PS DUO

PORTABLE DUAL GAS DETECTOR

USER MANUAL

TELEDYNE
GAS MEASUREMENT INSTRUMENTS
Everywhereyoulook™

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CONTENTS

SAFETY WARNING

Before using the device, ensure that you fully understand this manual. The device must be used and repaired according to the instructions provided. Failure to follow these instructions may result in device malfunction, injury, or even life-threatening situations.

WARNING

- Do not replace or modify components. Doing so may void the warranty and compromise safety, even if the device is under warranty.
- Do not open or replace the battery in explosive environments. The battery should only be replaced in a safe location.
- Ensure that there is no foreign matter on the surface of the sensors, LEDs, or buzzer before use.
- Regularly test the gas sensor's performance using gases that exceed the alarm levels.
- Regularly test the LED, alarm, and vibration functions to ensure they are functioning properly.
- Use the device within the specified temperature, humidity, and pressure ranges. Using the device outside of these conditions may lead to malfunction or failure.
- The sensor inside the device may display different gas concentrations depending on environmental factors such as temperature, pressure, and humidity. Always calibrate the detector in environments that are similar to or match the specifications.
- Rapid changes in temperature may cause rapid changes in gas concentration. (For example, when using the detector in areas with significant temperature differences between indoors and outdoors.) Use the device once the concentration has stabilized.
- Severe pressure or impact may cause rapid changes in gas concentration. Therefore, use the device when the concentration is stable. Severe pressure or impact may also cause the sensor or device to malfunction.
- Alarms are set according to international standards and should be adjusted by authorized professionals.
- Battery replacement should be carried out in a safe area where there is no risk of explosion or fire. Using improper replacement parts not approved by the manufacturer may void the warranty.
- Wireless communication should be carried out in a safe area where there is no risk of explosion or fire.
- Do not expose the detector to poisons such as alcohol or citrus-based products. Poisons can compromise the accuracy and response time of the device.
- If sensor contamination is suspected, confirm using calibration, bump tests, etc.
- This detector is designed to be used in explosive atmospheres where oxygen levels do not exceed 20.9% (v/v). Some sensor outputs may be suppressed in oxygen-deficient environments (<10% v/v).
- Do not charge primary cell batteries. Replace the battery at a Teledyne GMI authorized service center before it is fully discharged.
- Do not calibrate the device when it has been exposed to conditions representing the IP rating.
- Use dedicated calibration caps or calibration equipment for calibration.
- Do not perform calibration during the device's stabilization process after power-up.
- Sudden changes in atmospheric pressure may temporarily destabilize oxygen concentrations.
- Check for obstructions, debris, or blockages in the gas inlet every day before use. If the gas inlet is blocked by contaminants, the actual detected concentration may be measured lower than the normal level.
- The device should be carried at all times and not left unattended.
- If there is a mechanism that generates charges, the exposed metal parts of the enclosure may store electrostatic charges at levels that could be ignitable for IIC gases. Therefore, users/installers should take

the aforementioned precautions to prevent static accumulation. This is particularly important when bringing the equipment into Zone 0 locations.

- The battery and sensor should be replaced by a Teledyne GMI authorized service center in a safe area where there are no hazardous gases.

Caution

- Please read the manual carefully before use.
- This device is a gas detector, not a measurement instrument.
- If continuous calibration failures occur, discontinue use and contact the manufacturer.
- Test the device every 30 days in a clean air environment free of gases.
- Clean the exterior of the product with a soft cloth; do not use chemical solvents.

Special Conditions for Safe Use

- Do not open or replace the battery in explosive environments. The battery should only be replaced in a safe location.
- Only use SB-AA02(P) (Vitzrocell) batteries.
- Do not use the device in environments with temperatures, humidity, or pressure outside the specified ranges.
- Ensure that there are no foreign substances on the sensor, LED, or buzzer before use.
- For consistent performance, periodically test the device with gases that exceed the alarm thresholds.
- If it is found that the film does not comply with inspection conditions, it must be reapplied according to the manufacturer's instructions. Ensure it is not exposed to excessive heat, harsh chemicals or solvents, sharp edges, or abrasive surfaces.

Avertissements de Sécurité

Avant d'utiliser l'appareil, assurez-vous d'avoir parfaitement compris ce manuel. L'appareil doit être utilisé et réparé conformément aux instructions fournies. Le non-respect de ces instructions peut entraîner un dysfonctionnement de l'appareil, des blessures ou même des situations mettant la vie en danger.

