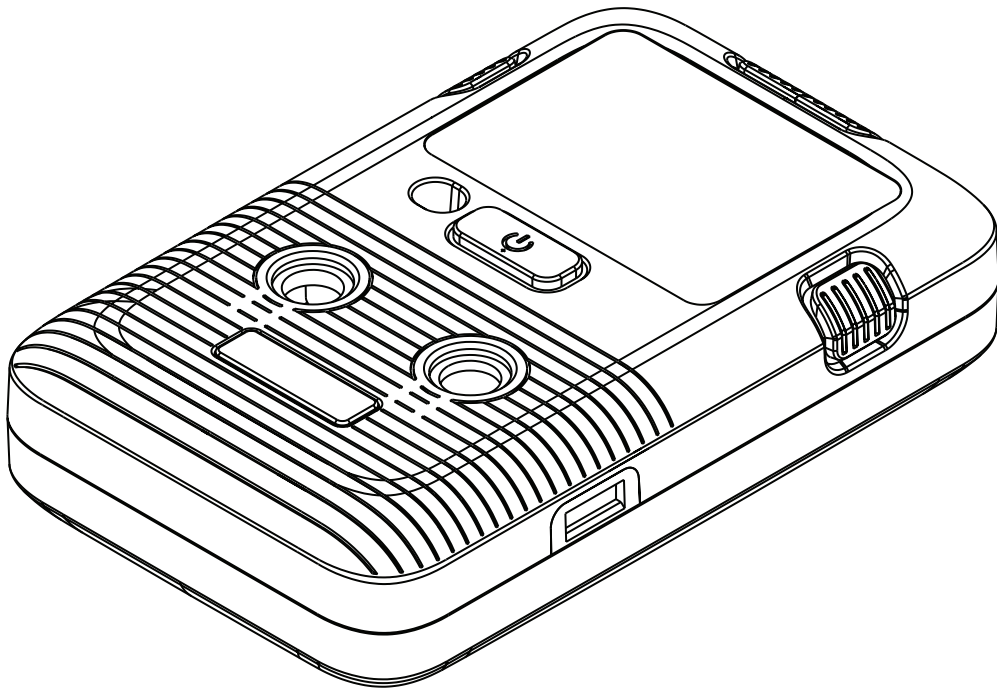


DUO TRACER

PORTABLE DUAL GAS DETECTOR

USER MANUAL



SENKO

www.senko-detection.com

SAFETY WARNING



WARNING

- Please do not replace or change the parts. In this case, we do not guarantee the warranty and safety even though it is under warranty.
- Do not open or replace battery when an explosive atmosphere is present. The battery can only be replaced in safe area.
- Please remove any debris on the surfaces of the sensor, LED or buzzer before use.
- Test the performance of the gas sensor through the gas beyond the alarm level regularly.
- Test the device on a regular basis whether its LED, alarm and vibration function properly.
- Use the device under the conditions instructed, including the temperature, humidity and pressure range. The use environment outside the instruction may cause malfunction or failure.
- The sensors inside the device may indicate the gas concentration differently according to the environment such as temperature, pressure and humidity. Please make sure to calibrate the detector under the same or similar environment to the specification.
- Extreme changes in temperature may cause drastic changes of the gas concentration. (e.g. using the detector where there is a huge gap between the inside and outside temperature) Please use the device when the concentration becomes stable.
- Severe pressure or impact may cause drastic changes of the gas concentration. Therefore, please use the device when the concentration is stable. Severe pressure or impact may cause also malfunction in the sensor or the device.
- The alarms are set according to the international standard and must be changed by an authorized expert.
- Replacing the battery should be done in a safe area where there is no risk of explosion or fire. Changing the sensor or battery with improper replacements, which are not authorized by the manufacturer, may invalidate the warranty.
- IR communication should be done in a safe area where there is no risk of explosion or fire.
- Do not expose the detector to poisons such as alcohol and citrus based products, as poisons may damage device's accuracy and response time.
- If you suspect sensor poisoning, please check such as calibration and bump.
- The detector is designed for use only in potentially explosive atmospheres where oxygen concentrations do not exceed 20.9% (v/v). Oxygen deficient atmospheres (<10% v/v) may suppress some sensor outputs.
- Do not charge because of primary cell battery.
- Replace the battery from SENKO authorized service providers before it is discharged.
- Do not calibrate if exposed to the condition representative of the IP rating.
- Use the exclusive calibration cap or device for calibration.
- Do not perform the calibration in the stabilization process after turning on the device.
- Sudden change in atmospheric pressure may cause oxygen concentration unstable temporarily.
- Before daily use, check the sensor vents are clear of any obstructions, debris, or blockage.

SAFETY WARNING

- If the sensor vents are blocked by any pollutants, a real detection concentration may be measured lower than the normal concentration.
- The equipment shall only be carried and must not be laid down unattended.
- If a charge-generating mechanism is present, the exposed metallic part on the enclosure is capable of storing a level of electrostatic charge that could become incensive for IIC gases. Therefore, the user / installer shall implement precautions, for example, those listed above, to prevent the build-up of electrostatic charge. This is particularly important if the equipment is brought into a Zone 0 location.
- The battery and sensors should be replaced by SENKO authorized service providers in the safety zone that is free of hazardous gases.



CAUTION

- Please use after reading the manual carefully.
- The device is not a measurement device, but a gas detector.
- Please stop using and consult the manufacturer if the calibration fails continuously.
- Please test the device every 30 days under the atmospheric environment of clean air without gases.
- Clean the exterior of the device with soft cloth and do not clean it with chemical detergent.



