

User Manual R1.0
ESSAN-10 Pocket CO2 Meter



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Contents

INTRODUCTION.....	3
FEATURES.....	3
MONITOR	3
LCD DISPLAY	4
OPERATION.....	4
MENU/CONFIGURATION	5
Calibration	6
Alarm Threshold	6
MAN DOWN FEATURE	7
MAINTENANCE.....	7
SPECIFICATIONS	8
TROUBLESHOOTING	9
WARRANTY	9
CONTACT US	9

INTRODUCTION

Congratulations on your purchase of the ESSAN-10 Pocket CO₂ Personal Safety Monitor. The ESSAN-10 is a smart carbon dioxide (CO₂) monitor using NDIR technology to provide long term stability. The ESSAN-10 Personal Safety CO₂ Monitor is designed for employees who work in enclosed areas where carbon dioxide buildup may cause personal harm. It is designed to alert people in the area with excessive carbon dioxide gas. ESSAN-10 is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

FEATURES

- Audible, visual strobe and vibrating alarms
- Large LCD display
- Man down alarm – leveraging accelerometer technology
- Rugged design with protective rubber enclosure
- Heavy duty metal clip
- Front facing sensor unit
- Rechargeable Li-ion Battery 4.2v, 1500mAh – 18+ hours per charge
- Black Micro USB cable and Wall USB charger
- Dual calibration methods: Ambient Air (300-600ppm) and Nitrogen (0-200ppm)
- Automatic atmospheric pressure compensation for CO₂ concentrations
- No over-exposure or negative memory effects
- IP54 housing
- Stable NDIR sensor for CO₂ detection

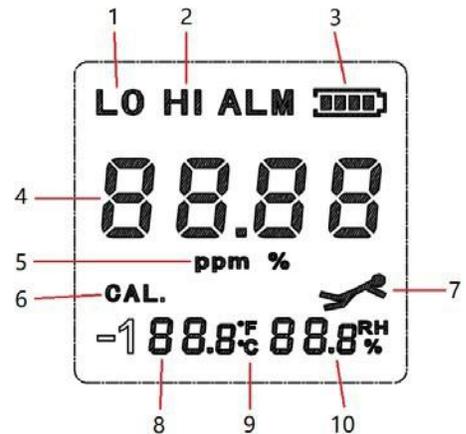
MONITOR

1. Visual alarm/strobe
2. Front facing sensor
3. Charging indicator
4. LCD display
5. Power button
6. Temperature unit button
7. USB charging inlet (bottom side)
8. Heavy duty metal clip
9. Factory reset button



LCD DISPLAY

1. Low alarm indicator
2. High alarm indicator
3. Battery indicator
4. CO2 concentration
5. CO2 concentration units (ppm or % when >9,999 ppm)
6. Calibration icon
7. Man down alarm
8. Air Temperature
9. Temperature unit (Fahrenheit or centigrade degrees)
10. % Relative Humidity



OPERATION

Note:

LCD backlight will turn off automatically after 5 seconds of inactivity.

- When LCD backlight is off, press either button to turn on the backlight. It will not turn the monitor off or change the °C/°F setting.

1. Power button

1.1 When the Monitor is turned off, press  to turn on the unit.

1.2 When the Monitor is turned on, press  for 3 seconds to turn off the unit.

When the unit is first turned on, it performs 5 seconds countdown for Monitor warm up, then enters normal display with current CO2, temperature, and humidity readings displayed. The monitor starts taking measurements when power on and updates readings every 2 seconds. The device can't shut off alarm, if power off will come back in alarm mode and must delay.

2. Temperature Units Button

2.1 Temperature Unit

Press  shortly to switch two temperature units: °F and °C.

2.2 Menu and Configuration Settings

By pressing the temperature button  for **13** seconds, the unit enters in to **Menu status**. There are six menu items by pressing the temperature button shortly to  loop switching between AIR, N2, LX.X, HX.X, A ON/AOFF and E (exit).

The menu items are described in the following table.

Menu Items	Functional Description
AIR	“AIR” means Ambient Air Calibration. User presses the power button  to implement Ambient Air Calibration (300~600ppm).
N2	“N2” means Nitrogen Calibration. User presses the power button  to implement Nitrogen Calibration (0~200ppm).
H0.5/H0.5T/H1.0/ H1.5/H3.0 Current Defaults are L.0.5 H1.0	High Alarm Threshold setup. User presses the power button  to switch the high alarm threshold: H0.5 (5000 ppm), H0.5A (5000 ppm), H1.0 (10000 ppm), H1.5 (15000 ppm), and H3.0 (30000 ppm).
L0.5/L0.5A/L1.0/L1.5/L3.0	Low Alarm Threshold setup. User presses the power button  to switch the low alarm threshold: L0.5 (5000 ppm), L0.5T (5000 ppm TWA), L1.0 (10000 ppm), L1.5 (15000ppm), and L3.0 (30000 ppm).
A ON/ AOFF	Setting Man down alarm function on/off. User presses the power button  to switch “A ON” (allowing Man down alarm) or “AOFF” (prohibiting Man down alarm).
E	User presses the temperature button  to exit the menu status.