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 n'est pas rechargeable.
- Remplacez la batterie auprès des prestataires de service agréés Teledyne 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 Teledyne 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 chimiques.

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-M02(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.

1. Product Overview

1.1. Product Introduction

The PS DUO is a portable diffusion-type gas detector that alerts users to hazardous environments related to gases. The detector displays the concentration of oxygen or toxic gases on an LCD monitor. It is easy and simple to operate, and alerts the operator of danger through an alarm, LED, and vibration if the gas concentration exceeds the safe limit. This device displays real-time gas concentrations and identifies maximum and minimum levels. Settings can be adjusted wirelessly.

1.2. Product Features

- Equipped with a miniaturized electrochemical gas sensor
- Wireless communication functionality
- Excellent waterproof and dustproof construction
- Replaceable battery design
- Power On/Off capability

1.3. Product Specifications

Model Name	PS DUO
Sensor Type	Electrochemical
Measurement Type	Diffusion Type
Case	TPU + Polycarbonate (PC)
Size	56(W) x 89(H) x 21(D)mm
Weight	200g
Operating Temperature	-20℃ ~ +50℃
Operating Humidity	15% ~ 90% RH(Non-condensing)
Environmental Conditions	Pollution Degree: "2", Atmospheric Pressure: 80 ~ 120KPa
Operation	A clip is attached to the device, allowing it to be easily carried by the user on a pocket, belt, helmet, etc.
Alarm	Visual (LED), Tactile (Vibration), Audible (95dB) alarms
Display	Liquid Crystal Display (LCD)
Battery	Lithium Primary Battery (Li/SOCl2), Nominal Voltage: 3.6V, Nominal Capacity: 1,200mAh
Rating	Powered by 3.6VDC battery
Battery Life	Approximately 2 years (8 hours of daily use, wireless off) ※ Battery life may vary depending on usage conditions and environment.
Calibration Interval	The detector can be calibrated in an appropriate environment as needed.
Accessories	Calibration cap

1.4. Gas Types

The detector can monitor various types of gases, including oxygen and toxic gases and it is available in the following configurations:

Model Name		Gas Type	
Model	**X**	**Ch-A**	**Ch-B**
PS DUO	3	O2	CO
	4		H2S
	5		SO2
	6		H2
	7		NO2
	8		NH3
	9		O3
	A	NO2	CO
	B		H2S
	C		SO2
	D	SO2	H2S
	E		CO
	F	NH3	CO

2. Components

2.1. External Components

2.2. LCD Display Symbols

LO	- Low Alarm - 1ST Warning		- Battery or Calibration Date Check - Countdown
HI	- High Alarm - 2nd Warning		- Calibration Success - Software Version Check - Device Settings
	- Alarm Level Exceeded Indicator		- Zero Calibration (Fresh Air Calibration)
STEL	- STEL Alarm		- Span Calibration (Standard Gas Concentration Calibration)
TWA	- TWA Alarm		- Sufficient Battery Remaining
	- Wireless Indicator		- Low Battery

2.3. Interface

2.3.1. Visual Display

The detector features an LCD (Liquid Crystal Display) that shows the following:

