PPM-1c / Part Per Million CO_2 Monitor

The PPM-1c allows users to upgrade C.A.P.'s line of CO_2 & Environmental controllers to control CO_2 with PPM / "Part Per Million" accuracy. The PPM-1c is capable of measuring CO_2 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) CO_2 sensor.
- It can measure CO_2 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 CO_2-2, CO_2-4 Environmental controller or the CGC-1 Complete Greenhouse Controller.
- Once the PPM-1c is connected to either the CO_2-2, CO_2-4 or the CGC-1, the controller will receive information from the PPM-1c and use it to control the CO_2 levels with extreme precision.
- The PPM-1c works in harmony with the Inject and Sample timers on the CO_2-2 , CO_2-4 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: Before releasing tabs, remove small Phillips screw from bottom edge of the unit. 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 CO_2 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 CO_2-2 / CO_2-4 and the bottom of the CGC-1. Once the PPM-1c is connected, the controller will automatically begin controlling CO_2 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 "CO_2 Level Low" function of the environmental controller effectively shutting OFF the CO_2 outlet. Adjusting the CO_2 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. (***CO_2 ____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 CO_2 level.
   ***Important: Do not breathe while checking the calibration the unit. As you exhale, large concentrations of CO_2 are expelled from your lungs. This higher level of CO_2 will affect the calibration of the unit.**
5) If the level is between (250-550PM) 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 CO_2 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 CO_2 are expelled from your lungs. This higher level of CO_2 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 CO_2 sensor is warming up or that it is self-calibrating. When the LED is ON, it means that the CO_2 level is being measured.

PRECAUTIONS

1) DO NOT expose the PPM-1c to water. It utilizes a ventilated enclosure to properly "sample" the CO_2.
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.

Liability statement:

R & M Supply and their retailers and distributors are not responsible for any damage or injuries (consequential or otherwise) arising from the use of this device. The purchaser assumes all responsibility for the use and proper installation of this device.