SPECIAL CONDITIONS OF SAFE USE

- Do not open or replace battery when an explosive atmosphere is present. The battery can only be replaced in safe area.
- Only the battery SB-AA02(P) (Vitzrocell) can be used.
- The LCD screen is covered with an electrostatic dissipating film and must be inspected periodically if this coating is required to ensure no degradation, delamination, abrasions or other deformities to this surface. If the film is found not complying with the inspection conditions, it must be reapplied according to the manufacturer instructions. Care must be taken to avoid exposure to excessive heat, harsh chemicals or solvents, sharp edges and abrasive surfaces.

Avertissements de Sécurité



Avertissement

- Veuillez ne pas remplacer ni modifier les pièces. Dans ce cas, nous ne garantissons pas la sécurité ni la garantie, même si l'appareil est sous garantie.
- Ne pas ouvrir ou remplacer la batterie en présence d'une atmosphère explosive. La batterie ne peut être remplacée que dans une zone sécurisée.
- Veuillez retirer tout débris sur les surfaces du capteur, de la LED ou du buzzer avant utilisation.
- Testez régulièrement les performances du capteur de gaz en utilisant un gaz au-delà du niveau d'alarme.
- Vérifiez régulièrement si la LED, l'alarme et la fonction de vibration de l'appareil fonctionnent correctement.
- Utilisez l'appareil dans les conditions spécifiées, y compris la plage de température, d'humidité et de pression. Un environnement d'utilisation en dehors des instructions peut entraîner un dysfonctionnement ou une défaillance.
- Les capteurs à l'intérieur de l'appareil peuvent indiquer des concentrations de gaz différentes en fonction de l'environnement, comme la température, la pression et l'humidité. Veuillez calibrer le détecteur dans un environnement similaire ou identique aux spécifications.
- Des variations extrêmes de température peuvent entraîner des changements brusques de la concentration de gaz (par ex., utiliser le détecteur dans un lieu où il y a un grand écart de température entre l'intérieur et l'extérieur). Veuillez utiliser l'appareil lorsque la concentration est stable.
- Une pression ou un impact sévère peut entraîner des changements brusques de la concentration de gaz et également provoquer des dysfonctionnements du capteur ou de l'appareil. Par conséquent, utilisez l'appareil lorsque la concentration est stable.
- Les alarmes sont réglées selon les normes internationales et doivent être modifiées par un expert agréé.
- Le remplacement de la batterie doit être effectué dans une zone sécurisée sans risque d'explosion ou d'incendie. Remplacer le capteur ou la batterie par des composants non autorisés par le fabricant peut invalider la garantie.
- La communication IR doit être effectuée dans une zone sécurisée sans risque d'explosion ou d'incendie.
- N'exposez pas le détecteur à des substances toxiques telles que l'alcool ou les produits à base d'agrumes, car ces substances peuvent altérer la précision et le temps de réponse de l'appareil.
- En cas de suspicion d'empoisonnement du capteur, veuillez vérifier avec un calibrage ou un test rapide ("bump").
- Le détecteur est conçu uniquement pour une utilisation dans des atmosphères potentiellement explosives où les concentrations d'oxygène ne dépassent pas 20,9 % (v/v). Les atmosphères pauvres en oxygène (<10 % v/v) peuvent diminuer les sorties de certains capteurs.
- Ne chargez pas la batterie, car elle est non rechargeable.

Avertissements de Sécurité

- Remplacez la batterie auprès des prestataires de service agréés SENKO avant qu'elle ne soit complètement déchargée.
- Ne calibrez pas si vous êtes exposé à des conditions représentant le degré de protection IP.
- Utilisez le capuchon ou l'appareil de calibration exclusif pour le calibrage.
- Ne procédez pas à la calibration pendant le processus de stabilisation après avoir allumé l'appareil.
- Les changements soudains de pression atmosphérique peuvent entraîner une instabilité temporaire de la concentration en oxygène.
- Avant chaque utilisation, vérifiez que les ouvertures des capteurs ne sont pas obstruées par des débris ou des blocages.
- Si les ouvertures des capteurs sont obstruées par des polluants, une concentration de gaz inférieure à la normale peut être mesurée.
- L'équipement doit toujours être transporté et ne doit pas être laissé sans surveillance.
- En cas de présence d'un mécanisme générateur de charge, la partie métallique exposée du boîtier peut accumuler une charge électrostatique suffisante pour enflammer des gaz de type IIC. Par conséquent, l'utilisateur ou l'installateur doit prendre des précautions pour éviter l'accumulation de charge électrostatique, en particulier dans les zones de type 0.
- La batterie et les capteurs doivent être remplacés par des prestataires de service agréés SENKO dans une zone de sécurité exempte de gaz dangereux.



Précaution

- Veuillez lire attentivement le manuel avant utilisation.
- L'appareil n'est pas un dispositif de mesure, mais un détecteur de gaz.
- Veuillez arrêter l'utilisation et consulter le fabricant en cas d'échec répété de la calibration.
- Testez l'appareil tous les 30 jours dans un environnement atmosphérique exempt de gaz.
- Nettoyez l'extérieur de l'appareil avec un chiffon doux et évitez d'utiliser des détergents



Conditions spéciales d'utilisation en sécurité

- Ne pas ouvrir ni remplacer la batterie en présence d'une atmosphère explosive. La batterie ne peut être remplacée que dans une zone sécurisée.
- Seule la batterie SB-AA02(P) (Vitzrocell) est autorisée.
- L'écran LCD est recouvert d'un film dissipant les charges électrostatiques et doit être inspecté régulièrement pour vérifier l'absence de dégradation, de délamination ou d'abrasion. Si le film ne respecte pas les conditions d'inspection, il doit être remplacé selon les instructions du fabricant. Évitez toute exposition à une chaleur excessive, à des produits chimiques agressifs, à des solvants, à des bords tranchants ou à des surfaces abrasives.