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

2.3.2. Display Icons

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

- Alarm type and alarm level
- Diagnostic warnings

2.3.3. One-Button Operation

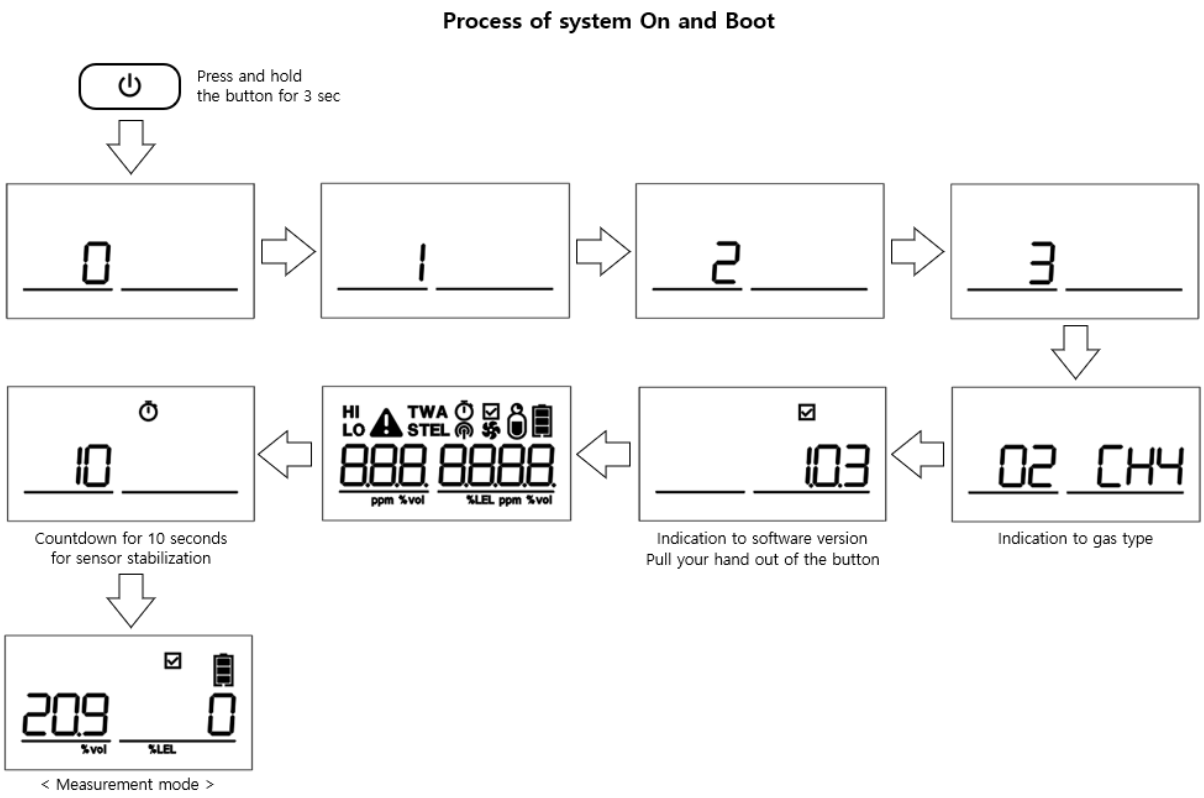
- Activate the detector
- Display alarm set points
- Display maximum gas exposure
- Display remaining days for bump test
- Display remaining days for calibration
- Display firmware version
- Display calibration gas concentration
- Display all LCD icons
- Set up the detector
- Deactivate the detector

3. Basic Operation

3.1. System Activation

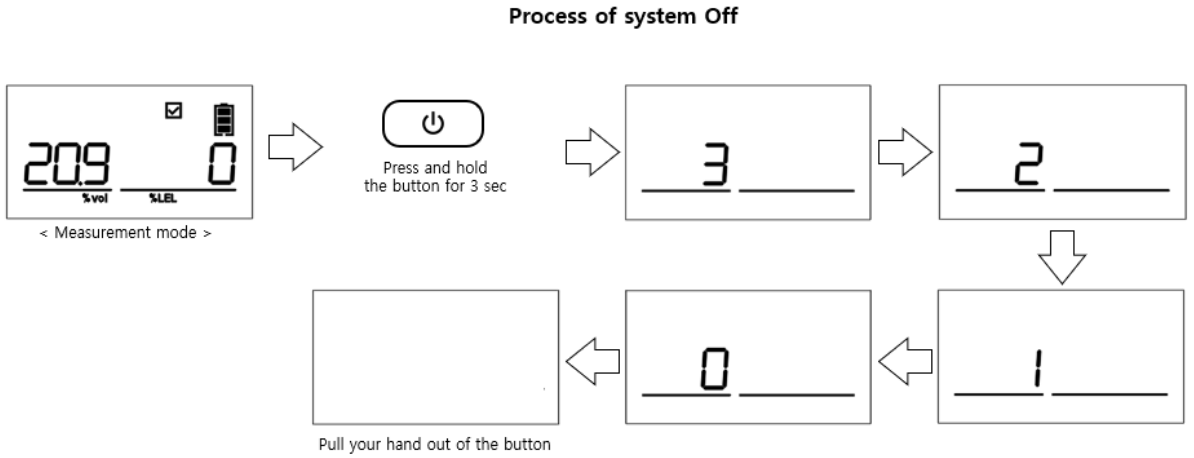
The detector features a single user interface button for implementing functions such as device activation.

