autopilot®

Environmental Controllers

CO$_2$ MONITOR (w/Memory & Data Storage)

HF 77
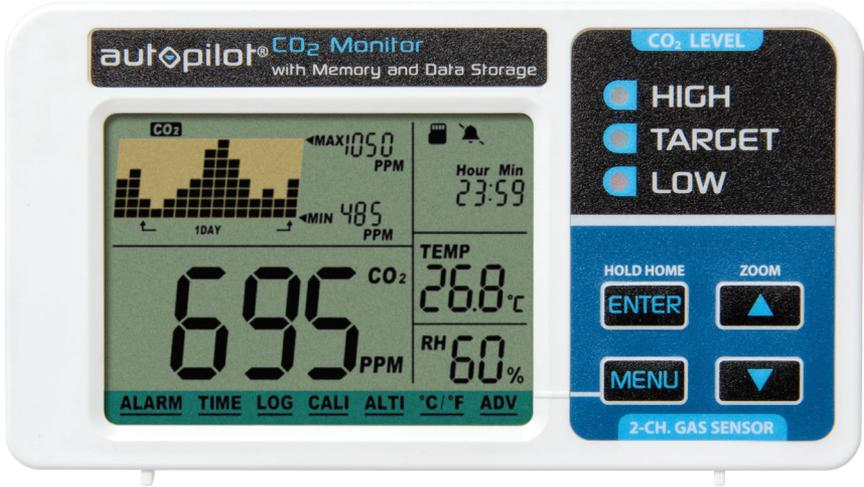
APCEMDL

AutopilotControllers.com

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OVERVIEW

Thank you for purchasing the Autopilot *APCEMDL* Desktop CO_2 Monitor with Memory and Data Storage. Developed to detect the presence of CO_2 in ambient air, this device is smart, compact and easy to use. In addition to measuring the CO_2 concentration, the APCEMDL also measures the room's ambient temperature and relative humidity. Its high quality LCD display is easy to read, and it features independent CO_2, RH and temperature readings. In addition, it automatically records logged data to an included microSD card and comes equipped with a built-in microSD card port. The card is removable and easily exported to a computer into an Excel file format. The on-screen display chart will allow 17 sets of data to be recorded and viewed before the first set of data is recorded over. Using the Autopilot Desktop CO2 Monitor with Memory and Data Storage can greatly improve your understanding of your grow room's atmospheric conditions 24/7/365. For information on additional Autopilot products please visit AutopilotControllers.com.

TOOLS NEEDED - (FOR OPTIONAL MOUNTING)

Phillips
Screwdriver

PARTS LIST

A - Power cord
B - USB Power Adapter
C - 1GB Micro SD card
D - CO_2 Monitor

Holes for Screws
(screws not included)

Hole for Rope Strap
(strap not included)

Calibration Hole
(for factory only)