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1. PRODUCT OVERVIEW

1.1. PRODUCT INTRODUCTION

The DUO TRACER is a portable gas detector with the diffusion method that warns of dangerous environment related to the gases. The detector indicates the concentration of oxygen, explosive or toxic gases on the LCD monitor. It is easy and simple to operate. The device alerts the workers of the danger by alarm, LED, vibration when the concentration exceeds the safety gas levels. The device shows the gas concentration in real time and identify the maximum and minimum concentration. Settings can be modified via wireless or Senko IR-LINK (optional).

1.2. PRODUCT FEATURES

- Dual gas detection
- Wireless and IR connectivity
- Real-time monitoring
- Water/dust proof (IP67)
- Compact and lightweight
- High-performance alarms
- Automatically logs up to 30 alarm events
- Easy configuration and manage data using the IR link
- User-friendly operation

1.3. SPECIFICATION

Model	DUO TRACER
Sensor Type	Electrochemical, Non-Dispersive Infrared (NDIR)
Measuring Type	Diffusion
Case Material	Rubber type polycarbonate
Dimensions	56(W) x 89(H) x 21(D) mm / 2.2(W) x 3.5(H) x 0.83(D) inch
Weight	200g / 7.05oz
Operating Temperature	-20°C to +50°C / -4°F to +122°F
Operating Humidity	15% to 90% RH (Non-condensing)
Event Log	Most recent 30 alarms
IP	IP 67
Alarm	Visual (LCD and flashing LEDs), Audible(Buzzer), Vibration
Display	Liquid Crystal Display (LCD)
Key	One button
Battery	Replaceable Primaty cell 3.6V Thionyl chloride (Li/SOCl ₂) battery manufactured in Vitzrocell
Battery Life	DUO TRACER-1 to 2: Approximately 3 months DUO TRACER-3 to 9, A to F: Approximately 2 years * 8 hours daily use, wireless off. * Battery lifetime could vary depending on usage conditions and environment.
Environmental Condition	Pollution Degree: "2", Atmospheric Pressure: 80 ~ 120KPa
Accessories	Calibration Cap (Available as an option)
Attachment Method	Equipped with a clip for attachment to clothing, belts, or helmets.
Warranty	2 years from the date of purchase

2. GAS TYPE AVAILABLE

The detector can monitor various types of gases such as oxygen, explosive and toxic gases. The device is consist of oxygen and explosive type, oxygen and toxic type or toxic and toxic type.

Model Name		Gas Type	
Model	x(*)	Ch-A	Ch-B
DUO TRACER-x(*)	1	O2	CH4(**)
	2		CO2(**)
	3		CO
	4	O2	H2S
	5		SO2
	6		H2
	7		NO2
	8		NH3
	9		O3
	A	NO2	CO
	B		H2S
	C		SO2
	D	SO2	H2S
	E		CO
	F		CO

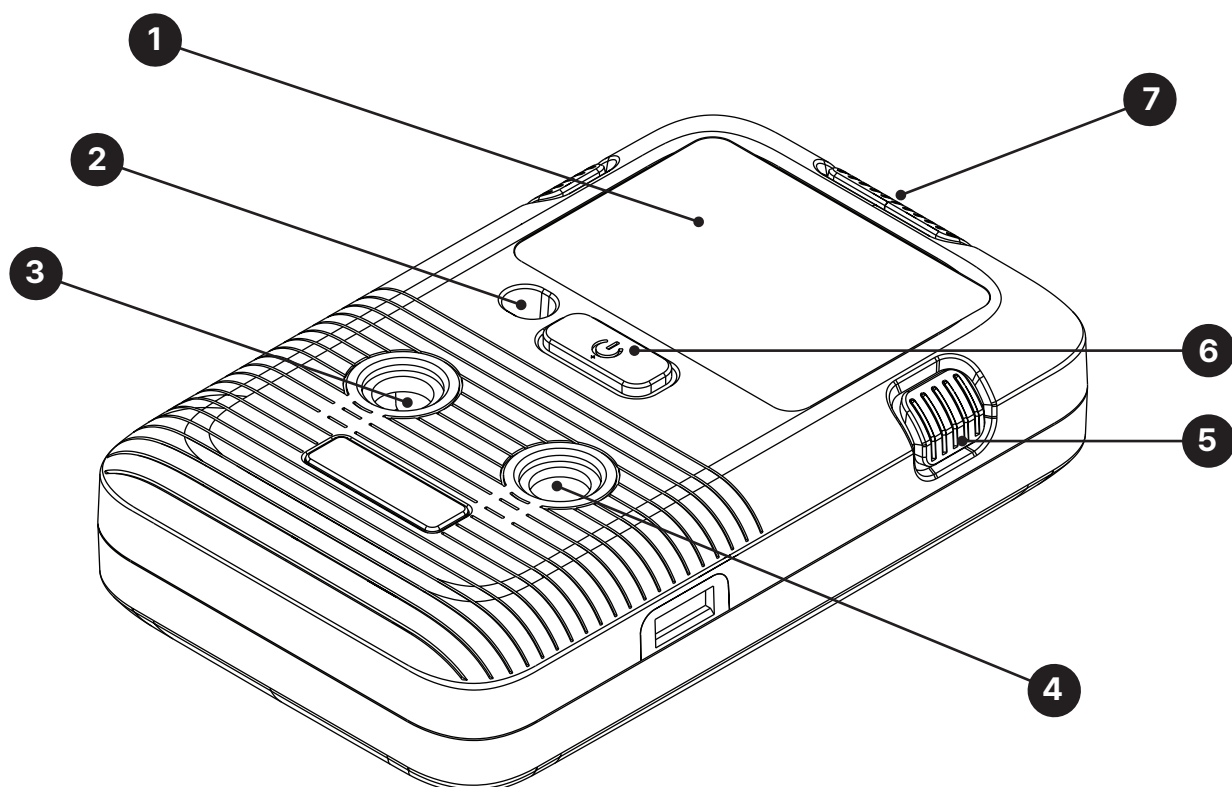
(*) x means series number for gas domvination. The number is 1 to 9 or A to F.