① Before use, check the activation deadline, and do not activate the product if the deadline has passed.
② Move to a safe environment.
③ Press and hold the button until the 3-second countdown is displayed.
④ The device will then power on, turning on all LCD segments with a short vibration.
⑤ The detector will operate in measurement mode.



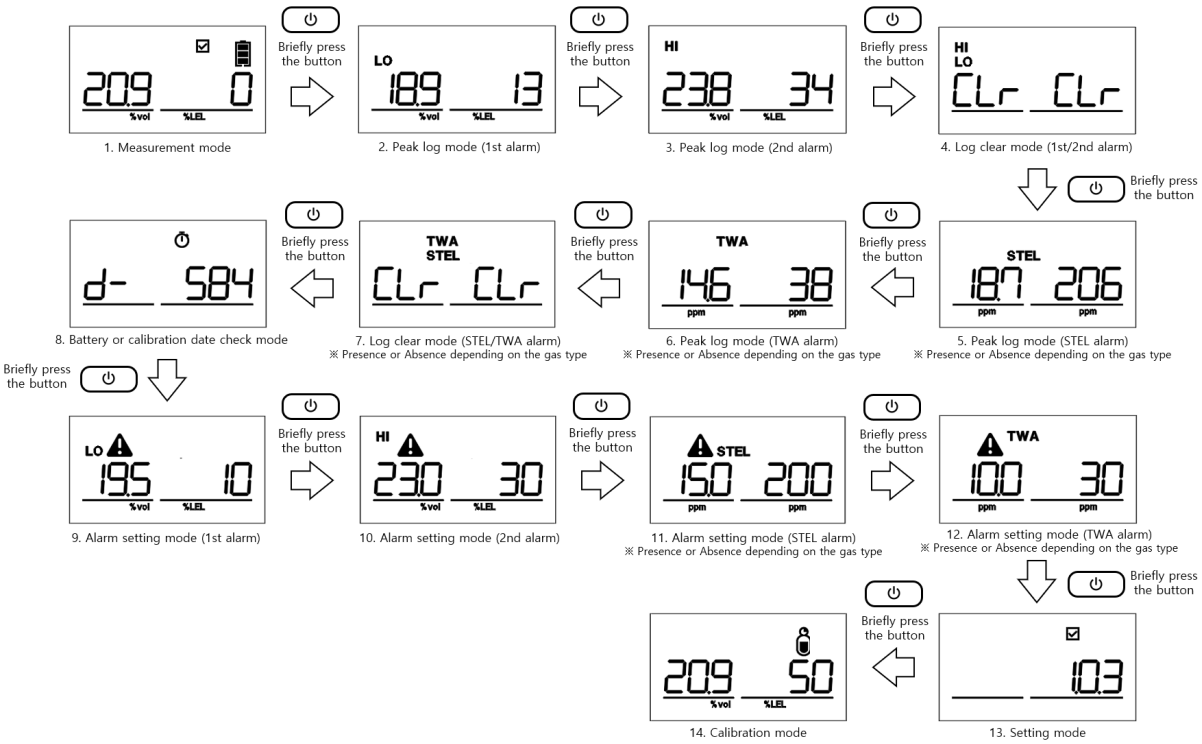
3.2. System Shutdown

In measurement mode, pressing and holding the button for 3 seconds will display a system shutdown countdown on the LCD.