3. Calibration

There are two calibration methods: Ambient Air (300-600ppm) and Nitrogen (0-200ppm).

By pressing the temperature unit button  for 5 seconds, the monitor will enter CO2 calibration mode. While in calibration mode, press the temperature button  quickly to switch between AIR (Ambient Air Calibration) or N2 (Nitrogen Calibration). Press the power button  to confirm.

Zero calibration requires 100% nitrogen (0% CO2) calibration gas, a flow regulator and flexible tubing.

The Atmospheric calibration will not require additional materials but must be performed in outdoor (300-600ppm fresh air) during the entire procedure.

See Section 2.2 Menu and Configuration Settings, to change settings.

4. Alarm Threshold

There are default thresholds: 5,000 ppm CO2 (low alarm) and 1% CO2 (Short Term Exposure Limit) (high alarm). The alarm thresholds can be changed dependent on the user, to L0.5 (5000 ppm), L0.5T (5000 ppm TWA), L1.0 (10000 ppm), L1.5 (15000 ppm), or L3.0 (30000 ppm).

If the measured CO2 value exceeds the define Low Alarm threshold, the alarm LED will flash red at 2Hz and the audio alarm “de de ... de de ...” will sound. If the CO2 level exceeds the High Alarm threshold, the LED will flash faster and the audio alarm will increase. To alert users in a noisy environment, the monitor will also vibrate.

See Section 2.2 Menu and Configuration Settings, to change settings.

5. Automatic Atmospheric Pressure Compensation

The displayed CO2 level is affected by atmospheric pressure or change in altitude. To insure maximum accuracy, this monitor has automatic atmospheric pressure compensation for CO2 concentrations by means of a digital atmospheric pressure sensor integrated in the unit. No calculations or maintenance is required.

See Section 2.2 Menu and Configuration Settings, to change settings.

6. Man down alarm

Falling by breathing dangerous gases can cause serious injury and even fatality to workers. If the Man down alarm function in ESSAN-10 is set on, ESSAN-10 can detect falls and send a man down alert which will activate the audible and visual alarms and alert other people in the area.



The man-down detection uses a three-axis accelerometer to automatically monitor the user's movements. If a sudden fall/impact is followed by a lack of movement for 6 seconds, the alarm will sound. Turn off the alarm by pressing either of the two buttons.

See Section 2.2 Menu and Configuration Settings, to change settings.

7. Reset Button

Users can reset the unit by pushing a reset button through a hole on back of shell.



MAINTENANCE

Calibration

The ESSAN-10 comes pre-calibrated from the factory. However, the CO2 sensor should be calibrated at least once a year, or as described in your company's safety procedures. You can perform the calibration yourself, or you can return it to us for factory calibration at a nominal fee.

The temperature and humidity sensors do not require calibration and should remain accurate for the life of your unit.

Cleaning and Storage

The front cover and case can be cleaned with a mild solution of detergent and water. Apply sparingly with a soft cloth and allow to dry completely before using. Do not use aromatic hydrocarbons or chlorinated solvents for cleaning.

SPECIFICATIONS

Device Specifications

Operating Environment	32~122°F (0~50°C), <95% RH non-condensing
Storage	14~140°F (-10~60°C), <99% RH non-condensing
Power Supply	Li-ion battery (4.2V, 1500mAh), Micro USB cable w. Wall USB charger
Dimensions	3.9 x 2.0 x 1.7 in. (98x50x42mm)
Weight	4.76 oz. (135 grams)

CO2 Sensor Specifications

CO2 Sensor	Single-beam NDIR diffusion sampling
Measurement Range	5% Vol (0~50,000ppm) display
Display Resolution	1ppm / 0.01%
Accuracy	±200ppm or ±10% of reading
Repeatability	±20ppm @ 400ppm
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
Response Time	About 2 min for 90% of step change
Warm-up Time	< 5 seconds at 22°F
IAQ LED Display	Green: <800ppm • Yellow: 800~1200ppm • Red: >1200ppm
Measurement interval	2 seconds

Temperature Sensor Specifications

Temperature Range	50~140°F (10~60°C) display
Display Resolution	0.1°F (0.1°C)
Display Options	°F/°C switchable
Accuracy	±0.9°F (±0.5°C)
Response Time	5~30 seconds (device must equilibrate with environment)

Relative Humidity Sensor Specifications

Measurement Range	0~99.9%RH
Display Resolution	1%RH
Accuracy	±4.5%RH
Response Time	<8 seconds for 63% of step change

Out of range of operating conditions will impact the accuracy of the CO2 measurement. A warning will display when humidity or temperature is above the rated thresholds (>95% RH condensing, > 122°F or < 32°F).

TROUBLESHOOTING

Cannot power on	Press the Power Button for more than 0.5 seconds.
	Check that the Li-ion battery is charged.
	If monitor is charged but will not turn on, contact support.
Slow response	Power cycle → Verify Unit
Readings do not change	Confirm the monitor has sufficient charge.

WARRANTY

The monitor comes with a one (1) year warranty starting from the date the monitor was shipped to the buyer.

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