(**) These sensors are NDIR sensors, and the rest are electrochemical sensors.

SENSOR SPECIFICATIONS

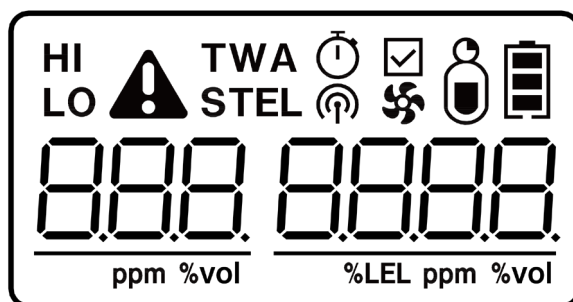
Gas	Measuring Range	Resolution	Low Alarm	High Alarm
CH ₄	0 ~ 100 %LEL	1% LEL	10 %LEL	30 %LEL
CO ₂	0 ~ 5 %vol	0.01 %vol	0.5 %vol	1.0 %vol
CO	0 ~ 500 ppm	1 ppm	30 ppm	60 ppm
H ₂ S	0 ~ 100 ppm	0.1 ppm	10 ppm	15 ppm
SO ₂	0 ~ 20 ppm	0.1 ppm	2 ppm	5 ppm
H ₂	0 ~ 1,000 ppm	1 ppm	100 ppm	500 ppm
NH ₃	0 ~ 100 ppm	1 ppm	25 ppm	35 ppm
NO ₂	0 ~ 20 ppm	0.1 ppm	3 ppm	5 ppm
O ₂	0 ~ 30 %vol	0.1 %vol	19 %Vol	23 %Vol
O ₃	0 ~ 5 ppm	0.1 ppm		

3. PRODUCT DESCRIPTION



1. LCD Display
2. Buzzer
3. Gas Inlet (Ch-A)
4. Gas Inlet (Ch-B)
5. Alarm LEDs
6. Button
 - One-button operation must:
 - Activate the detector
 - Display alarm set points
 - Display peak gas exposures
 - Display remaining days for Calibration
 - Display Firmware version
 - Display concentration of the gas applied for calibration
 - Display all icons on the LCD
 - Detector Setting
 - Deactivate the detector
7. IR Port

4. INTERFACES



4.1. VISUAL DISPLAY

The detector must have a LCD (liquid crystal display) that advises.

- Gas type monitoring
- Alarm levels triggered: low or high (including ppm or %vol concentration levels)
- Alarm settings: low and high
- Peak (maximum) alarm exposure

4.2. DISPLAY ICONS

The LCD of the detector also includes icons that clearly indicate:

- Alarm type and alarm level
- Diagnostic warning

Icon	Name	Description
LO	Low Alarm	Low(1st) alarm
HI	High Alarm	High(2nd) alarm
!	Alarm	Over limit indicator
STEL	STEL	STEL alarm
TWA	TWA	TWA alarm
	Wireless	Wireless indicator
	Time Count	Battery or calibration date check Count down for stabilization
	Checking	Success calibration, Software version check Device setting
	Zero Cal.	Zero calibration
	Span Cal.	Span calibration
	Battery	Available battery
		Discharge warning

5. ALARM / TEST FAILURE

5.1. ALARM FUNCTIONS

When a gas concentration exceeds alarm set points, alarm state will be displayed on the LCD and the device will vibrate, flash (LED), and beep. To remove alarms, move to the location at clean air, then the alarms will be automatically stopped.

Category	Details
Gas Alarm	The factory alarm setpoints are programmed in advance (1st, 2nd alarm). When the detector is exposed over the upper limit range, it will display OL(Over Limit) alarm on the LCD.
Visual Alarm	LCD and three flashing LED regions are equipped. When a gas concentration exceeds alarm set points (1st, 2nd alarm), LED will flash and the reading will be displayed on the LCD.
Audible Alarm	The programmed audible alarm runs when a gas concentration exceeds alarm set points(1st, 2nd alarm) in order to warn with sound.
Vibration Alarm	The equipped vibrator runs when a gas concentration exceeds alarm set points(1st, 2nd alarm) in order to warn in the noisy area.

5.2. ALARM SET POINTS

The default alarm setpoints is stored in the factory. Alarm set points are adjustable by SP-IR LINK after the activation. All alarm value is set in advance according to the alarm standards that are required by international standards. Therefore, alarm values can be changed only under the responsibility and approval of the administration of the work site where the instrument is used.

5.3. ALARM SOUND, VIBRATION, LED, AND DISPLAY

Icon	Name	Description
LO	Low Alarm	Low icon which is located on the top screen turn on.
HI	High Alarm	High icon which is located on the top screen turn on.
STEL	STEL Alarm	STEL icon which is located on the top screen turn on.
TWA	TWA Alarm	TWA icon which is located on the top screen turn on.