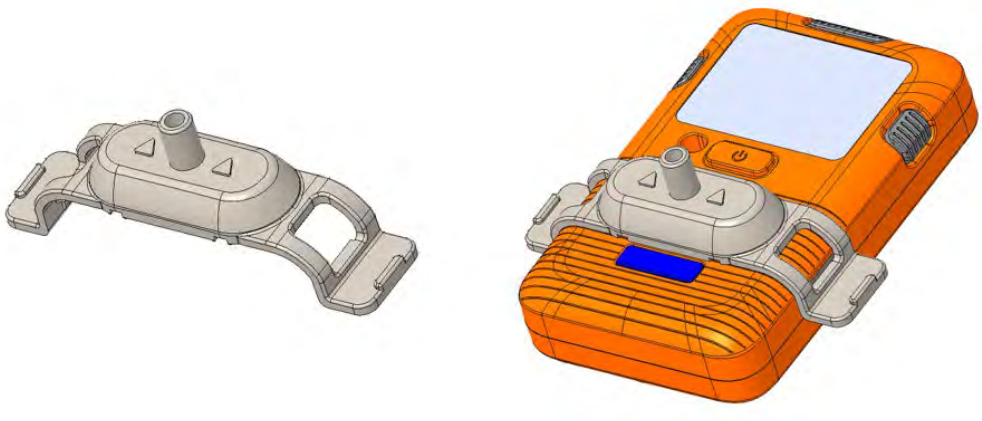
3.3. Configuration Mode

In measurement mode, press the button briefly to switch modes. The device features several modes, as shown in the illustration below. Each mode is distinguished by the active icon displayed on the top screen.



3.4. 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.



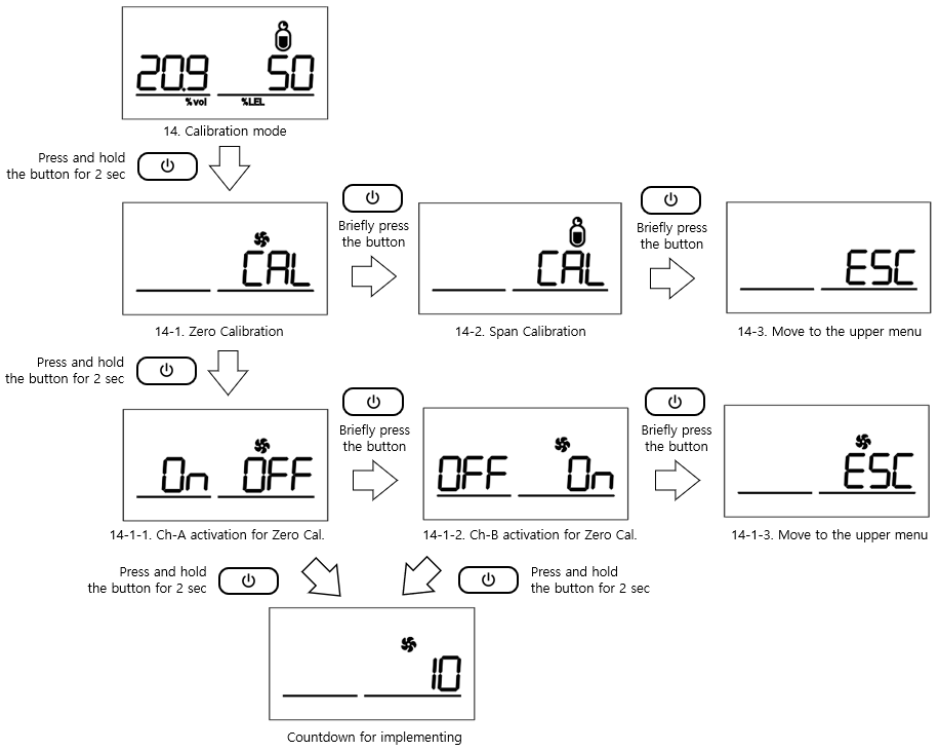
3.5. Standard gas concentration for Calibration

Be use the standard gas and concentration for each sensor when it's calibrating. Standard gas concentration can be changed using IR Connect program.

Gas	Sensor type	Measurement Info.		Cal. Standard Concentration
		Range	Resolution	
Oxygen	Electrochemical	0 to 30 %vol	0.1 %vol	18 %vol
Carbon monoxide	Electrochemical	0 to 500 ppm	1 ppm	100 ppm
Hydrogen sulfide	Electrochemical	0 to 100 ppm	0.1 ppm	25 ppm
Sulfur dioxide	Electrochemical	0 to 20 ppm	0.1 ppm	5 ppm
Hydrogen	Electrochemical	0 to 1000 ppm	1 ppm	500 ppm
Nitrogen dioxide	Electrochemical	0 to 20 ppm	0.1 ppm	10 ppm
Ammonia	Electrochemical	0 to 100 ppm	1 ppm	50 ppm
Ozone	Electrochemical	0 to 20 ppm	0.1 ppm	16 ppm (Using NO2 20 ppm)

