
INSTRUCTIONS

autopilot®

Environmental Controllers

DESKTOP CO₂ MONITOR



APCEM


HYDROFARM

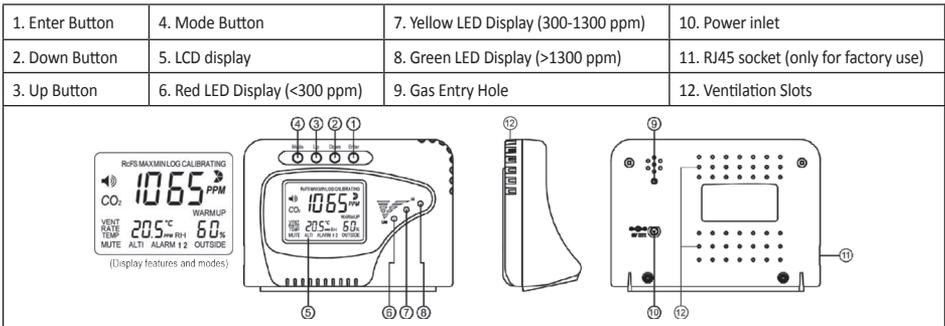
INSTRUCTIONS

OVERVIEW

Thank you for selecting the APCEM desktop CO₂ monitor. It is smart, compact and easy to use. In addition to measuring CO₂ concentration, the APCEM can also measure ambient temperature and relative humidity. This product was developed to detect the presence of CO₂ in ambient air. The APCEM can be used in greenhouses, grow rooms and other places where CO₂ should be monitored to assure that plants grow well.

FEATURES

- **The built-in data logger** can store 48 sets of CO₂, temperature, and RH readings in the past 24 hours (one log per 30 minutes).
- **Max/Min Mode** records the maximum and minimum concentrations of CO₂ since the device has been last turned on.
- **RcFS Mode** can recover the original factory settings after the CO₂ device has been recalibrated, altered, or damaged.



MODE FUNCTIONS

There are several modes which can be adjusted by user. These modes are ALTI Mode, OUTSIDE Mode, CALI Mode, LOG Mode, MinMax Mode, and RcFS Mode.

ALTI	Compensates for pressure changes with appropriate altitude of location when measured		OUTSIDE	Use this mode to modify the outside CO ₂ concentration for calculation of the ventilation rate	
CALI	Calibrates the sensor when the reading deviates from the actual CO ₂ concentration		LOG	Shows the logged CO ₂ , Temperature and RH values recorded in the past 24 hours	
MaxMin	Shows the maximum and minimum CO ₂ reading before being cleared or after Power On		RcFS	Recovers the factory settings and purges customized settings	
MUTE	The beep alarm can be set on/off under Mute Mode		ALARM 1	For setting the user-adjustable first alarm level	

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ALARM 2	For setting the user-adjustable second alarm level						
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SAFETY INSTRUCTIONS

⚠ WARNING: Your safety is very important to us. To ensure that you use the product correctly and safely, please read the warnings and this entire instruction booklet before using the product. They contain important safety information which should be observed at all times.

1. Please handle the devices carefully and do not subject it to impact or shock.
2. Do not immerse the product in water. Water can cause electric shock, fire or malfunction which may result in damage.
3. Do not keep the product in a hot and moist environment. Keep the product away from heat sources and contact with water.
4. Please use only the included power adapter. Improper power adapters or power sources can cause serious damage to the product, and/or result in injuries to the user.

CARING FOR THE PRODUCT

To ensure you receive the maximum benefit from using this product, please observe the following guidelines:

1. Cleaning—Disconnect the power before cleaning. Use a damp cloth. Do not use chemical cleaning agents such as benzene, thinners, or aerosols.
2. Repair—Do not attempt to repair the product or modify the circuitry by yourself. Please contact the dealer or a qualified technician if the product needs servicing.
3. Air circulation—The ventilation slots and Gas Entry Hole should never be blocked. The slots facilitate air circulation through the unit, and the Gas Entry Hole allows measurement of the surrounding air's CO₂ concentration.

CUSTOMIZE SETTINGS

When the power has been connected, the APCEM CO₂ monitor will begin to work. In order to meet your personal requirements, it is advisable to set up the customizing parameters.

Warm Up: The Warm Up period lasts approximately one minute before the WARM UP display disappears, indicating it has ended. All MODE functions are non-responsive during warm-up.