6. DETECTOR POWER

6.1. ELECTRICAL RATINGS

3.6VDC Battery Powered

6.2. BATTERY SPECIFICATION

- System : Lithium Primary(Li/SOCl₂) battery
- Nominal voltage : 3.6V
- Nominal capacity : 1,200mAh

7. DETECTOR MAINTENANCE

7.1. CALIBRATION FREQUENCY

On demand, the detectors can be calibrated in appropriate environment.

7.2. BATTERY

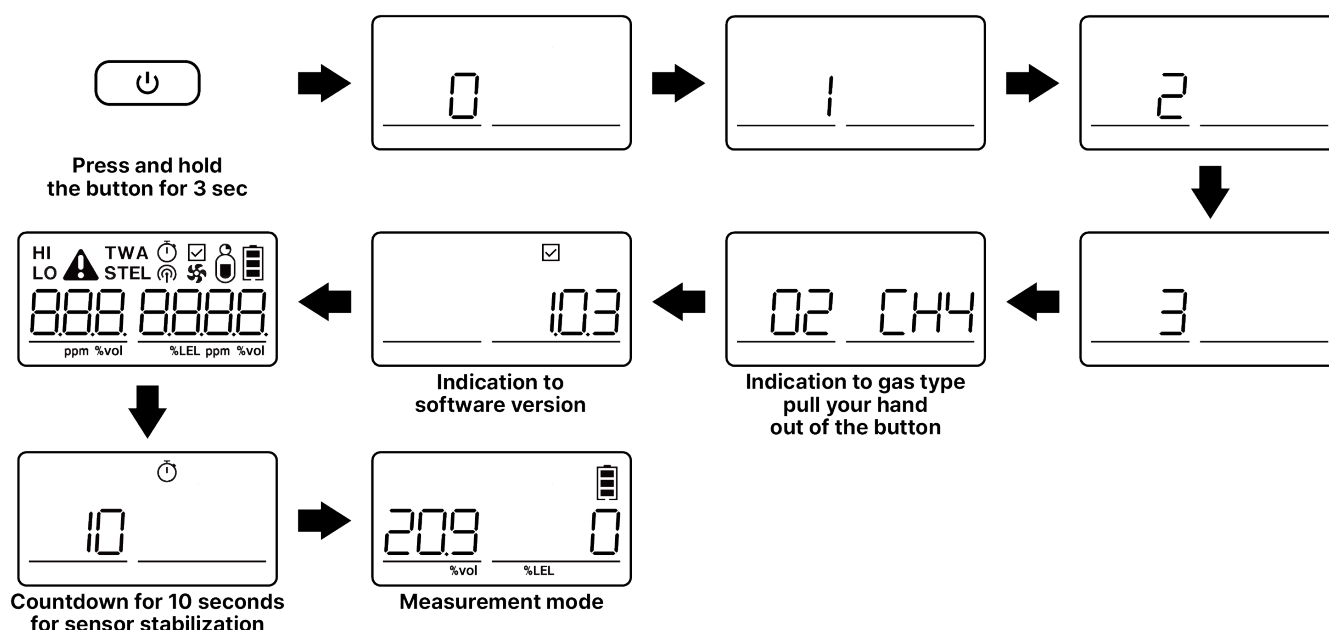
No part of the detector should be replaced by the user and must be replaced by the manufacturer.

8. BASIC OPERATION

8.1. ACTIVATION

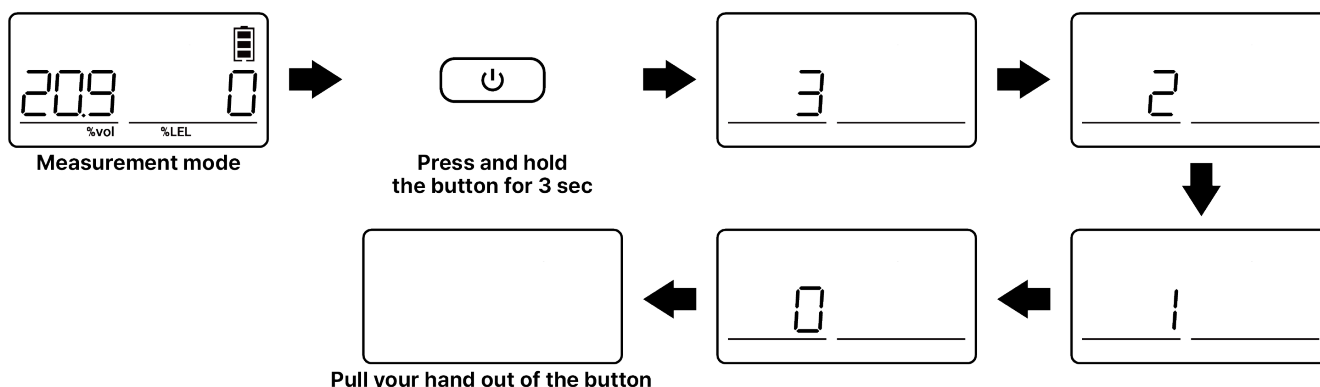
The detector has one button for user interface including the activation of the detector.

1. Before use, check the activation due date. If the activation date is past, do not activate this product.
2. Move to a safety environment.
3. Press and hold the button until a 3 second countdown is displayed.
4. After that, The device is booting with turned on all LCD segments with short vibration.
5. The detector can operate in measurement mode.