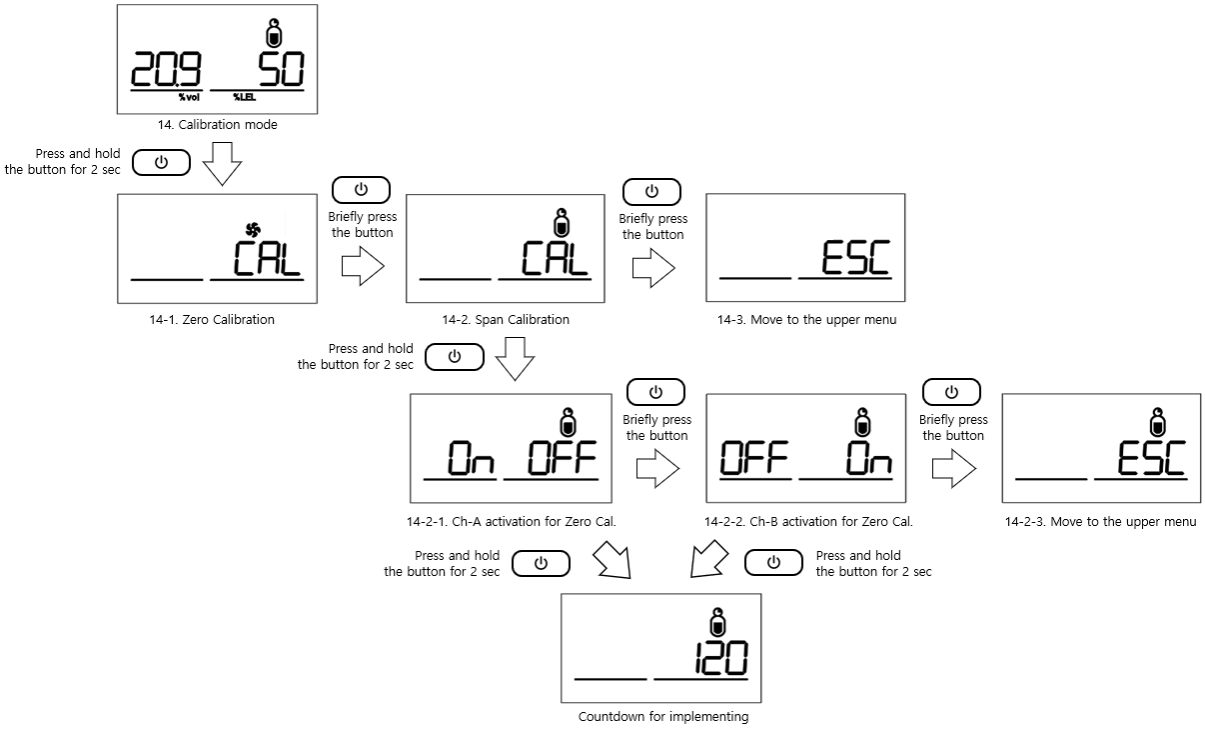
3.6. Zero Calibration

Zero calibration means fresh air correction. On the Calibration mode, Press and hold the button for 2 seconds to enter the sub menu. Press and hold the button when the zero-calibration icon is on the display. Select the channel which is implemented zero calibration. And then, Press and hold the button for 2 seconds to calibrating.



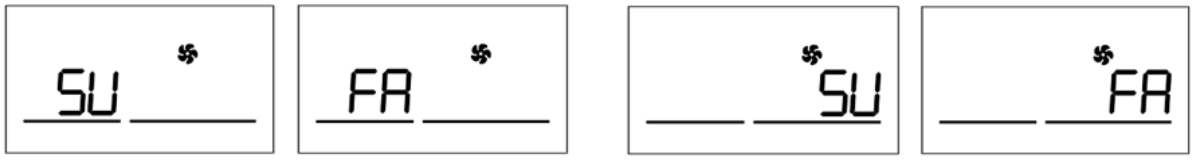
3.7. Span Calibration

Span calibration means standard gas concentration correction. On the Calibration mode, Press and hold the button for 2 seconds to enter the sub menu. Press and hold the button when the span-calibration icon is on the display. Select the channel which is implemented span calibration. And then, Press and hold the button for 2 seconds to calibrating.



3.8. Judgement for Implementing

Result for calibrating is on the display for each gas channel after implementing.



3.9. Peak (Max) Value

When gas is detected, the detector records the maximum exposure concentration. The recorded value can be cleared.

3.10. Alarm Display

The detector monitors gas concentrations and displays the alarm status when the gas concentration exceeds the alarm set point.