2.0"/50.8 mm

Micro USB
Power Socket
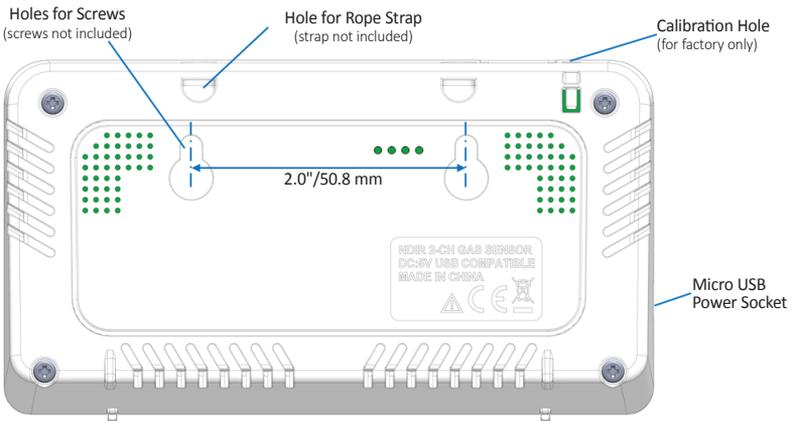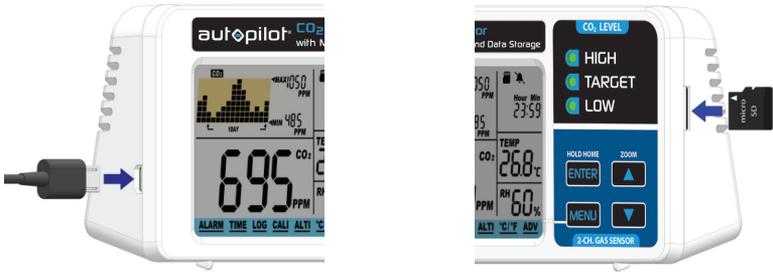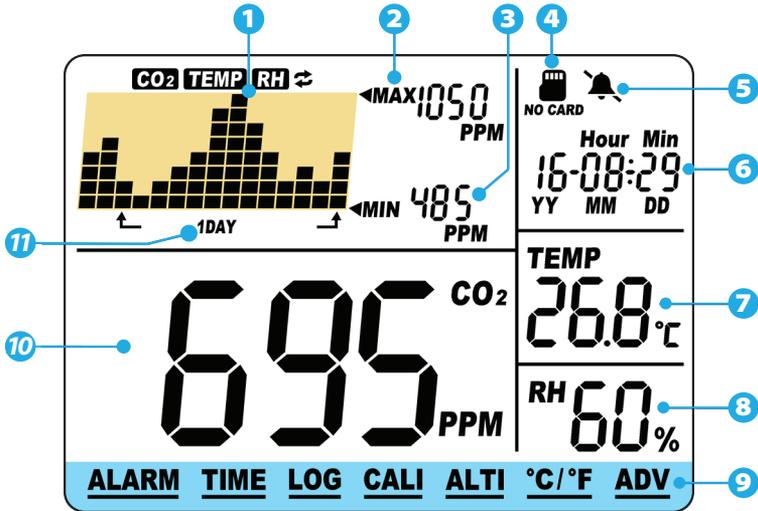
1. CO_2/TEMP/RH Chart
2. Max Reading of Chart
3. Min Reading of Chart
4. MicroSD Card
5. Audible Alarm On/Off
6. Date and Time
7. Temperature Reading
8. RH Reading
9. Main Menu
10. CO_2 Reading
11. Zoom Level of time (indicates the chart's span of time)

DISCLAIMERS

USB connection is for power supply only; it will not transfer data to/from a computer. Unplugging the device may result in loss of the most recently logged data on the chart.

This device is not intended for workplace hazard CO_2 monitoring, nor is it intended as a definitive monitor for human or animal health institutions, life sustenance, or in any medically-related situation.

Neither Hydrofarm nor the manufacturer assume any responsibility for any damage or loss suffered by the user or any third party arising through the use of this product or its malfunction.

Hydrofarm reserves the right to change the specifications without notice.

NOTE: When connecting unit to a battery pack, the recommended battery capacity is: larger or equal to 4000 mAh (3000 mAh still works, with reduced battery life).

INITIAL SETUP

When first unboxing, plug the included Micro USB cable (or one of your own) into the unit and the other end into almost any cell phone charger or USB power source. If successfully connected, three things will happen while booting up:

• 3 LEDs flash one by one

• Chart display shows the current software version & "Warm Up"

• Main display shows a countdown from 10

Once the countdown is complete, your product is ready to use. No initial setup or calibration is needed.

SD CARD FOR LOGGER

The unit automatically records data from the unit to the included microSD card. It logs date, time, CO_2, temperature, and relative humidity (RH) data. You can export and view the logged data by using an SD card reader. The unit creates a ".csv" file which is an Excel format file (spreadsheet) that is easily viewed via Excel on the computer that the SD card reader is connected to. In Excel, the data should appear as it does in the graphic below:

	A	B	C	D	E	F
1	Position	M_D_YYYY	TIME[HH:mn	CO2[ppm]	Temp[F]	RH[%]
2	1	2/2/17	15:22:03	1790	72.3	52.4
3	2	2/2/17	15:22:08	1790	72.3	52.2
4	3	2/2/17	15:22:13	1790	72.4	52
5	4	2/2/17	15:22:18	1785	72.4	52

To export and view the data, remove the microSD card by gently pressing it inward with your thumbnail or the point of a pen. This will cause it to eject. Place it into an SD card reader (one that accepts microSD cards) which is connected to a computer. You will see a folder containing .csv files. When opened in Excel, they will look like the above example.

The APCEMDL records data to the log (.csv file) every 5 seconds. Each .csv file compiles a maximum of 30,000 sets of data. If the maximum limit of 30,000 sets is reached, the unit will simply create another new .csv file (spreadsheet). In a full year of constant operation and data-logging, the SD card will contain 210 spreadsheets (over 6 million entries total).

