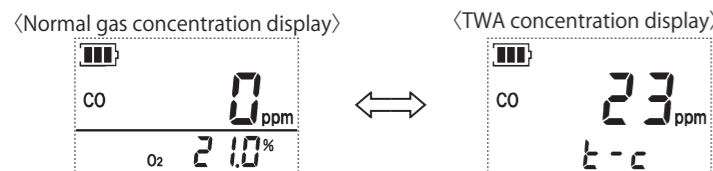
⑤ Peak hold function (function to hold a peak value)

ON/OFF PEAK Press the [Power (PEAK)] switch to display PEAK. The highest concentration value (lowest for O₂) marked during PEAK being displayed will remain displayed. To reset the value and return to the normal screen, press the switch again.



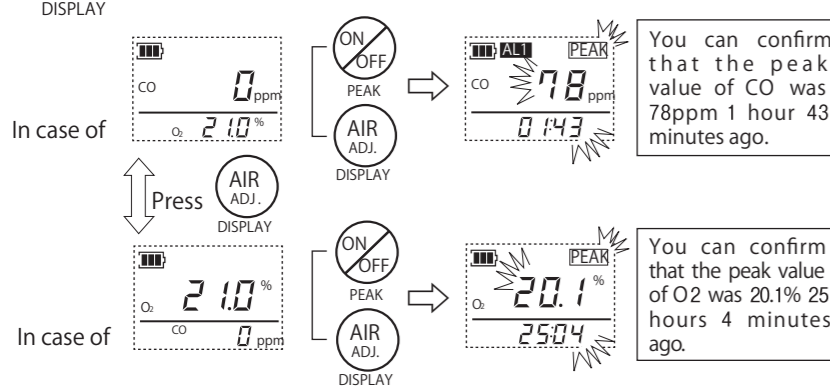
⑥ TWA concentration display

T x C The TWA value and "t-c" are displayed while the [Tx C] switch is being held down. Release the switch to return to the normal gas concentration display. The TWA concentration is reset when the power is turned off, and the TWA starts from "0ppm" again the next time the power is turned on.



⑦ Peak value memory function [Memorize and check the peak value between power ON and OFF.]

ON/OFF PEAK Press the [Power (PEAK)] switch and [Air Adjustment] switch at the same time. The display will blink only while the switches are held down at the same time, indicating the peak value from the time of power on to the present. The subsidiary display indicates the elapsed time since the peak value was observed.

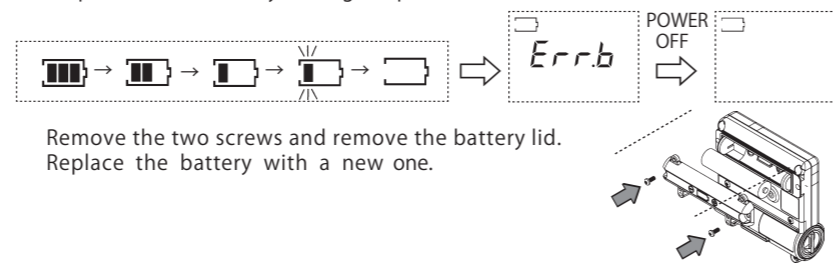


⑧ Turning the power off

ON/OFF PEAK Press and hold the [Power (PEAK)] switch for approximately 3 seconds. "oFF" and count down "3→2→1" are displayed, and the power turns off.

4. Replacing Battery

The remaining battery level indication decreases in increments as the battery level decreases as shown below:
Before remaining battery level is exhausted, the last indication will blink with an intermittent alarm sound in 10 second intervals. When the remaining battery level is exhausted, [Err.b] is displayed and accompanied by a continuous alarm sound. The product will no longer operate. Stop the alarm sound by turning the power OFF.



CAUTION When inserting the battery, match the polarities (+ and -) with the battery marks. If the battery polarity is reversed the detector cannot be turned on and a continuous vibration may occur depending on the battery type. Remove the battery promptly and insert it again with the correct polarity.

Note This product uses a very small amount of current even after turned off to stabilize the sensor. Keep the battery in the product even when the product is not being used. If the battery is removed from the product for a long period of time, initial stabilization of the sensor may take longer, causing an error. In such a case, insert the battery and leave the product with the power being off for one day or longer before use.

5. Troubleshooting

Display	Content
Err.b	No remaining battery level. Replace the battery.
Err.A	Execute the air adjustment again in clean air. If the alarm is activated after multiple adjustments, request repairs.
Err.r	Readout error. Remove and reinsert the battery. Turn on the detector to check performance. If normal operation cannot be restored with this procedure, request repairs.
Err.E	Readout error. Remove and reinsert the battery. Turn on the detector to check performance. If normal operation cannot be restored with this procedure, request repairs.
Err.S	The CO sensor may be incorrectly installed. Check the sensor. Request repairs, if "Err.S" is displayed even though the sensor is correctly installed.

If the operation switches or displays do not operate properly other than when alarms are activated as described above, remove and reinsert the battery into the product. Turn on the detector to check performance. If normal operation cannot be restored with this procedure, request repairs.

