



PPM-1c / Part Per Million CO₂ Monitor

The PPM-1c allows users to upgrade C.A.P.'s line of CO₂ & Environmental controllers to control CO₂ with PPM / "Part Per Million" accuracy. The PPM-1c is capable of measuring CO₂ PPM levels from 0-5000. On-board adjustable set point and calibration makes it easy to use.

- The PPM-1c is an extremely accurate Part-Per-Million (PPM) CO₂ sensor.
- It can measure CO₂ from 0-5000 PPM +/- 100PPM.
- It has an easy to read 4-digit LCD display.
- It has an external power supply and a Quick Disconnect or "QD", which is connected to a CO₂-2, CO₂-4 Environmental controller or the CGC-1 Complete Greenhouse Controller.
- Once the PPM-1c is connected to either the CO₂-2, CO₂-4 or the CGC-1, the controller will receive information from the PPM-1c and use it to control the CO₂ levels with extreme precision.
- The PPM-1c works in harmony with the Inject and Sample timers on the CO₂-2, CO₂-4 or the CGC-1.
- The PPM-1c also has a visual Status indicator, which verifies the unit has completed the "Initial warm-up" stage and is functioning properly.



INSTALLATION

- 1) The base-plate must be mounted to a wall using the (4) screws provided with the unit. Find a location near a 120-volt receptacle for power. The PPM-1c will need to have a fair amount of airflow around the enclosure and be at "plant-level" to be most accurate.
- 2) Once the base-plate is mounted the sensor can be snapped onto the base-plate by hooking the two top tabs and then pivoting the unit down until it snaps into place.
**Note: To release the tabs, press in on the two snap tabs located on the bottom of the unit near each edge.*
- 3) The PPM-1c comes pre-wired with a plug-in power supply. The power supply must be connected to a constant source of 120-vac power. Once powered up, the PPM-1c will enter a "Initial warm-up" and calibration mode. Slowly over a 10-20 minute period, the CO₂ level should stabilize between 250-550 PPM outdoors and as much as 1500 PPM indoors.

CONNECTING TO THE ENVIRONMENTAL CONTROLLER

The other cable coming from the PPM-1c is the Quick disconnect or "QD". The QD is a standard IEC cable which replaces the jumper plugged into the connector on the left side of the CO₂-2 / CO₂-4 and the bottom of the CGC-1. Once the PPM-1c is connected, the controller will automatically begin controlling CO₂ with Part-Per-Million accuracy.

MAKING ADJUSTMENTS

The PPM-1c has an adjustable setpoint from 0-5000 PPM. Once the desired setpoint is entered, the PPM-1c will disable the "CO₂ Level Low" function of the environmental controller effectively shutting OFF the CO₂ outlet. Adjusting the CO₂ setpoint and re-calibrating the unit is easy using the front mounted push buttons. There are four buttons.

- a) **clear**: used with the mode button to enter the programming mode.
- b) **mode**: used with the clear button to enter the programming mode and to scroll through the different modes.
- c) **up/down**: The arrow up / down button is used to change the program set points.
- d) **enter**: accept the changes and stores the settings.

To change the set point:

- 1) Press and hold the (**clear**) and (**mode**) buttons for 5 seconds.
- 2) Now press the (**mode**) button nine times to display the current set point. (**RELAY** is displayed)
- 3) Use the (**up**) and (**down**) arrow buttons to change the set point.
- 4) Press (**enter**) to accept the change.
- 5) Press (**clear**) to return the unit to RUN mode. (**CO₂ ___ PPM** is displayed)

CALIBRATION

The PPM-1c is factory calibrated. The sensor onboard the PPM-1c is capable of remaining in calibration for a minimum of three years. Extreme shock during shipping and other factors may affect the calibration. By bringing the unit outdoors, you can do a quick check of the calibration. The reading outdoors should be between 250-550 PPM. If the display does not read 250-550 PPM, a simple calibration can be performed.

To check for correct calibration:

- 1) Bring the unit outside so that it will receive fresh air. Do not locate the unit in direct sunlight.
- 2) Plug the power supply and power cord into 120vac.
- 3) Move away from the controller to allow the reading to stabilize for approximately 20 minutes.
- 4) Check the CO₂ level.
***Important: Do not breathe while checking the calibration the unit. As you exhale, large concentrations of CO₂ are expelled from your lungs. This higher level of CO₂ will affect the calibration of the unit.**
- 5) If the level is between (250-550PPM) the unit is performing fine. If it is outside that range, the unit can be re-calibrated.

To re-calibrate the unit:

- 1) Bring the unit outside so that it will receive fresh air. Re-connect the power supply.
- 2) Move away from the controller to allow the reading to stabilize for approximately 20 minutes.
- 3) Check the CO₂ level. It should read around 350-450. If not, proceed with the calibration
***Important: Do not breathe near the PPM-1c while checking the calibration the unit. As you exhale, large concentrations of CO₂ are expelled from your lungs. This higher level of CO₂ will affect the calibration of the unit.**
- 4) Press and hold the (clear) and (enter) buttons for 5 seconds.
- 5) (CAL AIR is displayed) * If CAL NITROGEN is displayed, press MODE one time to bring up CAL AIR.
- 6) Press (enter) to enter the calibration mode. (AIR-CAL and the current calibration point is displayed)
- 7) Use the arrow UP / DOWN buttons to enter the new point to be calibrated to. *Normally 400-430 PPM
- 8) Press (enter) to start the self-calibrating process. The green LED will flash as long as it is self-calibrating.
- 9) Move away from the unit. After approximately 5 minutes the green LED will stop flashing and the display will return to the normal run mode.

STATUS INDICATOR

The PPM-1c has a green LED indicator light on the front of the cover. If the LED is blinking, it indicates that the CO₂ sensor is warming up or that it is self-calibrating. When the LED is ON, it means that the CO₂ level is being measured.

PRECAUTIONS

- 1) DO NOT expose the PPM-1c to water. It utilizes a ventilated enclosure to properly "sample" the CO₂.
- 2) DO plug the PPM-1c into a source of CONSTANT 120-vac power.

WARRANTY

The PPM-1c is warranted against defects in workmanship for THREE years.

SPECIFICATIONS

Operating principle	Single-beam Non-Dispersive Infrared (NDIR)
Measurement range	0 – 5000 PPM CO ₂
Warm-up time	Minimum 20 minutes (full accuracy)
Maximum drift per year	+/- 15 PPM
Accuracy @ 77°F	+/- 50 PPM
Recommended calibration interval	Three years
Operating voltages	18-24volt @ 250ma
Operating temperature range	0-50° C
Operating humidity range	0-99% RH (non-condensing)
Operating life expectancy	15 years typical
Warranty	Three years, parts and labor through repair or exchange.

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