3.11. Acquiring Alarm Events

Data stored in the detector's memory can be downloaded via IrDA. The stored information includes calibration events, LOW and HIGH alarms (including time of occurrence, duration, and gas concentration).

3.12. Log

During operation, data, event, calibration, and bump test logs are stored. The stored data can be downloaded using IR Connect and a PC program.

Category	Details
Event Alarms (High, Low, TWA, STEL)	Time of occurrence, duration, alarm type, gas concentration, serial number
Bump Test Logs	Test date, success/failure, calibration gas concentration, detected concentration
Calibration Logs	Calibration date, type, calibration gas concentration, detected concentration
Data Logs	Date and time of IR Connect execution, concentration, alarm type, options

4. Alarm / Test Failure

4.1. Alarm Function

When the gas concentration exceeds the alarm set value, the alarm status is displayed on the LCD, and the device vibrates, flashes (LED), and emits a beep. To stop the alarm, move to an area with clean air, and the alarm will automatically stop.

Category	Details
Gas Alarm	The alarm set values are pre-programmed (primary, secondary alarms) at the factory. If the detector is exposed to concentrations above the upper limit, an OL (Over Limit) alarm is displayed on the LCD.
Visual Alarm	The LCD and three flashing LED areas will indicate when the gas concentration exceeds the alarm set value (primary, secondary alarms).
Audible Alarm	The programmed audible alarm is triggered when the gas concentration exceeds the alarm set value (primary, secondary alarms), and it emits a beep as a warning.
Vibration Alarm	The vibration motor activates when the gas concentration exceeds the alarm set value (primary, secondary alarms), providing effective warnings even in noisy areas.

4.2. Alarm Setting Values

The default alarm set values are configured at the factory. Alarm set values can be adjusted using the IR Connect. All alarm values are preset according to alarm standards required by international standards. Therefore, alarm values can only be changed under the responsibility and approval of the site manager where the device is used.

4.3. Alarm Sound, Vibration, LED, and Display (Per Second)

Category	Details
Low Alarm	The Low icon on the top screen is illuminated.
High Alarm	The High icon on the top screen is illuminated.
TWA Alarm	The TWA icon on the top screen is illuminated.
STEL Alarm	The STEL icon on the top screen is illuminated.

5. Certification

5.1. Explosion-Proof Certification

The detector is certified according to the following standards:

Certification		
IECEx	IECEx KSCP 25.0001X	Ex ia IIC T4 Ga
ATEX CE 0080 Ex II 1 G	KSCP 25ATEX0001X	Ex ia IIC T4 Ga
CSA/UL	LC25 CA 22376-1ML	Class I, Zone 0, AEx ia IIC T4 Ga Class I, Division 1, Groups A,B,C,D, T4 Ex ia IIC T4 Ga

6. Protection Rating

The detector's IP Rating should be assessed as IP67.

The product complies with Directive 2014/30/EC (EMC).

7. Warranty and Repair

Warning

- Never replace the battery in explosive or hazardous areas.
- Replace the battery in a clean environment free of hazardous gases, as failure to do so may lead to severe accidents (serious injury or fatality).
- Replacing parts may invalidate the intrinsic safety features.
- Sensor and battery replacement should be performed by authorized dealers, distributors, or managers.
- Only sensors designated by Teledyne GMI should be used for replacement.
- Disassembly is only necessary for sensor and battery replacement. After sensor replacement, a Span gas calibration must be performed.
- Before disassembly, ensure the power is turned off and remove the screws.

7.1. Sensor Replacement

1. Deactivate the detector.
2. Remove the six screws from the rear cover.
3. Remove the two screws securing the PCB.
4. Flip the PCB over, remove the old sensor, and replace it with a new sensor.
5. Reassemble the PCB and rear cover.
6. After reassembly, perform Zero calibration and Span calibration according to the standards in this manual.

7.2. Warranty

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

The manufacturer is not responsible for defects if, upon testing and inspection, the product is found to be free of defects or if the defect was caused by misuse, neglect, improper installation, testing, or calibration by the purchaser (or a third party). Unauthorized attempts to repair or modify the product, or damage caused by fire, lightning, water, or other hazards, are also excluded from the manufacturer's responsibility.

If the product fails to meet the manufacturer's specifications during the warranty period, please contact the authorized reseller or Teledyne GMI service center for repair/return information.

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