6. Maintenance

This product is a precision instrument. Please perform the periodical checks and inspections below to maintain the detector's performance and ensure safety. In the event of a failure to follow the safety precautions (page 2), such as impact shock from dropping or exposure to water, or use in conditions outside the specifications (page 13), such as usage in temperature/humidity exceeding the specified range, please contact New Cosmos or your New Cosmos representative for inspection. A comprehensive description of the current situation would be appreciated when you contact us.

7. Specifications

Model	XOC-2200	
Type of gas detected	Oxygen (O ₂)	Carbon Monoxide (CO)
Detection principle	Galvanic cell	Electrochemical
Gas sampling method	Diffusion type	
Detection range (Service Range)	0—25vol% (25.1—50vol%)	0—300ppm: 1ppm, (300—2000ppm: 50ppm)
Resolution	0.1vol%	0—350ppm : 1ppm 350—2000ppm : 50ppm
Reading accuracy *1	Within ± 0.5vol%	Within ± 30ppm
Alarm set value	19.5vol% (first stage), 18.0vol% (second stage)	50ppm (first stage), 150ppm (second stage), 150ppm·h (time weighted average)
Response time *2	Maximum 20 seconds	Maximum 30 seconds
Display	LCD (with backlight)	
Alarm	Buzzer sounds, flashing red light, vibration (auto-resetting)	
Functions	Remaining battery level, peak hold, memory of peak value, readout of time weighted average, remaining battery level, alarm functions except gas alarm (time weighted average, sensor malfunction, battery level, zero-adjustment malfunction), gas calibration, gas concentration indication	
Explosion-proof	Ex ib IIB T3 Gb (Japan) Intrinsically safe ⁶⁴	
Operating temperature	-10°C—40°C, 30—85% RH (non condensing)	
Operating air pressure	Atmospheric pressure (80—110kPa)	
Power	Alkaline AAA battery (Panasonic LR03X or Toshiba LR03) x 1pc	
Battery life *3	Approx. 5,000 hours (at 20°C with no alarm)	
External dimensions	W65 x D 22 x H 64mm (excl. projections)	
Weight	Approx. 75g (including battery)	
Standard accessories	1 x Alkaline AAA battery 1 x safety pin adaptor (with 4 screws)	
Approval	EMC directive (2014/30/EU/SI 2016 No.1091) and RoHS directive (2011/65/EU+(EU)2015/863/SI 2012 No.3032)	

Specifications are subject to change for improvements without prior notice
*1 Under identical measuring conditions. Except for the service range.
*2 Assuming 90% response and operating at 20 +/- 2°C
*3 Battery life may vary with ambient conditions, conditions of use, storage period, battery manufacturer, etc.
*4 Outside Japan, XOC-2200 should not be used in hazardous areas.

CAUTION The recommended replacement cycle for sensors is one year. Replace the sensor with a new one annually to ensure correct detection.
The above-recommended cycles is only an estimate based on normal use and proper maintenance without exposure to high concentration gas or gas poisoning; therefore, no guarantee is provided.

(1) Daily Check

Execute daily check in clean air before use.
1) Operation
Check alarm sound, alarm lamp, vibration and LCD work properly when the detector is turned on. If not, request repairs.

2) Alarm function
Check the alarm indications such as alarm sound, alarm lamp and vibration by having the detector draw gas at a level that slightly exceeds the alarm level. In the event of an abnormality in the way the gas concentration readings change, such as the alarm lamp does not flicker or the buzzer does not sound request repairs.

3) Remaining battery level
Check the remaining battery level of the gas detector. If the remaining battery level is low, replace the battery. (See "Replacing Battery" on page 10)

Note Alarm activation and use at low temperature may shorten the battery life.

4) Gas detection intakes
Check that the gas detection intakes A and B are not blocked and the filter elements are clean and dry. Replace the elements if dirty or wet. (See "Replacement Parts" on page 5)

(2) Periodic Check

Check the product accuracy at least once a month and perform gas calibration at least once every 6 months. It is recommended to contact New Cosmos or your New Cosmos representative to perform a periodic inspection including sensor replacement at least once a year (fees apply). Quick accuracy check can be performed with test jig (EG-105) and gas calibration can be performed with gas calibration kit (EG-106) by the customer (see page 5).

8. Glossary

- Explosion-proof structure: Structure of an electrical apparatus to not become an ignition source in a flammable atmosphere.
- Intrinsically safe (IS) structure: Structure tested (e.g., spark test) to not become an ignition source in a flammable atmosphere due to an electrical spark or hot surface during normal operation and fault conditions.
- Non-hazardous area: Area in which an explosive atmosphere is not expected to be present in quantities such as to require special precautions for the construction, installation and use of equipment
- Air adjustment: Adjusting the zero point (or 21.0% for oxygen) in clean air.
- Service range: A range of target gas concentrations the detector is able to indicate, which are usually outside the Detection Range and used only as reference.
- Time weighted average (TWA): Concentration value expressed as the product of gas exposure time (hour) and gas concentration (ppm). For this detector, it is calculated by dividing the average concentration per minute by the integrated value of 60 minutes. Note that there is an error of ±5% in the time calculation, and the unit is "ppm" just for convenience. Example: When continuously exposed to 100 ppm CO for 30 minutes, 100 ppm x 30/60 = 50 ppm-h.
- Gas calibration: Adjusting the indicated values by using span gas. Also called "span adjustment".
- Clean air: Air free from target or interfering gases, and composed of 20.9-21.0vol% oxygen in dry conditions.