8.2. SYSTEM OFF

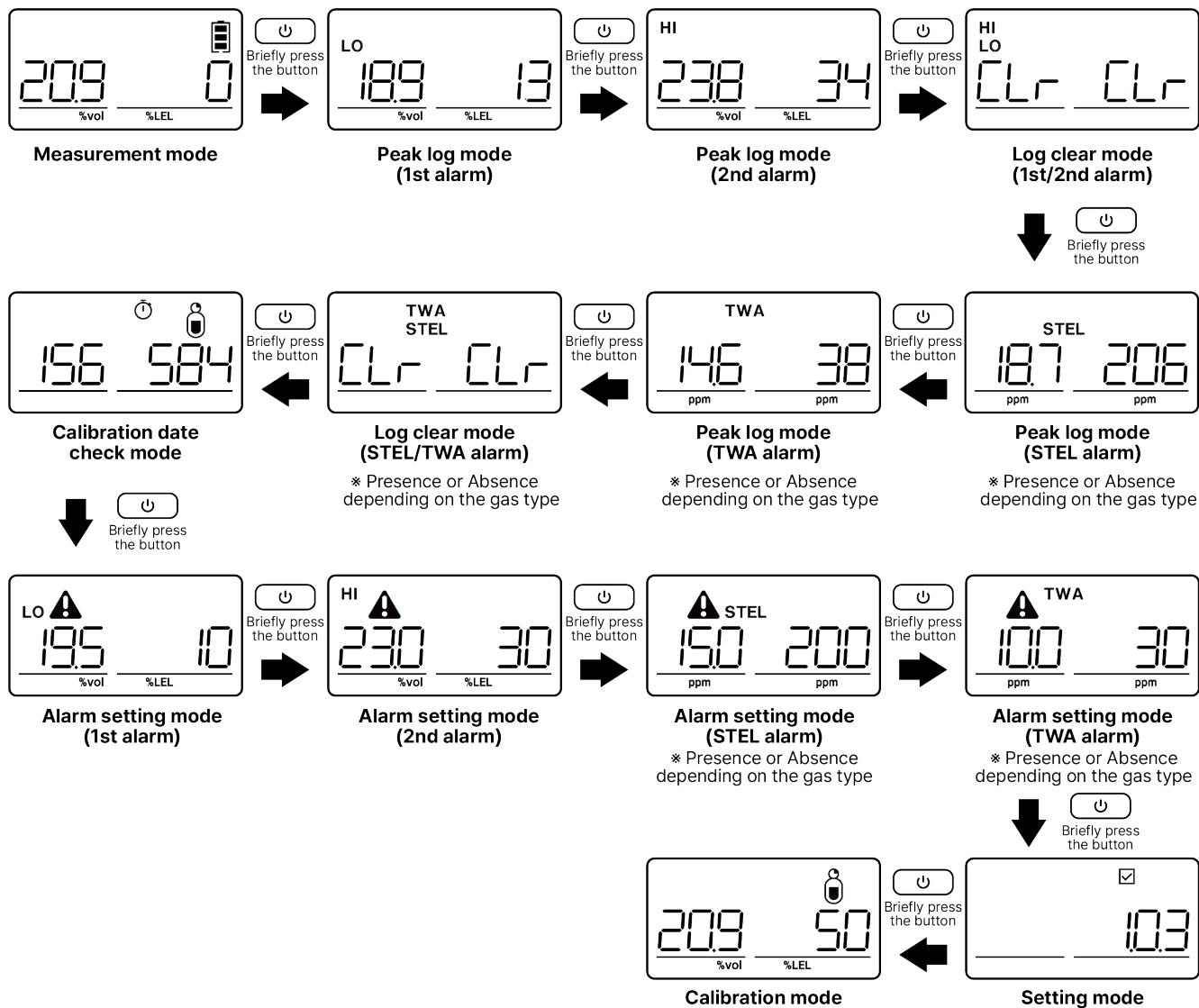
If you press and hold the button for 3 seconds on measurement mode, the LCD is on a numbers with countdown for system shut down.



8. BASIC OPERATION

8.3. CONFIGURATION MODE

On the Measurement mode, press the button briefly to change the device mode. The modes are consist of several modes like figure below. Each mode is distinguished through active icons which are located on the top screen.