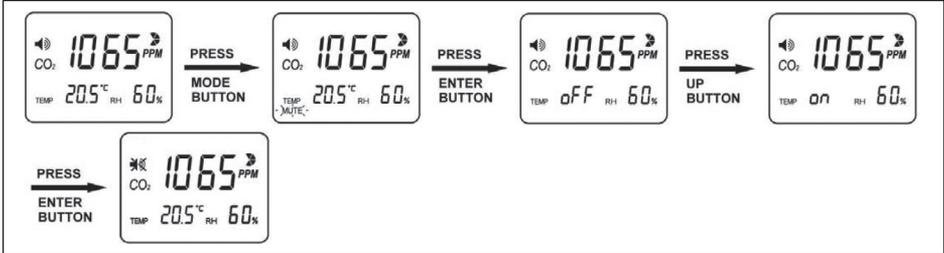
TEMPERATURE (°C/°F) RH AND VENTILATION RATE:

	→ PRESS UP BUTTON		→ PRESS UP BUTTON		→ PRESS UP BUTTON	
1. Press Up/Down to select the temperature, RH and ventilation rate modes.						
2. When you press the Up button, the LCD display sequence is Temp °C -> Temp °F -> Vent Rate lps -> Vent Rate cfm/p. When you press the Down button, the LCD display sequence is reversed.						

NOTE: Temp °C refers to temperature in Celsius; Temp °F refers to temperature in Fahrenheit. Vent Rate lps refers to Liter Per Second; Vent Rate cfm/p refers to cubic feet per minute.

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USING THE MUTE FUNCTION



1. Press **Mode**. The speaker icon flashes simultaneously.
2. Press **Enter**, then press **Up** or **Down** to select on or off.
3. Press **Enter** again to save the data.

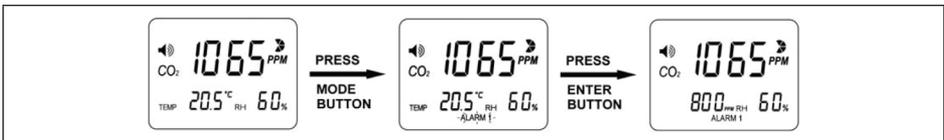
NOTE: The default (factory) setting for the alarm is off. Set the alarm on/off under MUTE function as described above.

USING THE ALTI MODE:



1. Press **Mode**. The ALTI icon will flash.
2. Press **Enter**. ALTI will show on the display. Press the **Mode** button to choose between m (meters) and ft (feet).
3. Adjust altitude to match your location (step=100m/500ft) using the **Up** and **Down** buttons.
4. Press **Enter** again to save the data.

SETTING THE ALARM 1 LEVEL



1. Press **Mode**. The ALARM 1 icon will flash.
2. Press **Enter**. Use **Up/Down** to set the parameter. The default ALARM 1 is 800 ppm.
3. Press **Enter** again to save the data.

NOTE: When CO₂ Alarm level is $\geq 1,000$ ppm, the interval is ± 100 ppm, and when the CO₂ Alarm level is $< 1,000$ ppm, the interval is ± 50 ppm. After setting a new alarm level parameter, the green LED will light when CO₂ concentration is below the Alarm 1 level.

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SETTING THE ALARM 2 LEVEL

	PRESS MODE BUTTON		PRESS ENTER BUTTON	
1. Press Mode . The ALARM 2 icon will flash.				
2. Press Enter . Use Up/Down to set the parameter. The default ALARM 2 is 1200 ppm.				
3. Press Enter again to save the data.				

NOTE: As with Alarm 2, when CO₂ Alarm level is $\geq 1,000$ ppm, the interval is ± 100 ppm, when the CO₂ Alarm level is $< 1,000$ ppm, the interval is ± 50 ppm. After setting a new alarm level parameter, the green LED will light when CO₂ concentration is below the Alarm 1 level. The red LED will light when CO₂ concentration exceeds the Alarm 2 level, the yellow LED will light when CO₂ concentration is between the Alarm 1 level and the Alarm 2 level.

USING THE OUTSIDE MODE:

	PRESS MODE BUTTON		PRESS ENTER BUTTON	
1. Press Mode . The OUTSIDE icon will flash.				
2. Press Enter . OUTSIDE, CO2 and ppm will flash. Press Up/Down to adjust the data.				
3. Press Enter to save the setting. After the modification, the VENT Rate will change.				