NOTE: Be aware that there may be a significant delay while the Excel file is being populated with the APCEMDL data. It may appear that no data is loading or that something is wrong, but please be patient.

MAIN MENU FUNCTIONS

The Main Menu (9) functions can be toggled through by using the **MENU** button. If the main menu is not brought up, the green bar will remain blank, leaving the **UP/DOWN** buttons to toggle between parameters and zoom levels, respectively.

Pressing **MENU** once will bring up the main menu, with a flashing bar indicating the current choice.

<div align="center">

ALARM   TIME   LOG   CALI   ALTI   °C/°F   ADV

</div>

HOLD HOME

Hold ENTER for 3 seconds to reset the unit back to Home Setting which has a default target zone of 800-1200 PPM. The Target Zone is the only setting that will be reverted back to Home Setting. All other settings will not be reset. If the unit is unplugged it will keep the plant setting previously selected before power was removed.

The table below shows what main menu selection is made by pressing **MENU** multiple times as well as their functions. Note that the device will display "Done," followed by the confirmed selection if selected correctly.

NOTE: The CO_2 sensor comes pre-calibrated. Calibration is not needed for first 2 years of use.

The trend chart displays the past readings for CO_2, temperature and RH parameters. These readings can be toggled by using the **DOWN** key: CO_2, TEMP, RH. See below:

auto cycle
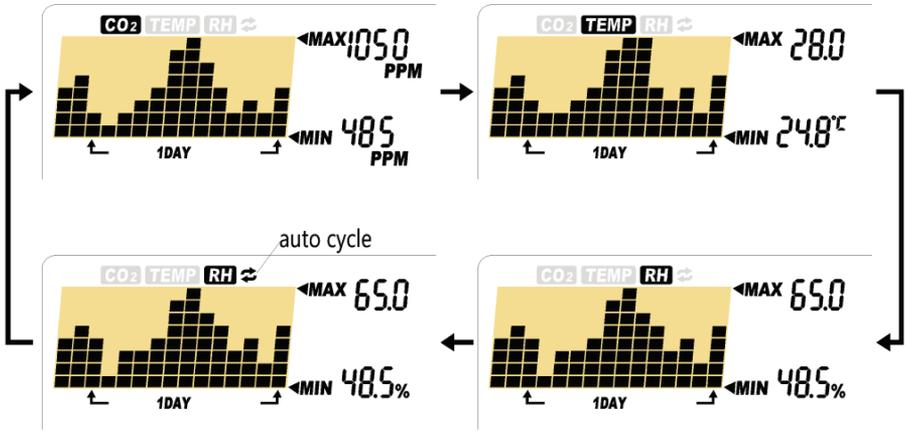
TREND CHART ZOOM

Below is a table that shows the available zoom levels for all parameters, as well as the duration of each division for corresponding zoom levels:

Using **UP** will toggle the available zoom levels for each parameter. Note the Time Per Division in addition to the Zoom Level.

ZOOM LEVEL (Time Span) (11)	TIME PER DIVISION
1 MIN (minute)	5 sec /div
1 HR (hour)	5 m/div
1 DAY (day)	2 h/div
1 WEEK (week)	0.5 d/div

MAX/MIN

At the top right corner of the display, there are two numerical indicators: MAX and MIN. As the zoom level is changed, the MAX and MIN values will reflect the maximum and minimum values on the chart of the selected CO_2 parameter. At startup, the unit will automatically display values for CO_2.

CLOCK

The clock display is at the top right corner of LCD screen. You can adjust the date and time by selecting **TIME** mode. We recommend that you set the date and time to your local settings immediately upon setting up the unit if exporting of logged data is going to be necessary.