8.4. CALIBRATION

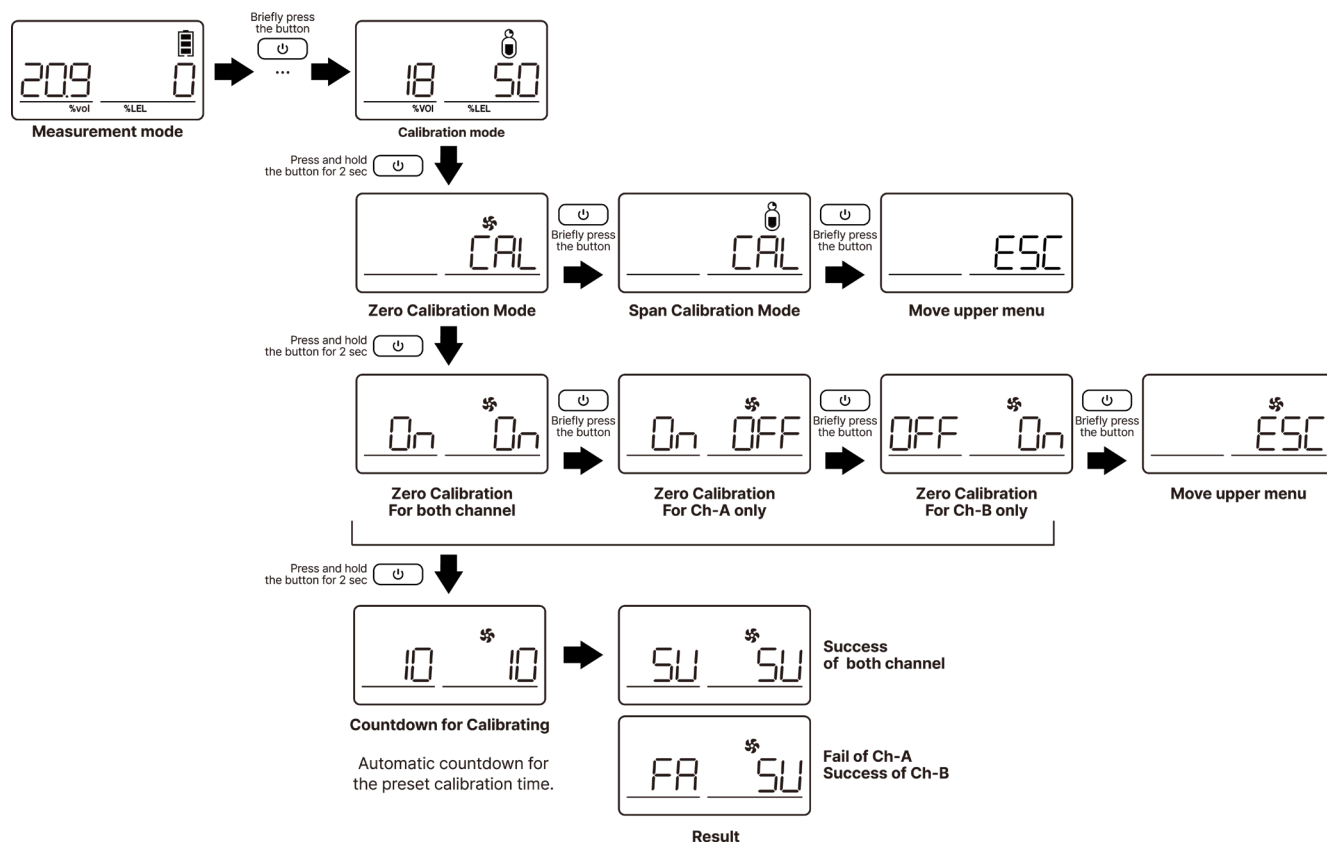
For calibration on the device, move the clean atmosphere. And then, perform the zero calibration and span calibration. Ensure to use the exclusive calibration cap or device for calibration. Note that calibration cap must be equipped toward upward arrow pointing.



8. BASIC OPERATION

8.5. ZERO CALIBRATION

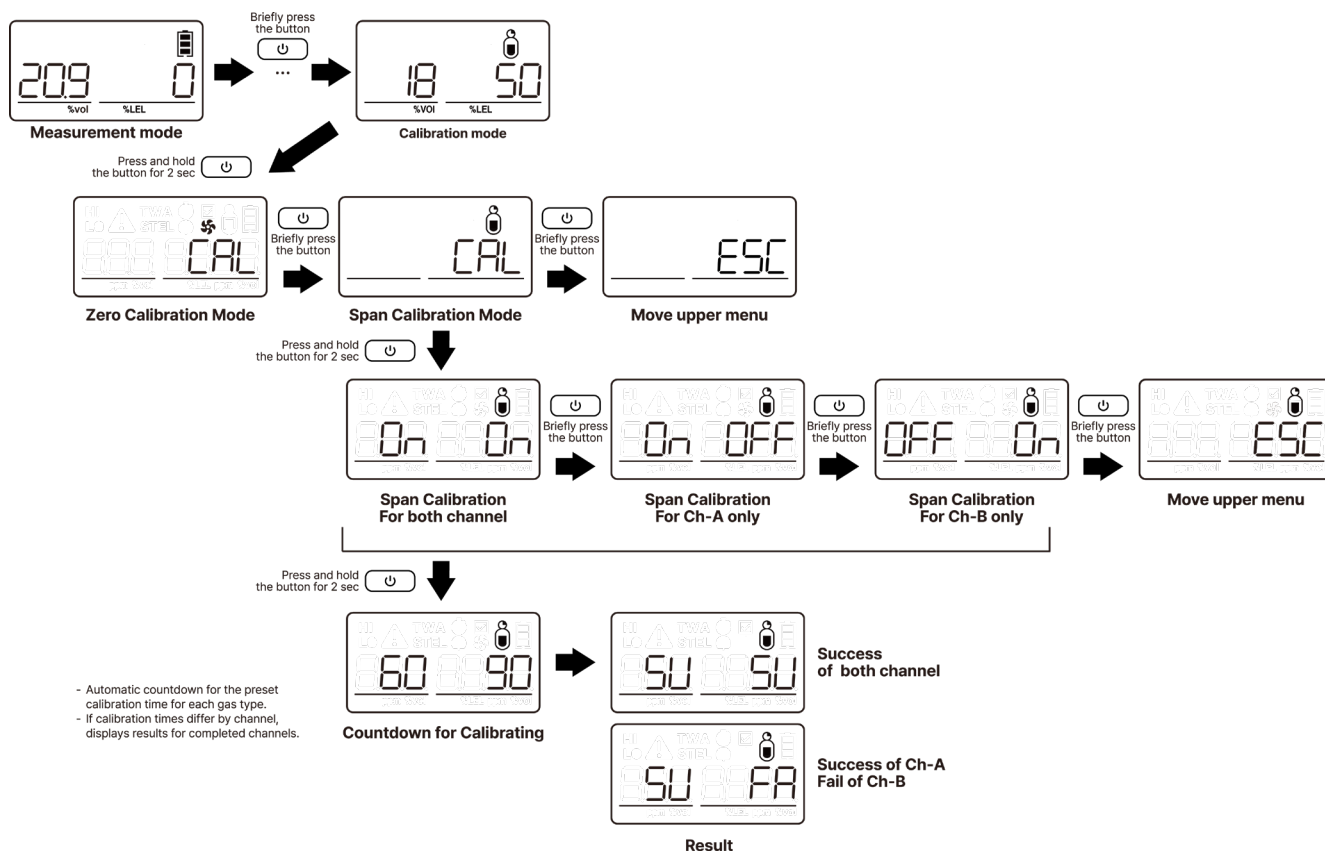
Zero Calibration means fresh air correction.