NOTE: Ventilation rate represents how much air is introduced into the indoor space from outside. Low numbers indicate low ventilation rates and potentially poor air quality. High levels indicate excessive ventilation and potential excessive energy usage. To obtain an accurate measurement, readings should be taken 2–3 hours after occupancy has stabilized in a space or at a peak in daily CO₂ concentrations. For indoor air quality control, CO₂ value is an indicator of ventilation rate. 400 ppm (parts per million) is the default outdoor CO₂ concentration according to ASHRAE: American Society of Heating, Refrigeration and Air conditioning Engineers.

USING THE CALI (CALIBRATION) MODE:

	PRESS MODE BUTTON		PRESS ENTER BUTTON	
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1. Expose the unit to fresh air by bringing it outdoors. Avoid direct contact with automobile exhaust, furnace exhaust, etc. DO NOT BREATHE ON THE UNIT DURING THE CALIBRATION PROCESS. Connect the power supply.
2. Move away from the unit to allow the reading to stabilize for approximately 20 minutes.
3. Press **Mode**, and the CALI icon will flash.
4. Press **Enter**. The screen will show the CALI icon without flashing.
5. Press **Mode** for more than 10 seconds. CALIBRATING flashes. Calibration will be done automatically after about 3 minutes and the LCD will display PASS or FAIL. If it shows FAIL, please try again.
6. After calibration is complete, disconnect the power supply for a few seconds.

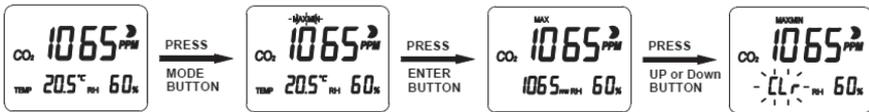
USING THE LOG MODE:



1. Press **Mode**. LOG icon flashes.
2. Press **Enter**. CO₂ reading and Temperature will show on the LCD.
3. Press **Up/Down** to page up/down in the log of readings.

NOTE: With the built-in data logger, the APCEM can provide the logged CO₂, temperature and RH readings from the past 24 hours. The log interval is 30 minutes per data. When the APCEM is connected with power and used for the first time, if the working time is more than 30 minutes, the APCEM will have CO₂, RH and temperature readings in the data logger. If the working time is less than 30 minutes, the LCD will display "NULL" while using the LOG function.

USING THE MAX MIN MODE:

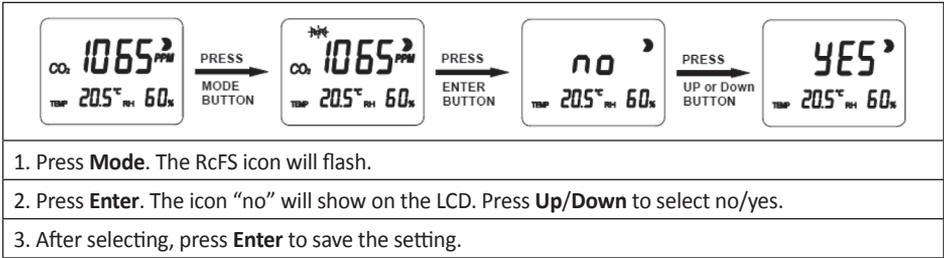


1. Press **Mode**. The MAX MIN icon will flash.
2. Press **Enter**. The MAX and MIN CO₂ readings will flash alternately.
3. Press **Down** and "Clr" will flash on the LCD. Press **Enter** to CLEAR the MAX and MIN record.

NOTE: With the Built-in MAX MIN mode, the APCEM can provide the maximum and minimum CO₂ readings since the device has last been turned on. If users press **Up/Down** to clear the MAX and MIN CO₂ reading record, the APCEM will provide the new MAX and MIN CO₂ reading from that time.

TROUBLESHOOTING & SPECS

USING THE RCFS MODE:



1. Press **Mode**. The RcFs icon will flash.
2. Press **Enter**. The icon “no” will show on the LCD. Press **Up/Down** to select no/yes.
3. After selecting, press **Enter** to save the setting.

NOTE: If through an error incorrect data is set or the APCEM is calibrated incorrectly, use RcFS (Recover the Factory Setting) to reset to the default factory settings.