MAIN MENU FUNCTIONS CHART

FUNCTION	DIRECTIONS
ALARM	By default, the audible alarm for CO_2 levels exceeding set level, is set to OFF. Once **ALARM** is selected (by pressing **ENTER**), use either **UP** or **DOWN** to toggle the selection from **ON** to **OFF** or vice versa. Press **ENTER** one more time to confirm. A regular bell icon will be displayed if alarm is on; a silenced bell icon will appear on the screen if the alarm is set to off.
TIME	This function allows the user to adjust the real time. Once **TIME** is selected, use **UP** and **DOWN** to adjust the current date and time. Press **ENTER** to confirm.
LOG	This feature allows the user to see historical data recorded in the log at any point that is displayable on the chart. First make sure the desired Zoom Level is selected before enabling this function. Once **LOG** is enabled, use **UP** and **DOWN** to toggle between the time divisions to see all parameters' measurements for each division. Press **ENTER** once more to exit this mode.
CALI	Use this function to calibrate your device with outside atmospheric CO_2 levels (usually around 400 ppm). Select this mode, hold **ENTER** for 3 seconds until a beep is heard, and the chart will read "Calibrating". Then place the device outdoors for 20 minutes. To escape, press **MENU**. Make sure the device is far from a source of CO_2, not in direct sunlight, and not exposed to water. Do not stand near the device during calibration mode.
ALTI	This feature provides an altitude correction to the CO_2 level for increased accuracy. Select this feature, then use **UP** and **DOWN** to input the current altitude in meters. Press **ENTER** once altitude is correct.
ºC/ºF	Use this feature to toggle between Celsius and Fahrenheit for the temperature display. First use **UP** and **DOWN**, then **ENTER** when the desired one is selected.
ADV	This function toggles between three things when selected: 1. Changing the alarm and lights to suit levels for Low Border; 2. Changing the alarm and lights to suit levels for Hi Border; and 3. Restore Factory setting. Restore Factory Setting will reset the device to factory settings and erase all stored data in the chart. To use any of these modes, hold **ENTER** for 3 seconds until an audible beep is heard.
(Return)	Exits the main menu. No options will be displayed on the green bar. A different audible beep will be heard in this option.

SPECIFICATIONS

Typical test conditions, unless otherwise specified: Ambient Temp =73+/-3°F, RH=50%-70%, Altitude=0-100 meters

MEASUREMENT	SPECIFICATION
Operating Temperature	32°F to 122°F (0°C to 50°C)
Storage Temperature	-4°F to 140°F (-20°C to 60°C)
Operating & Storage RH	0-95%, non-condensing
CO_2 Measurement	
Accuracy at 0-3000 ppm	±50 ppm or ±5% of reading, whichever is greater
Accuracy over 3000 ppm	±7%
Repeatability	20 ppm at 400 ppm (standard dev. of 10 readings in 1 minute)
Measurement Range	0-5000 ppm
Display Resolution	1 ppm (0-1000); 5 ppm (1000-2000); 10 ppm (>2000)
Temp Dependence	±0.1% of reading per °C or ±2 ppm per °C, whichever is greater, referenced to 25°C
Pressure Dependence	0.13% of reading per mmHg (corrected by user's altitude input)
Response Time	<2 min for 63% of step change or <4.6 min for 90% step change
Warm-up Time	<30 sec
Temperature Measurement	
Operating Temperature	32°F to 122°F (0°C -50°C)
Display Resolution	0.1°F (0.1°C)
Accuracy	±1°F (±0.5°C)
Response Time	<20 min (63%)
RH Measurement	
Range	5-95%
Accuracy	±5%
Resolution	1% on main reading, 0.1% on MAX/MIN reading
Power Requirements	160 mA peak, 15 mA average at 5.0V
Dimensions	Control Unit: 120 x 66 x 33 mm (4.7" x 2.6" x 1.3")
Weight	103 g (3.6 oz) (unit only; Micro USB cable not included in weight calculation)

WARRANTY

1 Year Warranty!

LIMITED WARRANTY

Hydrofarm warrants the **APCEMDL** to be free from defects in materials and workmanship. The warranty term is for 1 year beginning on the date of purchase. Misuse, abuse, or failure to follow instructions is not covered under this warranty. Hydrofarm's warranty liability extends only to the replacement cost of the product. Hydrofarm will not be liable for any consequential, indirect, or incidental damages of any kind, including lost revenues, lost profits, or other losses in connection with the product. Some states do not allow limitation on how long an implied warranty lasts or the exclusion of incidental or consequential damages, so the above limitations or exclusions may not apply to you. Hydrofarm will, at our discretion, repair or replace the **APCEMDL** covered under this warranty if it is returned to the original place of purchase. To request warranty service, please return the **APCEMDL**, with original sales receipt and original packaging, to your place of purchase. The purchase date is based on your original sales receipt.

Thank you for choosing Autopilot by Hydrofarm. For further information about Autopilot products, videos and technical information, please visit *AutopilotControllers.com*

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