8. BASIC OPERATION

8.6. SPAN CALIBRATION

Span Calibration means standard gas concentration correction.



9. ALARM AND LOG FUNCTIONS

9.1. PEAK(MAX) VALUE

The detector will record MAX exposure concentration when a gas occurred. And the recorded values can clear.

9.2. INDICATING ALARM

The detector must monitor the gas concentration when a gas concentration exceeds alarm set- points and indicate the alarm state.

9.3. ACQUIRING ALARM EVENTS

The stored data in memory of the detector can be downloaded via IrDA. The stored information are LOW, and HIGH alarm. (including occurred time, duration time and the concentration of the gas)

9.4. LOGGING

During the operation, event logs will be stored and then stored data can be downloaded via SENKO IR LINK with PC program.

Categories	Details
Event Alarms (High, Low, TWA, STEL)	Occurrence time, Duration, Alarm Type, Gas Concentration

10. EXPLOSION PROOF CERTIFICATION

Intrinsic Safety

The detector must be certified against the following standards:

Certificate			Standards
IECEx	IECEx KSCP 24.0025X	DUO TRACER-1 to 2 Ex ia op is IIC T4 Ga	IEC 60079-0:2017, Ed 7 IEC 60079-11:2011, Ed 6 IEC 60079-28:2015, Ed 2
		DUO TRACER-3 to 9 DUO TRACER-A to F Ex ia IIC T4 Ga	
ATEX	KSCP 24ATEX 0016X	DUO TRACER-1 to 2 Ex ia op is IIC T4 Ga	EN IEC 60079-0:2018 EN 60079-11:2012 EN 60079-28:2015
		DUO TRACER-3 to 9 DUO TRACER-A to F Ex ia IIC T4 Ga	
CSA/UL	LC24CA 22376-1	DUO TRACER-1 to 2 Class I, Zone 0, AEx ia op is IIC T4 Ga Class I, Division 1, Groups A,B,C,D,T4 Ex ia op is IIC T4 Ga	CSA C22.2 No. 60079-0:19 UL 60079-0:2019 CAN/CSA-C22.2 No. 60079-11:14 UL 60079-11:2018 CSA-C22.2 No.60079-28:16 (R2021) CSA-C22.2 No. 61010-1:12 (June 2023) UL 61010-1:12-(June 2023) UL 60079-28 Ed. 2-2017
		DUO TRACER-3 to 9 DUO TRACER-A to F Class I, Zone 0, AEx ia IIC T4 Ga Class I, Division 1, Groups A,B,C,D,T4 Ex ia IIC T4 Ga	
CNEx	CNEx 24.4201X	DUO TRACER-1 to 2 Ex ia op is IIC T4 Ga	GB/T 3836.1-2021 GB/T 3836.4-2021 GB/T 3836.22-2023
		DUO TRACER-3 to 9 DUO TRACER-A to F Ex ia IIC T4 Ga	
KCs	KCS 24-GA2BO-0613X	DUO TRACER-1 to 2 Ex ia IIC T4 Ga	IEC 60079-0:2017, Ed 7 IEC 60079-11:2011, Ed 6
	KCS 24-GA2BO-0612X	DUO TRACER-3 to 9 DUO TRACER-A to F Ex ia IIC T4 Ga	

MANUFACTURING APPROVAL

The detector manufacturers must be certified compliant with ISO 9001:2015 provisions.

PROTECTION RATING

The IP Rating of the detector must be rated to IP67 standards.

The product is in conformance with the directive 2014/30/EC, (EMC).

11. REPAIR

CAUTION

- It is absolutely forbidden to replace or recharge batteries in explosive or hazardous areas. Replace the battery in a clean environment, which has no hazardous gases otherwise it can lead to serious accidents. (serious injury or fatality)
- Replacement of components can invalidate the intrinsic safety function. Replacing the sensor and battery should be performed by authorized sellers, agents, distributors, or managers.
- The sensors published by SENKO should be used for replacement.
- Disassembly should be necessary only for sensors & battery replacement. After the sensor replacement, the span gas calibration should be done.
- Before disassembling, please turn off the power and remove screws.

11.1. SENSOR REPLACEMENT

1. Deactivate the detector.
2. Remove six screws on the rear case.
3. Remove two screws for fixing PCB.
4. After turn the PCB over, Remove the old sensor and replace it with a new one.
5. Reassemble the PCB and rear case.
6. After assembling, perform atmospheric calibration and standard calibration according to the standards in this user manual.

12. WARRANTY

The warranty period is 2 years from the date of purchase from the manufacturer or from the product's authorized reseller.

The manufacturer is not liable (under this warranty) if its testing and examination disclose that the alleged defect in the product does not exist or was caused by the purchaser's (or any third party's) misuse, neglect, or improper installation, testing, or calibrations. Any unauthorized attempt to repair or modify the product, or any other cause of damage beyond the range of the intended use, including damage by fire, lightening, water damage or other hazard, voids liability of the manufacturer.

In the event that a product should fail to perform up to manufacturer specifications during the applicable warranty period, please contact the product's authorized reseller or SENKO service center at 82-31-492-0445 to repair/return information.

SENKO

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