SPECIFICATIONS

CO₂ SPECIFICATION

Measurement Range	0–3,000 ppm display		
Display Resolution	1 ppm at 0–1,000 ppm; 5 ppm at 1,001–2,000 ppm; 10 ppm at 2,001–3,000ppm		
Accuracy	0–2,000ppm: ±70 ppm or ±5% of reading, whichever is greater; over 2000 ppm: +/-7%		
Temperature Dependence	Typ. ±0.2% of reading per °C or ±2 ppm per °C, whichever is greater, referenced to 25°C		
Pressure Dependence	0.13% of reading per mm Hg (corrected via user input for altitude)		
Repeatability	±20 ppm @ 400 ppm	Response Time	About 2 min for 63% of step change
Warm-Up Time	<60 seconds at 22°C	Zone LED Display	Red: <300 ppm; Yellow 300–1300 ppm; Green: >1300 ppm

TEMPERATURE SPECIFICATION

Temperature Range	0°C to 50°C (32°F to 122°F) display	Display Resolution	0.1°C (0.1°F)
Display Options	°C/°F	Response Time	20-30 minutes (case must equalize with environment)
Accuracy	±1°C (±2°F) When a fan blows on the device directly, the accuracy of temperature is ±1.5°C		

RH SPECIFICATION

Measurement Range	20%-90% RH	Operating Conditions	
Display Resolution	1% RH	Operating Temperature	0°C to 50°C (32°F to 122°F)
Accuracy	±5% RH@23°C	Humidity Range	0–95% RH non-condensing
Response Time	<5 min for 63% of step change	Storage Conditions	
		Storage Temperature	-20°C to 60°C (-4°F to 140°F)

POWER SUPPLY

Power Supply	100–240 VAC 50/60 Hz 6 VDC from external AC/DC adapter which is included in package (use specified AC adapter only)
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FAULT CODES & TROUBLESHOOTING GUIDE

FAULT ICON	DESCRIPTION OF THE FAULT	SUGGESTED ACTIONS
「Err3」	The ambient temperature has exceeded the operating temperature range of 0°C to 50°C (32°F to 122°F)	This error will clear when the temperature returns to the range between 0°C to 50°C (32°F to 122°F).
「Err5」 「Err6」	EEPROM System problem	Please reconnect AC adapter to the APCEM CO ₂ Monitor. If the “Err5, Err6” still appears, please contact the Service Department for further assistance.

WARRANTY



LIMITED WARRANTY

Hydrofarm warrants the **APCEM** to be free from defects in materials and workmanship. The warranty term is for one year beginning on the date of purchase. Misuse, abuse, or failure to follow instructions is not covered under this warranty. Hydrofarm will, at our discretion, repair or replace the **APCEM** covered under this warranty if it is returned to the original place of purchase. To request warranty service, please return the **APCEM**, with original sales receipt and original packaging, to your place of purchase. The purchase date is based on your original sales receipt.

GARANTÍA LIMITADA

Hydrofarm garantiza que **APCEM** no presenta defectos en los materiales ni la fabricación. La vigencia de la garantía es un año que comienza en la fecha de compra. Esta garantía no cubre el uso erróneo, el abuso o el incumplimiento de las instrucciones. Hydrofarm, según su criterio, reparará o sustituirá **APCEM** incluido en esta garantía si se devuelve al centro original de compra. Para solicitar el servicio de garantía, devuelva **APCEM**, con el tique de compra y el embalaje originales, a su centro de compra. La fecha de compra se basa en su tique de compra original.

GARANTIE LIMITÉE

Hydrofarm garantit que **APCEM** ne présente pas de défauts de matériel ni de fabrication. La garantie est en vigueur un an à partir de la date d'achat. Cette garantie ne couvre pas l'utilisation incorrecte, l'abus ou le non respect de la notice. Hydrofarm, selon ses critères, réparera ou remplacera **APCEM** couvert par cette garantie s'il est renvoyé au centre original d'achat. Pour demander le service de garantie, renvoyer **APCEM**, avec le ticket d'achat et l'emballage originaux, au centre d'achat. La date d'achat est indiquée sur le ticket d'achat original.

BEGRENZTE GARANTIE

Hydrofarm gewährleistet, dass **APCEM** ohne Material- und Herstellungsmängel geliefert wird. Die Garantiedauer beträgt ein Jahr und beginnt zum Kaufdatum zu laufen. Schäden, die aufgrund eines unsachgemäßen Gebrauchs oder der Nichteinhaltung der Anleitungen entstehen, sind von der Garantie nicht gedeckt. Hydrofarm wird den unter Garantie stehenden **APCEM** nach eigenem Ermessen entweder reparieren oder ersetzen, sofern die Rückgabe an der Verkaufsstelle, an der erworben wurde, erfolgt. Für die Beantragung der Garantieleistungen ist der **APCEM** mit der Quittung und in der Originalverpackung an der Verkaufsstelle zurückzugeben. Als Kaufdatum gilt jenes Datum, das dem Kaufticket im Original zu entnehmen ist.